From: Melinda Cotton [mailto:mbcotton@hotmail.com]
Sent: Tuesday, March 21, 2023 1:32 PM
To: Council District 3 <District3@longbeach.gov>; Rex Richardson <Rex.Richardson@longbeach.gov>; Council District 1 <District1@longbeach.gov>; Council District 2 <District2@longbeach.gov>; Council District 4 <District4@longbeach.gov>; Council District 5 <District5@longbeach.gov>; Council District 6 <District6@longbeach.gov>; Council District 7 <District7@longbeach.gov>; Council District 8 <District8@longbeach.gov>; Council District 9 <District9@longbeach.gov>; Tom Modica <Tom.Modica@longbeach.gov>; CityClerk <CityClerk@longbeach.gov>
Cc: Alyssa Bishop <alyssabishopyoga@gmail.com>; Anna Christensen <annachristensen259@gmail.com>; Charles Moore <cmoore@algalita.org>; Karen Harper <ksharper01@cs.com>; oururbanparadise@gmail.com; Rececca Robles <rebrobles1@gmail.com>; taheshakc259@gmail.com; Bickford <vbickf123@aol.com>; nicole.levin@sierraclub.org; morgan.goodwin@sierraclub.org; mgoldenkrasner@biologicaldiversity.org; Doug Carstens <dpc@cbcearthlaw.com>; sss@cbcearthlaw.com; bbradshaw@biologicaldiversity.org; Lena.Gonzalez@sen.ca.gov; Mejia, Abigail <Abigail.Mejia@sen.ca.gov>
Subject: Item 8 " Unit Annual Plan" on tonight's Council 3/21/23 Agenda Should be brought back at another Meeting with an adequate description of the subject matter.

-EXTERNAL-

I join the Sierra Club, the Center for Biodiversity, Algalita and the many concerned individuals below in asking that this item be pulled from the Consent Calendar for discussion tonight, as the Agenda failed to include a brief general description of each item of business to be transacted or discussed at the meeting .

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Thank you for your attention.

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From: anngadfly@aol.com <anngadfly@aol.com>
Sent: Tuesday, March 21, 2023 11:11 AM
To: district1@longbeach.gov <district1@longbeach.gov>; district2@longbeach.gov <district2@longbeach.gov>; district3@longbeach.gov <district3@longbeach.gov>;

district5@longbeach.gov <district5@longbeach.gov>; district6@longbeach.gov <district6@longbeach.gov>; district7@longbeach.gov <district7@longbeach.gov>; district8@longbeach.gov <district8@longbeach.gov>; district9@longbeach.gov <district9@longbeach.gov>; mayor@longbeach.gov <mayor@longbeach.gov>; cityclerk@longbeach.gov <cityclerk@longbeach.gov>; cityattorney@longbeach.gov <cityattorney@longbeach.gov>; citymanager@longbeach.gov <citymanager@longbeach.gov>
Cc: alyssabishopyoga@gmail.com <alyssabishopyoga@gmail.com>; annachristensen259@gmail.com <annachristensen259@gmail.com>; cmoore@algalita.org <cmoore@algalita.org>; ksharper01@cs.com <ksharper01@cs.com>; oururbanparadise@gmail.com <oururbanparadise@gmail.com>; rebrobles1@gmail.com <rebrobles1@gmail.com>; taheshakc259@gmail.com <taheshakc259@gmail.com>; vbickf123@aol.com <vbickf123@aol.com>; nicole.levin@sierraclub.org <nicole.levin@sierraclub.org>; morgan.goodwin@sierraclub.org <morgan.goodwin@sierraclub.org>; mgoldenkrasner@biologicaldiversity.org <mgoldenkrasner@biologicaldiversity.org>; dpc@cbcearthlaw.com <dpc@cbcearthlaw.com>; sss@cbcearthlaw.com <sss@cbcearthlaw.com>; bbradshaw@biologicaldiversity.org <bbradshaw@biologicaldiversity.org>
Subject: Comments on Item 8 3/21/23 Agenda

Los Cerritos Wetlands Task Force
Angeles Chapter, Sierra Club

To: Long Beach Mayor and Councilmembers
From: Sierra Club Los Cerritos Wetlands Task Force
Re: March 21, 2023 Agenda Item 8. 23-0238
Recommendation to approve and adopt the Long Beach Unit Annual Plan (July 1, 2023 to June 30, 2024) and Program Plan (July 1, 2023 to June 30, 2028). (Citywide)
Office or Department: ENERGY RESOURCES

Dear Decision Makers:

We ask that

If the Mayor and Council are unwilling follow Brown Act section 54954.2. (a) "(1) *At least 72 hours before a regular meeting, the legislative body of the local agency, or its designee, shall post an agenda containing a brief general description of each item of business to be transacted or discussed at the meeting* . . ." , **we respectfully ask that this item be pulled from the Consent Calendar for discussion tonight.**

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Cc: alyssabishopyoga@gmail.com <alyssabishopyoga@gmail.com>; annachristensen259@gmail.com <annachristensen259@gmail.com>; cmoore@algalita.org <cmoore@algalita.org>; ksharper01@cs.com <ksharper01@cs.com>; oururbanparadise@gmail.com <oururbanparadise@gmail.com>; rebrobles1@gmail.com <rebrobles1@gmail.com>; taheshakc259@gmail.com <taheshakc259@gmail.com>; vbickf123@aol.com <vbickf123@aol.com>; nicole.levin@sierraclub.org <nicole.levin@sierraclub.org>; morgan.goodwin@sierraclub.org <morgan.goodwin@sierraclub.org>; mgoldenkrasner@biologicaldiversity.org <mgoldenkrasner@biologicaldiversity.org>; dpc@cbcearthlaw.com <dpc@cbcearthlaw.com>; sss@cbcearthlaw.com <sss@cbcearthlaw.com>; bbradshaw@biologicaldiversity.org <bbradshaw@biologicaldiversity.org>
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Angeles Chapter, Sierra Club

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From: Ashley Craig [mailto:ashleycraig913@gmail.com]
Sent: Monday, March 20, 2023 12:46 PM
To: Rex Richardson <Rex.Richardson@longbeach.gov>; Mary Zendejas <Mary.Zendejas@longbeach.gov>; Cindy Allen <Cindy.Allen@longbeach.gov>; Suely Saro <Suely.Saro@longbeach.gov>; Al Austin <Al.Austin@longbeach.gov>; Daryl Supernaw <Daryl.Supernaw@longbeach.gov>; Megan@megankerr.com
Cc: CityClerk <CityClerk@longbeach.gov>; Paul Monge <Paul.Monge@longbeach.gov>; Forrestosburn@gmail.com; Connor Lock <Connor.Lock@longbeach.gov>
Subject: Pull item #8 and Phase out Drilling in 5 Years

-EXTERNAL-

Long Beach Decision-makers,

I am writing with serious concerns in regards to item number 8 on tomorrows agenda.

Instead of passing this report, City Council should direct Energy Resources to rewrite a plan in line with a 5-year phase out of oil drilling and 3200 feet health and safety setbacks immediately.

Ashley Craig
ashleycraig913@gmail.com

From: Ashley Craig [mailto:ashleycraig913@gmail.com]
Sent: Monday, March 20, 2023 12:46 PM
To: Rex Richardson <Rex.Richardson@longbeach.gov>; Mary Zendejas <Mary.Zendejas@longbeach.gov>; Cindy Allen <Cindy.Allen@longbeach.gov>; Suely Saro <Suely.Saro@longbeach.gov>; Al Austin <Al.Austin@longbeach.gov>; Daryl Supernaw <Daryl.Supernaw@longbeach.gov>; Megan@megankerr.com
Cc: CityClerk <CityClerk@longbeach.gov>; Paul Monge <Paul.Monge@longbeach.gov>; Forrestosburn@gmail.com; Connor Lock <Connor.Lock@longbeach.gov>
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Ashley Craig
ashleycraig913@gmail.com

STATE CAPITOL
P.O. BOX 942849
SACRAMENTO, CA 94249-0069
(916) 319-2069
FAX (916) 319-2169

Assembly
California Legislature

JOSH LOWENTHAL
ASSEMBLYMEMBER, SIXTY-NINTH DISTRICT

March 17, 2023

Mayor and City Council
Long Beach City Hall
411 West Ocean Blvd.
Long Beach, California 90802

RE: Council Agenda Item 8 - Long Beach Unit Annual Plan

Honorable Mayor and Members of the Long Beach City Council:

I write to express my concerns with agenda item 8, which seeks the adoption of the Long Beach Unit (LBU) Annual Plan (July 1, 2023, to June 30, 2024) and Program Plan (July 1, 2023, to June 30, 2028).

I strongly urge you to reconsider and reduce the rate and locations of oil and gas production as proposed in the LBU Annual plan. As Long Beach positions itself as a global leader in the fight against climate change and increased carbon emissions, its plans must reflect these values and part ways with its overreliance on oil production at the expense of our community's health.

The effects of environmental pollution on public health are linked and exacerbated in areas like Long Beach, where community members face a multitude of toxic emission sources from oil production, transportation corridors, and ports. Recognizing the disastrous health impacts on residents living near oil production wells, the California legislature passed Senate Bill (SB) 1137 (Chapter 1, Statutes of 2022), and on September 16, 2022, Governor Gavin Newsom signed the legislation into law. SB 1137 protects the public health of California's frontline communities by creating a minimum health protection zone of 3,200 feet between sensitive receptors, such as a residences, schools, childcare facilities, playgrounds, hospitals, or nursing homes, and new or reworked oil and gas production well. In addition, the bill establishes strict engineering controls to be implemented by existing operations within the health protection zone, including leak notification and safety protocols.

To protect residents and workers in homes, schools, childcare centers, and medical facilities from environmental health hazards of oil operations, the LBU Annual Plan should not include any development of wells within the 3200-foot health protection zone as defined in SB 1137. Currently, the LBU Annual Plan (Part III - page 11) states - "This plan is based upon 33 replacement wells planned from existing cellars." Questions that the Mayor and council should take into consideration:

- Will this proposed new drilling occur in health protection zones?
- How is the city contemplating health protection zones in their planning?
- How has the city engaged with the greater Long Beach community (affected residents, stakeholders and environmental partners)?

Furthermore, it runs afoul for the city to continue permitting or reworking oil wells, both for the poor health outcomes it poses for our community, but also for the greater unfunded liability responsibilities it poses for both the City and the State of California.

At its March 7th, 2023 meeting, the City council approved an agenda item requesting that the city manager find alternative revenue opportunities to offset projected reductions in oil revenues. This item relayed that “now is the time for the City of Long Beach to take its place as a global leader in curbing the effects of climate change and carbon-emissions by creating a sustainable climate economy. The City will need to part ways with the Long Beach of the past that rely heavily on the production of oil and fossil fuels at the expense of our community’s health.”

For these reasons, I strongly urge the City of Long Beach to continue its commitment to reducing its reliance on oil production and to work diligently with the greater environmental community on a 5-year plan that truly reflects the values and fiscal priorities of the City.

Sincerely,

JOSH LOWENTHAL
Assemblymember, 69th District

STATE CAPITOL
P.O. BOX 942849
SACRAMENTO, CA 94249-0069
(916) 319-2069
FAX (916) 319-2169

Assembly
California Legislature

JOSH LOWENTHAL
ASSEMBLYMEMBER, SIXTY-NINTH DISTRICT

March 17, 2023

Mayor and City Council
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411 West Ocean Blvd.
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Assemblymember, 69th District

From: Constance May [mailto:constm1@uci.edu]
Sent: Tuesday, March 21, 2023 1:58 PM
Cc: CityClerk <CityClerk@longbeach.gov>; Mary Zendejas <Mary.Zendejas@longbeach.gov>; Cindy Allen <Cindy.Allen@longbeach.gov>; Suely Saro <Suely.Saro@longbeach.gov>; Al Austin <Al.Austin@longbeach.gov>; Daryl Supernaw <Daryl.Supernaw@longbeach.gov>; Megan@megankerr.com; Paul Monge <Paul.Monge@longbeach.gov>; Forrestosburn@gmail.com; Connor Lock <Connor.Lock@longbeach.gov>
Subject: Pull item #8 and Phase out Drilling in 5 Years

-EXTERNAL-

Long Beach Decision-makers,

Line up our oil actions with the intent of SB 1137. Do not side with oil - Protect Sensitive zones like schools.

Thanks,
Constance May
Research Program Coordinator
Center for Ecosystem Climate Solutions (CECS)
Climate Energy and Water Solutions group (CLEWS)
University of California, Irvine

From: Constance May [mailto:constm1@uci.edu]
Sent: Tuesday, March 21, 2023 1:58 PM
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Research Program Coordinator
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University of California, Irvine

From: Kailee Caruso [mailto:kailee.caruso@gmail.com]
Sent: Tuesday, March 21, 2023 12:51 PM
Subject: NO DRILLING NEAR SCHOOLS Item #8

-EXTERNAL-

Long Beach Mayor, City Council and City Clerk,

Hope each of you are well. Tonight you will be giving a 5 year oil plan with the state. We need a ban on any wells that are within the 3,200 foot health and safety buffer. The buffer zone must stay in the plan. The city has continued to ignore years of climate experts saying we need a plan. For 6 years we have been calling for an end to the status quo. Orange County and LA City have all made moves in the right direction. In Long Beach we are even behind Texas on energy policy. We can no longer ignore the impacts climate concerns have on the livelihood of all our communities. Especially what the data tells us regarding the 17 year life expectancy gap depending on what zip code one lives in Long Beach. If we want true equity throughout our city we have to include proper environmental regulations to protect our children, families, seniors and residents. Data continues to tell us that communities of color are more impacted by this with a 9.4 times higher rate of hospitalization for asthma.

Thank you and take good care.

In Community,

Kailee Caruso

resident of D3, mother, community advocate, MPA

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Thank you and take good care.

In Community,

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resident of D3, mother, community advocate, MPA

From: Dori Chandler [mailto:drchan54@gmail.com]
Sent: Monday, March 20, 2023 11:04 AM
To: CityClerk <CityClerk@longbeach.gov>
Subject: Public Comment

-EXTERNAL-

Dear Office of the City Clerk,

I would like to ask that Agenda items 8 (and related 9/10),11, 12, 13, and 16 be removed from the consent calendar as they represent millions of investment in fossil fuels that cannot continue to be considered routine.

I include my comments on those items here:

#8, 23-0238 ER - Long Beach Unit Annual Plan (July 1, 2023 - June 30, 2024)
This invests 60 million in 35 more wells when we need from a climate and finance perspective to be removing wells. Long Beach needs to wean itself off of oil and not invest more in it.

#11, 23-0241 Ray Gaskin - Contract for Ford F-550 truck for Clean Team
By adding another fossil fuel vehicle to our fleet we are cleaning up trash while spewing pollution. One of the goals of this is to fit in smaller areas and a F-150 Lightning is available on the market. Please put this 159k into BEV, not fossil fuels.

#12, 23-0242 Purchase of two Volvo L120H Wheel Loader tractors
Volvo has converted L120H wheel loaders to electric in Europe and it's mentioned that they will respond to demand for more. Long Beach should ask for them to bring the L120H BEV to the USA. Also, the smaller L25 Electric is available today via SourceWell, but I'm not sure it's a fit for the same work.

We should not get more vehicles to keep the sand in place, while helping raise sea levels. If we can't get an electric version this year - let's wait on the purchase until we can.

#13, On 23-0243 Arizona Machinery - Purchase of two John Deere tractors
What kind of John Deere tractors are we purchasing as I found some price values ranging from 30k to 500k each and I didn't find any in the middle. Again we should evaluate electric options and wait for the electric options that all companies are working towards. Solectrac and Monarch, among others, are making BEV tractors today.

#16, On 23-0246 Purchase of a mobile command center

Custom vehicles like this are harder to source but there are still greener options. LDV does offer a Mobile Command Center with solar and battery storage although mainly powered by fossil fuels still. Farber Specialty mentions options to customize the all-electric Ford eTransit van or the MT50e walk-in van from Freightliner Custom Chassis.

I fully support item #15, 23-0245 Velocity Truck Center - Contract for two BEV Crane Carrier LNT-26 trucks and that should be approved without delay.

Sincerely,

Dori Chandler

From: Dori Chandler [mailto:drchan54@gmail.com]
Sent: Monday, March 20, 2023 11:04 AM
To: CityClerk <CityClerk@longbeach.gov>
Subject: Public Comment

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From: Friends of Bixby Park [mailto:friendsofbixbypark@gmail.com]
Sent: Tuesday, March 21, 2023 2:00 PM
To: Rex Richardson <Rex.Richardson@longbeach.gov>; +mary.zendejas@longbeach.gov; +cindy.allen@longbeach.gov; +suely.saro@longbeach.gov; +al.austin@longbeach.gov; +daryl.supernaw@longbeach.gov; +Megan@megankerr.com
Cc: CityClerk <CityClerk@longbeach.gov>; Paul Monge <Paul.Monge@longbeach.gov>; Forrestosburn@gmail.com; Connor Lock <Connor.Lock@longbeach.gov>
Subject: Pull item #8 and Phase out Drilling in 5 Years

-EXTERNAL-

Long Beach Decision-makers,

I am writing with serious concerns in regards to item number 8 on tomorrows agenda.

Instead of passing this report, City Council should direct Energy Resources to rewrite a plan in line with a 5-year phase out of oil drilling and 3200 feet health and safety setbacks immediately.

Ketty Citterio
CD2

From: Friends of Bixby Park [mailto:friendsofbixbypark@gmail.com]
Sent: Tuesday, March 21, 2023 2:00 PM
To: Rex Richardson <Rex.Richardson@longbeach.gov>; +mary.zendejas@longbeach.gov; +cindy.allen@longbeach.gov; +suely.saro@longbeach.gov; +al.austin@longbeach.gov; +daryl.supernaw@longbeach.gov; +Megan@megankerr.com
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Ketty Citterio
CD2

From: Sona Coffee [mailto:sonacoffee@gmail.com]
Sent: Tuesday, March 21, 2023 11:56 AM
To: Rex Richardson <Rex.Richardson@longbeach.gov>; +mary.zendejas@longbeach.gov; +cindy.allen@longbeach.gov; +suely.saro@longbeach.gov; +al.austin@longbeach.gov; +daryl.supernaw@longbeach.gov; +Megan@megankerr.com; Council District 9 <District9@longbeach.gov>; Kristina Duggan <Kristina.Duggan@longbeach.gov>
Cc: CityClerk <CityClerk@longbeach.gov>; +Paul.Monge@longbeach.gov; +connor.lock@longbeach.gov; Council District 3 <District3@longbeach.gov>
Subject: Pull item #8 and Phase out Drilling in 5 Years

-EXTERNAL-

Hello Mayor Richardson and Long Beach City Council,

I am writing with concerns on Item 8 regarding oil drilling.

Instead of approving this item, please consider directing the Energy Resources Department to prepare a plan with a 5-year phase out of oil drilling that adheres to a 3,200 foot health and safety setback.

At the last Council meeting this body took action to direct City staff to identify alternate resources to oil revenue, and cited the need for a phase out of oil drilling to address the climate crisis. Please reaffirm your commitment to climate action and protecting public welfare by rapidly developing and implementing a phase out plan.

On Monday, the IPCC issued its final warning to humanity to act now and avoid irrevocable harm.

Overwhelming scientific consensus has shown that without deep and rapid emissions reductions, global warming will exceed 1.5 degrees Celsius compared to preindustrial levels, resulting in catastrophic damage around the world. Every fraction of additional warming above 1.5 degrees will worsen these harms, threatening lives, livelihoods, the environment and global security for this and future generations.

Long Beach and others cannot continue business-as-usual and need to transition away from fossil fuels today. If the City Council provides the direction, the Departments can shift their focus to implementing the clean energy solutions that are already available while attracting investment to the city that will make Long Beach the leader in this effort. This type of investment will also lead to community benefit and improvements to public health, something that we won't see with continued oil drilling.

Thank you for your consideration. I am here to help in whatever information or support you may need.

www.wri.org/insights/2023-ipcc-ar6-synthesis-report-climate-change-findings

All my best,
Sona

Sona Kalapura Coffee, MPP
(she, her, hers)
Sustainable City Commissioner

City of Long Beach
linkedin.com/in/sona-coffee

From: Sona Coffee [mailto:sonacoffee@gmail.com]
Sent: Tuesday, March 21, 2023 11:56 AM
To: Rex Richardson <Rex.Richardson@longbeach.gov>; +mary.zendejas@longbeach.gov; +cindy.allen@longbeach.gov; +suely.saro@longbeach.gov; +al.austin@longbeach.gov; +daryl.supernaw@longbeach.gov; +Megan@megankerr.com; Council District 9 <District9@longbeach.gov>; Kristina Duggan <Kristina.Duggan@longbeach.gov>
Cc: CityClerk <CityClerk@longbeach.gov>; +Paul.Monge@longbeach.gov; +connor.lock@longbeach.gov; Council District 3 <District3@longbeach.gov>
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All my best,
Sona

Sona Kalapura Coffee, MPP
(she, her, hers)
Sustainable City Commissioner

City of Long Beach
linkedin.com/in/sona-coffee

From: Ashley Craig [mailto:ashleycraig913@gmail.com]
Sent: Monday, March 20, 2023 12:45 PM
To: CityClerk <CityClerk@longbeach.gov>
Cc: Connor Lock <Connor.Lock@longbeach.gov>
Subject: Agenda Number 8 on 3/21 Meeting Agenda

-EXTERNAL-

Dear LB City Council,

I was very disappointed to learn that the City Council is proposing a five year plan that includes continued oil drilling in all areas of LB, including within the buffer zones proposed in SB 1137. **The LBU Annual Plan should not include any development of wells that are within the 3200 foot health and safety buffer zone.**

The City Council must take decisive steps to move away from oil drilling and reduce reliance on the associated revenue as soon as possible. This action is going to create some funding challenges in the near term, but continuing to rely on revenue from oil drilling is irresponsible and inhumane. The IPCC report was just released this morning, stating that we are moving far too slowly to have a shot at keeping warming below the 1.5 degree target. However, the report also stated that all hope is not lost and that if we act now to reduce our reliance on fossil fuels, we may have a chance at avoiding irreversible harm.

Most of the new demand for oil and gas is going to produce plastics - the production of which is expected to double in the next few decades, unless we can come to our senses and stop using this toxic substance for our food, drink, and other consumer products. If we can cut back on plastics use, we will greatly reduce the demand for petroleum products.

The City Council must direct Energy Resources to rewrite a plan in line with a 5-year phase out of oil drilling and 3200 feet health and safety setbacks immediately.

Thank you for your consideration.

Best,
Ashley Craig

From: Ashley Craig [mailto:ashleycraig913@gmail.com]
Sent: Monday, March 20, 2023 12:45 PM
To: CityClerk <CityClerk@longbeach.gov>
Cc: Connor Lock <Connor.Lock@longbeach.gov>
Subject: Agenda Number 8 on 3/21 Meeting Agenda

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The City Council must direct Energy Resources to rewrite a plan in line with a 5-year phase out of oil drilling and 3200 feet health and safety setbacks immediately.

Thank you for your consideration.

Best,
Ashley Craig

From: Susanne Cumming [mailto:outlook_127E774F8553D780@outlook.com]
Sent: Tuesday, March 21, 2023 1:37 PM
To: Rex Richardson <Rex.Richardson@longbeach.gov>
Cc: CityClerk <CityClerk@longbeach.gov>
Subject: Pull item #8 and Phase out Drilling in 5 Years

-EXTERNAL-

Long Beach Decision-makers,

I am writing with serious concerns in regards to item number 8 on the agenda for 3-22-23.

Instead of passing this report, City Council should direct Energy Resources to rewrite a plan in line with a 5-year phase out of oil drilling and 3200 feet health and safety setbacks immediately.

The 5 Year Plan you are considering does not align with Long Beach's big talk about phasing out fossil fuels.
Long Beach residents need their health & safety protected by these buffers.

Sent from Mail for Windows

From: Susanne Cumming [mailto:outlook_127E774F8553D780@outlook.com]
Sent: Tuesday, March 21, 2023 1:37 PM
To: Rex Richardson <Rex.Richardson@longbeach.gov>
Cc: CityClerk <CityClerk@longbeach.gov>
Subject: Pull item #8 and Phase out Drilling in 5 Years

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Long Beach residents need their health & safety protected by these buffers.

Sent from Mail for Windows

From: Indira Galvez [mailto:indirag@sandiego.edu]
Sent: Tuesday, March 21, 2023 3:06 PM
To: CityClerk <CityClerk@longbeach.gov>
Subject: Agenda Item #8

-EXTERNAL-

Good Afternoon,

I am submitting a written comment for today's city council meeting in this email:

Long Beach City Council will vote today on March 21st to approve its “5 Year Program” for oil and gas development. Please vote NO on this highly destructive plan to our people's health and the planet. The plan also does virtually nothing to phase out oil and gas extraction which goes against Long Beach's message to phase out fossil fuels. Given how serious climate change is (the extreme weather and rain we have seen is already one sign of many), this plan should not even be considered. Please vote NO."

From: Indira Galvez [mailto:indirag@sandiego.edu]
Sent: Tuesday, March 21, 2023 3:06 PM
To: CityClerk <CityClerk@longbeach.gov>
Subject: Agenda Item #8

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From: Emily Jeffers [mailto:ejeffers@biologicaldiversity.org]
Sent: Tuesday, March 21, 2023 1:30 PM
To: CityClerk <CityClerk@longbeach.gov>
Cc: Brady Bradshaw <bbradshaw@biologicaldiversity.org>; Victoria Bogdan Tejeda <vbogdantejeda@biologicaldiversity.org>; Miyoko Sakashita <miyoko@biologicaldiversity.org>
Subject: RE: Center for Biological Diversity comments on Long Beach Unit Annual and Program Plans

-EXTERNAL-

We were alerted that the below link to our cited references may not work for non-Microsoft users. Please try this link -- Long Beach Unit Annual & Program Plans - References – and let me know if you are able to access and download the sources.

Best,
Emily Jeffers

From: Emily Jeffers
Sent: Tuesday, March 21, 2023 12:20 PM
To: cityclerk@longbeach.gov
Cc: Brady Bradshaw <BBradshaw@biologicaldiversity.org>; Victoria Bogdan Tejeda <vbogdantejeda@biologicaldiversity.org>; Miyoko Sakashita <miyoko@biologicaldiversity.org>
Subject: Center for Biological Diversity comments on Long Beach Unit Annual and Program Plans

Dear Clerk,

The Center for Biological Diversity submits the attached comments in response to the City of Long Beach's draft five-year Program Plan for the Long Beach Unit, covering years 2023-28, and the related one-year draft Annual Plan for the LBU, covering July 1, 2023-June 30, 2024.

All sources cited in the comment letter are included in this public folder: Long Beach Unit Annual & Program Plans - References

Please confirm you can access and will download these references.

We will also hand-deliver a USB flash drive containing all cited references at tonight's city council meeting.

Please let me know if you have any questions. You can reach me at (408) 348-6958.

Thank you,

Emily Jeffers
Center for Biological Diversity

From: Emily Jeffers [mailto:ejeffers@biologicaldiversity.org]
Sent: Tuesday, March 21, 2023 12:20 PM
To: CityClerk <CityClerk@longbeach.gov>
Cc: Brady Bradshaw <bbradshaw@biologicaldiversity.org>; Victoria Bogdan Tejeda <vbogdantejeda@biologicaldiversity.org>; Miyoko Sakashita <miyoko@biologicaldiversity.org>
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Emily Jeffers
Center for Biological Diversity

March 21, 2023

Submitted via email to cityclerk@longbeach.gov

References available at https://centerforbiologicald-my.sharepoint.com/:f:/g/personal/celkins_biologicaldiversity_org/EnKgnCor99lGuuLZ09VgLJEBe1qZCkB-L3ApueGIIPlwhQ?e=glc5NS

References also submitted via USB flash drive

Long Beach City Council
411 W. OCEAN BOULEVARD
Long Beach, CA 90802

Re: City Council Agenda Item: Recommendation to approve and adopt the Long Beach Unit Annual Plan (July 1, 2023 to June 30, 2024) and Program Plan (July 1, 2023 to June 30, 2028). (Citywide)

Dear Long Beach City Council:

The Center for Biological Diversity submits the following comments in response to the City of Long Beach's ("the City") draft five-year Program Plan for the Long Beach Unit ("LBU"), covering years 2023-28, and the related one-year draft Annual Plan for the LBU, covering July 1, 2023-June 30, 2024. The City posted both plans to its website for review by the public on Monday, March 13, 2023, and consideration by the City Council on March 21, 2023.

First, as a threshold matter, the City's plans must be subject to environmental review and public comment under the California Environmental Quality Act ("CEQA"). CEQA requires only that a discretionary activity *may* either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, for review to be triggered. As plans that propose over 100 drilling activities and open the door to other actions such as use of enhanced oil recovery, the plans meet this low-bar test. Long Beach oil and gas drilling, as we discuss below, impacts air quality, climate emissions, water quality, subsidence, species, environmental justice, energy use, and other areas of consequence. CEQA was intended to be interpreted in such a manner as to afford the fullest possible protection to the environment and the City must take action to comply by subjecting the plans to full review.

Second, we urge the City to adhere to its own plans to eliminate oil and gas by phasing down production. Inexplicably, the draft plans project over 26.2 million barrels of oil and over 12 billion cubic feet of natural gas production—an *increase* over the previous five-year Program

Plan's production numbers. This comes despite the City "know[ing] and support[ing] the position that oil production is not in [its] long-term future."[1]

Third, the City must end all oil and gas operations within 3200 feet of homes, schools, nursing homes, and hospitals, as established by Senate Bill 1137 (2022). Governor Newsom signed SB 1137 into law, and while its enactment is delayed because of a referendum, it is a vital public health protection that begins to address the environmental health disparities experienced by frontline communities. The City must not perpetuate the harms that the legislature already declared "disproportionately impact[s] Black, indigenous, and people of color in California."[2] Instead of pushing forward its plans that lead to continued harms and increased drilling, the City should create a plan for alternative sources of revenue, consistent with a five-year phaseout of oil drilling, that supports a just transition for impacted workers.

Finally, one week is an appallingly short amount of time for the public to review the proposed plans that will have consequences for years to come. In addition to pausing approvals for CEQA review, the City must provide the public with adequate time (at least 30 days) for review and public comment.

I. Because the plans are projects, CEQA review is required

The City of Long Beach is proposing in its five-year Program Plan for 2023-28 and associated Annual Plan to conduct oil and gas drilling activities in the LBU that are likely to cause adverse environmental impacts, as described in greater detail below. That neither the City nor any affiliated agencies have conducted CEQA review on the plans runs counter to law and deprives the public and other officials of information necessary to make informed decisions and formulate project alternatives and mitigations.[3]

CEQA directs state and local agencies to "take all action necessary to protect, rehabilitate, and enhance the environmental quality of the state" and to "[e]nsure that the long-term protection of the environment . . . shall be the guiding criterion in public decisions."[4] "CEQA was intended to be interpreted in such a manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language," and "[t]he purpose of CEQA is . . . to compel government at all levels to make decisions with environmental consequences in mind."[5] By "requir[ing] full environmental disclosure," the Act

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[1] City of Long Beach, Recommendation from the Sustainable City Commission (March 15, 2022) at 19, https://www.longbeach.gov/globalassets/city-manager/media-library/documents/memos-to-the-mayor-tabbed-file-list-folders/2022/march-15--2022---recommendation-from-the-sustainable-city-commission; *see also* City of Long Beach, Recommendation from the Sustainable City Commission & Reducing Reliance on City Revenue from Oil Production (Jan. 2022 and Oct. 2021) at 4, http://longbeach.legistar.com/View.ashx?M=F&ID=10423777&GUID=CE2373C6-1897-4A8F-9FE8-858224EC882E.
[2] SB 1137 (Gonzalez, 2022), approved and filed Sept. 16, 2022.
[3] Cal. Pub. Res. Code § 21002.
[4] *Id.* § 21001.
[5] Cal. Code Regs. tit. 14, § 15003 (hereinafter, "CEQA Guidelines").

ensures public awareness and participation in decisions with the potential for environmental consequences.[6]

The LBU plans are projects under CEQA and therefore warrant environmental review. CEQA applies to all "discretionary projects proposed to be carried out or approved by public agencies."[7] CEQA defines "project" as "the whole of an action" directly undertaken, supported or authorized by a public agency, "which *may cause* either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment."[8] The bar for what constitutes a direct or reasonably foreseeable indirect physical change in the environment is low. According to the California Supreme Court, the "likely *actual* impact of an activity is not at issue when determining its status as a project."[9] Instead, the threshold question is whether an activity, "by its general nature" may be "capable, at least in theory, of causing" direct or "reasonably foreseeable indirect" environmental changes.[10]

The LBU plans easily meet the test for what constitutes a "project" under CEQA. The draft Program Plan, covering years 2023-28, prescribes discretionary activities such as redrilling and possible new drilling, potential use of enhanced oil recovery, and other activities that could be capable of producing environmental impacts on air quality, water quality, noise, species, and more. The Annual Plan is not only "based upon 33 replacement wells" described in the Program Plan, but also pledges to undertake discretionary activities related to "facilities piping, tanks, and vessels" as well as to "plug[] wells to surface, in-zone, and conditional abandonments."[11] These are all activities that are capable of causing environmental changes and must be subject to environmental review. Further, just because the City is projecting to end its reliance on revenue from oil production by 2035,[12] that does not preclude the current plans (which extend to 2028) or future plans from triggering CEQA, given that the plans are capable of causing environmental impacts for many years to come.

Once CEQA review begins for the plans, it is likely that a full environmental impact report ("EIR") will be warranted because oil drilling activities may cause significant

[6] *Cmtys. for a Better Env't v. City of Richmond*, 108 Cal. Rptr. 3d 478, 491 (Cal. Ct. App. 2010).
[7] Cal. Pub. Res. Code § 21080(a). Note that just because "further governmental decisions need to be made before . . . actual environmental impacts can be determined" does not mean an activity is not a project triggering CEQA review. *Muzzy Ranch Co. v. Solano Cnty. Airport Land Use Com.*, 41 Cal. 4th 372, 383 (2007), *as modified* (Sept. 12, 2007); *see also Save Tara v. City of W. Hollywood*, 45 Cal. 4th 116, 194 P.3d 344 (2008), *as modified* (Dec. 10, 2008) ("CEQA review may not always be postponed until the last governmental step is taken, because postponing the environmental review may incentivize ignoring environmental concerns.").
[8] Cal. Pub. Res. Code. § 21065 (emphasis added); CEQA Guidelines § 15378.
[9] *Union of Med. Marijuana Patients, Inc. v. City of San Diego*, 7 Cal. 5th 1171, 1199 (2019) (emphasis in original).
[10] *Id.* at 1197.
[11] Annual Plan 2023-24 at 3-5.
[12] *See* City of Long Beach, Recommendation from the Sustainable City Commission & Reducing Reliance on City Revenue from Oil Production (Jan. 2022 and Oct. 2021), http://longbeach.legistar.com/View.ashx?M=F&ID=10423777&GUID=CE2373C6-1897-4A8F-9FE8-858224EC882E.

environmental effects.[13] That EIR must present "feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such" activities.[14]

The foundational components of CEQA—transparency, analysis and information sharing, alternatives and enforceable mitigation measures, public comments and agency responses[15]—are vitally important to environmental protection and civic participation. Notably, *all* such components are absent in the City's current process for Program and Annual Plans. The draft plans provide no impacts analysis, offer no alternatives, and prescribe no mitigations. Moreover, the City provided only one week between release of the draft plans and the hearing date before City Council—hardly enough time for the public, and particularly those in overburdened and frontline communities—to digest the plans and offer comment. As such, the City is running afoul of CEQA and undermining public participation.

II. Impacts of Plan Activities

The plans prescribe drilling and operations activities that will lead to the production of over 26.2 million barrels of oil and over 12 billion cubic feet of natural gas. These activities will cause a range of direct and indirect environmental impacts. The drilling will put communities and ecosystems at risk of oil spills and other accidents, degrade groundwater aquifers, and cause subsidence which can lead to flooding and increased seismicity. The plan activities will lead to harmful air pollution as well as approximately the same greenhouse gas emissions as two coal-fired powerplants. The activities also perpetuate environmental injustice since much of the operations are within the health and safety buffer researchers have identified as necessary to avoid frontline communities at risk. Because of these foreseeable impacts, and others, the City must conduct a robust CEQA review.

A. The Plans Risk Harmful Oil Spills and Other Accidents

Oil spills are an inevitable consequence of oil drilling and can occur during every phase of onshore and offshore drilling, from exploration to extraction to transportation and refinement. California has seen spill after spill during the decades oil companies have been drilling on land and in our ocean. In the last two years alone, Orange County has seen multiple oil spills discharge tens of thousands of gallons of oil into the ocean, from breaks in pipes connecting offshore drilling operations to shore. And in 2015, the Plains All American pipeline ruptured and spilled up to 142,000 gallons of oil on the Santa Barbara coastline. While there are inherent risks in any drilling, the infrastructure in waters off California is especially susceptible to causing another disaster due to its age and condition, including Long Beach's oil islands and pipelines. Long Beach must consider the risk and mitigate the risk oil spills pose to the local community, the coastal ecosystem, endangered wildlife, and the economy.

In addition to the risks inherent in drilling for oil, hazards from climate change, such as increased severity of storms and sea level rise, increase the risk of oil spills and other accidents

[13] Cal. Pub. Res. Code § 21080(d); *see also* CEQA Guidelines §§ 15063(b)(1), 15064.
[14] Cal. Pub. Res. Code § 21002.
[15] *See* Cal. Pub. Res. Code § 21002, 21003.1; *see generally* CEQA Guidelines § 15002.

from aging infrastructure. Their old age also increases the risk of spills. For example, according to scientists, aging poses risks of corrosion, erosion and fatigue stress to subsea pipelines.[16] Subsea pipeline corrosion appears to accelerate over time,[17] and can act synergistically with fatigue stress to increase the rate of crack propagation.[18] Marine environments are especially known to produce significant corrosion on steel surfaces, and when a steel structure is at or beyond its elastic limit, the rate of corrosion increases 10 to 15 percent.[19] One offshore pipeline study found that after 20 years the annual probability of pipeline failure increases rapidly, with values in the range of 0.1 to 1.0, which equates to a probability of failure of 10 to 100 percent per year.[20]

The U.S. Department of Transportation itself found that offshore pipelines can be more vulnerable than onshore pipelines. They have a greater vulnerability to severe weather conditions than onshore pipelines, especially during hurricane events. And massive wave action can alter the pipeline stability, causing gradual displacement, especially in small diameter pipelines.[21] Offshore pipelines can also face more corrosion than onshore pipelines due to higher temperature and pressure conditions that occur during the laying of these pipelines.[22]

Oil spills have a wide array of lethal and sublethal impacts on terrestrial and marine species, both immediate and long-term. For example, a growing body of evidence demonstrate that even brief exposures to crude oil and its components can have severe impacts on fish and invertebrate species. Schlenker et al. (2022) investigated the response of wild mahi-mahi (*Coryphaena hippurus*) to crude oil exposure and found:

> profound effects on survival and reproduction in the wild. In addition to significant changes in gene expression profiles and predation mortality, we documented altered acceleration and habitat use in the first 8 days oil-exposed individuals were at liberty as well as a cessation of apparent spawning activity for at least 37 days. These data reveal that even a brief and low-dose exposure to crude oil impairs fitness in wild mahi-mahi.[23]

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[16] Petroleum Safety Authority Norway, Material Risk – Ageing offshore installations (2006) ("PSA Norway").
[17] Mohd, M.H. and J.K. Paik, *Investigation of the corrosion progress characteristics offshore oil well tubes*, 67 Corrosion Science 130-141 (2013).
[18] PSA Norway 2006.
[19] Mohd and J.K. Paik, *Pitting corrosion in pipeline steel weld zones*, 53:12 Corros. Sci. 4026–4032 (2011); R.E. Melchers, et al., *Statistical characterization of surfaces of corroded steel plates*, 23 Mar. Struct. 274–287 (2010).
[20] Bea, R., C. Smith, et al., Real-time Reliability Assessment & Management of Marine Pipelines, ASME, 21st Int'l Conference on Offshore Mechanics & Arctic Engineering (2002), https://asmedigitalcollection.asme.org/OMAE/proceedings-abstract/OMAE2002/36142/133/294825.
[21] U.S. Dep't of Transportation: Federal Highway Administration. Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: The Gulf Coast Study, Phase 2 (2014).
[22] Keuter, J., In-line Inspection of Pipes Using Corrosion Resistant Alloys (CRA) (2014), Rosen Technology and Research Center GmbH, Rosen Group, Germany; Standard Oil Company (1981) Drilling fluid bypass for marine riser. U.S. Grant. US4291772 A.
[23] Schlenker, Lela S. et al., *Brief oil exposure reduces fitness in wild Gulf of Mexico mahi-mahi* (*Coryphaena hippurus*), 56 Envt'l Sci. & Tech. 13019, 13019 (2022). *See also* Ek-Huchim, Juan Pablo et al., *Red blood cell cytotoxicity associated to heavy metals and hydrocarbons exposure in flouder fish from two regions of the Gulf of Mexico*, 108 Bull. Envt'l Contamination & Toxicology 78 (2022); McDonald, Ashley M. et al., *Prior*

Recent research demonstrates that fish exposure to oil and gas from any given lease—exposure that contributes to the cumulative stresses experienced by individual animals—rises to the level of significance. For example, Pulster et al. (2021) found that 99 percent of red snapper (*Lutjanus campechanus*) sampled throughout the Gulf of Mexico between 2011–2017 showed signs of liver damage (*e.g.*, inflammation, neoplasms and other lesions, parasites) associated with exposure to PAHs.[24] And Lawson et al. (2021) found that deep-sea invertebrate species including sea anemones, sea cucumbers, and sea pens bioaccumulate PAHs.[25]

Oil pollution poses a well-known and significant threat to seabirds.[26] Seabirds are particularly vulnerable to offshore oil and gas development because of their frequent contact with the water's surface, their myriad foraging strategies, and the propensity of oil—even the thinnest sheen—to adhere to the birds' plumage.[27] Birds may be exposed to oil through acute events like spills, and chronically through routine discharges and leaks.[28] Chronic oil exposure is more challenging to measure, but can have pervasive lethal, sublethal, and cascading effects that

exposure to weathered oil influences foraging of an ecologically important saltmarsh resident fish, 10 PeerJ e12593 (2022).

[24] Pulster, Erin L. et al., *Hepatobiliary PAHs and prevalence of pathological changes in Red Snapper*, 230 Aquatic Toxicology 105714 (2021). Previous research has demonstrated that fish exposed to PAHs may experience reduced growth, endocrine disruption, reproductive harms, embryonic malformations, behavioral impairment, suppressed immune system function, skeletal and skin disorders, abnormal liver growths, cancer, and death. Peter Albers, Petroleum and Individual Polycyclic Aromatic Hydrocarbons, Ch. 14 *in* David J. Hoffman *et al.* (eds), Handbook of Ecotoxicology 352, 353 (2d ed. 2002); Tracy K. Collier et al., *Effects on fish of polycyclic aromatic hydrocarbons (PAHs) and naphthenic acid exposures*, 33 Organic Chemical Toxicology of Fishes 195, 197-98, 200-06, 211-22, 224-30 (2014); Ronald Eisler, Polycyclic aromatic hydrocarbon hazards to fish, wildlife, and invertebrates: a synoptic review, U.S. Fish & Wildlife Serv. Biological Report 85 (1.11) 32 (May 1987); Xavier Cousin & Jerome Cachot, *PAHs and fish—exposure monitoring and adverse effects—from molecular to individual level*, 21 Envtl. Sci. and Pollution Research 13685, 13688 (2014); Canadian Water Quality Guidelines for the Protection of Aquatic Life: Polycyclic Aromatic Hydrocarbons (PAHs) 5, 6, 8 (1999); Britton C. Goodale, Ph.D., Dissertation: Developmental toxicity of Polycyclic Aromatic Hydrocarbons: Defining Mechanisms with Systems-Based Transcriptional Profiling 8 (2013); Jerry F. Payne et al., Ecotoxicological Studies Focusing on Marine and Freshwater Fish, Ch. 11 *in* Peter E.T. Douben (ed.), PAHs: An Ecotoxicological Perspective 192, 201-06, 208-09 (2003). The harms of exposure may be passed down through the generations. Collier et al. at 222-24; Cousin & Cachot 16389; Payne et al. at 205-06.

[25] Lawson, M. Chase, et al. *PAH and PCB body-burdens in epibenthic deep-sea invertebrates from the northern Gulf of Mexico*, Marine Pollution Bulletin 162 (2021): 111825.

[26] Dias, M.P. et al., *Threats to seabirds: a global assessment*, 237 Biological Conservation 525 (2019).

[27] O'Hara, Patrick D. & Lora A. Morandin, *Effects of sheens associated with offshore oil and gas development on the feather microstructure of pelagic seabirds*, 60 Marine Pollution Bull. 672 (2010); Haney, J.C. et al., *Challenges to oil spill assessment for seabirds in the deep ocean*, 73 Arch. Environ. Contam. Toxicol. 33, 33 (2017).

[28] Jodice, P. G. R., et al., GoMAMN Strategic Bird Monitoring Guidelines: Seabirds, at 129-170 in R. R. Wilson, A. M. V. Fournier, J. S. Gleason, J. E. Lyons, and M. S. Woodrey (Eds.) (2019), Strategic Bird Monitoring Guidelines for the Northern Gulf of Mexico, Mississippi Agricultural and Forestry Experiment Station Research Bulletin 1228, Mississippi State University; Lamb, Juliet S., et al., *Seasonal variation in environmental and behavioural drivers of annual-cycle habitat selection in a nearshore seabird*, 26 Diversity & Distributions 254 (2020).

hinder species and ecosystem recovery.[29] Sublethal effects can occur even when oil is not visible.[30]

Marine mammals can be exposed to oil internally by inhaling volatile compounds at the surface, swallowing oil, consuming oil-contaminated prey, and externally by swimming in oil.[31] Exposure to toxic fumes from petroleum hydrocarbons during oil spills have been recently linked to mortality in cetaceans, even years after such accidents.[32] Studies have determined, for example, that the Deepwater Horizon oil spill caused adrenal and lung lesions in bottlenose dolphins which led to an unusual mortality event in which dolphins died over the course of several years.[33]

Oil spills can harm a wide variety of wildlife, which includes species protected under the Endangered Species Act ("ESA"). For example, ESA-listed sea otters are particularly vulnerable to contamination from oil spills. When sea otters come into contact with oil, it causes their fur to mat, which prevents the fur from insulating their bodies. Without this natural protection from the cold water temperature, sea otters can quickly die from hypothermia. The toxicity of oil can also be harmful to sea otters, causing liver and kidney failure and damage to their lungs and eyes.[34] ESA-listed western snowy plovers and the California least tern are extremely sensitive to disturbances such as oil spills, especially during the nesting season.[35]

ESA-listed fish also may be affected by the lease extensions. Tidewater goby is a small, endangered coastal fish that inhabits the coastal areas of California. Steelhead trout are an anadromous fish, and the southern California population is listed as endangered. They both have designated critical habitat in areas along the Southern California Coast.[36] Oil field pollution degrades tidewater goby habitat.[37] Fish are vulnerable to offshore oil and gas pollution and oil spills at all life stages.[38] For example, oil induced developmental abnormalities in laboratory

[29] Peterson, Charles H. et al., *Long-term ecosystem response to the Exxon Valdez oil spill*, 302 Sci. 2082 (2003).
[30] Fallon, J.A. et al., *Ultraviolet-assisted oiling assessment improves detection of oiled birds experiencing clinical signs of hemolytic anemia after exposure to the deepwater horizon oil spill*, 29 Ecotoxicology 1399 (2020).
[31] NOAA, Analysis of Hydrocarbons in Samples Provided from the Cruise of the R/V WEATHERBIRD II, (May 23-26, 2010).
[32] Venn-Watson et al., *Adrenal Gland and Lung Lesions in Gulf of Mexico Common Bottlenose Dolphins (Tursiops truncatus) Found Dead following the Deepwater Horizon Oil Spill*. PLoS ONE 10(5): e0126538 (2015), doi:10.1371/journal.pone.0126538.
[33] *Id.*
[34] U.S. Fish and Wildlife Service, Southern Sea Otter (*Enhydra lutris nereis*) 5-Year Review: Summary and Evaluation (Sept. 15, 2015).
[35] U.S. Fish and Wildlife Service, Recovery Plan for the Pacific Coast Popultion of the Western Snowy Plover at 73 (Sept. 13, 2007). Available at https://www.biologicaldiversity.org/species/birds/western_snowy_plover/pdfs/2007%20recovery%20plan.pdf.
[36] 70 Fed. Reg. 52488-52627 (2005); 78 Fed. Reg. 8746-8819 (2013).
[37] U.S. Fish and Wildlife Service, Recovery Plan for the Tidewater Goby (2005).
[38] Bernanke, J. & H.R. Kohler, *The impact of environmental chemicals on wildlife vertebrates*, 198 Rev. Envtl. Contamination & Toxicology 1 (2009).

zebrafish,[39] and salmonid embryos exposed to oil exhibited reduced growth and significantly lower survival.[40]

Oil and gas activity also creates noise, light, and other pollution that can harm ESA-listed species. For example, Senzaki et al. (2020) found "that anthropogenic noise and light can substantially affect breeding bird phenology and fitness."[41] Noise pollution created by offshore oil and gas activity can also harm marine mammals. In addition, the air, water, noise, light, and vibration pollution from injection activities onshore extends beyond the well pad and affects nearby habitat. Numerous studies have documented density effects whereby wildlife species decrease use of preferable habitat areas or avoid habitat areas altogether in areas with increasing densities of oil and gas development, leading to indirect habitat loss.[42]

Wetlands, and the sensitive vegetation and species they support, are also vulnerable to oil spills. When marsh plants come into contact with crude oil, it can cause nearly complete mortality.[63] Additionally, the oil can reside in the soil and cause long-term stress for marsh vegetation and erosion of marshlands.[43] Salt marsh bird's-beak, Ventura marsh milkvetch, and other threatened and endangered plants along the Southern California coast are at risk.

The coastal areas affected by oil spills in California include some of the more important cultural resources for Indigenous people. For example, the disastrous spills in 1969 and 2015 off Santa Barbara harmed Chumash sacred sites and animals.[44] The 2021 Platform Elly pipeline spill has harmed Acjachemen and Tongva homelands and cultural resources. A spill in Long Beach would harm important cultural resources. Under CEQA, agencies must, when feasible, avoid damaging tribal cultural resources, which include sites, features, places, cultural landscapes, sacred places, and objects with cultural value to California Native American tribes.[45] Several tribal entities of the Acjachemen and Tongva nations hold critical cultural information regarding the cultural sites affected by the continued development of oil infrastructure, continued extraction, and continued threat of oil spills that threaten to impact these cultural resources and sacred sites. Oil spill response efforts without consultation with these entities risk further impacting cultural resources, and the City should consult early and often on these impacts and oil spill response plans. The City has the responsibility to engage in early and meaningful

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[39] de Soysa, T. Yvanka et al., *Macondo crude oil from the Deepwater Horizon oil spill disrupts specific developmental processes during zebrafish embryogenesis*, 10 BMC Biology 40 (2012).
[40] Heintz, R.A. et al., *Delayed effects on growth and marine survival of pink salmon Oncorhynchus gorbuscha after exposure to crude oil during embryonic development*, 208 Marine Ecology Progress Series 205 (2000).
[41] Senzaki, Masayuki et al., *Sensory pollutants alter bird phenology and fitness across a continent*, 587 Nature 605 (2020).
[42] Beckmann, J.P. et al., *Human-mediated shifts in animal habitat use: Sequential changes in pronghorn use of a natural gas field in Greater Yellowstone*, Biological Conservation 147(1): 222-3 (2012); Dzialak M.R. et al., *Prioritizing conservation of ungulate calving resources in multiple-use landscapes*, PLOS One 6(1): e14597 (2011); Doherty, K.E. et al., *Greater sage-grouse winter habitat selection and energy development*, Journal of Wildlife Management 72: 187-195 (2008).
[43] NOAA, Oil Spills in Marshes (2013).
[44] Ben-Hur, Arielle, The Chumash Heritage National Marine Sanctuary: An Exploration of Changing the Discourse on Conservation, 105 Pitzer Senior Theses. 45-50 (2020).
[45] Cal. Pub. Res. Code § 21084.3.

consultation with tribes traditionally and culturally affiliated with the area (if such consultation is requested by the tribes).[46]

Oil spills also cause economic impacts, from closures of fisheries to lost revenue from tourism. Even before the 2021 oil spills in Orange County, an analysis found that since 1986, nearly 1400 oil and gas pipeline leaks, spills and other incidents in the California have caused at least $1.2 billion in damages, as well as 230 injuries and 53 deaths.[47] On average California has suffered 40 significant pipeline incidents a year, according to federal data.[48]

Other areas also experience significant costs as a result of oil spills. For example, tourism significantly declined after the 2010 BP Deepwater Horizon oil disaster in the Gulf of Mexico, even in neighboring states that were largely free of oil on their beaches.[49] Leisure visitor spending in Louisiana alone dropped by $247 million in 2010, with a total loss of $422 million over three years.[50] Even after shorelines are clean of oil, normal tourism activities may not resume if public perception of prolonged and wide-scale pollution remains.[51]

Both the Plains All American Oil Spill and the Platform Elly pipeline spill closed California fisheries and caused longer-term harm. The Deepwater Horizon disaster also has long lasting impacts on the region's fisheries. The long-term economic impact of the spill on commercial and recreational fisheries in the Gulf of Mexico is estimated at $8.7 billion.[52] California's economy similarly stands a lot to lose if an oil spill were to seriously impact the state's commercial fisheries. In 2017, approximately $210 million dollars in ex-vessel revenue (the amount paid directly to fishermen) came from commercial fishery landings, and more than 120,000 jobs on and off the water were supported by the state's seafood industry.[53]

B. Injection Wells Could Contaminate Drinking Water and Result in Earthquakes

The Plans will result in the injection of produced water containing chemicals used in oil production, and analysis must be done to ensure these injections do not contaminate drinking water in Long Beach or have other harmful impacts to human health and the environment including increased seismicity. Under CEQA, Long Beach must consider and mitigate direct and

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[46] *Id.* §§ 21080.3.1, 21080.3.2.
[47] Center for Biological Diversity, Analysis: Even Before Orange County Leak, California Pipeline Incidents Cased $1.2 Billion in Damages, available at https://biologicaldiversity.org/w/news/press-releases/analysis-even-before-orange-county-leak-california-pipeline-incidents-caused-12-billion-in-damages-2021-10-07/ (Oct. 2021).
[48] Pipeline and Hazardous Materials Safety Administration, Accident and Incident Data, available at https://www.phmsa.dot.gov/data-and-statistics/pipeline/distribution-transmission-gathering-lng-and-liquid-accident-and-incident-data
[49] Oceana, Oil Spills and Tourism: They Don't Mix (2015), https://coastalcarolinariverwatch.org/wp-content/uploads/2019/06/14Oil-Spills-Tourism-Dont-Mix-Oceana.pdf.
[50] The Impact of The BP Oil Spill on Visitor Spending in Louisiana: Revised estimates based on data through 2010 Q4 , Tourism Economics, prepared for the Louisiana Office of Tourism (June 2011).
[51] ITOPF 2014, Effects of Oil Pollution on Social and Economic Activities, https://www.itopf.org/fileadmin/uploads/itopf/data/Documents/TIPS_TAPS_new/TIP_12_Effects_of_Oil_Pollution_on_Social_and_Economic_Activities.pdf.
[52] Sumaila et al. 2012, *Impact of the Deepwater Horizon well blowout on the economics of US Gulf fisheries*, Canadian Journal of Fisheries and Aquatic Sciences, https://doi.org/10.1139/f2011-171.
[53] NOAA, Fisheries Economics of the United States (2017), https://media.fisheries.noaa.gov/2021-09/FEUS2017-final-v1.3.pdf

indirect impacts of allowing injection. Because injecting produced water is part of the process of producing oil and gas, all those impacts should be adequately disclosed, analyzed, and mitigated for the entire 5-year duration of this project.

CalGEM's independent scientific panel has recommended a 3,200 foot buffer between homes and all oil and gas activities, including injection, and Long Beach must ensure that it meets this minimum distance for all injection wells.[54] CalGEM has also questioned the validity of Long Beach's maximum allowable injection pressure, and in particular the current injection gradient.[55] If altered, this "would limit the Unit's ability to inject water and subsequently reduce produced volumes."[56] Long Beach must disclose the content of the discussions with CalGEM and why the agency believes the current injection pressures and gradients are insufficient to protect the environment, including human health.

1. *Risk of Aquifer Contamination*

The Plans make clear that new injection wells are anticipated in the coming years, but make no attempt to ensure they do not result in contamination of nearby aquifers. The Plans also suggest that injection wells will be drilled in more permeable layers, which could result in increased leaching into nearby aquifers.[57] (To support the "strategy to invest and minimize the decline of the LBU's oil production rate" . . . activities will include [d]rilling injection wells targeting increased throughout in the less mature sand layers"). At a very minimum, Long Beach must disclose what is in the water being injected, and the water quality of the aquifer being injected into. Because the risks of aquifer contamination are great, and because Long Beach relies upon local groundwater for 60% of its water use, the City must ensure injection wells do not risk the drinking water for any residents of Long Beach.[58]

As shown by a century-long hydrological record, California undergoes repeated cycles of drought and non-drought due to natural climate variability.[59] During drought periods—when precipitation and snow pack are at a minimum—the state is forced utilize its groundwater reserves to meet it agricultural and drinking water needs. With ever-progressing climate change, such demand will only increase as drought-favorable conditions become more prevalent.[60]

Studies show that anthropogenic warming contributed to the severity of the recent California drought. One study attributes as much as 27 percent of California 2012-14 drought

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[54] PSE Berkeley, Response to CalGEM Questions for the California Oil and Gas Public Health Rulemaking Scientific Advisory Panel (Oct. 1, 2021), https://www.conservation.ca.gov/calgem/Documents/public-health/Public%20Health%20Panel%20Responses_FINAL%20ADA.pdf.
[55] Program Plan at 13.
[56] *Id.*
[57] *Id.* at 27.
[58] Long Beach Water, Water Sources, available at https://lbwater.org/water-sources/ ("Roughly 60% of the Long Beach water supply is local groundwater).
[59] *See* Cheng, L. et al., *How has human-induced climate change affected California drought risk?*, 29 Journal of Climate 111 (2016); Diffenbaugh, N.S. et al., *Anthropogenic warming has increased drought risk in California*, 112 PNAS 3931 (2015); Williams, A.P., *Contribution to anthropogenic warming to California drought during 2012-2014*, 42 Geophys. Res. Lett. 6819 (2015).
[60] *Id.*

severity to anthropogenic warming, with natural variability accounting for the remainder.[61] As a result, drought severity was record-breaking in many counties.[62] This is because higher temperatures increase soil moisture loss, alter the timing of snowmelt, and decrease reservoir levels due to increased evaporation.[63]

In the future, municipalities may need to look not just to seawater, but to aquifers previously considered too salty to be usable, as a source of drinking water. The SDWA mandates protection of future drinking water sources as well as current sources. Given the potential for desalination and other treatment systems to render what was previously considered unusable water potable, the City must protect "freshwater" using a protective approach that more accurately reflects current technology in water treatment, and the necessity of preserving the future availability of sufficient fresh water during times of drought.

The fragile state of groundwater makes any potential impact of great and significant concern. All oil and gas wells, cyclic steam wells included, use a host of chemicals that are harmful to the environment and human health that would jeopardize groundwater. Recent studies have found numerous chemicals contained in fluid involved in routine oil production operations are harmful to human health.[64, 65] These include injection activities like waste disposal and enhanced oil recovery.[66] Disposal wells may receive wastewater that contains chemicals used to perform well maintenance or other chemical-dependent processes. Oil and gas wastewater and fluids injected for enhanced oil recovery may contain additional chemicals added in other phases of production or maintenance of a well.

Contaminating nearby aquifers would be an irreversible disaster. The State Water Resources Control Board explained to the state legislature recently that injection wells across the state have already contaminated scores of aquifers: "any injection [from injection wells] into the aquifers that are not exempt has contaminated those aquifers."[67] And once contaminants reach an aquifer, according to the Water Board, "you don't clean up aquifers, you contain the spread of

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[61] Williams, A.P., *Contribution to anthropogenic warming to California drought during 2012-2014*, 42 Geophys. Res. Lett. 6819 (2015).
[62] *Id.*
[63] Gleick, Peter, Circle of Blue, Clarifying the Discussion about California Drought and Climate Change (Mar. 7, 2014), *available at*: http://www.circleofblue.org/2014/in-the-circle/peter-gleick-clarifying-discussion-california-drought-climate-change/.
[64] Stringfellow WT, et al., *Comparison of chemical-use between hydraulic fracturing, acidizing, and routine oil and gas development*, 12 PLoS ONE(4): e0175344 (2017), https://doi.org/10.1371/journal.pone.0175344.
[65] *See* Shonkoff, S., "Hazard Assessment of Chemical Additives Used in Oil Fields that Reuse Produced Water for Agricultural Irrigation, Livestock Watering, and Groundwater Recharge in The San Joaquin Valley of California: Preliminary Results," PSE Health Energy Technical Report (Sept. 2016).
[66] *Id.*, citing Muggeridge, A, et al., *Recovery rates, enhanced oil recovery and technological limits*, Phil Trans R Soc A. 372:20120320 (2014), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3866386/.
[67] Transcript: Joint Oversight Hearing: Senate Natural Resource and Water and Environmental Quality Committees, "Ensuring Groundwater Protection: Is the Underground Injection Control Program Working?" Jonathan Bishop speaking at 74, (March 10, 2015). See also, CalEPA 2015, Memo: CalEPA Review of UIC Program,
https://sntr.senate.ca.gov/sites/sntr.senate.ca.gov/files/3_10_15_cal_epa_review_of_uic_program.pdf.

contamination."[68] Thus, any plans that puts groundwater at risk could lead to irreversible damage. Long Beach should not be jeopardizing groundwater for the benefit of the oil industry.

Injection activity does not occur in isolation. Operators use chemicals in all stages of oil production, such as drilling muds to facilitate the drilling process, powerful cleaning solvents, or chemical mixtures designed to maintain the well. Unfortunately, neither state nor federal regulations require companies to fully disclose the chemical identities or volumes used. While some chemicals have been identified, a substantial portion of chemicals remain secret. This is worrisome because enhanced oil recovery operations like cyclic steam injection commonly employ harmful chemicals acting as surfactants, polymers, caustics, or biocides to facilitate the operation.

The City must be aware of the full spectrum of substances being injected in order to regulate effectively. Accordingly, the range of substances to be tested for must be expanded, so that regulators and operators are aware of all fluids and chemicals injected or emplaced into a Class II injection well. Without such chemical information, it is impossible to detect contamination or predict how chemicals will interact or migrate in the subsurface.

The potential for harm is evident from past studies of oil and gas activities. CalGEM itself acknowledges that there are potential pathways for the chemicals and hydrocarbons to migrate underground. For example, "[o]ther wells within the area of review that penetrate the injection zone could potentially serve as conduits for fluid migration."[69]

The injection wells themselves may become conduits for fluid migration. In cyclic steam injection, the repeated soaking of the formation with very hot steam creates "large temperature variations and formation movements," putting extreme pressure on the ground and well casing, which can cause well failure or the migration of fluids and steam.[70] Indeed, "[c]yclic steam injection presents some of the harshest conditions" under which a well can be placed.[71] Thus, it is not surprising that rates of well casing failure from "excessive deformation, buckling, and collapse" are especially high in cyclic steam injection wells.[72] Further, the injection of hot steam can deform the surrounding formation and overlying ground so much that cyclic steaming can result in the migration of fluids and steam. This can sometimes pollute underground aquifers. It can also result in "surface expressions," in which the steam, oil, gas, and whatever else might be mixed in underground come bubbling to, or even exploding out of the surface of the ground.[73]

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[68] *Id.* at 73.
[69] Division of Oil, Gas, and Geothermal Resources (DOGGR), Initial Statement of Reasons In Support of Updated Underground Injection Control Regulations (2018) ("Statement of Reasons 2018"), at p. 16.
[70] Xie, Jueren, Analysis of Casing Deformations in Thermal Wells (2008), https://www.researchgate.net/publication/308709003_Analysis_of_Casing_Deformations_in_Thermal_Wells.
[71] Kulakofsky, David, Achieving Long-Term Zonal Isolation in Heavy-Oil Steam Injection Wells, a Case History (Aug. 2008), DOI: 10.2118/115201-MS.
[72] Wu, Jiang, Casing Temperature and Stress Analysis in Steam-Injection Wells, paper presented at the International Oil & Gas Conference and Exhibition (December 2006); *see also* Wu, Jiang, Casing Failures in Cyclic Steam Injection Wells (2008).
[73] Cal. Dep't of Conservation, Division of Oil, Gas, and Geothermal Resources, Report of Occurrences,

Cyclic steam injection leads to changes subsurface pressures, which are poorly understood and opens the door to fluid migration. A scientist at Lawrence Berkeley National Laboratory explained:

> "As important as the subsurface is for U.S. energy strategy, our understanding of how the subsurface responds to common perturbations, such as those caused by pulling fluids out or pushing fluids in, is quite crude.…We're not able to manipulate the subsurface with the control that can guarantee that we're not only maximizing energy production or waste storage, but that we're also protecting our environment—including minimizing greenhouse gas emissions, impacts to groundwater, and induced seismicity. That's a significant gap."[74]

Cyclic steam operations will lead to significant and unavoidable impacts for surface and groundwater. In the winter of 1995, six well casings in a field in Alberta, Canada, failed under the pressure of cyclic steam stimulation.[75] Similar to projects in Long Beach, the operations were pursuing heavy oil at relatively shallow depths.[76] The failures released approximately 55,000 cubic meters of "oil, saline produced water, and solids" to the environment, polluting two groundwater aquifers in the process.[77]

2. *Increased risk of earthquakes*

The mechanisms linking wastewater injection and earthquakes are well understood: injection-induced increases in fluid pressure within aquifers and fault lubrication by injected fluids have the potential to destabilize well bores and cause preexisting faults to slip.[78] Such mechanisms serve to explain atypical seismic activity, such as the extensively documented earthquakes in the central and eastern United States. There, earthquake count has increased dramatically over the last decade, with more than 300 earthquakes with $M \geq 3$ between 2010 and 2012, or an average of 100 events/year, compared with an average rate of 21 events/year for the period spanning 1967 to 2000.[79] This surge of activity includes a magnitude 5.7 earthquake that struck Oklahoma in 2011, in close proximity to active hydraulic fracturing wastewater wells,[80]

The Chevron Fatality Accident, June 21, 2011, and Area Surface Expression Activity, Pre and Post Accident, Sections 21 & 22 T.32S./R.23E., Midway-Sunset Oil Field, Kern County (May 2012) ("Accident Report"); Cal. Dep't of Conservation, Division of Oil, Gas, and Geothermal Resources, Reports of Occurrence: Surface Expressions in Bakersfield (2011) ("Spill Binder").

[74] Chao, J., "Underground Science: Berkeley Lab Digs Deep For Clean Energy Solutions," Lawrence Berkeley National Laboratory (Oct. 19. 2016), quoting Susan Hubbard, Associate Director, available at http://newscenter.lbl.gov/2016/10/19/berkeley-lab-digs-deep-clean-energy-solutions/.

[75] Kennedy, Alan and Calvin Sikstrom, *Assessment and Remediation of a Heavy-Oil Spill into Groundwater Aquifers*, International Oil Spill Conference Proceedings, Vol. 1997, No. 1, pp. 347-363 (April 1997).

[76] *Id.*

[77] *Id.*

[78] Brodsky, Emily and Lisa J. Lajoie, *Anthropogenic Seismicity Rates and Operational Parameters at the Salton Sea Geothermal Field*, 341 Science (2013); Davies, Richard et al., *Induced Seismicity and Hydraulic Fracturing for the Recovery of Hydrocarbons*, 45 Marine and Petroleum Geology 171 (2013).

[79] Ellsworth, William, *Injection-Induced Earthquakes*, 341 Science (July 12, 2013), https://www.science.org/doi/10.1126/science.1225942.

[80] Keranen, Katie M. et al., P*otentially Induced Earthquakes in Oklahoma, USA: Links between Wastewater Injection and the 2011 Mw 5.7 Earthquake Sequence*, 41 Geology 699 (2013).

and a 5.8 magnitude quake on September 3, 2016 that proved to be the most powerful earthquake ever recorded in Oklahoma.[81]

Detecting induced events in California has received less attention due to the greater background seismicity in the West. However, such connections have been made, as is the case in a published 2016 study linking wastewater injection in the Tejon Oil Field in Kern County to a September 2005 earthquake swarm of three $M \geq 4$ events near the White Wolf Fault.[82]

Given California's history with earthquakes and the noted links between wastewater injection and seismicity, these plans should not be approved without adequate consideration of these threats.

In Oklahoma, wastewater injection has already led to a magnitude 5.8 earthquake.[83] The earthquake's epicenter was an unknown fault.[84] The proposed regulations require disclosure of only previously *known* faults. This leaves the operator with no requirement to seek out any unmapped fault lines, like the one triggering Oklahoma's record earthquake, before injection operations begin.

Seismic monitoring should apply to all injection wells. Until more is known about the link between injection activity and seismic events, it is necessary to collect more data on earthquakes near injection activity. By failing to require data collection on injection wells, Long Beach is eschewing an important opportunity to further study how injections may lead to increased seismic activity.

3. *Track record of missing well integrity tests*

An analysis of state public records between 2015 and 2018 from California's Division of Oil, Gas and Geothermal Resources showed that the THUMS offshore platforms had long lapses with missing well integrity tests that are required by state law at least every five years. Most of the missing and failed well tests in the THUMS notices of violation were for underground injection wells, which are used to stimulate oil and gas production and help prevent the land subsidence that has caused billions of dollars in damage to Long Beach. Drilling wastes contaminated with toxic chemicals and heavy metals can be injected into these wells, which state law requires to be enclosed and able to withstand pressure so the ocean and freshwater aquifers don't get contaminated. "Mechanical integrity tests" are required before any underground injections take place. THUMS had 103 violations for missing tests and 47 failed tests, and Tidelands had 68 missing tests and 10 wells that failed the tests over the past three years.[85] Long

[81] Chen, Xiaowei et al., *The Pawnee earthquake as a result of the interplay among injection, faults and aftershocks*, 7 Nature Scientific Reports 4945 (2017).
[82] Goebel, T.H.W. et al., *Wastewater Disposal and Earthquake Swarm Activity at the Southern End of the Central Valley, California*, 43 Geophys. Res. Lett. 1092 (2016), https://doi.org/10.1002/2015GL066948.
[83] Yeck, W. L., et al., *Oklahoma experiences largest earthquake during ongoing regional wastewater injection hazard mitigation efforts*, 44 Geophys. Res. Lett. (2017), doi:10.1002/2016GL071685.
[84] *Id.*
[85] Center for Biological Diversity, "Records: Nearly 400 Violations at California Offshore Drilling Operations (April 11, 2018), https://www.biologicaldiversity.org/news/press_releases/2018/offshore-drilling-04-11-2018.php#:~:text=THUMS%20had%20103%20violations%20for,over%20the%20past%20three%20years; *see also* Database of Violations (included in references).

Beach must ensure that oil and gas operations are performing the proper well integrity tests to ensure adequate protection of the environment and human health.

C. Enhanced Oil Recovery

The Program Plan leaves open the possibility for enhanced oil recovery to "be considered for implementation if economically and technically viable."[86] Long Beach must examine and mitigate the impacts of such dangerous oil and gas extraction techniques under CEQA.

Enhanced oil recovery involves the injection of fluids or steam underground to increase the flow of oil and gas to the surface. Enhanced oil recovery techniques may combine injected fluids or steam with harmful chemicals used as surfactants. And while there are a number of enhanced oil recovery technologies, some elements are common to all processes; the use of a recovery fluid, a system to inject recovery fluids, surface processing, and a need to dispose of waste materials.[87] As a result, the environmental risks of enhanced oil recovery are shared by all methods.

Groundwater contamination: As discussed above, migration of injection fluids into drinking water aquifers is concerning due to the potentially hazardous substances those fluids may contain.[88] Chemical additives are often added to help increase production, and disclosure of contaminants in not required by federal or state regulations. Post injection, dissolution of other contaminants present in oil reservoirs can introduce new compounds into the fluid that will be recovered with oil. Contamination of groundwater is a major concern as approximately 60% of Long Beach's water needs are filled by local groundwater.[89] Health risks from chemicals migrating into Long Beach's groundwater must be adequately examined and mitigated.

Air pollution: As detailed below, oil and gas drilling in Long Beach results in emissions of hazardous air pollutants include volatile organic compounds and considerable greenhouse gas pollution. The pressure and heat needed for extended oil recovery operations can lead to significantly larger quantities of air pollution that conventional oil and gas extraction techniques. The California Air Resources Board itemized a number of sources associated with operational activities including steam generators, steam drive wells, cyclic steam wells, fugitive emissions from the wellhead, valves, fittings, and evaporation from sumps and pits.[90] The air pollution from these operational activities will be a significant impact if the Plans authorize extended oil recovery. In addition, the energy required to create the steam and transport the oil makes

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[86] Program Plan 2023-28 at 6.
[87] *See* Clean Water Action, Environmental Risks and Oversight of Enhanced Oil Recovery (2017), https://www.cleanwateraction.org/sites/default/files/docs/publications/Environmental%20Risks%20and%20Oversight%20of%20Enhanced%20Oil%20Recovery%2011.08.17a.pdf.
[88]Stringfellow, et al., Comparison of chemical-use between hydraulic fracturing, acidizing, and routine oil and gas development, 12 PLoS ONE(4): e0175344 (2017) https://doi.org/10.1371/journal.pone.0175344.
[89] Long Beach Water, Groundwater, available at https://lbwater.org/water-sources/ground-and-imported-water/.
[90] CCST Report Vol. II at p. 199, citing CARB (California Air Resources Board) (2013), Almanac Emission Projection Data: 2012 Estimated Annual Average Emissions by California Air District, http://www.arb.ca.gov/ei/maps/statemap/dismap.htm.

California's oil production some of the most carbon-intensive in the world, especially from fields that rely on enhanced oil recovery.[91]

Worker safety: California regulators now rightly *presume* injections into diatomaceous formations "creates a risk of surface expressions…."[92] These surface expressions have occurred frequently and with disastrous effects. On June 21, 2011, a Chevron worker was killed when investigating steam coming from a surface expression caused by cyclic steaming in Kern County's Midway-Sunset oil field.[93] When approaching the plume of steam, the ground gave way, and the worker fell into a sinkhole and died.[94] In May 2012, California's Division of Oil, Gas, and Geothermal Resources (now known as CalGEM) issued a report on the tragedy.[95] As with the Plan at issue, operations in the Midway-Sunset oil field were using enhanced oil recovery (cyclic steam injection) to exploit shallow heavy oil deposits.[96]

D. Subsidence and Increased Impacts from Sea Level Rise, Storm Surges, and Flooding

Long Beach admits in its Program Plan that "the oil reservoir zones of the Wilmington Oil Field are susceptible to compaction" and "[a] major goal during the operation and development of the Unit is the continued prevention of subsidence related to oil and gas production."[97] Long Beach must examine and mitigate the risks of subsidence under CEQA, especially as subsidence will be exacerbated by sea level rise, storm surges, and flooding caused by climate change.

Land subsidence in Long Beach is caused by the extraction of oil and gas from underground reservoirs. Long Beach is home to one of this country's most dramatic cases of land subsidence caused by oil and gas production; between 1928 and 1965, the community sank almost 30 feet. As the oil reservoirs were depleted, sand compaction caused a land subsidence that flooded streets and wharfs and caused structural damage to bridges, railroads, and other harbor facilities.[98]

While subsidence in Long Beach in recent years is less dramatic, subsidence is still a major issue. One recent study that examined subsidence in Long Beach was conducted by the

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[91] Center for Biological Diversity, Killer Crude: How California Produces Some of the Dirties, Most Dangerous Oil in the World (2021), https://www.biologicaldiversity.org/programs/climate_law_institute/pdfs/June-2021-Killer-Crude-Rpt.pdf.
[92] Statement of Reasons at p. 30.
[93] Department of Conservation Division of Oil, Gas and Geothermal Resources, Executive Summary of Report of Occurrences: The Chevron Fatality Accident June 21, 2011 and Area Surface Expression Activity Pre and Post Accident – Sections 21 & 22 T.32S./R.23E., Midway-Sunset Oil Field Kern County (May 2012). (aka "Accident Report ES"); Accident Report at 2.
[94] *Id.* at 2.
[95] *Id.* at 1.
[96] *Id.* at 9.
[97] Program Plan 2023-28 at 11.
[98] USGS, National Assessment of Coastal Change Hazards (2003), https://pubs.usgs.gov/of/2003/of03-337/extraction.html.

United States Geological Survey ("USGS") in collaboration with the City of Long Beach.[99] The study, published in 2018, used satellite data to measure changes in land surface elevation in Long Beach over a 17-year period. The study found that parts of Long Beach had subsided by as much as 9 inches during that time period, with the greatest subsidence occurring in areas where oil extraction had taken place.

The impacts of land subsidence are particularly dire near sea level where minor lowering of the land surface results in permanent inundation. Not only are many of Long Beach wells near sea level, but sea level rise in coming years will compound the subsidence problem and result in increased flooding. In the Los Angeles region, containing all of Ventura, LA, and Orange Counties, roughly 1 to 2 feet of sea level rise is projected by mid-century, with the most extreme projections predicting 8 to 10 feet of sea level rise by the end of the century.[100] Scientific estimates suggest that sea level rise in California could be at least half of a foot just in 2030.[101] In its recent adopted Climate Action Plan, the city of Long Beach projected 11 inches of sea level rise by 2030.[102] As drilling in Long Beach exacerbates land subsidence in the community, the impacts of sea level rise will become increasingly severe.

The City of Long Beach has voiced extreme concern at the prospect of sea level rise and resulting economic impacts.[103] For example, in its Climate Action Plan, Long Beach acknowledges that "permanent inundation from [sea level rise] as well as increased frequency and intensity of temporary flooding from king tides and storm surges will become a very real threat in the near future." The Plan identifies a number of actions the City will take to address sea level rise and flooding.[104] These include relocating/elevating critical infrastructure, including elevating riverine levees and flood proofing vulnerable sewer pump stations, elevating streets and pathways, extending sea walls, and investigating the feasibility of a managed retreat in the long term.[105] Despite the concern the City professes to have for the impacts of sea level rise, it continues to allow oil and gas drilling that will inevitably increase subsidence and vulnerability to sea level rise, as well as produce the very emissions that causes sea level rise in the first place.

The subsidence caused by drilling in Long Beach will also result in increased expense to mitigate the harm of sea level rise. With 11 inches of sea level rise (predicted by 2030), approximately 1.3 million square feet of buildings are projected to be exposed to annual king tides. Approximately half of these buildings are residential (624,100 square feet) and half are

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[99] USGS, Comparison of regression relations of bankfull discharge and channel geometry for the glaciated and nonglaciated settings of Pennsylvania and southern New York (2018), https://pubs.er.usgs.gov/publication/sir20185066.
[100] California's 4th Climate Change Assessment, Los Angeles Region Report, https://www.energy.ca.gov/sites/default/files/2019-11/Reg%20Report-%20SUM-CCCA4-2018-007%20LosAngeles_ADA.pdf.
[101] Legislative Analyst's Office, What Threat Does Sea Level Rise Pose to California (2020), https://lao.ca.gov/reports/2020/4261/sea-level-rise-081020.pdf.
[102] City of Long Beach, Climate Action Plan at 16 (2022), https://longbeach.gov/globalassets/lbds/media-library/documents/planning/lb-cap/adopted-lb-cap_-aug-2022.
[103] *Id.* at 55.
[104] *Id.* at 11-12.
[105] *Id.*

commercial (689,600 square feet).[106] At the very least, Long Beach must examine to the degree to which oil and gas drilling exacerbate the burdens of sea level rise within the city.

In addition, larger storms are predicted in the future, resulting in increased rainfall, flooding, and storm surges. According to the Climate Action Plan: "Urban flooding during precipitation events is already a problem in Long Beach, and extreme events today provide an example of what may become more common in the future, when more intense precipitation events are projected."[107] As Long Beach experiences heightened storm surges and king tides, battering the coast, subsidence will increase water inundation and cause innumerable problems for residents of the city.

E. Environmental Justice

There are significant environmental justice impacts from drilling in the Long Beach Unit. According to analysis by FracTracker, an estimated 140,138 Long Beach residents—amounting to over 30% of the City's population—live within 3,200 feet of an operational oil and gas well within the city limits.[108] Of those, 101,498 (72.4%) are people of color.[109]

According to CalEnviroScreen, communities living near Long Beach Unit drilling activities are in the highest percentiles for pollution vulnerability. The CalEnviroScreen map below "shows the combined Population Characteristics scores, which is made up of indicators from the Sensitive Populations and Socioeconomic Factors components of the CalEnviroScreen model. Population Characteristics represent physiological traits, health status, or community characteristics that can result in increased vulnerability to pollution."[110]

Environmental justice is increasingly being incorporated into State decisionmaking, and CEQA is an important environmental justice tool. The State Attorney General announced that his office "is particularly concerned that land use planning and permitting decisions consider and address any additional burdens on environmental justice communities."[111] And as stated by the California Environmental Justice Alliance, "CEQA protects the basic rights of disadvantaged or EJ communities in California. These rights include the right to clean air and water, [and] the right to participate in local land use decisions, and the right to affordable housing and good schools free from pollution and other harms."[112] As shown above, environmental justice considerations are directly relevant to LBU plans. The City's current process to prepare, propose, and adopt Program and Annual Plans ignores the need to take environmental justice considerations into account.

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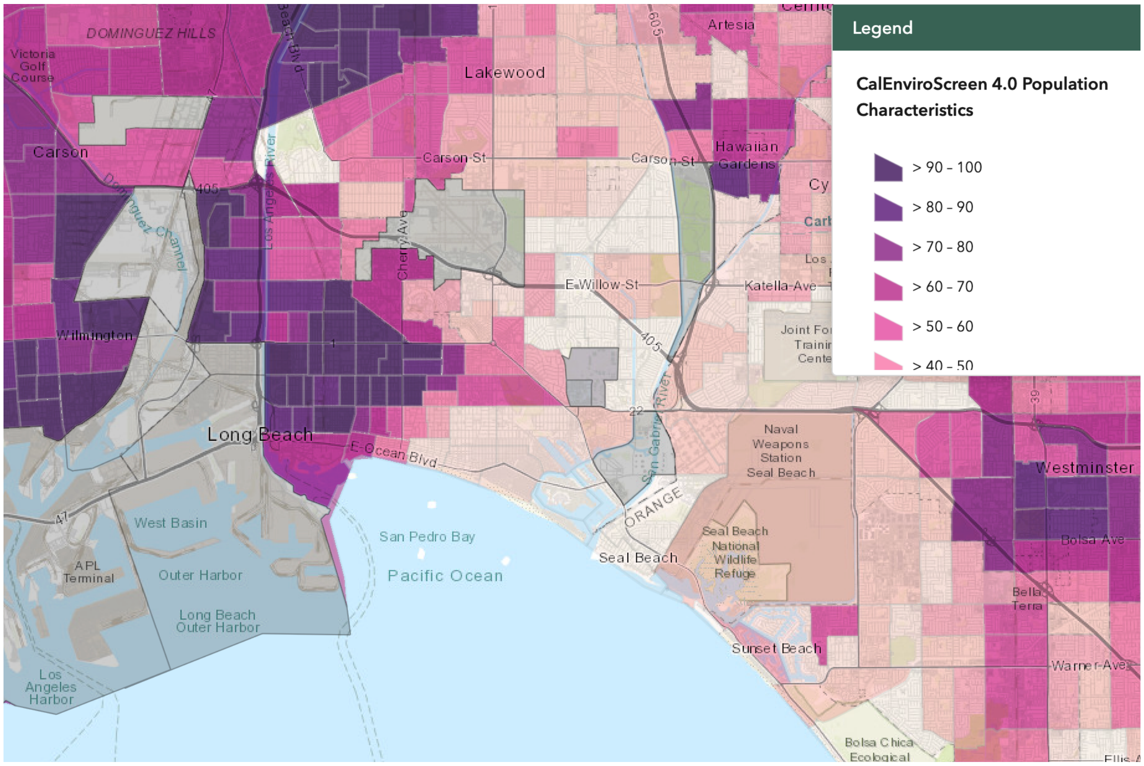
[106] *Id.* at 23, Appendix C.
[107] City of Long Beach, Climate Action Plan at 56.
[108] FracTracker, City of Long Beach Oil and Gas Extraction (April 1, 2022) at 2.
[109] *Id.*
[110] OEHHA, CalEnviroScreen 4.0, https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40 (search for "Long Beach" and "Population Characteristics").
[111] Bon Bonta, Cal. Attorney General, https://oag.ca.gov/environment/justice.
[112] Cal. Environmental Justice Alliance, Protect CEQA to Advance Environmental Justice and Protect Housing, https://caleja.org/2019/05/protect-ceqa-to-advance-environmental-justice-and-protect-housing/.



F. Greenhouse Gas Emissions & Air Pollution

Drilling and other oil field operations in the LBU produce significant air pollution and greenhouse gas ("GHG") emissions, impacts that must be analyzed and mitigated under CEQA.[113]

The climate crisis, caused primarily by fossil fuels, poses an existential threat to every aspect of society. In the words of the State Lands Commission:

> Climate change is an existential threat that grows more urgent each passing day . . . . The State of California, the fifth largest economy in the world, is aggressively pursuing various options to reduce greenhouse gas emissions and deaccelerate the impacts of climate change. The United Nation's Intergovernmental Panel on Climate Change has found that emissions from fossil fuels are the dominant cause of global warming. Oil, a fossil fuel that releases an enormous amount of carbon when burned, exacerbates climate change.[114]

[113] *See generally* CEQA Guidelines § 15126.2; Appendix G (naming GHG emissions and air quality as environmental factors that must be evaluated for significance).
[114] State Lands Commission, Staff Report 52 (Feb. 25, 2022), https://slcprdwordpressstorage.blob.core.windows.net/wordpressdata/2022/02/02-25-22_52.pdf.

Indeed, the vast scientific literature documenting these findings has been set forth in a series of authoritative reports from the Intergovernmental Panel on Climate Change ("IPCC"), U.S. Global Change Research Program, and other institutions, which make clear that fossil-fuel driven climate change is a "code red for humanity."[115] Without limits on fossil fuel production and deep and rapid emissions reductions, global temperature rise will exceed 1.5°C and will result in catastrophic damage in the U.S. and around the world.[116]

While the City has made statements to the effect of, "Long Beach knows and supports the position that oil production is not in our long-term future,"[117] the LBU continues to produce millions of barrels of oil each year. In 2015, "oil fields in Long Beach [likely referring to the entire Wilmington field] produced more than 13 million barrels of crude oil, representing significant [GHG] emissions."[118] Those 13 million barrels of crude oil (and 5.1 million Mcf of natural gas extracted) "generated an estimated 8.3 million MT CO2e in lifecycle emissions."[119] This is the equivalent of over 1.7 million gasoline-powered passenger cars driven for one year, or the annual operations of 2.2 coal-fired power plants.[120] Similarly, in 2022, the City reported production of approximately 10 million barrels of oil per year.[121]

According to a 2020 study conducted as part of the City's climate action planning, approximately 96 percent of the city's oil and gas lifecycle emissions are attributed to oil, with the remaining 4 percent resulting from natural gas.[122] That same study determined that Long Beach oil field carbon intensity is 5.48 gCO2e/MJ, which puts the oil field at 94th out of 157

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[115] *See* United Nations Secretary-General, Secretary-General's statement on the IPCC Working Group 1 Report on the Physical Science Basis of the Sixth Assessment, Aug. 9, 2021, https://www.un.org/sg/en/content/secretary-generals-statement-the-ipcc-working-group-1-report-the-physical-science-basis-of-the-sixth-assessment.
[116] IPCC, Summary for Policymakers, In: Global Warming of 1.5°C.:An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (2018) [Masson-Delmotte, V. et al. (eds.)], https://www.ipcc.ch/sr15/.
[117] City of Long Beach, Recommendation from the Sustainable City Commission (March 15, 2022) at 19, https://www.longbeach.gov/globalassets/city-manager/media-library/documents/memos-to-the-mayor-tabbed-file-list-folders/2022/march-15--2022---recommendation-from-the-sustainable-city-commission; *see also* City of Long Beach, Recommendation from the Sustainable City Commission & Reducing Reliance on City Revenue from Oil Production (Jan. 2022 and Oct. 2021) at 4, http://longbeach.legistar.com/View.ashx?M=F&ID=10423777&GUID=CE2373C6-1897-4A8F-9FE8-858224EC882E.
[118] City of Long Beach, Appx G, Proposed Climate Action and Adaptation Plan (Nov. 2020) at 1, https://www.longbeach.gov/globalassets/lbds/media-library/documents/planning/lb-cap/lb-caap-proposed-plan-app-g-_dec-14 ("Appx G Climate Plan").
[119] Appx G Climate Plan at 1.
[120] *See* EPA, Greenhouse Gas Equivalencies Calculator, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results.
[121] City of Long Beach, Recommendation from the Sustainable City Commission (March 15, 2022) at 5, https://www.longbeach.gov/globalassets/city-manager/media-library/documents/memos-to-the-mayor-tabbed-file-list-folders/2022/march-15--2022---recommendation-from-the-sustainable-city-commission.
[122] Appx G Climate Plan at 1.

when ranked lowest to highest.[123] This suggests that even among other California oil fields, the majority have a lower carbon intensity value than Long Beach oil.[124]

The City cannot ignore the plain fact that its oil and gas drilling operations results in significant climate impacts. The current draft Program Plan projects that over the next five years, **LBU expects to produce over 26.2 million barrels of oil and over 12 billion cubic feet of natural gas**.[125] Those are tremendously high numbers and represent an *increase* over what the Program Plan for 2021-26 anticipated.[126] The City's own report acknowledges that "[u]pstream emissions occur at the oil fields within the city boundary" and because "[t]he City issues well permits for petroleum operations, [it] has relatively more direct control over these emissions."[127] Even if oil and gas operations had no other environmental and public health impacts (which clearly is not the case), these massive GHG emissions would warrant analysis and mitigation under CEQA.

Similarly, it is well-documented that oil field operations result in significant impacts to air quality and expose communities and sensitive receptors to substantial air pollution concentrations.[128] Oil and gas operations emit large amounts of volatile organic compounds ("VOCs") and nitrous oxides ("NOX").[129] The oil and natural gas industry is the largest industrial source of emissions of VOCs, a group of chemicals that contribute to the formation of ground-level ozone (smog).[130] Ozone exposure is linked to a wide range of health effects, including aggravated asthma, increased emergency room visits and hospital admissions, and premature death.[131]

The VOCs emitted include the BTEX compounds—benzene, toluene, ethyl benzene, and xylene—which are Hazardous Air Pollutants.[132] There is substantial evidence of the harm from

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[123] *Id.* at 8.
[124] *Id.*
[125] Draft Program Plan 2023-28, Exhibit C.
[126] Program Plan 2021-26, Exhibit C (projecting just over 25.4 million barrels of oil produced over five years). Moreover, the City showed its discretion because it increased production numbers anticipated in 2023-26 over what it prescribed in the 2021 Program Plan for the time period. For example, the City expected 5,037,000 barrels per year in 2023/24 (2021-26 Program Plan) but increased that to 5,365,000 (2023-28 Program Plan).
[127] Appx G Climate Plan at 2.
[128] *See, e.g.*, Stanford News, "Living near oil and gas wells increases air pollution exposure, according to Stanford research" (Oct. 21, 2021), https://news.stanford.edu/2021/10/12/living-near-oil-gas-wells-increases-air-pollution-exposure/.
[129] *Id.*
[130] EPA, "Basic Information about Oil and Natural Gas Air Pollution Standards," https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/basic-information-about-oil-and-natural-gas#:~:text=In%20addition%20to%20helping%20form,and%20other%20serious%20health%20effects.
[131] *Id.*
[132] Each has also been identified as a carcinogen. Mall, Amy, Petition for Rulemaking Pursuant to Section 6974(a) of the Resource Conservation and Recovery Act Concerning the Regulation of Wastes Associated with the Exploration, Development, or Production of Crude Oil or Natural Gas or Geothermal Energy at 13 (Sep. 8, 2010); 42 U.S.C. § 7412(b).

these pollutants, including cancer and other serious health effects.[133] One analysis found that 37 percent of the chemicals used during natural gas drilling, fracturing, and production were volatile, and that of those volatile chemicals, 81 percent can harm the brain and nervous system, 71 percent can harm the cardiovascular system and blood, and 66 percent can harm the kidneys.[134] Exposure to benzene has been associated with increased incidence of leukemia and other serious health conditions; exposure to toluene can damage the nervous system; and xylenes can cause dizziness, headaches, and loss of balance.[135] Another study found that among known air contaminants, compounds of particular concern that are known to be emitted during the well-stimulation-enabled oil and gas development process are BTEX compounds, formaldehyde, hydrogen sulfide, particulate matter, nitrogen oxides, sulfur dioxide, polycyclic aromatic, aliphatic, and aromatic hydrocarbons, and volatile organic compounds.[136] Wastewater reinjection and disposal are among the potential pathways for these contaminants to escape into the air.[137]

The pressure and heat needed for EOR operations can lead to significantly larger quantities of air pollution. The California Air Resources Board itemized a number of sources associated with operational activities including steam generators, steam drive wells, cyclic steam wells, fugitive emissions from the wellhead, valves, fittings, and evaporation from sumps and pits.[138] The air pollution from these operational activities will be a significant impact if the Plans authorize EOR.

In a 14-year study of air quality across California, researchers observed higher levels of air pollutants within 2.5 miles of oil and gas wells, likely worsening negative health outcomes for nearby residents.[139] Moreover, the cumulative impacts of oil and gas air pollution combined with Port pollution needs to be analyzed. The community in West Long Beach has extensive exposure to air pollution, heightened risks of pollution related health problems, and the South Coast Air Basin is in non-attainment of ozone and particulate matter.[140] Neither draft plans

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[133] Colborn, Theo et al., *Natural Gas Operations for a Public Health Perspective*, 17 Human and Ecological Risk Assessment 1039 (2011) ("Colborn 2011"); McKenzie, Lisa et al., *Human Health Risk Assessment of Air Emissions form Development of Unconventional Natural Gas Resources*, Sci Total Environ (2012), doi:10.1016/j.scitotenv.2012.02.018; Food & Water Watch, The Case for a Ban on Fracking (2012).
[134] Colborn 2011 at 8.
[135] Mall, Amy, Petition for Rulemaking Pursuant to Section 6974(a) of the Resource Conservation and Recovery Act Concerning the Regulation of Wastes Associated with the Exploration, Development, or Production of Crude Oil or Natural Gas or Geothermal Energy at 7 (Sep. 8, 2010).
[136] CCST Report, Vol. II, p. 410.
[137] *Id.*
[138] *Id.* at p. 199, citing CARB (California Air Resources Board) (2013), Almanac Emission Projection Data: 2012 Estimated Annual Average Emissions by California Air District, http://www.arb.ca.gov/ei/maps/statemap/dismap.htm.
[139] Stanford News, "Living near oil and gas wells increases air pollution exposure, according to Stanford research" (Oct. 21, 2021), https://news.stanford.edu/2021/10/12/living-near-oil-gas-wells-increases-air-pollution-exposure/.
[140] South Coast Air Quality Management District, Multiple Air Toxics Exposure Study in the South Coast Air Basin, MATES IV (2012), at 4-16, https://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-final-draft-report-4-1-15.pdf?sfvrsn=7.

describe the impacts to air quality, which is all the more reason for analysis and disclosure of these likely impacts through CEQA analysis.

G. Energy Use

California's grid is on "shaky ground," with the 2022 heat wave pushing the grid "to the brink of collapse," prompting the California legislature and Governor Newsom to extend the life of the Diablo Canyon nuclear power plant despite a pre-planned closure.[141] Yet with the crisis of electricity demand in the State, the LBU is one of Southern California Edison's biggest electricity users, consuming approximately 683 million kWh per year in order to power its oilfield operations.[142] This is unacceptable. Because CEQA require that environmental reviews discuss the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy,[143] LBU's massive energy use must be addressed under CEQA.

Moreover, the Program Plan notes that the property lease for the Unit's in-house, 45MW power plant expires in July 2024, and lease negotiations have "stalled."[144] Failure to renew the lease could mean even greater demand on the State's power grid and/or "result in . . . relocating the plant or installing a sales pipeline to SoCal Gas."[145] Any of the potential scenarios above concerning the power plant could lead to significant concerns and environmental impacts and must be analyzed under CEQA.

H. Amine Plant

The City's Program Plan refers to an amine plant located within the oil field that is used in conjunction with power plant operations.[146] Amines are a class of chemicals that derive from ammonia[147] and can have negative effects on human health (irritation, sensitization, carcinogenicity, genotoxicity), be toxic to animals and aquatic organisms, and cause eutrophication and acidification in marine environments.[148] The Program Plan inadequately describes what having an "amine plant" means for the LBU and surrounding ecosystems and

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[141] *See* "California's latest power grid problems are just the beginning," Politico (Sept. 23, 2022), https://www.politico.com/news/2022/09/23/californias-lofty-climate-goals-clash-with-reality-00058466; Nathan Rott, "California lawmakers extend the life of the state's last nuclear power plant," NPR (Sept. 1, 2022), https://www.npr.org/2022/09/01/1119778975/california-lawmakers-extend-the-life-of-the-states-last-nuclear-power-plant.
[142] Program Plan 2023-28 at 12.
[143] Cal. Pub. Res. Code § 21100(b)(3); *see also* CEQA Guidelines, Appx. F: Energy Conservation (noting that environmental effects related to energy may include the project's energy requirements and its energy use efficiencies; the effects of the project on local and regional energy supplies; the effects of the project on peak and base period demands for electricity and other forms of energy; the degree to which the project complies with existing energy standards; the effects of the project on energy resources).
[144] Program Plan 2023-28 at 12.
[145] *Id*.
[146] *Id.* at 11.
[147] Science Direct, Amine Overview, https://www.sciencedirect.com/topics/chemistry/amine.
[148] Bellona, Amines Used in CO2 Capture - Health and Environmental Impacts (2009), https://network.bellona.org/content/uploads/sites/3/fil_Bellona_report_September_2009_-_Amines_used_in_CO2_capture.pdf ("Amine Report").

communities. The public needs to know about chemical transport, storage, production, use, discharges, and disposal. Because of the likely environmental and health impacts from using (or producing) amines in the LBU, this component of operations triggers CEQA and must be subject to review.

Amine use results in environmental and health impacts throughout its lifecycle. Amine gases that are released to the air could be dissolved in the rain droplets and ended up in water supplies such as rivers and lakes.[149] Some emitted amines are unstable in the nature environment.[150] The amines specifically used in natural gas capture are highly soluble in water and their reclaimer waste contains amine, ammonia, other degradation products, heat-stable salts, flue gas impurities, and also corrosion products.[151] Amines used in natural gas operations also lead to metals corrosion, which can result in excess emissions and leaks.[152] Discharged amines may degrade to some dangerous substances that are toxic and represents a risk for cancer, such as aldehydes, amides, nitrosamines, and nitramines.[153] Amine spills are a "major problem[]."[154] High concentration of amines in environment could leads to disruption of aquatic life and bioconcentration potential and can be toxic to humans.[155] Amines used near saltwater (a concern for the LBU) is especially concerning and could lead to significant impacts, as studies have sown amine degradation in seawater is slower than in the freshwater system.[156]

I. Cumulative Impacts

The public and other officials are entitled to know the cumulative impacts of LBU operations—including from drilling/redrilling activities, equipment updates and new technologies, power plant operations (including the associated amine plant), actions to reduce subsidence, and more.

CEQA requires a cumulative project impacts analysis because "the full environmental impact of a proposed . . . action cannot be gauged in a vacuum."[157] Under CEQA, cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.[158] The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects.[159] In an EIR, the discussion of each type of cumulative

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149 Salim, S.R.S., *Treatment of amine wastes generated in industrial processes,* IOP Conf. Series: Materials Science and Engineering (2021) at 2, https://iopscience.iop.org/article/10.1088/1757-899X/1092/1/012051/pdf ("Amine Treatment Study").
150 Amine Report at 13.
151 Amine Treatment Study at 2.
152 *Id.*
153 Amine Report at 13.
154 Amine Treatment Study at 2.
155 *Id.*
156 Eide-Haugmo, Ingvild et al., *Environmental impact of amines*, Science Direct, Energy Procedia 1 (2009) at 1298, https://www.sciencedirect.com/science/article/pii/S1876610209001714.
157 *Whitman v. Board of Supervisors*, 88 Cal.App.3d 397, 408 (1979).
158 CEQA Guidelines § 15355.
159 *Id.*

impact need only be proportional to the severity of the impact and the likelihood of its occurrence,[160] but even an insignificant impact must be justified as such.[161] An underinclusive cumulative impacts analysis "impedes meaningful public discussion and skews the decision maker's perspective concerning the environmental consequences of a project, the necessity for mitigation measures, and the appropriateness of project approval."[162]

J. Health and Safety Buffer Zones

The projections for oil and gas production in the Program Plan, and yearly maximums for redrills in FY 2025, assume that the 2022 legislation establishing 3200-foot health and safety setbacks from oil and gas operations—Senate Bill 1137 (SB 1137)—will not take effect and that CalGEM will issue permits for redrilling wells between now and 2028. While implementation of SB 1137 is currently paused because of a forced ballot referendum sponsored by the oil and gas industry that seeks to overturn the law, the City should not assume the absence of setbacks and instead should incorporate these necessary protections into its planning.

Schedule 1B indicates that up to 22 redrills on Island Grissom and up to 6 redrills on Pier J for oil production will be completed in FY 2024 alone. All of these wells are within the buffer zone that will be in place if SB 1137 remains law. This zone represents areas where Long Beach residents and visitors live, work, and recreate. Ongoing operations in these areas already pose significant public health harms and these harms will be exacerbated by the expanded production proposed by the five-year Program Plan.

There are an estimated 140,000 individuals living within 3200 feet of Long Beach oil and gas wells (a number that encompasses the entire oil field).[163] Of those, 101,498 (72.4%) identify as non-white, including Latina/Hispanic origin, which is slightly higher than the citywide average (71.7% non-white).[164] The map below depicts oil and gas operations from the LBU that are within the proposed setback zone.[165]

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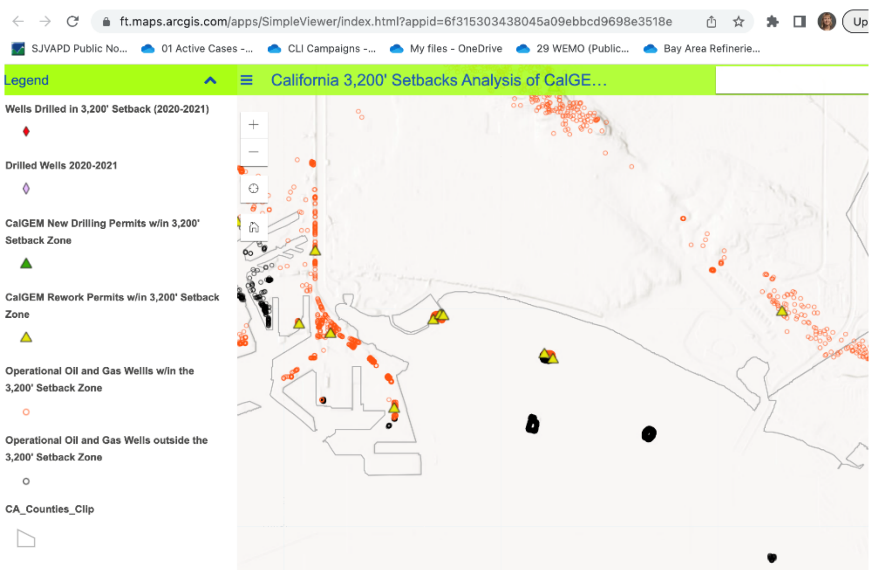
[160] *Id.* § 15130(b).
[161] *Id.* § 15130(a).
[162] *Citizens to Preserve the Ojai v. County of Ventura*, 176 Cal.App.3d 421, 431 (1985); *see also Friends of the Eel River v. Sonoma County Water Agency*, 108 Cal.App.4th 859 (2003).
[163] FracTracker, City of Long Beach Oil and Gas Extraction (April 1, 2022) at 2.
[164] *Id.*
[165] FracTracker, California 3,200' Setbacks Analysis (zoomed in for LBU), https://ft.maps.arcgis.com/apps/SimpleViewer/index.html?appid=6f315303438045a09ebbcd9698e3518e.

It is well-documented that there are adverse health outcomes for those living near oil and gas wells. In a 14-year analysis of air quality across California, Stanford researchers observed higher levels of air pollutants within 2.5 miles of oil and gas wells, likely worsening negative health outcomes for nearby residents.[166] Their data aligned with other smaller-scale studies that measured emissions from a handful of wells.[167] A panel of medical experts reported consistent findings of health impacts at distances less than one kilometer and recommended 3200-foot setbacks paired with pollution control measures on existing wells to account for significant impacts to perinatal and respiratory health in humans.[168]



The city manager's hesitation to embrace the health and safety buffer zone is concerning and runs counter to the city's 2030 strategic vision stating the intention to "improve the health of our environment and quality of life for all Long Beach residents and begin to remedy longstanding social, economic and environmental inequities . . . . All communities will have access to clean air, clean water, flourishing ecosystems, and protection from extreme weather events."[169] Fourteen organizations representing environmental justice, public health, business, and the environment have submitted a letter to the city manager expressing support for health and safety buffer zones and urging the city to reverse advocacy efforts casting doubt on the state law.[170]

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[166] Gonzalez, et al., *Upstream oil and gas production and ambient air pollution in California*, S. of the Total Envt., Vol. 806, Part 1, (Feb. 1, 2022), 150298, https://www.sciencedirect.com/science/article/pii/S0048969721053754.
[167] *Id.*
[168] PSE Berkeley, Response to CalGEM Questions for the California Oil and Gas Public Health Rulemaking Scientific Advisory Panel (Oct. 1, 2021), https://www.gov.ca.gov/wp-content/uploads/2021/10/Public-Health-Panel-Memo.pdf.
[169] City of Long Beach, 2030 Strategic Vision at 52, https://www.longbeach.gov/globalassets/city-manager/media-library/documents/2030-strategic-vision.
[170] *See* Sign-on letter re: SB 1137 (March 21, 2023), attached herein.

In order to protect the health of residents and to prepare for the implementation of SB 1137, Long Beach's plans should not include any projects (including redrills) within setback zones, which includes on Island Grissom, Island White, or Pier J. And the city should move expeditiously to phase down operations within the 3200-foot health and safety buffer zone.

K. Tribal consultation

Several tribal entities of the Acjachemen and Tongva nations hold critical cultural information regarding the cultural sites affected by the continued development of oil infrastructure, continued extraction, and continued threat of oil spills that threaten to impact these cultural resources and sacred sites. Oil spill response efforts without consultation with these entities risk further impacting cultural resources. A new CEQA review should be conducted considering these impacts and incorporating revisions of the oil spill response plans to alert and consult with Tribes.

CONCLUSION

Thank you for considering our comments. All the references cited herein are available at https://centerforbiologicald-my.sharepoint.com/:f:/g/personal/celkins_biologicaldiversity_org/EnKgnCor99lGuuLZ09VgLJEBe1qZCkB-L3ApueGIIPlwhQ?e=glc5NS. We will also hand-deliver a USB flash drive containing all references to the city clerk at tonight's meeting.

Victoria Bogdan Tejeda
Staff Attorney, Climate Law Institute
Center for Biological Diversity
vbogdantejeda@biologicaldiversity.org

Emily Jeffers
Senior Attorney, Oceans Program
Center for Biological Diversity
ejeffers@biologicaldiversity.org

From: Emily Jeffers [mailto:ejeffers@biologicaldiversity.org]
Sent: Tuesday, March 21, 2023 1:30 PM
To: CityClerk <CityClerk@longbeach.gov>
Cc: Brady Bradshaw <bbradshaw@biologicaldiversity.org>; Victoria Bogdan Tejeda <vbogdantejeda@biologicaldiversity.org>; Miyoko Sakashita <miyoko@biologicaldiversity.org>
Subject: RE: Center for Biological Diversity comments on Long Beach Unit Annual and Program Plans

-EXTERNAL-

We were alerted that the below link to our cited references may not work for non-Microsoft users. Please try this link -- Long Beach Unit Annual & Program Plans - References – and let me know if you are able to access and download the sources.

Best,
Emily Jeffers

From: Emily Jeffers
Sent: Tuesday, March 21, 2023 12:20 PM
To: cityclerk@longbeach.gov
Cc: Brady Bradshaw <BBradshaw@biologicaldiversity.org>; Victoria Bogdan Tejeda <vbogdantejeda@biologicaldiversity.org>; Miyoko Sakashita <miyoko@biologicaldiversity.org>
Subject: Center for Biological Diversity comments on Long Beach Unit Annual and Program Plans

Dear Clerk,

The Center for Biological Diversity submits the attached comments in response to the City of Long Beach's draft five-year Program Plan for the Long Beach Unit, covering years 2023-28, and the related one-year draft Annual Plan for the LBU, covering July 1, 2023-June 30, 2024.

All sources cited in the comment letter are included in this public folder: Long Beach Unit Annual & Program Plans - References

Please confirm you can access and will download these references.

We will also hand-deliver a USB flash drive containing all cited references at tonight's city council meeting.

Please let me know if you have any questions. You can reach me at (408) 348-6958.

Thank you,

Emily Jeffers
Center for Biological Diversity

From: Emily Jeffers [mailto:ejeffers@biologicaldiversity.org]
Sent: Tuesday, March 21, 2023 12:20 PM
To: CityClerk <CityClerk@longbeach.gov>
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Center for Biological Diversity

March 21, 2023

Submitted via email to cityclerk@longbeach.gov

References available at https://centerforbiologicald-my.sharepoint.com/:f:/g/personal/celkins_biologicaldiversity_org/EnKgnCor99lGuuLZ09VgLJEBe1qZCkB-L3ApueGIIPlwhQ?e=glc5NS

References also submitted via USB flash drive

Long Beach City Council
411 W. OCEAN BOULEVARD
Long Beach, CA 90802

Re: City Council Agenda Item: Recommendation to approve and adopt the Long Beach Unit Annual Plan (July 1, 2023 to June 30, 2024) and Program Plan (July 1, 2023 to June 30, 2028). (Citywide)

Dear Long Beach City Council:

The Center for Biological Diversity submits the following comments in response to the City of Long Beach's ("the City") draft five-year Program Plan for the Long Beach Unit ("LBU"), covering years 2023-28, and the related one-year draft Annual Plan for the LBU, covering July 1, 2023-June 30, 2024. The City posted both plans to its website for review by the public on Monday, March 13, 2023, and consideration by the City Council on March 21, 2023.

First, as a threshold matter, the City's plans must be subject to environmental review and public comment under the California Environmental Quality Act ("CEQA"). CEQA requires only that a discretionary activity *may* either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, for review to be triggered. As plans that propose over 100 drilling activities and open the door to other actions such as use of enhanced oil recovery, the plans meet this low-bar test. Long Beach oil and gas drilling, as we discuss below, impacts air quality, climate emissions, water quality, subsidence, species, environmental justice, energy use, and other areas of consequence. CEQA was intended to be interpreted in such a manner as to afford the fullest possible protection to the environment and the City must take action to comply by subjecting the plans to full review.

Second, we urge the City to adhere to its own plans to eliminate oil and gas by phasing down production. Inexplicably, the draft plans project over 26.2 million barrels of oil and over 12 billion cubic feet of natural gas production—an *increase* over the previous five-year Program

Plan's production numbers. This comes despite the City "know[ing] and support[ing] the position that oil production is not in [its] long-term future."[1]

Third, the City must end all oil and gas operations within 3200 feet of homes, schools, nursing homes, and hospitals, as established by Senate Bill 1137 (2022). Governor Newsom signed SB 1137 into law, and while its enactment is delayed because of a referendum, it is a vital public health protection that begins to address the environmental health disparities experienced by frontline communities. The City must not perpetuate the harms that the legislature already declared "disproportionately impact[s] Black, indigenous, and people of color in California."[2] Instead of pushing forward its plans that lead to continued harms and increased drilling, the City should create a plan for alternative sources of revenue, consistent with a five-year phaseout of oil drilling, that supports a just transition for impacted workers.

Finally, one week is an appallingly short amount of time for the public to review the proposed plans that will have consequences for years to come. In addition to pausing approvals for CEQA review, the City must provide the public with adequate time (at least 30 days) for review and public comment.

I. Because the plans are projects, CEQA review is required

The City of Long Beach is proposing in its five-year Program Plan for 2023-28 and associated Annual Plan to conduct oil and gas drilling activities in the LBU that are likely to cause adverse environmental impacts, as described in greater detail below. That neither the City nor any affiliated agencies have conducted CEQA review on the plans runs counter to law and deprives the public and other officials of information necessary to make informed decisions and formulate project alternatives and mitigations.[3]

CEQA directs state and local agencies to "take all action necessary to protect, rehabilitate, and enhance the environmental quality of the state" and to "[e]nsure that the long-term protection of the environment . . . shall be the guiding criterion in public decisions."[4] "CEQA was intended to be interpreted in such a manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language," and "[t]he purpose of CEQA is . . . to compel government at all levels to make decisions with environmental consequences in mind."[5] By "requir[ing] full environmental disclosure," the Act

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[1] City of Long Beach, Recommendation from the Sustainable City Commission (March 15, 2022) at 19, https://www.longbeach.gov/globalassets/city-manager/media-library/documents/memos-to-the-mayor-tabbed-file-list-folders/2022/march-15--2022---recommendation-from-the-sustainable-city-commission; *see also* City of Long Beach, Recommendation from the Sustainable City Commission & Reducing Reliance on City Revenue from Oil Production (Jan. 2022 and Oct. 2021) at 4, http://longbeach.legistar.com/View.ashx?M=F&ID=10423777&GUID=CE2373C6-1897-4A8F-9FE8-858224EC882E.
[2] SB 1137 (Gonzalez, 2022), approved and filed Sept. 16, 2022.
[3] Cal. Pub. Res. Code § 21002.
[4] *Id.* § 21001.
[5] Cal. Code Regs. tit. 14, § 15003 (hereinafter, "CEQA Guidelines").

ensures public awareness and participation in decisions with the potential for environmental consequences.[6]

The LBU plans are projects under CEQA and therefore warrant environmental review. CEQA applies to all "discretionary projects proposed to be carried out or approved by public agencies."[7] CEQA defines "project" as "the whole of an action" directly undertaken, supported or authorized by a public agency, "which *may cause* either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment."[8] The bar for what constitutes a direct or reasonably foreseeable indirect physical change in the environment is low. According to the California Supreme Court, the "likely *actual* impact of an activity is not at issue when determining its status as a project."[9] Instead, the threshold question is whether an activity, "by its general nature" may be "capable, at least in theory, of causing" direct or "reasonably foreseeable indirect" environmental changes.[10]

The LBU plans easily meet the test for what constitutes a "project" under CEQA. The draft Program Plan, covering years 2023-28, prescribes discretionary activities such as redrilling and possible new drilling, potential use of enhanced oil recovery, and other activities that could be capable of producing environmental impacts on air quality, water quality, noise, species, and more. The Annual Plan is not only "based upon 33 replacement wells" described in the Program Plan, but also pledges to undertake discretionary activities related to "facilities piping, tanks, and vessels" as well as to "plug[] wells to surface, in-zone, and conditional abandonments."[11] These are all activities that are capable of causing environmental changes and must be subject to environmental review. Further, just because the City is projecting to end its reliance on revenue from oil production by 2035,[12] that does not preclude the current plans (which extend to 2028) or future plans from triggering CEQA, given that the plans are capable of causing environmental impacts for many years to come.

Once CEQA review begins for the plans, it is likely that a full environmental impact report ("EIR") will be warranted because oil drilling activities may cause significant

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[6] *Cmtys. for a Better Env't v. City of Richmond*, 108 Cal. Rptr. 3d 478, 491 (Cal. Ct. App. 2010).
[7] Cal. Pub. Res. Code § 21080(a). Note that just because "further governmental decisions need to be made before . . . actual environmental impacts can be determined" does not mean an activity is not a project triggering CEQA review. *Muzzy Ranch Co. v. Solano Cnty. Airport Land Use Com.*, 41 Cal. 4th 372, 383 (2007), *as modified* (Sept. 12, 2007); *see also Save Tara v. City of W. Hollywood*, 45 Cal. 4th 116, 194 P.3d 344 (2008), *as modified* (Dec. 10, 2008) ("CEQA review may not always be postponed until the last governmental step is taken, because postponing the environmental review may incentivize ignoring environmental concerns.").
[8] Cal. Pub. Res. Code. § 21065 (emphasis added); CEQA Guidelines § 15378.
[9] *Union of Med. Marijuana Patients, Inc. v. City of San Diego*, 7 Cal. 5th 1171, 1199 (2019) (emphasis in original).
[10] *Id.* at 1197.
[11] Annual Plan 2023-24 at 3-5.
[12] *See* City of Long Beach, Recommendation from the Sustainable City Commission & Reducing Reliance on City Revenue from Oil Production (Jan. 2022 and Oct. 2021), http://longbeach.legistar.com/View.ashx?M=F&ID=10423777&GUID=CE2373C6-1897-4A8F-9FE8-858224EC882E.

environmental effects.[13] That EIR must present "feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such" activities.[14]

The foundational components of CEQA—transparency, analysis and information sharing, alternatives and enforceable mitigation measures, public comments and agency responses[15]—are vitally important to environmental protection and civic participation. Notably, *all* such components are absent in the City's current process for Program and Annual Plans. The draft plans provide no impacts analysis, offer no alternatives, and prescribe no mitigations. Moreover, the City provided only one week between release of the draft plans and the hearing date before City Council—hardly enough time for the public, and particularly those in overburdened and frontline communities—to digest the plans and offer comment. As such, the City is running afoul of CEQA and undermining public participation.

II. Impacts of Plan Activities

The plans prescribe drilling and operations activities that will lead to the production of over 26.2 million barrels of oil and over 12 billion cubic feet of natural gas. These activities will cause a range of direct and indirect environmental impacts. The drilling will put communities and ecosystems at risk of oil spills and other accidents, degrade groundwater aquifers, and cause subsidence which can lead to flooding and increased seismicity. The plan activities will lead to harmful air pollution as well as approximately the same greenhouse gas emissions as two coal-fired powerplants. The activities also perpetuate environmental injustice since much of the operations are within the health and safety buffer researchers have identified as necessary to avoid frontline communities at risk. Because of these foreseeable impacts, and others, the City must conduct a robust CEQA review.

A. The Plans Risk Harmful Oil Spills and Other Accidents

Oil spills are an inevitable consequence of oil drilling and can occur during every phase of onshore and offshore drilling, from exploration to extraction to transportation and refinement. California has seen spill after spill during the decades oil companies have been drilling on land and in our ocean. In the last two years alone, Orange County has seen multiple oil spills discharge tens of thousands of gallons of oil into the ocean, from breaks in pipes connecting offshore drilling operations to shore. And in 2015, the Plains All American pipeline ruptured and spilled up to 142,000 gallons of oil on the Santa Barbara coastline. While there are inherent risks in any drilling, the infrastructure in waters off California is especially susceptible to causing another disaster due to its age and condition, including Long Beach's oil islands and pipelines. Long Beach must consider the risk and mitigate the risk oil spills pose to the local community, the coastal ecosystem, endangered wildlife, and the economy.

In addition to the risks inherent in drilling for oil, hazards from climate change, such as increased severity of storms and sea level rise, increase the risk of oil spills and other accidents

[13] Cal. Pub. Res. Code § 21080(d); *see also* CEQA Guidelines §§ 15063(b)(1), 15064.
[14] Cal. Pub. Res. Code § 21002.
[15] *See* Cal. Pub. Res. Code § 21002, 21003.1; *see generally* CEQA Guidelines § 15002.

from aging infrastructure. Their old age also increases the risk of spills. For example, according to scientists, aging poses risks of corrosion, erosion and fatigue stress to subsea pipelines.[16] Subsea pipeline corrosion appears to accelerate over time,[17] and can act synergistically with fatigue stress to increase the rate of crack propagation.[18] Marine environments are especially known to produce significant corrosion on steel surfaces, and when a steel structure is at or beyond its elastic limit, the rate of corrosion increases 10 to 15 percent.[19] One offshore pipeline study found that after 20 years the annual probability of pipeline failure increases rapidly, with values in the range of 0.1 to 1.0, which equates to a probability of failure of 10 to 100 percent per year.[20]

The U.S. Department of Transportation itself found that offshore pipelines can be more vulnerable than onshore pipelines. They have a greater vulnerability to severe weather conditions than onshore pipelines, especially during hurricane events. And massive wave action can alter the pipeline stability, causing gradual displacement, especially in small diameter pipelines.[21] Offshore pipelines can also face more corrosion than onshore pipelines due to higher temperature and pressure conditions that occur during the laying of these pipelines.[22]

Oil spills have a wide array of lethal and sublethal impacts on terrestrial and marine species, both immediate and long-term. For example, a growing body of evidence demonstrate that even brief exposures to crude oil and its components can have severe impacts on fish and invertebrate species. Schlenker et al. (2022) investigated the response of wild mahi-mahi (*Coryphaena hippurus*) to crude oil exposure and found:

> profound effects on survival and reproduction in the wild. In addition to significant changes in gene expression profiles and predation mortality, we documented altered acceleration and habitat use in the first 8 days oil-exposed individuals were at liberty as well as a cessation of apparent spawning activity for at least 37 days. These data reveal that even a brief and low-dose exposure to crude oil impairs fitness in wild mahi-mahi.[23]

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[16] Petroleum Safety Authority Norway, Material Risk – Ageing offshore installations (2006) ("PSA Norway").
[17] Mohd, M.H. and J.K. Paik, *Investigation of the corrosion progress characteristics offshore oil well tubes*, 67 Corrosion Science 130-141 (2013).
[18] PSA Norway 2006.
[19] Mohd and J.K. Paik, *Pitting corrosion in pipeline steel weld zones*, 53:12 Corros. Sci. 4026–4032 (2011); R.E. Melchers, et al., *Statistical characterization of surfaces of corroded steel plates*, 23 Mar. Struct. 274–287 (2010).
[20] Bea, R., C. Smith, et al., Real-time Reliability Assessment & Management of Marine Pipelines, ASME, 21st Int'l Conference on Offshore Mechanics & Arctic Engineering (2002), https://asmedigitalcollection.asme.org/OMAE/proceedings-abstract/OMAE2002/36142/133/294825.
[21] U.S. Dep't of Transportation: Federal Highway Administration. Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: The Gulf Coast Study, Phase 2 (2014).
[22] Keuter, J., In-line Inspection of Pipes Using Corrosion Resistant Alloys (CRA) (2014), Rosen Technology and Research Center GmbH, Rosen Group, Germany; Standard Oil Company (1981) Drilling fluid bypass for marine riser. U.S. Grant. US4291772 A.
[23] Schlenker, Lela S. et al., *Brief oil exposure reduces fitness in wild Gulf of Mexico mahi-mahi* (*Coryphaena hippurus*), 56 Envt'l Sci. & Tech. 13019, 13019 (2022). *See also* Ek-Huchim, Juan Pablo et al., *Red blood cell cytotoxicity associated to heavy metals and hydrocarbons exposure in flouder fish from two regions of the Gulf of Mexico*, 108 Bull. Envt'l Contamination & Toxicology 78 (2022); McDonald, Ashley M. et al., *Prior*

Recent research demonstrates that fish exposure to oil and gas from any given lease—exposure that contributes to the cumulative stresses experienced by individual animals—rises to the level of significance. For example, Pulster et al. (2021) found that 99 percent of red snapper (*Lutjanus campechanus*) sampled throughout the Gulf of Mexico between 2011–2017 showed signs of liver damage (*e.g.*, inflammation, neoplasms and other lesions, parasites) associated with exposure to PAHs.[24] And Lawson et al. (2021) found that deep-sea invertebrate species including sea anemones, sea cucumbers, and sea pens bioaccumulate PAHs.[25]

Oil pollution poses a well-known and significant threat to seabirds.[26] Seabirds are particularly vulnerable to offshore oil and gas development because of their frequent contact with the water's surface, their myriad foraging strategies, and the propensity of oil—even the thinnest sheen—to adhere to the birds' plumage.[27] Birds may be exposed to oil through acute events like spills, and chronically through routine discharges and leaks.[28] Chronic oil exposure is more challenging to measure, but can have pervasive lethal, sublethal, and cascading effects that

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exposure to weathered oil influences foraging of an ecologically important saltmarsh resident fish, 10 PeerJ e12593 (2022).

[24] Pulster, Erin L. et al., *Hepatobiliary PAHs and prevalence of pathological changes in Red Snapper*, 230 Aquatic Toxicology 105714 (2021). Previous research has demonstrated that fish exposed to PAHs may experience reduced growth, endocrine disruption, reproductive harms, embryonic malformations, behavioral impairment, suppressed immune system function, skeletal and skin disorders, abnormal liver growths, cancer, and death. Peter Albers, Petroleum and Individual Polycyclic Aromatic Hydrocarbons, Ch. 14 *in* David J. Hoffman *et al.* (eds), Handbook of Ecotoxicology 352, 353 (2d ed. 2002); Tracy K. Collier et al., *Effects on fish of polycyclic aromatic hydrocarbons (PAHs) and naphthenic acid exposures*, 33 Organic Chemical Toxicology of Fishes 195, 197-98, 200-06, 211-22, 224-30 (2014); Ronald Eisler, Polycyclic aromatic hydrocarbon hazards to fish, wildlife, and invertebrates: a synoptic review, U.S. Fish & Wildlife Serv. Biological Report 85 (1.11) 32 (May 1987); Xavier Cousin & Jerome Cachot, *PAHs and fish—exposure monitoring and adverse effects—from molecular to individual level*, 21 Envtl. Sci. and Pollution Research 13685, 13688 (2014); Canadian Water Quality Guidelines for the Protection of Aquatic Life: Polycyclic Aromatic Hydrocarbons (PAHs) 5, 6, 8 (1999); Britton C. Goodale, Ph.D., Dissertation: Developmental toxicity of Polycyclic Aromatic Hydrocarbons: Defining Mechanisms with Systems-Based Transcriptional Profiling 8 (2013); Jerry F. Payne et al., Ecotoxicological Studies Focusing on Marine and Freshwater Fish, Ch. 11 *in* Peter E.T. Douben (ed.), PAHs: An Ecotoxicological Perspective 192, 201-06, 208-09 (2003). The harms of exposure may be passed down through the generations. Collier et al. at 222-24; Cousin & Cachot 16389; Payne et al. at 205-06.

[25] Lawson, M. Chase, et al. *PAH and PCB body-burdens in epibenthic deep-sea invertebrates from the northern Gulf of Mexico*, Marine Pollution Bulletin 162 (2021): 111825.

[26] Dias, M.P. et al., *Threats to seabirds: a global assessment*, 237 Biological Conservation 525 (2019).

[27] O'Hara, Patrick D. & Lora A. Morandin, *Effects of sheens associated with offshore oil and gas development on the feather microstructure of pelagic seabirds*, 60 Marine Pollution Bull. 672 (2010); Haney, J.C. et al., *Challenges to oil spill assessment for seabirds in the deep ocean*, 73 Arch. Environ. Contam. Toxicol. 33, 33 (2017).

[28] Jodice, P. G. R., et al., GoMAMN Strategic Bird Monitoring Guidelines: Seabirds, at 129-170 in R. R. Wilson, A. M. V. Fournier, J. S. Gleason, J. E. Lyons, and M. S. Woodrey (Eds.) (2019), Strategic Bird Monitoring Guidelines for the Northern Gulf of Mexico, Mississippi Agricultural and Forestry Experiment Station Research Bulletin 1228, Mississippi State University; Lamb, Juliet S., et al., *Seasonal variation in environmental and behavioural drivers of annual-cycle habitat selection in a nearshore seabird*, 26 Diversity & Distributions 254 (2020).

hinder species and ecosystem recovery.[29] Sublethal effects can occur even when oil is not visible.[30]

Marine mammals can be exposed to oil internally by inhaling volatile compounds at the surface, swallowing oil, consuming oil-contaminated prey, and externally by swimming in oil.[31] Exposure to toxic fumes from petroleum hydrocarbons during oil spills have been recently linked to mortality in cetaceans, even years after such accidents.[32] Studies have determined, for example, that the Deepwater Horizon oil spill caused adrenal and lung lesions in bottlenose dolphins which led to an unusual mortality event in which dolphins died over the course of several years.[33]

Oil spills can harm a wide variety of wildlife, which includes species protected under the Endangered Species Act ("ESA"). For example, ESA-listed sea otters are particularly vulnerable to contamination from oil spills. When sea otters come into contact with oil, it causes their fur to mat, which prevents the fur from insulating their bodies. Without this natural protection from the cold water temperature, sea otters can quickly die from hypothermia. The toxicity of oil can also be harmful to sea otters, causing liver and kidney failure and damage to their lungs and eyes.[34] ESA-listed western snowy plovers and the California least tern are extremely sensitive to disturbances such as oil spills, especially during the nesting season.[35]

ESA-listed fish also may be affected by the lease extensions. Tidewater goby is a small, endangered coastal fish that inhabits the coastal areas of California. Steelhead trout are an anadromous fish, and the southern California population is listed as endangered. They both have designated critical habitat in areas along the Southern California Coast.[36] Oil field pollution degrades tidewater goby habitat.[37] Fish are vulnerable to offshore oil and gas pollution and oil spills at all life stages.[38] For example, oil induced developmental abnormalities in laboratory

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[29] Peterson, Charles H. et al., *Long-term ecosystem response to the Exxon Valdez oil spill*, 302 Sci. 2082 (2003).
[30] Fallon, J.A. et al., *Ultraviolet-assisted oiling assessment improves detection of oiled birds experiencing clinical signs of hemolytic anemia after exposure to the deepwater horizon oil spill*, 29 Ecotoxicology 1399 (2020).
[31] NOAA, Analysis of Hydrocarbons in Samples Provided from the Cruise of the R/V WEATHERBIRD II, (May 23-26, 2010).
[32] Venn-Watson et al., *Adrenal Gland and Lung Lesions in Gulf of Mexico Common Bottlenose Dolphins (Tursiops truncatus) Found Dead following the Deepwater Horizon Oil Spill*. PLoS ONE 10(5): e0126538 (2015), doi:10.1371/journal.pone.0126538.
[33] *Id.*
[34] U.S. Fish and Wildlife Service, Southern Sea Otter (*Enhydra lutris nereis*) 5-Year Review: Summary and Evaluation (Sept. 15, 2015).
[35] U.S. Fish and Wildlife Service, Recovery Plan for the Pacific Coast Popultion of the Western Snowy Plover at 73 (Sept. 13, 2007). Available at https://www.biologicaldiversity.org/species/birds/western_snowy_plover/pdfs/2007%20recovery%20plan.pdf.
[36] 70 Fed. Reg. 52488-52627 (2005); 78 Fed. Reg. 8746-8819 (2013).
[37] U.S. Fish and Wildlife Service, Recovery Plan for the Tidewater Goby (2005).
[38] Bernanke, J. & H.R. Kohler, *The impact of environmental chemicals on wildlife vertebrates*, 198 Rev. Envtl. Contamination & Toxicology 1 (2009).

zebrafish,[39] and salmonid embryos exposed to oil exhibited reduced growth and significantly lower survival.[40]

Oil and gas activity also creates noise, light, and other pollution that can harm ESA-listed species. For example, Senzaki et al. (2020) found "that anthropogenic noise and light can substantially affect breeding bird phenology and fitness."[41] Noise pollution created by offshore oil and gas activity can also harm marine mammals. In addition, the air, water, noise, light, and vibration pollution from injection activities onshore extends beyond the well pad and affects nearby habitat. Numerous studies have documented density effects whereby wildlife species decrease use of preferable habitat areas or avoid habitat areas altogether in areas with increasing densities of oil and gas development, leading to indirect habitat loss.[42]

Wetlands, and the sensitive vegetation and species they support, are also vulnerable to oil spills. When marsh plants come into contact with crude oil, it can cause nearly complete mortality.[63] Additionally, the oil can reside in the soil and cause long-term stress for marsh vegetation and erosion of marshlands.[43] Salt marsh bird's-beak, Ventura marsh milkvetch, and other threatened and endangered plants along the Southern California coast are at risk.

The coastal areas affected by oil spills in California include some of the more important cultural resources for Indigenous people. For example, the disastrous spills in 1969 and 2015 off Santa Barbara harmed Chumash sacred sites and animals.[44] The 2021 Platform Elly pipeline spill has harmed Acjachemen and Tongva homelands and cultural resources. A spill in Long Beach would harm important cultural resources. Under CEQA, agencies must, when feasible, avoid damaging tribal cultural resources, which include sites, features, places, cultural landscapes, sacred places, and objects with cultural value to California Native American tribes.[45] Several tribal entities of the Acjachemen and Tongva nations hold critical cultural information regarding the cultural sites affected by the continued development of oil infrastructure, continued extraction, and continued threat of oil spills that threaten to impact these cultural resources and sacred sites. Oil spill response efforts without consultation with these entities risk further impacting cultural resources, and the City should consult early and often on these impacts and oil spill response plans. The City has the responsibility to engage in early and meaningful

[39] de Soysa, T. Yvanka et al., *Macondo crude oil from the Deepwater Horizon oil spill disrupts specific developmental processes during zebrafish embryogenesis*, 10 BMC Biology 40 (2012).
[40] Heintz, R.A. et al., *Delayed effects on growth and marine survival of pink salmon Oncorhynchus gorbuscha after exposure to crude oil during embryonic development*, 208 Marine Ecology Progress Series 205 (2000).
[41] Senzaki, Masayuki et al., *Sensory pollutants alter bird phenology and fitness across a continent*, 587 Nature 605 (2020).
[42] Beckmann, J.P. et al., *Human-mediated shifts in animal habitat use: Sequential changes in pronghorn use of a natural gas field in Greater Yellowstone*, Biological Conservation 147(1): 222-3 (2012); Dzialak M.R. et al., *Prioritizing conservation of ungulate calving resources in multiple-use landscapes*, PLOS One 6(1): e14597 (2011); Doherty, K.E. et al., *Greater sage-grouse winter habitat selection and energy development*, Journal of Wildlife Management 72: 187-195 (2008).
[43] NOAA, Oil Spills in Marshes (2013).
[44] Ben-Hur, Arielle, The Chumash Heritage National Marine Sanctuary: An Exploration of Changing the Discourse on Conservation, 105 Pitzer Senior Theses. 45-50 (2020).
[45] Cal. Pub. Res. Code § 21084.3.

consultation with tribes traditionally and culturally affiliated with the area (if such consultation is requested by the tribes).[46]

Oil spills also cause economic impacts, from closures of fisheries to lost revenue from tourism. Even before the 2021 oil spills in Orange County, an analysis found that since 1986, nearly 1400 oil and gas pipeline leaks, spills and other incidents in the California have caused at least $1.2 billion in damages, as well as 230 injuries and 53 deaths.[47] On average California has suffered 40 significant pipeline incidents a year, according to federal data.[48]

Other areas also experience significant costs as a result of oil spills. For example, tourism significantly declined after the 2010 BP Deepwater Horizon oil disaster in the Gulf of Mexico, even in neighboring states that were largely free of oil on their beaches.[49] Leisure visitor spending in Louisiana alone dropped by $247 million in 2010, with a total loss of $422 million over three years.[50] Even after shorelines are clean of oil, normal tourism activities may not resume if public perception of prolonged and wide-scale pollution remains.[51]

Both the Plains All American Oil Spill and the Platform Elly pipeline spill closed California fisheries and caused longer-term harm. The Deepwater Horizon disaster also has long lasting impacts on the region's fisheries. The long-term economic impact of the spill on commercial and recreational fisheries in the Gulf of Mexico is estimated at $8.7 billion.[52] California's economy similarly stands a lot to lose if an oil spill were to seriously impact the state's commercial fisheries. In 2017, approximately $210 million dollars in ex-vessel revenue (the amount paid directly to fishermen) came from commercial fishery landings, and more than 120,000 jobs on and off the water were supported by the state's seafood industry.[53]

B. Injection Wells Could Contaminate Drinking Water and Result in Earthquakes

The Plans will result in the injection of produced water containing chemicals used in oil production, and analysis must be done to ensure these injections do not contaminate drinking water in Long Beach or have other harmful impacts to human health and the environment including increased seismicity. Under CEQA, Long Beach must consider and mitigate direct and

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[46] *Id.* §§ 21080.3.1, 21080.3.2.

[47] Center for Biological Diversity, Analysis: Even Before Orange County Leak, California Pipeline Incidents Cased $1.2 Billion in Damages, available at https://biologicaldiversity.org/w/news/press-releases/analysis-even-before-orange-county-leak-california-pipeline-incidents-caused-12-billion-in-damages-2021-10-07/ (Oct. 2021).

[48] Pipeline and Hazardous Materials Safety Administration, Accident and Incident Data, available at https://www.phmsa.dot.gov/data-and-statistics/pipeline/distribution-transmission-gathering-lng-and-liquid-accident-and-incident-data

[49] Oceana, Oil Spills and Tourism: They Don't Mix (2015), https://coastalcarolinariverwatch.org/wp-content/uploads/2019/06/14Oil-Spills-Tourism-Dont-Mix-Oceana.pdf.

[50] The Impact of The BP Oil Spill on Visitor Spending in Louisiana: Revised estimates based on data through 2010 Q4 , Tourism Economics, prepared for the Louisiana Office of Tourism (June 2011).

[51] ITOPF 2014, Effects of Oil Pollution on Social and Economic Activities, https://www.itopf.org/fileadmin/uploads/itopf/data/Documents/TIPS_TAPS_new/TIP_12_Effects_of_Oil_Pollution_on_Social_and_Economic_Activities.pdf.

[52] Sumaila et al. 2012, *Impact of the Deepwater Horizon well blowout on the economics of US Gulf fisheries*, Canadian Journal of Fisheries and Aquatic Sciences, https://doi.org/10.1139/f2011-171.

[53] NOAA, Fisheries Economics of the United States (2017), https://media.fisheries.noaa.gov/2021-09/FEUS2017-final-v1.3.pdf

indirect impacts of allowing injection. Because injecting produced water is part of the process of producing oil and gas, all those impacts should be adequately disclosed, analyzed, and mitigated for the entire 5-year duration of this project.

CalGEM's independent scientific panel has recommended a 3,200 foot buffer between homes and all oil and gas activities, including injection, and Long Beach must ensure that it meets this minimum distance for all injection wells.[54] CalGEM has also questioned the validity of Long Beach's maximum allowable injection pressure, and in particular the current injection gradient.[55] If altered, this "would limit the Unit's ability to inject water and subsequently reduce produced volumes."[56] Long Beach must disclose the content of the discussions with CalGEM and why the agency believes the current injection pressures and gradients are insufficient to protect the environment, including human health.

1. *Risk of Aquifer Contamination*

The Plans make clear that new injection wells are anticipated in the coming years, but make no attempt to ensure they do not result in contamination of nearby aquifers. The Plans also suggest that injection wells will be drilled in more permeable layers, which could result in increased leaching into nearby aquifers.[57] (To support the "strategy to invest and minimize the decline of the LBU's oil production rate" . . . activities will include [d]rilling injection wells targeting increased throughout in the less mature sand layers"). At a very minimum, Long Beach must disclose what is in the water being injected, and the water quality of the aquifer being injected into. Because the risks of aquifer contamination are great, and because Long Beach relies upon local groundwater for 60% of its water use, the City must ensure injection wells do not risk the drinking water for any residents of Long Beach.[58]

As shown by a century-long hydrological record, California undergoes repeated cycles of drought and non-drought due to natural climate variability.[59] During drought periods—when precipitation and snow pack are at a minimum—the state is forced utilize its groundwater reserves to meet it agricultural and drinking water needs. With ever-progressing climate change, such demand will only increase as drought-favorable conditions become more prevalent.[60]

Studies show that anthropogenic warming contributed to the severity of the recent California drought. One study attributes as much as 27 percent of California 2012-14 drought

[54] PSE Berkeley, Response to CalGEM Questions for the California Oil and Gas Public Health Rulemaking Scientific Advisory Panel (Oct. 1, 2021), https://www.conservation.ca.gov/calgem/Documents/public-health/Public%20Health%20Panel%20Responses_FINAL%20ADA.pdf.
[55] Program Plan at 13.
[56] *Id.*
[57] *Id.* at 27.
[58] Long Beach Water, Water Sources, available at https://lbwater.org/water-sources/ ("Roughly 60% of the Long Beach water supply is local groundwater).
[59] *See* Cheng, L. et al., *How has human-induced climate change affected California drought risk?*, 29 Journal of Climate 111 (2016); Diffenbaugh, N.S. et al., *Anthropogenic warming has increased drought risk in California*, 112 PNAS 3931 (2015); Williams, A.P., *Contribution to anthropogenic warming to California drought during 2012-2014*, 42 Geophys. Res. Lett. 6819 (2015).
[60] *Id.*

severity to anthropogenic warming, with natural variability accounting for the remainder.[61] As a result, drought severity was record-breaking in many counties.[62] This is because higher temperatures increase soil moisture loss, alter the timing of snowmelt, and decrease reservoir levels due to increased evaporation.[63]

In the future, municipalities may need to look not just to seawater, but to aquifers previously considered too salty to be usable, as a source of drinking water. The SDWA mandates protection of future drinking water sources as well as current sources. Given the potential for desalination and other treatment systems to render what was previously considered unusable water potable, the City must protect "freshwater" using a protective approach that more accurately reflects current technology in water treatment, and the necessity of preserving the future availability of sufficient fresh water during times of drought.

The fragile state of groundwater makes any potential impact of great and significant concern. All oil and gas wells, cyclic steam wells included, use a host of chemicals that are harmful to the environment and human health that would jeopardize groundwater. Recent studies have found numerous chemicals contained in fluid involved in routine oil production operations are harmful to human health.[64, 65] These include injection activities like waste disposal and enhanced oil recovery.[66] Disposal wells may receive wastewater that contains chemicals used to perform well maintenance or other chemical-dependent processes. Oil and gas wastewater and fluids injected for enhanced oil recovery may contain additional chemicals added in other phases of production or maintenance of a well.

Contaminating nearby aquifers would be an irreversible disaster. The State Water Resources Control Board explained to the state legislature recently that injection wells across the state have already contaminated scores of aquifers: "any injection [from injection wells] into the aquifers that are not exempt has contaminated those aquifers."[67] And once contaminants reach an aquifer, according to the Water Board, "you don't clean up aquifers, you contain the spread of

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[61] Williams, A.P., *Contribution to anthropogenic warming to California drought during 2012-2014*, 42 Geophys. Res. Lett. 6819 (2015).
[62] *Id.*
[63] Gleick, Peter, Circle of Blue, Clarifying the Discussion about California Drought and Climate Change (Mar. 7, 2014), *available at*: http://www.circleofblue.org/2014/in-the-circle/peter-gleick-clarifying-discussion-california-drought-climate-change/.
[64] Stringfellow WT, et al., *Comparison of chemical-use between hydraulic fracturing, acidizing, and routine oil and gas development*, 12 PLoS ONE(4): e0175344 (2017), https://doi.org/10.1371/journal.pone.0175344.
[65] *See* Shonkoff, S., "Hazard Assessment of Chemical Additives Used in Oil Fields that Reuse Produced Water for Agricultural Irrigation, Livestock Watering, and Groundwater Recharge in The San Joaquin Valley of California: Preliminary Results," PSE Health Energy Technical Report (Sept. 2016).
[66] *Id.*, citing Muggeridge, A, et al., *Recovery rates, enhanced oil recovery and technological limits*, Phil Trans R Soc A. 372:20120320 (2014), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3866386/.
[67] Transcript: Joint Oversight Hearing: Senate Natural Resource and Water and Environmental Quality Committees, "Ensuring Groundwater Protection: Is the Underground Injection Control Program Working?" Jonathan Bishop speaking at 74, (March 10, 2015). See also, CalEPA 2015, Memo: CalEPA Review of UIC Program,
https://sntr.senate.ca.gov/sites/sntr.senate.ca.gov/files/3_10_15_cal_epa_review_of_uic_program.pdf.

contamination."[68] Thus, any plans that puts groundwater at risk could lead to irreversible damage. Long Beach should not be jeopardizing groundwater for the benefit of the oil industry.

Injection activity does not occur in isolation. Operators use chemicals in all stages of oil production, such as drilling muds to facilitate the drilling process, powerful cleaning solvents, or chemical mixtures designed to maintain the well. Unfortunately, neither state nor federal regulations require companies to fully disclose the chemical identities or volumes used. While some chemicals have been identified, a substantial portion of chemicals remain secret. This is worrisome because enhanced oil recovery operations like cyclic steam injection commonly employ harmful chemicals acting as surfactants, polymers, caustics, or biocides to facilitate the operation.

The City must be aware of the full spectrum of substances being injected in order to regulate effectively. Accordingly, the range of substances to be tested for must be expanded, so that regulators and operators are aware of all fluids and chemicals injected or emplaced into a Class II injection well. Without such chemical information, it is impossible to detect contamination or predict how chemicals will interact or migrate in the subsurface.

The potential for harm is evident from past studies of oil and gas activities. CalGEM itself acknowledges that there are potential pathways for the chemicals and hydrocarbons to migrate underground. For example, "[o]ther wells within the area of review that penetrate the injection zone could potentially serve as conduits for fluid migration."[69]

The injection wells themselves may become conduits for fluid migration. In cyclic steam injection, the repeated soaking of the formation with very hot steam creates "large temperature variations and formation movements," putting extreme pressure on the ground and well casing, which can cause well failure or the migration of fluids and steam.[70] Indeed, "[c]yclic steam injection presents some of the harshest conditions" under which a well can be placed.[71] Thus, it is not surprising that rates of well casing failure from "excessive deformation, buckling, and collapse" are especially high in cyclic steam injection wells.[72] Further, the injection of hot steam can deform the surrounding formation and overlying ground so much that cyclic steaming can result in the migration of fluids and steam. This can sometimes pollute underground aquifers. It can also result in "surface expressions," in which the steam, oil, gas, and whatever else might be mixed in underground come bubbling to, or even exploding out of the surface of the ground.[73]

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[68] *Id.* at 73.
[69] Division of Oil, Gas, and Geothermal Resources (DOGGR), Initial Statement of Reasons In Support of Updated Underground Injection Control Regulations (2018) ("Statement of Reasons 2018"), at p. 16.
[70] Xie, Jueren, Analysis of Casing Deformations in Thermal Wells (2008), https://www.researchgate.net/publication/308709003_Analysis_of_Casing_Deformations_in_Thermal_Wells.
[71] Kulakofsky, David, Achieving Long-Term Zonal Isolation in Heavy-Oil Steam Injection Wells, a Case History (Aug. 2008), DOI: 10.2118/115201-MS.
[72] Wu, Jiang, Casing Temperature and Stress Analysis in Steam-Injection Wells, paper presented at the International Oil & Gas Conference and Exhibition (December 2006); *see also* Wu, Jiang, Casing Failures in Cyclic Steam Injection Wells (2008).
[73] Cal. Dep't of Conservation, Division of Oil, Gas, and Geothermal Resources, Report of Occurrences,

Cyclic steam injection leads to changes subsurface pressures, which are poorly understood and opens the door to fluid migration. A scientist at Lawrence Berkeley National Laboratory explained:

> "As important as the subsurface is for U.S. energy strategy, our understanding of how the subsurface responds to common perturbations, such as those caused by pulling fluids out or pushing fluids in, is quite crude.…We're not able to manipulate the subsurface with the control that can guarantee that we're not only maximizing energy production or waste storage, but that we're also protecting our environment—including minimizing greenhouse gas emissions, impacts to groundwater, and induced seismicity. That's a significant gap."[74]

Cyclic steam operations will lead to significant and unavoidable impacts for surface and groundwater. In the winter of 1995, six well casings in a field in Alberta, Canada, failed under the pressure of cyclic steam stimulation.[75] Similar to projects in Long Beach, the operations were pursuing heavy oil at relatively shallow depths.[76] The failures released approximately 55,000 cubic meters of "oil, saline produced water, and solids" to the environment, polluting two groundwater aquifers in the process.[77]

2. *Increased risk of earthquakes*

The mechanisms linking wastewater injection and earthquakes are well understood: injection-induced increases in fluid pressure within aquifers and fault lubrication by injected fluids have the potential to destabilize well bores and cause preexisting faults to slip.[78] Such mechanisms serve to explain atypical seismic activity, such as the extensively documented earthquakes in the central and eastern United States. There, earthquake count has increased dramatically over the last decade, with more than 300 earthquakes with $M \geq 3$ between 2010 and 2012, or an average of 100 events/year, compared with an average rate of 21 events/year for the period spanning 1967 to 2000.[79] This surge of activity includes a magnitude 5.7 earthquake that struck Oklahoma in 2011, in close proximity to active hydraulic fracturing wastewater wells,[80]

The Chevron Fatality Accident, June 21, 2011, and Area Surface Expression Activity, Pre and Post Accident, Sections 21 & 22 T.32S./R.23E., Midway-Sunset Oil Field, Kern County (May 2012) ("Accident Report"); Cal. Dep't of Conservation, Division of Oil, Gas, and Geothermal Resources, Reports of Occurrence: Surface Expressions in Bakersfield (2011) ("Spill Binder").

74 Chao, J., "Underground Science: Berkeley Lab Digs Deep For Clean Energy Solutions," Lawrence Berkeley National Laboratory (Oct. 19. 2016), quoting Susan Hubbard, Associate Director, available at http://newscenter.lbl.gov/2016/10/19/berkeley-lab-digs-deep-clean-energy-solutions/.

75 Kennedy, Alan and Calvin Sikstrom, *Assessment and Remediation of a Heavy-Oil Spill into Groundwater Aquifers*, International Oil Spill Conference Proceedings, Vol. 1997, No. 1, pp. 347-363 (April 1997).

76 *Id.*

77 *Id.*

78 Brodsky, Emily and Lisa J. Lajoie, *Anthropogenic Seismicity Rates and Operational Parameters at the Salton Sea Geothermal Field*, 341 Science (2013); Davies, Richard et al., *Induced Seismicity and Hydraulic Fracturing for the Recovery of Hydrocarbons*, 45 Marine and Petroleum Geology 171 (2013).

79 Ellsworth, William, *Injection-Induced Earthquakes*, 341 Science (July 12, 2013), https://www.science.org/doi/10.1126/science.1225942.

80 Keranen, Katie M. et al., P*otentially Induced Earthquakes in Oklahoma, USA: Links between Wastewater Injection and the 2011 Mw 5.7 Earthquake Sequence*, 41 Geology 699 (2013).

and a 5.8 magnitude quake on September 3, 2016 that proved to be the most powerful earthquake ever recorded in Oklahoma.[81]

Detecting induced events in California has received less attention due to the greater background seismicity in the West. However, such connections have been made, as is the case in a published 2016 study linking wastewater injection in the Tejon Oil Field in Kern County to a September 2005 earthquake swarm of three $M \geq 4$ events near the White Wolf Fault.[82]

Given California's history with earthquakes and the noted links between wastewater injection and seismicity, these plans should not be approved without adequate consideration of these threats.

In Oklahoma, wastewater injection has already led to a magnitude 5.8 earthquake.[83] The earthquake's epicenter was an unknown fault.[84] The proposed regulations require disclosure of only previously *known* faults. This leaves the operator with no requirement to seek out any unmapped fault lines, like the one triggering Oklahoma's record earthquake, before injection operations begin.

Seismic monitoring should apply to all injection wells. Until more is known about the link between injection activity and seismic events, it is necessary to collect more data on earthquakes near injection activity. By failing to require data collection on injection wells, Long Beach is eschewing an important opportunity to further study how injections may lead to increased seismic activity.

3. *Track record of missing well integrity tests*

An analysis of state public records between 2015 and 2018 from California's Division of Oil, Gas and Geothermal Resources showed that the THUMS offshore platforms had long lapses with missing well integrity tests that are required by state law at least every five years. Most of the missing and failed well tests in the THUMS notices of violation were for underground injection wells, which are used to stimulate oil and gas production and help prevent the land subsidence that has caused billions of dollars in damage to Long Beach. Drilling wastes contaminated with toxic chemicals and heavy metals can be injected into these wells, which state law requires to be enclosed and able to withstand pressure so the ocean and freshwater aquifers don't get contaminated. "Mechanical integrity tests" are required before any underground injections take place. THUMS had 103 violations for missing tests and 47 failed tests, and Tidelands had 68 missing tests and 10 wells that failed the tests over the past three years.[85] Long

[81] Chen, Xiaowei et al., *The Pawnee earthquake as a result of the interplay among injection, faults and aftershocks*, 7 Nature Scientific Reports 4945 (2017).
[82] Goebel, T.H.W. et al., *Wastewater Disposal and Earthquake Swarm Activity at the Southern End of the Central Valley, California*, 43 Geophys. Res. Lett. 1092 (2016), https://doi.org/10.1002/2015GL066948.
[83] Yeck, W. L., et al., *Oklahoma experiences largest earthquake during ongoing regional wastewater injection hazard mitigation efforts*, 44 Geophys. Res. Lett. (2017), doi:10.1002/2016GL071685.
[84] *Id.*
[85] Center for Biological Diversity, "Records: Nearly 400 Violations at California Offshore Drilling Operations (April 11, 2018), https://www.biologicaldiversity.org/news/press_releases/2018/offshore-drilling-04-11-2018.php#:~:text=THUMS%20had%20103%20violations%20for,over%20the%20past%20three%20years; *see also* Database of Violations (included in references).

Beach must ensure that oil and gas operations are performing the proper well integrity tests to ensure adequate protection of the environment and human health.

C. Enhanced Oil Recovery

The Program Plan leaves open the possibility for enhanced oil recovery to "be considered for implementation if economically and technically viable."[86] Long Beach must examine and mitigate the impacts of such dangerous oil and gas extraction techniques under CEQA.

Enhanced oil recovery involves the injection of fluids or steam underground to increase the flow of oil and gas to the surface. Enhanced oil recovery techniques may combine injected fluids or steam with harmful chemicals used as surfactants. And while there are a number of enhanced oil recovery technologies, some elements are common to all processes; the use of a recovery fluid, a system to inject recovery fluids, surface processing, and a need to dispose of waste materials.[87] As a result, the environmental risks of enhanced oil recovery are shared by all methods.

Groundwater contamination: As discussed above, migration of injection fluids into drinking water aquifers is concerning due to the potentially hazardous substances those fluids may contain.[88] Chemical additives are often added to help increase production, and disclosure of contaminants in not required by federal or state regulations. Post injection, dissolution of other contaminants present in oil reservoirs can introduce new compounds into the fluid that will be recovered with oil. Contamination of groundwater is a major concern as approximately 60% of Long Beach's water needs are filled by local groundwater.[89] Health risks from chemicals migrating into Long Beach's groundwater must be adequately examined and mitigated.

Air pollution: As detailed below, oil and gas drilling in Long Beach results in emissions of hazardous air pollutants include volatile organic compounds and considerable greenhouse gas pollution. The pressure and heat needed for extended oil recovery operations can lead to significantly larger quantities of air pollution that conventional oil and gas extraction techniques. The California Air Resources Board itemized a number of sources associated with operational activities including steam generators, steam drive wells, cyclic steam wells, fugitive emissions from the wellhead, valves, fittings, and evaporation from sumps and pits.[90] The air pollution from these operational activities will be a significant impact if the Plans authorize extended oil recovery. In addition, the energy required to create the steam and transport the oil makes

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[86] Program Plan 2023-28 at 6.
[87] *See* Clean Water Action, Environmental Risks and Oversight of Enhanced Oil Recovery (2017), https://www.cleanwateraction.org/sites/default/files/docs/publications/Environmental%20Risks%20and%20Oversight%20of%20Enhanced%20Oil%20Recovery%2011.08.17a.pdf.
[88] Stringfellow, et al., Comparison of chemical-use between hydraulic fracturing, acidizing, and routine oil and gas development, 12 PLoS ONE(4): e0175344 (2017) https://doi.org/10.1371/journal.pone.0175344.
[89] Long Beach Water, Groundwater, available at https://lbwater.org/water-sources/ground-and-imported-water/.
[90] CCST Report Vol. II at p. 199, citing CARB (California Air Resources Board) (2013), Almanac Emission Projection Data: 2012 Estimated Annual Average Emissions by California Air District, http://www.arb.ca.gov/ei/maps/statemap/dismap.htm.

California's oil production some of the most carbon-intensive in the world, especially from fields that rely on enhanced oil recovery.[91]

Worker safety: California regulators now rightly *presume* injections into diatomaceous formations "creates a risk of surface expressions…."[92] These surface expressions have occurred frequently and with disastrous effects. On June 21, 2011, a Chevron worker was killed when investigating steam coming from a surface expression caused by cyclic steaming in Kern County's Midway-Sunset oil field.[93] When approaching the plume of steam, the ground gave way, and the worker fell into a sinkhole and died.[94] In May 2012, California's Division of Oil, Gas, and Geothermal Resources (now known as CalGEM) issued a report on the tragedy.[95] As with the Plan at issue, operations in the Midway-Sunset oil field were using enhanced oil recovery (cyclic steam injection) to exploit shallow heavy oil deposits.[96]

D. Subsidence and Increased Impacts from Sea Level Rise, Storm Surges, and Flooding

Long Beach admits in its Program Plan that "the oil reservoir zones of the Wilmington Oil Field are susceptible to compaction" and "[a] major goal during the operation and development of the Unit is the continued prevention of subsidence related to oil and gas production."[97] Long Beach must examine and mitigate the risks of subsidence under CEQA, especially as subsidence will be exacerbated by sea level rise, storm surges, and flooding caused by climate change.

Land subsidence in Long Beach is caused by the extraction of oil and gas from underground reservoirs. Long Beach is home to one of this country's most dramatic cases of land subsidence caused by oil and gas production; between 1928 and 1965, the community sank almost 30 feet. As the oil reservoirs were depleted, sand compaction caused a land subsidence that flooded streets and wharfs and caused structural damage to bridges, railroads, and other harbor facilities.[98]

While subsidence in Long Beach in recent years is less dramatic, subsidence is still a major issue. One recent study that examined subsidence in Long Beach was conducted by the

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[91] Center for Biological Diversity, Killer Crude: How California Produces Some of the Dirties, Most Dangerous Oil in the World (2021), https://www.biologicaldiversity.org/programs/climate_law_institute/pdfs/June-2021-Killer-Crude-Rpt.pdf.
[92] Statement of Reasons at p. 30.
[93] Department of Conservation Division of Oil, Gas and Geothermal Resources, Executive Summary of Report of Occurrences: The Chevron Fatality Accident June 21, 2011 and Area Surface Expression Activity Pre and Post Accident – Sections 21 & 22 T.32S./R.23E., Midway-Sunset Oil Field Kern County (May 2012). (aka "Accident Report ES"); Accident Report at 2.
[94] *Id.* at 2.
[95] *Id.* at 1.
[96] *Id.* at 9.
[97] Program Plan 2023-28 at 11.
[98] USGS, National Assessment of Coastal Change Hazards (2003), https://pubs.usgs.gov/of/2003/of03-337/extraction.html.

United States Geological Survey ("USGS") in collaboration with the City of Long Beach.[99] The study, published in 2018, used satellite data to measure changes in land surface elevation in Long Beach over a 17-year period. The study found that parts of Long Beach had subsided by as much as 9 inches during that time period, with the greatest subsidence occurring in areas where oil extraction had taken place.

The impacts of land subsidence are particularly dire near sea level where minor lowering of the land surface results in permanent inundation. Not only are many of Long Beach wells near sea level, but sea level rise in coming years will compound the subsidence problem and result in increased flooding. In the Los Angeles region, containing all of Ventura, LA, and Orange Counties, roughly 1 to 2 feet of sea level rise is projected by mid-century, with the most extreme projections predicting 8 to 10 feet of sea level rise by the end of the century.[100] Scientific estimates suggest that sea level rise in California could be at least half of a foot just in 2030.[101] In its recent adopted Climate Action Plan, the city of Long Beach projected 11 inches of sea level rise by 2030.[102] As drilling in Long Beach exacerbates land subsidence in the community, the impacts of sea level rise will become increasingly severe.

The City of Long Beach has voiced extreme concern at the prospect of sea level rise and resulting economic impacts.[103] For example, in its Climate Action Plan, Long Beach acknowledges that "permanent inundation from [sea level rise] as well as increased frequency and intensity of temporary flooding from king tides and storm surges will become a very real threat in the near future." The Plan identifies a number of actions the City will take to address sea level rise and flooding.[104] These include relocating/elevating critical infrastructure, including elevating riverine levees and flood proofing vulnerable sewer pump stations, elevating streets and pathways, extending sea walls, and investigating the feasibility of a managed retreat in the long term.[105] Despite the concern the City professes to have for the impacts of sea level rise, it continues to allow oil and gas drilling that will inevitably increase subsidence and vulnerability to sea level rise, as well as produce the very emissions that causes sea level rise in the first place.

The subsidence caused by drilling in Long Beach will also result in increased expense to mitigate the harm of sea level rise. With 11 inches of sea level rise (predicted by 2030), approximately 1.3 million square feet of buildings are projected to be exposed to annual king tides. Approximately half of these buildings are residential (624,100 square feet) and half are

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[99] USGS, Comparison of regression relations of bankfull discharge and channel geometry for the glaciated and nonglaciated settings of Pennsylvania and southern New York (2018), https://pubs.er.usgs.gov/publication/sir20185066.
[100] California's 4th Climate Change Assessment, Los Angeles Region Report, https://www.energy.ca.gov/sites/default/files/2019-11/Reg%20Report-%20SUM-CCCA4-2018-007%20LosAngeles_ADA.pdf.
[101] Legislative Analyst's Office, What Threat Does Sea Level Rise Pose to California (2020), https://lao.ca.gov/reports/2020/4261/sea-level-rise-081020.pdf.
[102] City of Long Beach, Climate Action Plan at 16 (2022), https://longbeach.gov/globalassets/lbds/media-library/documents/planning/lb-cap/adopted-lb-cap_-aug-2022.
[103] *Id.* at 55.
[104] *Id.* at 11-12.
[105] *Id.*

commercial (689,600 square feet).[106] At the very least, Long Beach must examine to the degree to which oil and gas drilling exacerbate the burdens of sea level rise within the city.

In addition, larger storms are predicted in the future, resulting in increased rainfall, flooding, and storm surges. According to the Climate Action Plan: "Urban flooding during precipitation events is already a problem in Long Beach, and extreme events today provide an example of what may become more common in the future, when more intense precipitation events are projected."[107] As Long Beach experiences heightened storm surges and king tides, battering the coast, subsidence will increase water inundation and cause innumerable problems for residents of the city.

E. Environmental Justice

There are significant environmental justice impacts from drilling in the Long Beach Unit. According to analysis by FracTracker, an estimated 140,138 Long Beach residents—amounting to over 30% of the City's population—live within 3,200 feet of an operational oil and gas well within the city limits.[108] Of those, 101,498 (72.4%) are people of color.[109]

According to CalEnviroScreen, communities living near Long Beach Unit drilling activities are in the highest percentiles for pollution vulnerability. The CalEnviroScreen map below "shows the combined Population Characteristics scores, which is made up of indicators from the Sensitive Populations and Socioeconomic Factors components of the CalEnviroScreen model. Population Characteristics represent physiological traits, health status, or community characteristics that can result in increased vulnerability to pollution."[110]

Environmental justice is increasingly being incorporated into State decisionmaking, and CEQA is an important environmental justice tool. The State Attorney General announced that his office "is particularly concerned that land use planning and permitting decisions consider and address any additional burdens on environmental justice communities."[111] And as stated by the California Environmental Justice Alliance, "CEQA protects the basic rights of disadvantaged or EJ communities in California. These rights include the right to clean air and water, [and] the right to participate in local land use decisions, and the right to affordable housing and good schools free from pollution and other harms."[112] As shown above, environmental justice considerations are directly relevant to LBU plans. The City's current process to prepare, propose, and adopt Program and Annual Plans ignores the need to take environmental justice considerations into account.

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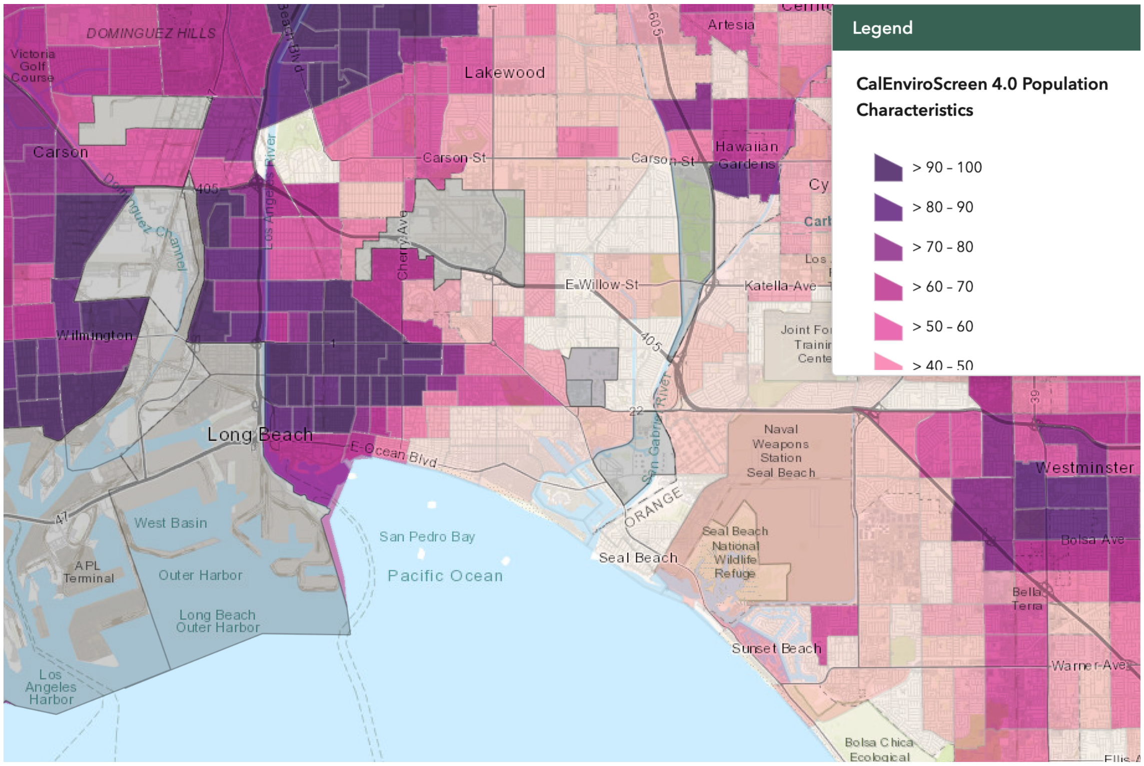
[106] *Id.* at 23, Appendix C.
[107] City of Long Beach, Climate Action Plan at 56.
[108] FracTracker, City of Long Beach Oil and Gas Extraction (April 1, 2022) at 2.
[109] *Id.*
[110] OEHHA, CalEnviroScreen 4.0, https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40 (search for "Long Beach" and "Population Characteristics").
[111] Bon Bonta, Cal. Attorney General, https://oag.ca.gov/environment/justice.
[112] Cal. Environmental Justice Alliance, Protect CEQA to Advance Environmental Justice and Protect Housing, https://caleja.org/2019/05/protect-ceqa-to-advance-environmental-justice-and-protect-housing/.



F. Greenhouse Gas Emissions & Air Pollution

Drilling and other oil field operations in the LBU produce significant air pollution and greenhouse gas ("GHG") emissions, impacts that must be analyzed and mitigated under CEQA.[113]

The climate crisis, caused primarily by fossil fuels, poses an existential threat to every aspect of society. In the words of the State Lands Commission:

> Climate change is an existential threat that grows more urgent each passing day . . . . The State of California, the fifth largest economy in the world, is aggressively pursuing various options to reduce greenhouse gas emissions and deaccelerate the impacts of climate change. The United Nation's Intergovernmental Panel on Climate Change has found that emissions from fossil fuels are the dominant cause of global warming. Oil, a fossil fuel that releases an enormous amount of carbon when burned, exacerbates climate change.[114]

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[113] *See generally* CEQA Guidelines § 15126.2; Appendix G (naming GHG emissions and air quality as environmental factors that must be evaluated for significance).
[114] State Lands Commission, Staff Report 52 (Feb. 25, 2022), https://slcprdwordpressstorage.blob.core.windows.net/wordpressdata/2022/02/02-25-22_52.pdf.

Indeed, the vast scientific literature documenting these findings has been set forth in a series of authoritative reports from the Intergovernmental Panel on Climate Change ("IPCC"), U.S. Global Change Research Program, and other institutions, which make clear that fossil-fuel driven climate change is a "code red for humanity."[115] Without limits on fossil fuel production and deep and rapid emissions reductions, global temperature rise will exceed 1.5°C and will result in catastrophic damage in the U.S. and around the world.[116]

While the City has made statements to the effect of, "Long Beach knows and supports the position that oil production is not in our long-term future,"[117] the LBU continues to produce millions of barrels of oil each year. In 2015, "oil fields in Long Beach [likely referring to the entire Wilmington field] produced more than 13 million barrels of crude oil, representing significant [GHG] emissions."[118] Those 13 million barrels of crude oil (and 5.1 million Mcf of natural gas extracted) "generated an estimated 8.3 million MT CO2e in lifecycle emissions."[119] This is the equivalent of over 1.7 million gasoline-powered passenger cars driven for one year, or the annual operations of 2.2 coal-fired power plants.[120] Similarly, in 2022, the City reported production of approximately 10 million barrels of oil per year.[121]

According to a 2020 study conducted as part of the City's climate action planning, approximately 96 percent of the city's oil and gas lifecycle emissions are attributed to oil, with the remaining 4 percent resulting from natural gas.[122] That same study determined that Long Beach oil field carbon intensity is 5.48 gCO2e/MJ, which puts the oil field at 94th out of 157

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[115] *See* United Nations Secretary-General, Secretary-General's statement on the IPCC Working Group 1 Report on the Physical Science Basis of the Sixth Assessment, Aug. 9, 2021, https://www.un.org/sg/en/content/secretary-generals-statement-the-ipcc-working-group-1-report-the-physical-science-basis-of-the-sixth-assessment.
[116] IPCC, Summary for Policymakers, In: Global Warming of 1.5°C.:An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (2018) [Masson-Delmotte, V. et al. (eds.)], https://www.ipcc.ch/sr15/.
[117] City of Long Beach, Recommendation from the Sustainable City Commission (March 15, 2022) at 19, https://www.longbeach.gov/globalassets/city-manager/media-library/documents/memos-to-the-mayor-tabbed-file-list-folders/2022/march-15--2022---recommendation-from-the-sustainable-city-commission; *see also* City of Long Beach, Recommendation from the Sustainable City Commission & Reducing Reliance on City Revenue from Oil Production (Jan. 2022 and Oct. 2021) at 4, http://longbeach.legistar.com/View.ashx?M=F&ID=10423777&GUID=CE2373C6-1897-4A8F-9FE8-858224EC882E.
[118] City of Long Beach, Appx G, Proposed Climate Action and Adaptation Plan (Nov. 2020) at 1, https://www.longbeach.gov/globalassets/lbds/media-library/documents/planning/lb-cap/lb-caap-proposed-plan-app-g-_dec-14 ("Appx G Climate Plan").
[119] Appx G Climate Plan at 1.
[120] *See* EPA, Greenhouse Gas Equivalencies Calculator, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results.
[121] City of Long Beach, Recommendation from the Sustainable City Commission (March 15, 2022) at 5, https://www.longbeach.gov/globalassets/city-manager/media-library/documents/memos-to-the-mayor-tabbed-file-list-folders/2022/march-15--2022---recommendation-from-the-sustainable-city-commission.
[122] Appx G Climate Plan at 1.

when ranked lowest to highest.[123] This suggests that even among other California oil fields, the majority have a lower carbon intensity value than Long Beach oil.[124]

The City cannot ignore the plain fact that its oil and gas drilling operations results in significant climate impacts. The current draft Program Plan projects that over the next five years, **LBU expects to produce over 26.2 million barrels of oil and over 12 billion cubic feet of natural gas**.[125] Those are tremendously high numbers and represent an *increase* over what the Program Plan for 2021-26 anticipated.[126] The City's own report acknowledges that "[u]pstream emissions occur at the oil fields within the city boundary" and because "[t]he City issues well permits for petroleum operations, [it] has relatively more direct control over these emissions."[127] Even if oil and gas operations had no other environmental and public health impacts (which clearly is not the case), these massive GHG emissions would warrant analysis and mitigation under CEQA.

Similarly, it is well-documented that oil field operations result in significant impacts to air quality and expose communities and sensitive receptors to substantial air pollution concentrations.[128] Oil and gas operations emit large amounts of volatile organic compounds ("VOCs") and nitrous oxides ("NOX").[129] The oil and natural gas industry is the largest industrial source of emissions of VOCs, a group of chemicals that contribute to the formation of ground-level ozone (smog).[130] Ozone exposure is linked to a wide range of health effects, including aggravated asthma, increased emergency room visits and hospital admissions, and premature death.[131]

The VOCs emitted include the BTEX compounds—benzene, toluene, ethyl benzene, and xylene—which are Hazardous Air Pollutants.[132] There is substantial evidence of the harm from

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[123] *Id.* at 8.
[124] *Id.*
[125] Draft Program Plan 2023-28, Exhibit C.
[126] Program Plan 2021-26, Exhibit C (projecting just over 25.4 million barrels of oil produced over five years). Moreover, the City showed its discretion because it increased production numbers anticipated in 2023-26 over what it prescribed in the 2021 Program Plan for the time period. For example, the City expected 5,037,000 barrels per year in 2023/24 (2021-26 Program Plan) but increased that to 5,365,000 (2023-28 Program Plan).
[127] Appx G Climate Plan at 2.
[128] *See, e.g.*, Stanford News, "Living near oil and gas wells increases air pollution exposure, according to Stanford research" (Oct. 21, 2021), https://news.stanford.edu/2021/10/12/living-near-oil-gas-wells-increases-air-pollution-exposure/.
[129] *Id.*
[130] EPA, "Basic Information about Oil and Natural Gas Air Pollution Standards," https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/basic-information-about-oil-and-natural-gas#:~:text=In%20addition%20to%20helping%20form,and%20other%20serious%20health%20effects.
[131] *Id.*
[132] Each has also been identified as a carcinogen. Mall, Amy, Petition for Rulemaking Pursuant to Section 6974(a) of the Resource Conservation and Recovery Act Concerning the Regulation of Wastes Associated with the Exploration, Development, or Production of Crude Oil or Natural Gas or Geothermal Energy at 13 (Sep. 8, 2010); 42 U.S.C. § 7412(b).

these pollutants, including cancer and other serious health effects.[133] One analysis found that 37 percent of the chemicals used during natural gas drilling, fracturing, and production were volatile, and that of those volatile chemicals, 81 percent can harm the brain and nervous system, 71 percent can harm the cardiovascular system and blood, and 66 percent can harm the kidneys.[134] Exposure to benzene has been associated with increased incidence of leukemia and other serious health conditions; exposure to toluene can damage the nervous system; and xylenes can cause dizziness, headaches, and loss of balance.[135] Another study found that among known air contaminants, compounds of particular concern that are known to be emitted during the well-stimulation-enabled oil and gas development process are BTEX compounds, formaldehyde, hydrogen sulfide, particulate matter, nitrogen oxides, sulfur dioxide, polycyclic aromatic, aliphatic, and aromatic hydrocarbons, and volatile organic compounds.[136] Wastewater reinjection and disposal are among the potential pathways for these contaminants to escape into the air.[137]

The pressure and heat needed for EOR operations can lead to significantly larger quantities of air pollution. The California Air Resources Board itemized a number of sources associated with operational activities including steam generators, steam drive wells, cyclic steam wells, fugitive emissions from the wellhead, valves, fittings, and evaporation from sumps and pits.[138] The air pollution from these operational activities will be a significant impact if the Plans authorize EOR.

In a 14-year study of air quality across California, researchers observed higher levels of air pollutants within 2.5 miles of oil and gas wells, likely worsening negative health outcomes for nearby residents.[139] Moreover, the cumulative impacts of oil and gas air pollution combined with Port pollution needs to be analyzed. The community in West Long Beach has extensive exposure to air pollution, heightened risks of pollution related health problems, and the South Coast Air Basin is in non-attainment of ozone and particulate matter.[140] Neither draft plans

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[133] Colborn, Theo et al., *Natural Gas Operations for a Public Health Perspective*, 17 Human and Ecological Risk Assessment 1039 (2011) ("Colborn 2011"); McKenzie, Lisa et al., *Human Health Risk Assessment of Air Emissions form Development of Unconventional Natural Gas Resources*, Sci Total Environ (2012), doi:10.1016/j.scitotenv.2012.02.018; Food & Water Watch, The Case for a Ban on Fracking (2012).
[134] Colborn 2011 at 8.
[135] Mall, Amy, Petition for Rulemaking Pursuant to Section 6974(a) of the Resource Conservation and Recovery Act Concerning the Regulation of Wastes Associated with the Exploration, Development, or Production of Crude Oil or Natural Gas or Geothermal Energy at 7 (Sep. 8, 2010).
[136] CCST Report, Vol. II, p. 410.
[137] *Id.*
[138] *Id.* at p. 199, citing CARB (California Air Resources Board) (2013), Almanac Emission Projection Data: 2012 Estimated Annual Average Emissions by California Air District, http://www.arb.ca.gov/ei/maps/statemap/dismap.htm.
[139] Stanford News, "Living near oil and gas wells increases air pollution exposure, according to Stanford research" (Oct. 21, 2021), https://news.stanford.edu/2021/10/12/living-near-oil-gas-wells-increases-air-pollution-exposure/.
[140] South Coast Air Quality Management District, Multiple Air Toxics Exposure Study in the South Coast Air Basin, MATES IV (2012), at 4-16, https://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-final-draft-report-4-1-15.pdf?sfvrsn=7.

describe the impacts to air quality, which is all the more reason for analysis and disclosure of these likely impacts through CEQA analysis.

G. Energy Use

California's grid is on "shaky ground," with the 2022 heat wave pushing the grid "to the brink of collapse," prompting the California legislature and Governor Newsom to extend the life of the Diablo Canyon nuclear power plant despite a pre-planned closure.[141] Yet with the crisis of electricity demand in the State, the LBU is one of Southern California Edison's biggest electricity users, consuming approximately 683 million kWh per year in order to power its oilfield operations.[142] This is unacceptable. Because CEQA require that environmental reviews discuss the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy,[143] LBU's massive energy use must be addressed under CEQA.

Moreover, the Program Plan notes that the property lease for the Unit's in-house, 45MW power plant expires in July 2024, and lease negotiations have "stalled."[144] Failure to renew the lease could mean even greater demand on the State's power grid and/or "result in . . . relocating the plant or installing a sales pipeline to SoCal Gas."[145] Any of the potential scenarios above concerning the power plant could lead to significant concerns and environmental impacts and must be analyzed under CEQA.

H. Amine Plant

The City's Program Plan refers to an amine plant located within the oil field that is used in conjunction with power plant operations.[146] Amines are a class of chemicals that derive from ammonia[147] and can have negative effects on human health (irritation, sensitization, carcinogenicity, genotoxicity), be toxic to animals and aquatic organisms, and cause eutrophication and acidification in marine environments.[148] The Program Plan inadequately describes what having an "amine plant" means for the LBU and surrounding ecosystems and

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[141] *See* "California's latest power grid problems are just the beginning," Politico (Sept. 23, 2022), https://www.politico.com/news/2022/09/23/californias-lofty-climate-goals-clash-with-reality-00058466; Nathan Rott, "California lawmakers extend the life of the state's last nuclear power plant," NPR (Sept. 1, 2022), https://www.npr.org/2022/09/01/1119778975/california-lawmakers-extend-the-life-of-the-states-last-nuclear-power-plant.
[142] Program Plan 2023-28 at 12.
[143] Cal. Pub. Res. Code § 21100(b)(3); *see also* CEQA Guidelines, Appx. F: Energy Conservation (noting that environmental effects related to energy may include the project's energy requirements and its energy use efficiencies; the effects of the project on local and regional energy supplies; the effects of the project on peak and base period demands for electricity and other forms of energy; the degree to which the project complies with existing energy standards; the effects of the project on energy resources).
[144] Program Plan 2023-28 at 12.
[145] *Id*.
[146] *Id.* at 11.
[147] Science Direct, Amine Overview, https://www.sciencedirect.com/topics/chemistry/amine.
[148] Bellona, Amines Used in CO2 Capture - Health and Environmental Impacts (2009), https://network.bellona.org/content/uploads/sites/3/fil_Bellona_report_September_2009_-_Amines_used_in_CO2_capture.pdf ("Amine Report").

communities. The public needs to know about chemical transport, storage, production, use, discharges, and disposal. Because of the likely environmental and health impacts from using (or producing) amines in the LBU, this component of operations triggers CEQA and must be subject to review.

Amine use results in environmental and health impacts throughout its lifecycle. Amine gases that are released to the air could be dissolved in the rain droplets and ended up in water supplies such as rivers and lakes.[149] Some emitted amines are unstable in the nature environment.[150] The amines specifically used in natural gas capture are highly soluble in water and their reclaimer waste contains amine, ammonia, other degradation products, heat-stable salts, flue gas impurities, and also corrosion products.[151] Amines used in natural gas operations also lead to metals corrosion, which can result in excess emissions and leaks.[152] Discharged amines may degrade to some dangerous substances that are toxic and represents a risk for cancer, such as aldehydes, amides, nitrosamines, and nitramines.[153] Amine spills are a "major problem[]."[154] High concentration of amines in environment could leads to disruption of aquatic life and bioconcentration potential and can be toxic to humans.[155] Amines used near saltwater (a concern for the LBU) is especially concerning and could lead to significant impacts, as studies have sown amine degradation in seawater is slower than in the freshwater system.[156]

I. Cumulative Impacts

The public and other officials are entitled to know the cumulative impacts of LBU operations—including from drilling/redrilling activities, equipment updates and new technologies, power plant operations (including the associated amine plant), actions to reduce subsidence, and more.

CEQA requires a cumulative project impacts analysis because "the full environmental impact of a proposed . . . action cannot be gauged in a vacuum."[157] Under CEQA, cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.[158] The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects.[159] In an EIR, the discussion of each type of cumulative

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[149] Salim, S.R.S., *Treatment of amine wastes generated in industrial processes,* IOP Conf. Series: Materials Science and Engineering (2021) at 2, https://iopscience.iop.org/article/10.1088/1757-899X/1092/1/012051/pdf ("Amine Treatment Study").
[150] Amine Report at 13.
[151] Amine Treatment Study at 2.
[152] *Id.*
[153] Amine Report at 13.
[154] Amine Treatment Study at 2.
[155] *Id.*
[156] Eide-Haugmo, Ingvild et al., *Environmental impact of amines*, Science Direct, Energy Procedia 1 (2009) at 1298, https://www.sciencedirect.com/science/article/pii/S1876610209001714.
[157] *Whitman v. Board of Supervisors*, 88 Cal.App.3d 397, 408 (1979).
[158] CEQA Guidelines § 15355.
[159] *Id.*

impact need only be proportional to the severity of the impact and the likelihood of its occurrence,[160] but even an insignificant impact must be justified as such.[161] An underinclusive cumulative impacts analysis "impedes meaningful public discussion and skews the decision maker's perspective concerning the environmental consequences of a project, the necessity for mitigation measures, and the appropriateness of project approval."[162]

J. Health and Safety Buffer Zones

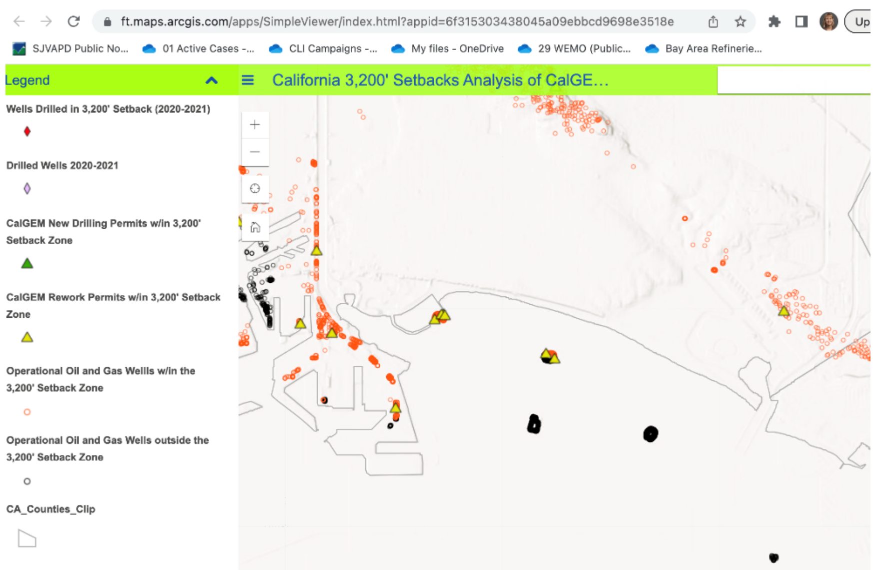
The projections for oil and gas production in the Program Plan, and yearly maximums for redrills in FY 2025, assume that the 2022 legislation establishing 3200-foot health and safety setbacks from oil and gas operations—Senate Bill 1137 (SB 1137)—will not take effect and that CalGEM will issue permits for redrilling wells between now and 2028. While implementation of SB 1137 is currently paused because of a forced ballot referendum sponsored by the oil and gas industry that seeks to overturn the law, the City should not assume the absence of setbacks and instead should incorporate these necessary protections into its planning.

Schedule 1B indicates that up to 22 redrills on Island Grissom and up to 6 redrills on Pier J for oil production will be completed in FY 2024 alone. All of these wells are within the buffer zone that will be in place if SB 1137 remains law. This zone represents areas where Long Beach residents and visitors live, work, and recreate. Ongoing operations in these areas already pose significant public health harms and these harms will be exacerbated by the expanded production proposed by the five-year Program Plan.

There are an estimated 140,000 individuals living within 3200 feet of Long Beach oil and gas wells (a number that encompasses the entire oil field).[163] Of those, 101,498 (72.4%) identify as non-white, including Latina/Hispanic origin, which is slightly higher than the citywide average (71.7% non-white).[164] The map below depicts oil and gas operations from the LBU that are within the proposed setback zone.[165]

[160] *Id.* § 15130(b).
[161] *Id.* § 15130(a).
[162] *Citizens to Preserve the Ojai v. County of Ventura*, 176 Cal.App.3d 421, 431 (1985); *see also Friends of the Eel River v. Sonoma County Water Agency*, 108 Cal.App.4th 859 (2003).
[163] FracTracker, City of Long Beach Oil and Gas Extraction (April 1, 2022) at 2.
[164] *Id.*
[165] FracTracker, California 3,200' Setbacks Analysis (zoomed in for LBU), https://ft.maps.arcgis.com/apps/SimpleViewer/index.html?appid=6f315303438045a09ebbcd9698e3518e.

It is well-documented that there are adverse health outcomes for those living near oil and gas wells. In a 14-year analysis of air quality across California, Stanford researchers observed higher levels of air pollutants within 2.5 miles of oil and gas wells, likely worsening negative health outcomes for nearby residents.[166] Their data aligned with other smaller-scale studies that measured emissions from a handful of wells.[167] A panel of medical experts reported consistent findings of health impacts at distances less than one kilometer and recommended 3200-foot setbacks paired with pollution control measures on existing wells to account for significant impacts to perinatal and respiratory health in humans.[168]



The city manager's hesitation to embrace the health and safety buffer zone is concerning and runs counter to the city's 2030 strategic vision stating the intention to "improve the health of our environment and quality of life for all Long Beach residents and begin to remedy longstanding social, economic and environmental inequities . . . . All communities will have access to clean air, clean water, flourishing ecosystems, and protection from extreme weather events."[169] Fourteen organizations representing environmental justice, public health, business, and the environment have submitted a letter to the city manager expressing support for health and safety buffer zones and urging the city to reverse advocacy efforts casting doubt on the state law.[170]

[166] Gonzalez, et al., *Upstream oil and gas production and ambient air pollution in California*, S. of the Total Envt., Vol. 806, Part 1, (Feb. 1, 2022), 150298, https://www.sciencedirect.com/science/article/pii/S0048969721053754.
[167] *Id.*
[168] PSE Berkeley, Response to CalGEM Questions for the California Oil and Gas Public Health Rulemaking Scientific Advisory Panel (Oct. 1, 2021), https://www.gov.ca.gov/wp-content/uploads/2021/10/Public-Health-Panel-Memo.pdf.
[169] City of Long Beach, 2030 Strategic Vision at 52, https://www.longbeach.gov/globalassets/city-manager/media-library/documents/2030-strategic-vision.
[170] *See* Sign-on letter re: SB 1137 (March 21, 2023), attached herein.

In order to protect the health of residents and to prepare for the implementation of SB 1137, Long Beach's plans should not include any projects (including redrills) within setback zones, which includes on Island Grissom, Island White, or Pier J. And the city should move expeditiously to phase down operations within the 3200-foot health and safety buffer zone.

K. Tribal consultation

Several tribal entities of the Acjachemen and Tongva nations hold critical cultural information regarding the cultural sites affected by the continued development of oil infrastructure, continued extraction, and continued threat of oil spills that threaten to impact these cultural resources and sacred sites. Oil spill response efforts without consultation with these entities risk further impacting cultural resources. A new CEQA review should be conducted considering these impacts and incorporating revisions of the oil spill response plans to alert and consult with Tribes.

CONCLUSION

Thank you for considering our comments. All the references cited herein are available at https://centerforbiologicald-my.sharepoint.com/:f:/g/personal/celkins_biologicaldiversity_org/EnKgnCor99lGuuLZ09VgLJEBe1qZCkB-L3ApueGIIPlwhQ?e=glc5NS. We will also hand-deliver a USB flash drive containing all references to the city clerk at tonight's meeting.

Victoria Bogdan Tejeda
Staff Attorney, Climate Law Institute
Center for Biological Diversity
vbogdantejeda@biologicaldiversity.org

Emily Jeffers
Senior Attorney, Oceans Program
Center for Biological Diversity
ejeffers@biologicaldiversity.org

From: Christine Jocoy [mailto:cjocoy@gmail.com]
Sent: Tuesday, March 21, 2023 1:07 PM
To: CityClerk <CityClerk@longbeach.gov>
Subject: March 21 2023 Agenda item 8

-EXTERNAL-

I urge the City Council to deny the recommendation of the Long Beach Unit Annual Plan and Program Plan and direct Energy Resources to rewrite a plan in line with a 5-year phase out of oil drilling and 3200 feet health and safety setbacks immediately. This plan is not consistent with taking serious action on climate change.

Sincerely,
Christine Jocoy

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Sincerely,
Christine Jocoy

To: City Council 3/21/23

From: Corliss Lee

Resident City of Long Beach

Regarding: City Council Agenda item 8 3/21/23

8. 23-0238

Recommendation to approve and adopt the Long Beach Unit Annual Plan (July 1, 2023 to June 30, 2024) and Program Plan (July 1, 2023 to June 30, 2028). (Citywide)

COMMENTS:

This item should be delayed and re-titled. The main subject of this line item (Oil) does not show up in the subject line and is therefore not visible to the public. Placing it on the consent calendar further obfuscates the line item. This appears to be a violation of the Brown Act.

Having read the staff report, I can appreciate the effort to do maintenance, save money and make the existing wells more efficient. I'm told that wells that are re-drilled are usually already idle because they are mechanically damaged or uneconomic to produce (depleted at their current location). As I understand it, there is intent is to use the current infrastructure to do an oil expansion, not just maintenance.

It is noted in the report that 3 of the sites (*Island Grissom, Island White, and Pier J)* would be affected by the new law SB1137. We need to respect that our State Legislature deemed it in the best interest of the people to abandon oil expansion close to residences. Our plan should specify **maintenance only** at those sites.

I would hope that our City intends to obey the new law SB 1137 close to public residences. Weaning ourselves off oil as an energy resource is good for the planet as well as for the residents of Long Beach. I can understand that it needs to be an orderly transition and without pulling the rug out from under ourselves. Our plans however should clearly indicate a move to solar and other sources of energy with haste.

Respectfully,

Corliss Lee/ Eastside Voice

Resident of the City of Long Beach

[redacted]

REFERENCES:

Taken from the staff report:

"SB 1137 prohibits most new or modified oil and gas wells within 3,200 feet of specific locations. It also requires existing wells in these areas to meet specified health, safety, and environmental requirements.

The bill passed the California State - 6 - Assembly and California State Senate in late August and was signed into law in September. A referendum challenging the law collected enough signatures to stay the law until the next general election in 2024 where the public will vote on the bill. If the bill becomes a law, it will likely adversely affect the development plans and maintenance on wells that require permitted operations on wells in Island Grissom, Island White, and Pier J. Incremental operating costs are also anticipated due to the additional monitoring requirements of the law."

Staff report references indicating the intent for oil expansion:

2. Assess and deliver additional redevelopment investment opportunities via the drilling and investment well work programs. Redevelopment activities are currently focused on capturing **bypassed, unswept oil** and increasing waterflood throughput in less mature areas.

3. Implement new technologies to decrease costs, improve efficiencies, and **develop unproven reserves**. Enhanced oil recovery applications will be considered for implementation if economically and technically viable.

Brown Act section 54954.2. (a) "(1) *At least 72 hours before a regular meeting, the legislative body of the local agency, or its designee, shall post an agenda containing a brief general description of each item of business to be transacted or discussed at the meeting* . . ."

To: City Council 3/21/23

From: Corliss Lee

Resident City of Long Beach

Regarding: City Council Agenda item 8 3/21/23

8. 23-0238

Recommendation to approve and adopt the Long Beach Unit Annual Plan (July 1, 2023 to June 30, 2024) and Program Plan (July 1, 2023 to June 30, 2028). (Citywide)

COMMENTS:

This item should be delayed and re-titled. The main subject of this line item (Oil) does not show up in the subject line and is therefore not visible to the public. Placing it on the consent calendar further obfuscates the line item. This appears to be a violation of the Brown Act.

Having read the staff report, I can appreciate the effort to do maintenance, save money and make the existing wells more efficient. I'm told that wells that are re-drilled are usually already idle because they are mechanically damaged or uneconomic to produce (depleted at their current location). As I understand it, there is intent is to use the current infrastructure to do an oil expansion, not just maintenance.

It is noted in the report that 3 of the sites (*Island Grissom, Island White, and Pier J)* would be affected by the new law SB1137. We need to respect that our State Legislature deemed it in the best interest of the people to abandon oil expansion close to residences. Our plan should specify **maintenance only** at those sites.

I would hope that our City intends to obey the new law SB 1137 close to public residences. Weaning ourselves off oil as an energy resource is good for the planet as well as for the residents of Long Beach. I can understand that it needs to be an orderly transition and without pulling the rug out from under ourselves. Our plans however should clearly indicate a move to solar and other sources of energy with haste.

Respectfully,

Corliss Lee/ Eastside Voice

Resident of the City of Long Beach

[redacted]

REFERENCES:

Taken from the staff report:

"SB 1137 prohibits most new or modified oil and gas wells within 3,200 feet of specific locations. It also requires existing wells in these areas to meet specified health, safety, and environmental requirements.

The bill passed the California State - 6 - Assembly and California State Senate in late August and was signed into law in September. A referendum challenging the law collected enough signatures to stay the law until the next general election in 2024 where the public will vote on the bill. If the bill becomes a law, it will likely adversely affect the development plans and maintenance on wells that require permitted operations on wells in Island Grissom, Island White, and Pier J. Incremental operating costs are also anticipated due to the additional monitoring requirements of the law."

Staff report references indicating the intent for oil expansion:

2. Assess and deliver additional redevelopment investment opportunities via the drilling and investment well work programs. Redevelopment activities are currently focused on capturing **bypassed, unswept oil** and increasing waterflood throughput in less mature areas.

3. Implement new technologies to decrease costs, improve efficiencies, and **develop unproven reserves**. Enhanced oil recovery applications will be considered for implementation if economically and technically viable.

Brown Act section 54954.2. (a) "(1) *At least 72 hours before a regular meeting, the legislative body of the local agency, or its designee, shall post an agenda containing a brief general description of each item of business to be transacted or discussed at the meeting* . . ."

From: Nicole Levin [mailto:nicole.levin@sierraclub.org]
Sent: Tuesday, March 21, 2023 9:10 AM
To: Tom Modica <Tom.Modica@longbeach.gov>; Rex Richardson <Rex.Richardson@longbeach.gov>; Suely Saro <Suely.Saro@longbeach.gov>; Cindy Allen <Cindy.Allen@longbeach.gov>; Kristina Duggan <Kristina.Duggan@longbeach.gov>; Mary Zendejas <Mary.Zendejas@longbeach.gov>; Roberto Uranga <Roberto.Uranga@longbeach.gov>; Joni Ricks-Oddie <Joni.Ricks-Oddie@longbeach.gov>; Al Austin <Al.Austin@longbeach.gov>
Cc: Dawn McIntosh <Dawn.McIntosh@longbeach.gov>; CityClerk <CityClerk@longbeach.gov>; Brady Bradshaw <bbradshaw@biologicaldiversity.org>; Connor Lock <Connor.Lock@longbeach.gov>; Paul Monge <Paul.Monge@longbeach.gov>
Subject: Re: Support for Health and Safety Buffer Zones

-EXTERNAL-

Similarly, on behalf of the Sierra Club, I am sending in this letter signed by 700 members asking decision makers to support setbacks, ban new oil drilling within 3200 feet. Furthermore, today we ask you to reject the five year plan for expanding oil drilling and instead create a new plan to phase out oil drilling under the same timeline.

Best,

Nicole Levin

On Tue, Mar 21, 2023 at 8:55 AM Brady Bradshaw <bbradshaw@biologicaldiversity.org> wrote:

Dear Mr. Modica,

Please find the attached letter from 14 organizations representing membership in Long Beach in support of 2022 Senate Bill 1137. We request your office's support for, and cooperation with, necessary 3200-foot health and safety buffer zones for the Long Beach community.

All the best,

Brady Bradshaw (he/el)

Senior Oceans Campaigner

Center for Biological Diversity

Living and working from sacred Chumash and Tongva lands

Nicole Levin *(Pronouns: they/them)*
Campaign Representative
Beyond Dirty Fuels Campaign
nicole.levin@sierraclub.org

Long Beach City Council and Staff
411 W. Ocean Blvd.
Long Beach, CA 90802

March 21, 2023

Re: Long Beach's "5 Year Plan" item #8 on today's agenda

Dear Long Beach Decisionmakers,

I am writing in support of Senate Bill 1137 (SB 1137) and setbacks between oil and gas wells and sensitive sites. I am deeply disappointed to see your office's letter to Governor Newsom in defiance of SB 1137 and your continued public denouncement of these critical health and safety protection zones for your constituents.

This stance runs contrary to well-established science and fails to accurately represent the voices of the Long Beach community. We encourage you to retract your statements on SB 1137 and prohibit new drilling and rework permits within the 3,200 foot setback zone while we await the results of the referendum.

Neighborhood oil drilling exposes Long Beach residents to toxic chemicals and smog-forming gasses, which can cause respiratory illness, cardiovascular disease, leukemia, lymphoma, lung cancer, nervous system damage, reproductive and endocrine disruption, birth defects, and premature death. Neighbors adjacent to urban oil drilling suffer the most from these health effects. Even once a well is no longer active, it can continue to leak oil, methane, and other gasses, leaving nearby communities at continued risk.

An estimated 140,138 Long Beach residents live within 3,200 feet of an operational oil and gas well within the city limits. This amounts to about 30.2% of the population. Of those, 101,498 (72.4%) identify as non-white, including Latina/Hispanic origin. Communities of color and low-income households are most affected by neighborhood oil drilling. Many neighborhoods with urban oil drilling operations have already been identified as high-risk because of their exposure to other environmental hazards and pollution.

The stance on setbacks as currently set by your office is allowing for the expansion of an already catastrophic public health crisis.

Instead of using city resources fighting these overdue protections, we urge you to use your time and resources to adapt to the health and safety standards that Long Beach residents need; standards that protect basic human health and the right to breathe clean air.

1. Lisa Atkinson
Zip Code: 90230
Air Quality and Water quality in Los Angeles area including all surrounding counties is critical stage of needing to improve. The next generation needs more health than the last generation.

2. Allie Bussjaeger
Zip Code: 90712
As a CSULB graduate and someone who works out of an office in Long Beach, I feel strongly that it is critical the City phase out oil drilling ASAP.

3. Amber Lara
Zip Code: 90804
As a family medicine physician and a resident of Long Beach, I am very much aware of the environmental and health impacts of drilling in communities. End oil drilling now!

4. Christina Farnsworth
Zip Code: 93950
As a former Long Beach resident and California native, it is important to me that we not elevate the desires of HUGELY profiting oil companies above the health and safety of the human and other community.

5. Steve Askin
Zip Code: 90804
As a Long Beach resident I want our city to stop poisoning our planet.

6. Stephanie Felix
Zip Code: 90815
As a new mom and new resident to Long Beach, I was super disappointed to hear our pediatrician say that our child has to acclimate to living in one of the most polluted cities in the country. I knew Long Beach air quality wasn?t great but I didn?t realize it?s that terrible. Beyond my personal experience what we do now to combat climate change matters so much and what we do now to right the wrongs against marginalized communities matters. I believe this city can and should rise to the occasion and be leaders for change and justice.

7. Lorenzo Gonzalez
Zip Code: 90043
As a physician treating many Long Beach residents, We can no longer ignore the health ramifications of chronic exposure to oil drilling. It is time that we use government for its purpose of protecting the people. Therefore, facing out oil drilling can no longer wait.

8. Marilyn Eng
Zip Code: 91765
As a resident of Southern California this is very important to me. Please begin transitioning away from fossil fuels and make Long Beach cleaner. Fight climate change NOW.

9. Linda Hernandez
Zip Code: 90703
As a teacher in the area for the past 50+ years, I think it is time to stop exposing students and their families to these dangers!

10. Sadie Johnson
Zip Code: 90802
As a voting resident of Long Beach, O want my city council members to being looking out for the wellbeing of my neighbors and myself! Please vote to start curbing and eliminating oil wells in our neighborhoods.

11. Varenka Lorenzi

Zip Code: 90814
As both a Long Beach resident and an environmental toxicologist,
I find it unacceptable that the City is still allowing oil drilling near urban areas. The toxic effects of chemicals leaking out are now clear and the health of residents should come before profit.
We cannot wait any more, every day that goes by, is one more day breathing in carcinogenic compounds.

12. Barb Hensleigh
Zip Code: 90027
Because we all live on one planet and what you do in Long Beach effects us all. Please do the right thing.

13. Norma Williamson
Zip Code: 90703
Climate Change is a clear and present danger. We have renewable energy technologies that make it possible to live a comfortable modern lifestyle with oil or gas. Ban oil drilling!

14. Rachel Cristy
Zip Code: 95670
Climate change is already causing deadly disasters around the world. If we are to have any chance of mitigating the damage, we must immediately stop the extraction of fossil fuels.

15. Ted Stolze
Zip Code: 90815
Deal with the climate crisis now?and locally!

16. Scott Holmes
Zip Code: 90815
Do need more harmful pollutants in Long Beach. Fossil fuels are going by the wayside.

17. Richard Ramirez
Zip Code: 96143
Drilling for oil in Los Angles is not only anti-environmental, it's done in districts of color more than where Alien Euro-Americans reside, Environment racism is as real as it is wrong.

18. Tara Gilmaher
Zip Code: 91020
Drilling in Long Beach has created neighborhoods of sick kids and families for too many years. Climate change, social & ecological justice mean we should stop drilling for fossil fuels, and especially in harmful ways that threaten BIPOC people and wildlife.

19. v and b Jones
Zip Code: 90510
Enough carcinogenic fossil fuels.

20. Kayla Partridge
Zip Code: 91342
Enough pollution, and poor drilling practices.

21. Tina Bowman
Zip Code: 90803
For our health and the planet's health, it's time to move away from oil.

22. Daren Black
Zip Code: 90066
Fossil fuel technology is ANTIQUE!
It is past time to end all drilling for fossil fuels!

23. Jan Hansen
Zip Code: 92122
Fossil fuels are the past; renewables are the future!

24. Danett Abbott-Wicker

Zip Code: 92865
Global crop failures hit at 1.5-2 degrees C/Billions die at 3C/most humans dead at 4C/Earth uninhabitable at 6C/We're heading for 1.5 C by 2025/2C by 2035/4-6C by 2075

25. Diane Meyerson
Zip Code: 90740
Health and wellness matters!!!

26. Chris Weidenbach
Zip Code: 94611
Health over short-term profit EVERY TIME!

27. Louis Cangemi
Zip Code: 90066
Here is your opportunity to conform to the phasing out of oil drilling in Southern California and help us live with cleaner air.

28. Cynthia Kameya
Zip Code: 90808
I am a cancer survivor and I believe this can contribute to causing cancer in some individuals.

29. Ian Beavis
Zip Code: 90803
I am a LB resident. The smell and noise is simply unacceptable.

30. Cory O?Neill
Zip Code: 90804
I am a resident of Long Beach and want to live and raise my children in a healthy environment

31. Val Lopez
Zip Code: 90808
I am against oil drilling in Long Beach, especially in areas close to public spaces- schools, parks, and residential areas.

32. Eugenie Lewis
Zip Code: 90278
I am concerned about the adverse health impact of oil drilling on people who live nearby. Also we need to focus our efforts on renewable energy sources and phase out fossil fuels.

33. Louis Cangemi
Zip Code: 90066
I am constantly coughing up mucus in my system due to chemicals in the air. It makes a difference to have cleaner air to breathe.

34. Jane Affonso
Zip Code: 90278
I am involved with the South Coast Interfaith Council and we believe the drilling should be phased out to protect front line communities and to address climate change.

35. Christine Miller
Zip Code: 92127
I can't believe this is still going on in beautiful Long Beach. Enough! Time to move forward on clean energy!

36. Laura and Paul Muenchow
Zip Code: 90266
I care about the planet and all of the environmental issues caused by fossil fuels. We need to turn to alternatives now. Bye Bye oil drilling. It's not needed or wanted. thank you

37. Barbara Mais
Zip Code: 90807
I don't know if this drilling benefits our community.

38. Jim Stewart
Zip Code: 90813

I don't want our Long Beach officials opening wanting our residents to be poisoned! The science report is clear, people living withing 3200 feet of wells have MUCH higher illness rates!

39. Janice Sampson
Zip Code: 90815
I feel it is very important to move forward on cleaning up our air, water, and land so our children have a happy and healthy life..

40. Diana Parmeter
Zip Code: 90805
I grew up in LB and moved back 15 years ago. Oil is what built LB and is why the city originally grew and prospered. But we need to stop polluting the air, water and ground which is the byproduct of the drilling/fracking process. Fossil fuels are finite and killing us and they need to be obsolete. Thank you for your attention to this urgent matter!

41. George Bates
Zip Code: 96052
I grew up surfing beautiful Southern California beaches. We must protect them as we also stop the burning of all fossil fuels and their terrible impact on global warming

42. Leo Olofsson
Zip Code: 90804
I have a family here. The air gets polluted by drilling and the damages are seen much later.

43. Rachael Lehmberg
Zip Code: 90740
I have seen the effects of our bad air on friends, family and even plants. Please protect us!!

44. Peggy Haught
Zip Code: 92506
I haven't been to Long Beach in forever but when I did, I found it to be very dirty Beach, please don't drill there anymore. It is filthy enough, thank you, Peggy Haught

45. Serena Palmer
Zip Code: 92801
I just want to ensure a safe, healthy environment for the future kids of this planet. Enough of the oil drilling near our schools, and pollution in our air.

46. Supun Edirisinghe
Zip Code: 90746
I live close to Long Beach in Carson. The surrounding areas are affected by so much drilling and over developed infrastructure for gas and oil! I hope they also help clean up Signal Hill and especially the area from Wilmington to Carson that's been abused by drilling companies for decades. They have been ruining the environment and need to stop and help clean up and restore as well!

47. Antoinette Nolan
Zip Code: 90710
I live in Harbor City and worry about the effects oil drilling sites have on my health. It's time for a change, to find solutions the protect health, to phase out oil drilling, and to help workers find jobs in climate-protecting rather than climate-destroying energy industry. Now is the time for the City Council to take a major first step into a clean future.

48. Melinda Cotton
Zip Code: 90803
I live in Long Beach and care about my City and the people who live in it. We have more than 100 additional oil wells proposed for the Los Cerritos Wetlands just two miles

east of where I live. Hundreds of new homes are proposed within a quarter of a mile of those new proposed wells. This is dangerous and unnecessary and with an earthquake fault running directly under the Wetlands, indeed an additional dangerous situation and destructive to the Wetlands we're trying to save.

49. Denis Berardo
Zip Code: 90807
I live next to a oil pump

50. Jim Peugh
Zip Code: 92106
I lived in Long Beach for much of my childhood. I can remember getting black oil stains on my legs when we went to the beach. Swimming in that oil tainted water was bad for my health. Stopping will also reduce global warming. It is way past time to stop,
Jim Peugh

51. Merrill Bobele
Zip Code: 92122
I lived near Long Beach for27 years before moving to San Diego, which is close. enough. I remember Long Beach a attending Long Beach City College I was benefited by the oil wells. But Global Warming and Climate Changed the benefits to be harmful ! Oil drilling and the use of petroleum must end and with to renewable energy sources.

52. debbie gibson
Zip Code: 90405
I love the ocean and the amount of toxins we have already put into them is enough - it needs to stop. Not only that but drilling for new sources of a non renewable finite resource is just plain not healthy! We need to use our financial resources to discover new renewable resources and build up the ones we already know.

53. Sherrill Futrell
Zip Code: 95618
I NEVER GO THERE ANYMORE. THE WATER'S FILTHY AND OIL CRAP'S EVERYWHERE.

54. Linda Stock
Zip Code: 90630
I own half of an oil well and I believe this issue is so important that I am willing to forego the revenue from it to help curb the harmful effects on those who live near it.

55. Pete Marsh
Zip Code: 90814
I realize that this action is largely symbolic, because the downstream consumers of oil drilled in Long Beach can - under present market conditions - procure their fossil products from many other sources.
And yet, there are two tangible benefits:
(1) The more rapidly the city phases down oil production, the more rapidly we will purge the effects of the oil industry's "dark money" on our local decision making.
(2) If Long Beach phases down rapidly, AND other sources do also, the global supply of fossil fuels will tighten rapidly, which is exactly the outcome we need in order to provide a prosperous economy and safe, healthy life for our children and grandchildren.

56. Ashley Craig
Zip Code: 90266
I recently purchased a house in Long Beach, and my husband and I plan to make Long Beach our permanent family home. We are avid environmentalists and are very concerned about the climate crisis. I urge

the City Council to do the right thing and phase our oil drilling in Long Beach!

57. Jane Illades
Zip Code: 92103
I remember seeing these as a child driving though Long Beach and thinking how ugly they were. Little did I realize at that age, the contamination and problems they caused their near neighbors: actual PEOPLE who were affected by them in so many ways.
It IS time to phase them out and be rid of them forever!

58. Kayla Andersen
Zip Code: 91101
I support the phase out of oil drilling in Long Beach county! Oil drilling is harmful to our vulnerable communities and the environment - we can do better.
Follow in the historic footsteps of Culver City and Los Angeles and phase out oil drilling in Long Beach now!

59. Siena R
Zip Code: 91377
I value the lives of our generations and future ones, and in order to ensure that we have a habitable planet to live on, we need to curb greenhouse gas emissions from burning fossil fuels. Banning oil drilling in this important city is a crucial step in California?s clean energy transition.

60. Sara Hayes
Zip Code: 90814
I was under the impression that this drilling was supposed to stop because of laws passed here in California. This has been needed for a very long time. This drilling negatively especially affects individuals with lung issues, both old and young. This should NOT be a big part of the budget. Our lives should take precedent.

61. Joshua Goldstein
Zip Code: 90089
I write to encourage Long Beach leaders to take this necessary and historic step to phase out all oil drilling in Long Beach. As a life-long visitor to Long Beach's beautiful beaches and attractions, I know Long Beach to be a beautiful area. But Long Beach residents who live or go to school near oil wells experience a much less beautiful side of the city. Please let them live in a city as wonderful and healthy as I get to visit.

62. Thomas Chang
Zip Code: 90808
If you love Long Beach a clean transition from an extractive economy is critical. Please be a leader in the energy field by moving forward with phasing out oil drilling in Long Beach. Precedent wells and refineries do not need additional developments. We need to shift our mindsets and focus for a sustainable future generation. Please research the hard done to families and children who reside near oil wells and understand the decisions you make today will affect future generations. Thank you!

63. Ashley Flynn
Zip Code: 90802
I'm a long Beach resident and the air pollution, caused by the diesel trucks at the port and also from oil drilling, caused me to develop asthma. This led to me having a more difficult time when I contracted COVID. Now that we have a deadly respiratory virus running loose, as well as climate change underway, we need to move away from fossil fuels!!

64. Claire Broome
Zip Code: 94708

I'm a public health physician. Please prioritize the health of your communities.

65. Diana Waters
Zip Code: 90277
I'm fed up with breathing this noxious toxic and carcinogenic air. Fed up with the high and increasing rates of cancer in our communities.
You wonder why Long Beach is considered a slum compared to other coastal cities in California? This is the major reason. BAN IT, RIP IT OUT.

66. Alexander Kurz
Zip Code: 92867
It is time to change direction and phase out fossil fuels. California should be leading the world in renewables.

67. Andrew Milhan
Zip Code: 90807
It is time to make true progress against climate change by stopping the use of fossil fuels.

68. Janice Graef
Zip Code: 95746
It is time to phase out the oil drilling in Long Beach and see what can be done to take down those ugly oil drills. They are a blight to the community.

69. Marianne Buchanan
Zip Code: 90814
It is well past time for Long Beach to face the harsh reality that drilling for oil and gas is harmful to the health and happiness of many Long Beach residents. When you take into account the drilling itself, the noxious air from oil truck emissions, freeway traffic and oil refineries, O&G is a public health hazard that must be addressed. Long Beach has a Climate Action & Adaptation Plan with goals that cannot be reached if we continue down this fossil fuel path!

70. Kenneth Giannotti
Zip Code: 94550
It takes big and bold steps to save our planet. Please eliminate our dependence on oil.

71. Linda Engel
Zip Code: 95407
It?s not healthy for the environment.

72. Adam Gomez
Zip Code: 90805
It's time long beach focuses on new energy. We have no excuses to continue harming our communities.

73. Gwen Shaffer
Zip Code: 90803
Just last Saturday, my son and I joined a guided a walk sponsored by the Los Cerritos Wetlands. It is so wrong that oil drilling continues to take place on this land that is critical for groundwater purification, migratory birds and other habitat. In addition, our reliance on fossil fuels is killing the planet.

74. Cherie Holcomb
Zip Code: 94605
Keep it in the ground! The recent IPCC report shows that we MUST stop all new fossil fuel infrastructure development. In addition we MUST transition away from fossil fuels, , making significant progress on this in the next 2 years. We are out of "tomorrows". The time for action is today.

75. Jean Riehl
Zip Code: 94533
Let Long Beach Breathe !

76. Ryan Malone
Zip Code: 90035
Let us lead the country and the world through our actions in helping to do what?s right to save our planet. A renewable and sustainable energy solution is available and ready to be implemented. Let?s do it.

77. Jim Franzi
Zip Code: 95629
Let's head in the right direction

78. Anna Christensen
Zip Code: 90803
Long Beach has been an oil town for a century and shows no sign of abandoning this status even as its nothing to brag about anymore. As the seas rise due to the emissions from drilling, transporting, refining , and consuming oil fossil fuel, the City has yet to reduce our own dependency on oil and gas revenues. Instead we readily approve expanded drilling in sensitive wetlands and increased storage at our Port. We get to zero emissions by adding new bike lanes and green buildings to offset the deteriorating health of our most vulnerable residents exposed to toxic emissions from active and abandoned wells, refineries, and the import and export of fossil fuels through our port. The fact that elected officials and even the LBUSD continue to accept donations from fossil fuel companies and lobbyists means that residents have not been able to count on them to advocate for what is really needed most - to clean up 100 years of environmental damage, and stop making more.

79. Anne Proffit
Zip Code: 90802
Long Beach is addicted to oil and this must stop now. No more drilling; no more health issues for the public that puts you in office. Not only does oil drilling need to be phased out at our earliest convenience, but we must move forward with innovative ways to replace the Tidelands money that will run dry once oil is where it belongs. Underground.

80. Karen Jacques
Zip Code: 95811
Long Beach is horribly polluted. The City Council needs to do everything in its power to phase out drilling immediately and protect and preserve the health of its constituents.

81. Mary Barton Mayes
Zip Code: 90814
My entire family lives here--and we don't like the health or environmental implications of oil drilling here!! That's why we bought solar panels, and drive high-mileage vehicles, recycle anything possible, and avoid plastic. It's time our City takes a bold and brave step to help reduce carbon pollution by banning oil drilling NOW.

82. Chuck Barrick
Zip Code: 90804
My family has been living, working, going to school, and running businesses in Long Beach for nearly 100 years. Although the city has made great strides in environmental cleanup and protection, we need to do more. Please ensure that LA County's second largest City is setting the important example of putting our people and our properties first with this important initiative.

83. Helene Whitson
Zip Code: 94709
My husband grew up in Long Beach. I remember going there to visit his parents and going by what I think is called Oil Hill. It

stank and was disgusting. The time for extracting fossil fuels is over. The drilling process exposes people living nearby to harmful chemicals, and it makes a total mess of the land on which the drilling takes place. It's time for green and renewable energy, as well as turning the oil drilling areas into something compatible with life, not the extinction of it.

84. V & B Jones
Zip Code: 90508
No more carcinogenic, climate-hijacking fossil fuels please.

85. Edward Costello
Zip Code: 90402
No more drilling for oil & gas

86. Allison Slay
Zip Code: 90814
No more oil to decrease the world temperatures

87. Edward Costello
Zip Code: 90402
No NEW oil drilling in Long Beach.

88. Linda Morgan
Zip Code: 94806
Oil drilling doesn?t belong in a city.

89. Elizabeth Gonzalez
Zip Code: 90805
Oil drilling in residential areas is toxic. It's long overdue to end it.

90. Jessie Gaskell
Zip Code: 90042
Oil drilling is a public health crisis that disproportionately affects low-income residents. I support the City?s steps to expedite the phase out of drilling and strongly encourage the Council to act on this with the urgency it requires.

91. Ann Cantrell
Zip Code: 90808
Oil drilling pollutes the air and water; many wells are on an earthquake fault; oil spills and pipeline leaks can destroy wetlands habitat.

92. Sara Bruce
Zip Code: 95110
Oil is potentially ruining the future for all of us, and drilling is ruining the present for some of us. It is time for the oil industry to re-assess its values!

93. Susanna Marshland
Zip Code: 94707
Oil is ruining the planet and our communities.

94. James Hines
Zip Code: 90814
Oil Slicks like the recent one in Long Beach and last year's Orange County spills highlight the fact that fossil fuel production has no place, anywhere in California, but especially offshore and near our beaches. How many more oil spills and fossil fuel accidents do we need until the city and the state begins to prioritize public health and the environment?

95. Alice Nguyen
Zip Code: 95136
On May 8, CA produced more than enough renewable electricity to power the entire state. We don't need or want dirty fossil fuels.

96. Sharon Fritsch
Zip Code: 95928

Our beaches have suffered from too much pollution.

97. Susan Perez
Zip Code: 90731
Our kids deserve clean air and water! Childhood asthma and toxic air and water are preventable. End this!

98. Jeffrey Wang
Zip Code: 90012
Please act with urgency!

99. Patricia Essick
Zip Code: 93023
Please do what is right for our environment and the health of your citizens.

100. Abbie Bernstein
Zip Code: 90069
Please don't subject less affluent citizens to environmentally dangerous projects in their backyards.

101. Catherine Ronan
Zip Code: 90066
Please help lead the way to phasing out oil drilling in our state. The climate crisis demands it. Thank you!

102. Christina Mancebo
Zip Code: 90808
Please invest in clean energy that is sustainable. Oil drilling is neither.

103. Emily Canata
Zip Code: 90814
Please phase out drilling in Long Beach and restore our natural environment. This will make Long Beach more beautiful and safer for everyone in our community. It will make the land more valuable and would be something we could brag about-look how we care about our environment and actually did something about it that everyone can understand and see.

104. Rachelle Sartini Garner
Zip Code: 90802
Please phase out drilling in our communities, and stop valuing profit over the health of the people of Long Beach. Highly support transitioning workers into jobs that allow them to fully care for their families without putting themselves at risk, and that can set them up with crucial skills needed as we transition into sustainable forms of energy production. Climate change is already affecting our state drastically, please be leaders that work swiftly and proactively to improve and protect the lives of your residents.

105. Austin Rice
Zip Code: 96130
Please reduce environmental & societal harm & risks by incrementally shutting down drilling in/near Long Beach, CA. Thank you.

106. Bruce Allen
Zip Code: 92075
Please stop ALL oil drilling in Long Beach to stop contributing to carbon-dioxide emissions that occur when oil & gas are burned. It is critical that we stop these emissions and transfer our energy sources to clean energy like hydro dams, solar farms and wind farms!!!

107. Anna Hornick
Zip Code: 94401
Please stop pollution from oil drilling. As a California resident, I find highly important that you pass this measure. Thank

108. Mindy Thomas
Zip Code: 90803

Please think of the environment-by your wallets

109. Dalila Hardwick
Zip Code: 90803
Please, please, please... stop the oil pumpjacks in Long Beach. Many are extremely close to homes and businesses, and some are not far from schools.
The fumes are poisonous and fumes travel far and wide.
We already have microplastic in our lungs, carcinogens from all kinds of poisons that should be illegal. Do contribute to making the air we breathe less noxious Hopefully, one day not too far most chemicals that are now "legal" will be banned and substituted by things that do not kill us.
Thank you
Dalila Hardwick

110. Lionel Mares
Zip Code: 91352
Please, protect impoverished neighborhoods.

111. Madlyn Monchamp
Zip Code: 93111
Protect our climate

112. Elizabeth Moreno
Zip Code: 95117
Quickly phasing out (5 yr.) of oil drilling in Long Beach would be a win-win, for residents' health and the health of the planet. Do it, Long Beach!

113. Marti Roach
Zip Code: 94556
Scientists in the lates IPCC report said that in order to prevent unimaginably challenging negative tipping points for our climate, we must not have new fossil fuel infrastructure and we must rapidly phase out burning fossil fuels. Wells release methane, a highly potent ghg that warms the planet fast. Even more importantly, the health benefits of using clean energy and avoiding health risks from air, water and soil contamination of wells are high. We have a healthy way for our energy future. Let's put our human energy into this transition to a clean energy economy that is fair to workers, communities and all.

114. Martin Holman
Zip Code: 90806
So much wealth has been made removing oil from the ground in Long Beach, it's a shame that none of that wealth can stand up and say ENOUGH!

115. Sherrill Futrell
Zip Code: 95618
SOMEONE MUST BE ON THE TAKE. THIS HAS GONE ON FOR DECADES.

116. Michael Wauschek
Zip Code: 90703
Standing rock is everywhere

117. Eanthy Zeltman
Zip Code: 92308
stop drillinmg where people live.

118. Kathleen Monteleone
Zip Code: 92530
STOP oil drilling today! It truly saddens me on a daily basis that our precious Mother Earth has been destroyed, ravaged, and abused because of greedy, heartless, business men. Our planet, wildlife, and humanity take precedence over money! STOP corporate greed now!

119. Karl Eggers
Zip Code: 90815

Stop selling Long Beach residents future for money today. The city is already on the hook for millions of dollars to properly abandon wells that their bankrupt commercial (private) partner is unwilling to fund. And are you using oil money to offset effects of climate change in the city, or just ongoing expenses (e.g., city employee retirement and health expenses).

120. Michael Mansfield
Zip Code: 94702
Surely we can do better and think more long-term.
More jobs and healthier communities await your leadership.
Peace.
Michael Mansfield

121. Kennedy Trawick
Zip Code: 90503
The citizens of Long Beach, and quite frankly the world, don?t deserve to be subjected to the detriments cause by the oil industry. Please put lives over profit.

122. Martin Holman
Zip Code: 90806
The City of Long Beach has long benefited from oil drilling. It really is past time to stop.

123. Cindy Koch
Zip Code: 90807
The entire world needs to phase out oil drilling if we want to survive decades to come! This should be important to EVERYONE!!

124. Marie Gaillac
Zip Code: 92868
The Long Beach community should become a model of a community that can transform itself from being an anti environment community to a model one. It is fortunate in its placement , climate .and potential.sgenic beauty.

125. Joshua Trotter
Zip Code: 90026
The most recent IPCC reports make it clear that transitioning away from fossil fuels as quickly as possible is essential. Now is the time for action.

126. Deborah Weinrauch
Zip Code: 90230
The oil fields are dangerous to everyone's health and safety and belong to a bygone era.

127. Aaron Valdespino
Zip Code: 90806
The oil island's are a huge eye sore to our beautiful ocean. The capped oil wells are also leaking over time and are NEVER maintained. Pure disregard and negligence by the politicians agreeing to these oil wells and islands. Please do what's best for your stakeholders and protect the land and ocean we love.

128. Daniel Nakashima
Zip Code: 90806
The tax per barrel is too low also. Raise the tax until it?s no longer profitable, then convert these sites
to solar and wind. There is no time to wait for Long Beach?s children.

129. Tab Buckner
Zip Code: 94117
The time to phase out Long Beach oil drilling is NOW!!!

130. Elizabeth Zenker
Zip Code: 95501

There is far more than simple oil gain from this precious piece of Earth!

131. Lizann Keyes
Zip Code: 95062
There is no acceptable place for oil drilling in California. I took part in the huge clean-up in the early 70s after the giant oil spill that spurred the Earth Day Movement. Now, over fifty years later, we should not be negotiating for fossil fuel rights. Protect our precious earth! Phase out drilling now!

132. Elen Lauper
Zip Code: 90803
These are my beaches, my neighborhoods. Protect our waters.

133. G Friaz
Zip Code: 95112
They've drilled long enough!

134. F. Michael Montgomery
Zip Code: 95403
This affects the health of Americans, our environment, and our climate crisis!

135. John Candela
Zip Code: 94121
This is unacceptable! Neighborhood oil drilling exposes Long Beach residents to toxic chemicals and smog-forming gasses, which can increase the risk of severe chronic conditions including respiratory illness and cardiovascular disease.

136. Susan Brunelle
Zip Code: 90807
This needs to be done for the health of our entire community. The health of residents must be protected by it's elected representatives.

137. Frederick Cliver
Zip Code: 90815
To the best of my knowledge, the city and state aren't even getting severance fees. What is the upside of this for the populace, especially when we need to be weaning ourselves off of fossil fuels?

138. Daryl Gale
Zip Code: 90013
We all have to do our part to segue to cleaner energy!

139. Stacey Meinzen
Zip Code: 95405
We are in a climate emergency and neighborhood drilling is not OK. It's time to stop sacrificing our communities' health for fossil fuel executive pocketbooks. We have clean energy options and we should be focused on accelerating those - electrifying everything, not creating more toxic liabilities. There are already too many abandoned oil wells that taxpayers are on the hook to clean up. Let's stop stranding more assets and invest in a climate-safe future.

140. Gary Charles
Zip Code: 90813
WE AVE SO MUCH SOLAR AVAILABLE HERE AND THE PORTS FREE WIND ENERGY ALL DAY AND NIGHT I DON'T CARE IF THE OIL COMPANIES DON'T GET A BIG XMAS BONUS EVER AGAIN AFTER ALL THE SPILLS TAXPAYERS HAVE PAID FOR THE CLEAN UP.

141. Sydney Pitcher
Zip Code: 91945
We cannot forget about the oil spill that happened off the California Coast in 2021. This is a wake up call once again, reminding us of the dangers of offshore drilling. We are in a climate crisis and we?re running out of time to save our health and the planet

from irreversible, extremely catastrophic outcomes.

142. Sue Gupta
Zip Code: 94556
We do not need oil drilling in this age of climate crisis and sea level rise that is threatening the future of our communities. People definitely do not want any more catastrophic oil spills.

143. Nancy Hubbs-Chang
Zip Code: 91105
We don't need fossil fuels any more. This year is proving beyond the shadow of a doubt how damaging they are to our city, county, country, and planet.

144. Felix Mbuga
Zip Code: 95035
We have a moral responsibility to our children and our grandchildren to not leave them a planet in worse condition than we received it that is devastated by climate pollution. The science is clear that this means: no more fossil fuel subsidies or expansion or investment in fossil fuel infrastructure, winding down existing fossil fuel production and consumption as quickly as possible, and rapidly expanding clean carbon-free energy production.

145. Kristie Guzman
Zip Code: 90713
We have enough pollution

146. Stephanie Oliver
Zip Code: 90803
We have the means to make this happen now. Let?s do it, we?re counting on you to make this wonderful community even better!

147. Gabriela Worrel
Zip Code: 90016
We have waited too long for environmental Justice. Stop harmful drilling now!

148. Richard Lindemann
Zip Code: 90804
We know that oil facilities are a harm to residents near or far from them. With the use of more electric means of transportation, OIL needs to be phased out in LB and SH as quickly as possible, within the next 5 to 7years. The time for this begins, NOW! Begin this process to better the health of generations to come. Clean up is MANDATORY for ALL OIL COMPANIES involved.

149. Paul Lewis
Zip Code: 90807
We live within a few blocks of several oil rigs, and it's a terrible thing! How dare the city where we live allow such toxic pollution to take place in residential neighborhoods? Other cities have outlawed it--as well it should be--so what is the City of Long Beach waiting for?

150. Nishanga Bliss
Zip Code: 94702
We must act now to keep oil in the ground and protect the climate!

151. Suzanna Byrne
Zip Code: 92649
We MUST stop being so dependent on fossil fuels especially oil. I cannot afford to buy a hybrid or an electric car but support the effort to get rid of gasoline powered cars for the future. Therein lies some hope of less damage to the only home we have - EARTH1

152. Ann Dorsey
Zip Code: 91325

We must stop extracting fossil fuels if we want a livable future.

153. Brady Bradshaw
Zip Code: 91302
We need drastic reductions in climate pollution if we are to avoid exponentially more catastrophic wildfires, droughts, and intensified storms.
My children's children will need a livable planet, and right now, people suffer at the hands of the oil industry's death-grip on our local, state, and federal governments. The misinformation campaign they are employing right now to lock in decades of further climate chaos and health impacts to our communities, is shameful. Big Oil's propaganda should be ignored outright as lies and deceit.
Do what is needed- phase out oil and gas immediately.

154. Sarah Butler
Zip Code: 94563
We need to ban new oil drilling now since oil wells are not healthy for people!

155. Paige Fordice
Zip Code: 95018
We need to build infrastructure for alternative energy sources. Stop producing oil.

156. Peter Canavan
Zip Code: 90803
We need to cut fossil fuels now! They are destroying our air our water our children and our lives! When are we going to wake up?

157. Denise Berringer-Wood
Zip Code: 90807
We need to focus on the health of our community and a clean climate future, not corporate profits!

158. Patricia Williams
Zip Code: 94571
We need to protect our beaches!

159. Kathleen Petricca
Zip Code: 94553
We need to push faster to get solar technology and storage to more residents. It's a race against time.

160. Mary Rojeski
Zip Code: 90405
What if it was next to Your home?

161. JB Jb
Zip Code: 94603
What! This is STILL happening? It's got to go!

162. Susan Hathaway
Zip Code: 90660
Why are you so eager to make people sick by putting more and more oil wells near their homes?

163. Dylan Michlin
Zip Code: 90254
Why don?t you invest in EV infrastructure instead?

164. Jeannine Pearce
Zip Code: 90814
You know why. Our kids are born and have infant asthma, Long Beach has a 17 year life expectancy difference due to health impacts of this climate crisis.
You got this and the Community has your back.

165. A.J. Averett

Zip Code: 91942

166. Ad Clayton
Zip Code: 92081

167. Adam Bernstein
Zip Code: 90012

168. Adam Resnick
Zip Code: 90026

169. Adria Tenisson
Zip Code: 93003

170. AIXA FIELDER
Zip Code: 90028

171. AJ Cho
Zip Code: 94579

172. Alan Chen
Zip Code: 90025

173. Alan Gonzalez
Zip Code: 90815

174. Alexis Georgiou
Zip Code: 95054

175. Alice Neuhauser
Zip Code: 90266

176. Allie Palmer
Zip Code: 92672

177. Alyza Cornett
Zip Code: 90056

178. Amaan Nabeel
Zip Code: 91301

179. Amanda DeJesus
Zip Code: 90806

180. Amira Mansour
Zip Code: 92612

181. AmirAli Siassi
Zip Code: 90049

182. Analisa Swan
Zip Code: 91504

183. Anastasia FIANDACA
Zip Code: 94901

184. Andarin Arvola
Zip Code: 95437

185. Andrea Scott
Zip Code: 94507

186. Andrea Milton
Zip Code: 91304

187. Andrew Philpot
Zip Code: 93463

188. Andy Lupenko
Zip Code: 91945

189. Angela Carter
Zip Code: 90731

190. Angela Gantos
Zip Code: 94920

191. Angela Clayton
Zip Code: 92081

192. Angie Klein
Zip Code: 94501

193. Annamarie Jones
Zip Code: 96101

194. Anne Mohr
Zip Code: 92626

195. Annemarie Weibel
Zip Code: 95410

196. Annette Benton
Zip Code: 94565

197. Annette Pirrone
Zip Code: 94960

198. Annie Hallatt
Zip Code: 94703

199. Anthony Montapert
Zip Code: 93455

200. Anthony Sandoval
Zip Code: 90710

201. Anthony Ramirez
Zip Code: 90802

202. Armando A. Garcia
Zip Code: 92571

203. Audrey Higbee
Zip Code: 90814

204. B Nemiroff
Zip Code: 90035

205. B Sandow
Zip Code: 94804

206. b edwards
Zip Code: 94973

207. Barbara Lovejoy
Zip Code: 94804

208. Barbara Mais
Zip Code: 90807

209. Barbara M
Zip Code: 90803

210. Barbara Marrs
Zip Code: 92371

211. Barbara Scheinman
Zip Code: 92691

212. Barbara Bellano
Zip Code: 91107

213. barbara poland
Zip Code: 91214

214. Barbara Mesney
Zip Code: 90066

215. Barbara Lehman
Zip Code: 91350

216. Barry & Tracy Kogen
Zip Code: 90808

217. Baty Family
Zip Code: 92373

218. Ben Keller
Zip Code: 94608

219. Ben Ruwe
Zip Code: 95005

220. Ben Hauck
Zip Code: 90808

221. Berna Cliffe
Zip Code: 90803

222. Bert Gfreenberg
Zip Code: 95135

223. Bob Flagg
Zip Code: 95436

224. Bonita Lacy
Zip Code: 91724

225. Bonnie Arbuckle
Zip Code: 95367

226. Bonny Davis
Zip Code: 95949

227. Brandon Gallegos
Zip Code: 92707

228. Brenda Haig
Zip Code: 90803

229. Brenda Haig
Zip Code: 90803

230. Brian Murphy
Zip Code: 91423

231. Brian Boortz
Zip Code: 95030

232. Bruce Burns
Zip Code: 92108

233. Bryan Callejo
Zip Code: 92114

234. Bryant Odega
Zip Code: 90501

235. bud hoekstra
Zip Code: 95232

236. Caephren Mckenna
Zip Code: 94609

237. Candace Rocha
Zip Code: 90032

238. Carol Drake
Zip Code: 94536

239. Carol Ng
Zip Code: 90026

240. Carol Lawson
Zip Code: 95821

241. carol schaffer
Zip Code: 94806

242. Carol Wiley
Zip Code: 92394

243. Carolyn Anders
Zip Code: 90230

244. Carolyn Leonard
Zip Code: 92404

245. Carolyn Yee
Zip Code: 95822

246. Carolyn Rosenstein
Zip Code: 90067

247. Carrie Weil
Zip Code: 90404

248. Caryn Cowin
Zip Code: 93308

249. Catherine Loudis
Zip Code: 94960

250. Cati Glasser
Zip Code: 90038

251. Caylee Hong
Zip Code: 90755

252. Celeste Anacker
Zip Code: 93105

253. Charlene Kerchevall

Zip Code: 92054

254. Charles Wieland
Zip Code: 94583

255. Charles Modjeski
Zip Code: 94555

256. Charles Heinrichs
Zip Code: 96097

257. CHARLOTTE WILLIAMS
Zip Code: 90302

258. Cheryl Albert
Zip Code: 95019

259. Chris Loo
Zip Code: 95037

260. Chris Geukens
Zip Code: 91343

261. Chris Gilbert
Zip Code: 94707

262. Christian Heinold
Zip Code: 94612

263. Christina Nielsen
Zip Code: 95120

264. Christina Medina
Zip Code: 90744

265. Christine Brockman
Zip Code: 92881

266. Christine Hayes
Zip Code: 91786

267. Christopher Cusack
Zip Code: 90016

268. Christopher Ware
Zip Code: 94539

269. Christopher Lish
Zip Code: 94903

270. Cindy Stein
Zip Code: 91320

271. Claire Perricelli
Zip Code: 95501

272. Claudia Monahan
Zip Code: 92253

273. Clay Thibodeaux
Zip Code: 90293

274. Consuelo Valenzuela
Zip Code: 95917

275. Corey Vanderwouw
Zip Code: 95949

276. Courtney Gartin
Zip Code: 95120

277. curt sanders
Zip Code: 93541

278. Damon Brown
Zip Code: 90016

279. Dan Esposito
Zip Code: 90266

280. Dana Kinonen
Zip Code: 90505

281. Danijel Mikulja
Zip Code: 90016

282. Darrell Neft
Zip Code: 92626

283. David Dexter
Zip Code: 94941

284. David Doering
Zip Code: 94109

285. David Boyer
Zip Code: 94304

286. David Hardy
Zip Code: 93065

287. David Garfinkle
Zip Code: 91356

288. David Peevers
Zip Code: 90066

289. David Murillo
Zip Code: 91351

290. Davin Peterson
Zip Code: 95503

291. Dean Campbell
Zip Code: 90807

292. Deborah Wardly
Zip Code: 95726

293. Debra Wills
Zip Code: 94610

294. Delores Yanko
Zip Code: 92543

295. Denise Fidel
Zip Code: 92007

296. Dennis Lynch
Zip Code: 95018

297. Dennis Trembly
Zip Code: 90275

298. Dennis Mcintyre
Zip Code: 92677

299. Dennis Trembly
Zip Code: 90275

300. Desendorf Mark
Zip Code: 90066

301. Diana Koeck
Zip Code: 92626

302. Diane Stotler
Zip Code: 93940

303. Diane Cottrell
Zip Code: 94803

304. Don Meehan
Zip Code: 95124

305. Donna Davies
Zip Code: 94040

306. Donna Mize
Zip Code: 94805

307. Donna Sharee
Zip Code: 94112

308. Donna Shellabarger
Zip Code: 90505

309. donnal poppe
Zip Code: 91325

310. Earl Frounfelter
Zip Code: 93454

311. Edgar Flores
Zip Code: 90808

312. Edward Landler
Zip Code: 90065

313. Edward Macan
Zip Code: 95501

314. Edwin and Jean Aiken
Zip Code: 94087

315. Elaine Russell
Zip Code: 90815

316. Elizabeth Levy
Zip Code: 94805

317. Elizabeth Ramsey
Zip Code: 95616

318. Elizabeth Estes
Zip Code: 91107

319. elizabeth myrin shore
Zip Code: 94979

320. Ellen Kaufman
Zip Code: 91311

321. Ellen Koivisto
Zip Code: 94122

322. Elliot Gonzales
Zip Code: 90813

323. Elsa Tung
Zip Code: 90807

324. Emmanuel Garcia-Rojas
Zip Code: 90066

325. Eric Muller
Zip Code: 94024

326. Eric Ericson
Zip Code: 90210

327. Erica Brown
Zip Code: 95602

328. Erin Suyehara
Zip Code: 90503

329. Erin Foley
Zip Code: 90813

330. Erin Mccune
Zip Code: 93117

331. Erlinda Cortez
Zip Code: 90807

332. Ernie Walters
Zip Code: 94587

333. Esther Moreno
Zip Code: 94505

334. Etta Robin
Zip Code: 93312

335. Evette Andersen
Zip Code: 95945

336. Fatima Iqbal-Zubair
Zip Code: 90248

337. Fiorella Russo-Jang
Zip Code: 94553

338. Flor Murray
Zip Code: 94044

339. Flora Rosas
Zip Code: 90038

340. Florence Litton
Zip Code: 92082

341. Gabriel Vargas

Zip Code: 90802

342. Gaille Heidemann
Zip Code: 90024

343. Gary Cote
Zip Code: 90803

344. Gary Goetz
Zip Code: 93950

345. Gary Popejoy
Zip Code: 96062

346. Gary Kuehn
Zip Code: 91321

347. Gavin Ford
Zip Code: 92104

348. Gavin0 Composer
Zip Code: 92618

349. Genesis Delgado
Zip Code: 90731

350. George Yenoki
Zip Code: 91016

351. Gerald Shaia
Zip Code: 91352

352. Gerard Ridella
Zip Code: 94546

353. Gladys Delgadillo
Zip Code: 92129

354. Gregg Lichtenstein
Zip Code: 92131

355. Gregory Perkins
Zip Code: 90814

356. Heather White
Zip Code: 90275

357. Heidi Buech
Zip Code: 90066

358. Helen Moncayo
Zip Code: 91784

359. Henry Schlinger
Zip Code: 91201

360. Henry Rosenfeld
Zip Code: 92506

361. Hildy Meyers
Zip Code: 92648

362. Howard Cohen
Zip Code: 94306

363. Inger Acking
Zip Code: 94710

364. Irene Hilgers
Zip Code: 94582

365. Iris Edinger
Zip Code: 91367

366. Iyela Palidine
Zip Code: 92672

367. J Lasahn
Zip Code: 94530

368. J P
Zip Code: 95521

369. J.W. Oman
Zip Code: 94618

370. Jack Cooper
Zip Code: 90807

371. Jackson Casimiro
Zip Code: 90731

372. Jacob Lang
Zip Code: 90041

373. Jacoba Dolloff
Zip Code: 91941

374. Jacqueline McVicar
Zip Code: 92115

375. Jacquelyn Heitman
Zip Code: 90814

376. Jaime Nahman
Zip Code: 90290

377. James Dawson
Zip Code: 95618

378. James Samis
Zip Code: 90275

379. James Symington
Zip Code: 90240

380. Jamie Le
Zip Code: 94501

381. Jan Warren
Zip Code: 94598

382. Jana Frazier
Zip Code: 90731

383. jane drexler
Zip Code: 93117

384. Jane Spini
Zip Code: 95521

385. Janet Maker
Zip Code: 90024

386. Jason Nolasco
Zip Code: 90706

387. Javier Del Valle
Zip Code: 90640

388. Jeanine Metildi
Zip Code: 90806

389. Jeannette Hanna
Zip Code: 95864

390. Jeff Slayton
Zip Code: 90806

391. Jeffrey Hurwitz
Zip Code: 94121

392. Jeffrey Streicher
Zip Code: 90808

393. Jen Rund
Zip Code: 94947

394. Jennifer Celio
Zip Code: 90802

395. Jennifer Tomassi
Zip Code: 90018

396. Jennifer Schmitz
Zip Code: 94541

397. Jes Laufenberg
Zip Code: 95819

398. jess zelniker
Zip Code: 91601

399. Jessica Powers
Zip Code: 91739

400. Jill Rhiannon
Zip Code: 95991

401. Jillian Gallery
Zip Code: 90740

402. Jim Cramer
Zip Code: 95616

403. Jim Curland
Zip Code: 95039

404. Jim Hartung
Zip Code: 90402

405. Jo Williams
Zip Code: 90814

406. Jo Ann Bollen
Zip Code: 92284

407. Joan Smith
Zip Code: 94904

408. Joanne Britton
Zip Code: 92115

409. Joe Buhowsky
Zip Code: 94582

410. Joe Smith
Zip Code: 92020

411. Joel Olson
Zip Code: 94063

412. Joel Kirschenstein
Zip Code: 91361

413. John Bertaina
Zip Code: 95139

414. John Cattarin
Zip Code: 94002

415. JOHN CHRISTOPHER
Zip Code: 90712

416. John Alexander
Zip Code: 92057

417. john pasqua
Zip Code: 92025

418. John Teevan
Zip Code: 91914

419. Jonathan Jonathan
Zip Code: 95037

420. Jonathan Peltz
Zip Code: 90046

421. Jose Rodriguez
Zip Code: 90604

422. Joseph Alvarado
Zip Code: 94122

423. Joslyn Baxter
Zip Code: 94110

424. Joy Zadaca
Zip Code: 90807

425. Joyce Smith
Zip Code: 95367

426. Juan Paulo Panaligan
Zip Code: 90804

427. Judith Baker
Zip Code: 91423

428. Judith Smith
Zip Code: 94601

429. Judy Bradford

Zip Code: 90275

430. Julia Dowell
Zip Code: 94501

431. June Cancell
Zip Code: 94025

432. Kaelan Shannon
Zip Code: 92882

433. Kailee Caruso
Zip Code: 90804

434. Kali Krishnan
Zip Code: 92346

435. Karen Harper
Zip Code: 90803

436. Karen Tandy
Zip Code: 91750

437. Karen Kirschling
Zip Code: 94117

438. Karl Pierce
Zip Code: 95829

439. Karla Devine
Zip Code: 90266

440. Kathleen Van Every
Zip Code: 93422

441. Kathleen Gause
Zip Code: 90815

442. Kathy Popoff
Zip Code: 90732

443. Kay Gallin
Zip Code: 90067

444. Kaylah Sterling
Zip Code: 94608

445. Keith Rhinehart
Zip Code: 95050

446. Kelly Fitzgerald
Zip Code: 90807

447. KELLY KRAMER
Zip Code: 92840

448. Ken Warfield
Zip Code: 92807

449. Kent Grigg
Zip Code: 94595

450. Kermit Cuff
Zip Code: 94041

451. Kevin Forde
Zip Code: 90814

452. Kim Floyd
Zip Code: 92260

453. Kirstie Palmer
Zip Code: 90277

454. Kobi Naseck
Zip Code: 94609

455. Kris Montgomery
Zip Code: 95405

456. Kristen Sandel
Zip Code: 95005

457. Kristin Womack
Zip Code: 94960

458. Kristina Fukuda
Zip Code: 90034

459. L Nelson
Zip Code: 95038

460. Laura Herndon
Zip Code: 91505

461. Laura Herndon
Zip Code: 91505

462. Laura Haider
Zip Code: 93727

463. Laura Dill
Zip Code: 94706

464. Lauren Linda
Zip Code: 92637

465. Lauren Prust
Zip Code: 92126

466. Lauren Ferree Bash
Zip Code: 90405

467. Lawrence Abbott
Zip Code: 94577

468. Leah Pressman
Zip Code: 90232

469. Leah Berman
Zip Code: 95003

470. LeAnn Bjelle
Zip Code: 95003

471. lee jordan
Zip Code: 90056

472. Lee Liddle
Zip Code: 93720

473. Leonie Terfort
Zip Code: 94941

474. Leslie Jones
Zip Code: 90803

475. Leslie Nanasy
Zip Code: 90808

476. Linda Ford
Zip Code: 92648

477. Linda Barrientos
Zip Code: 94015

478. Lindsay Mugglestone
Zip Code: 94705

479. Lindsey Kalfsbeek
Zip Code: 94509

480. Lisa Allowitz-Thompson
Zip Code: 96148

481. Lisa Salazar
Zip Code: 96089

482. Lisa Phenix
Zip Code: 95608

483. Livia Ferguson
Zip Code: 90266

484. Lori Kegler
Zip Code: 90731

485. Lori Wilson-Hopkins
Zip Code: 95603

486. Lucy Fried
Zip Code: 90016

487. Lydia M. Villalobos-White
Zip Code: 91345

488. Lynn Alley
Zip Code: 92011

489. M Lynch
Zip Code: 90405

490. M. C. Corvalan
Zip Code: 90278

491. M. Virginia Leslie
Zip Code: 95035

492. Marci Yellin
Zip Code: 94114

493. Marcia Edelen
Zip Code: 94704

494. Marcia Hackett
Zip Code: 92637

495. Marcy Meadows
Zip Code: 95444

496. Margaret Lirones
Zip Code: 93212

497. Margaret Rainey
Zip Code: 95519

498. Maria Mendez
Zip Code: 90016

499. Maria Skilbred
Zip Code: 90802

500. Marianne McDermott
Zip Code: 95928

501. Marie Winter
Zip Code: 92705

502. Marilyn Shepherd
Zip Code: 95570

503. Marisa Landsberg
Zip Code: 90266

504. Marjorie Hoskinson
Zip Code: 91360

505. Marjorie Xavier
Zip Code: 95409

506. Mark Feldman
Zip Code: 95401

507. Mark Looney
Zip Code: 94521

508. Mark Stannard
Zip Code: 90056

509. Mark Cappetta
Zip Code: 92270

510. Mark Skilbred
Zip Code: 91784

511. Mark Bartleman
Zip Code: 92651

512. Martin Horwitz
Zip Code: 94122

513. Mary Ames
Zip Code: 92592

514. Mary Hicklin
Zip Code: 92040

515. Mary Stanistreet
Zip Code: 93003

516. Mary Steele
Zip Code: 92677

517. Mary Ann McDonald

Zip Code: 95818

518. Marybeth Wall
Zip Code: 90802

519. Matt Filler
Zip Code: 90740

520. Matthew Reid
Zip Code: 94515

521. Matthew Comer
Zip Code: 92879

522. Meagan Wyllie
Zip Code: 90016

523. Meg Brown
Zip Code: 93252

524. Melinda Taylor
Zip Code: 90814

525. Melissa Finley
Zip Code: 95445

526. Melissa Hutchinson
Zip Code: 93950

527. mercedes moreno
Zip Code: 92057

528. michael bailey
Zip Code: 90802

529. Michael richardson
Zip Code: 90802

530. Michael Price
Zip Code: 94109

531. Michael Schulte
Zip Code: 90066

532. Michael Eichenholtz
Zip Code: 94804

533. Michele Smith
Zip Code: 90277

534. Michelle Lewis
Zip Code: 90802

535. Michelle Hudson
Zip Code: 94402

536. Michelle Palladine
Zip Code: 92262

537. michelle geil
Zip Code: 90292

538. Mignon Moskowitz
Zip Code: 95425

539. Mike Evans
Zip Code: 94720

540. Miles Aiello
Zip Code: 90638

541. Miriam Leiseroff
Zip Code: 95125

542. Mitch M
Zip Code: 92262

543. Monica Abruzzo
Zip Code: 94546

544. Monica Embrey
Zip Code: 90026

545. Nadia Tushnet
Zip Code: 90803

546. Nancy Nilssen
Zip Code: 94568

547. Nancy Havassy
Zip Code: 94611

548. Nancy Oliver
Zip Code: 95818

549. Nancy Heck
Zip Code: 93454

550. Nancy Tierney
Zip Code: 94044

551. Nanlouise Wolfe
Zip Code: 95060

552. Nareg Keshishian
Zip Code: 91367

553. Natalija Sale
Zip Code: 90740

554. Nicholas Cahill
Zip Code: 93291

555. Nicholas Ratto
Zip Code: 94501

556. nicole levin
Zip Code: 90027

557. Nicole Leseigneur
Zip Code: 95405

558. Nicolette Moore
Zip Code: 92620

559. Nina MacDonald & Ted Wright
Zip Code: 92676

560. Noah Tenney
Zip Code: 94606

561. Nora Coyle
Zip Code: 92807

562. Pamela Gaskill
Zip Code: 95993

563. Pat Lang
Zip Code: 94022

564. Patricia Depew
Zip Code: 91106

565. Patricia McPherson
Zip Code: 90066

566. Patricia Law
Zip Code: 92102

567. Patrick McCarty
Zip Code: 92128

568. Paul Shabazian
Zip Code: 95311

569. Paul and Katherine Malchiodi
Zip Code: 92110

570. Paula Cavagnaro
Zip Code: 94550

571. Pauline Faye
Zip Code: 92673

572. Philip Simon
Zip Code: 94912

573. Phoenix Giffen
Zip Code: 94952

574. Pol Hermes
Zip Code: 92065

575. Priyanka Bhakta
Zip Code: 92708

576. Querido Galdo
Zip Code: 95445

577. R Kadden
Zip Code: 91308

578. R D Harlowe
Zip Code: 92549

579. R Lee Weir
Zip Code: 93463

580. Rachel Ben-Menachem
Zip Code: 90029

581. Ralph Penfield
Zip Code: 92104

582. Randy Bueno
Zip Code: 90720

583. Randy Baker
Zip Code: 92870

584. Randy and Michelle Davis
Zip Code: 95688

585. Ray Staar
Zip Code: 94109

586. Raymond Plasse
Zip Code: 91307

587. Raymond Vaczek
Zip Code: 90023

588. Rebecca Hanna
Zip Code: 90806

589. Rebecca Prewitt
Zip Code: 91602

590. Renaldo Gonzalez
Zip Code: 92284

591. Rene Maurice
Zip Code: 94117

592. Renee Jeska
Zip Code: 90740

593. Rich Goldberg
Zip Code: 94951

594. Richard Gallo
Zip Code: 95062

595. Richard Kornfeld
Zip Code: 91101

596. Richard Robinson
Zip Code: 90266

597. Rob Guilmette
Zip Code: 90808

598. Rob Cherwink
Zip Code: 95476

599. Rob Gallinger
Zip Code: 92586

600. Robert Ortiz
Zip Code: 94945

601. Roberta Stern
Zip Code: 94618

602. Roland Leong
Zip Code: 95842

603. ROMONA WILLIAMS
Zip Code: 90746

604. Ronald Mohler
Zip Code: 90804

605. Rosario Sandel

Zip Code: 91335

606. Roy Jackson
Zip Code: 90504

607. Rubén Becerra
Zip Code: 90731

608. Ruselle Revenaugh
Zip Code: 95060

609. Russell Weisz
Zip Code: 95060

610. Ruth b
Zip Code: 94070

611. Ryan Park
Zip Code: 90503

612. S Barryte
Zip Code: 90275

613. Sally Beer
Zip Code: 91001

614. Sam Butler
Zip Code: 90045

615. Sandra Gamble
Zip Code: 93555

616. Sandy Rodgers
Zip Code: 92223

617. Sandy Zelasko
Zip Code: 92082

618. Sara C. Blunt
Zip Code: 93067

619. Sarah Larson
Zip Code: 90025

620. Sarah Harvey
Zip Code: 94606

621. Sarah Pinsky
Zip Code: 90803

622. Saran K.
Zip Code: 90035

623. Scott Grinthal
Zip Code: 94402

624. Seth Weisbord
Zip Code: 90094

625. Sharon Nicodemus
Zip Code: 95821

626. Sherry Marsh
Zip Code: 92056

627. Shirley Rodda
Zip Code: 95121

628. Shoshana Wechsler
Zip Code: 94708

629. Sinthuja Nagalingam
Zip Code: 90814

630. Skarlette Arvolkskaya
Zip Code: 90815

631. Skye Van Raalte-Herzog
Zip Code: 91042

632. Sofia Okolowicz
Zip Code: 92592

633. Stacey Jones
Zip Code: 95203

634. Stacy Rose
Zip Code: 93442

635. Stephanie Nunez
Zip Code: 91405

636. Stephanie Linam
Zip Code: 94510

637. Steve Metzger
Zip Code: 92647

638. Steve Robey
Zip Code: 94708

639. Steve Sketo
Zip Code: 93312

640. steve zelman
Zip Code: 91367

641. Steven Stewart
Zip Code: 92886

642. Steven Larky
Zip Code: 92007

643. Steven Mazliach
Zip Code: 94118

644. Stuart Greenburg
Zip Code: 91381

645. Stuart Hartley
Zip Code: 92106

646. Sue Cleereman
Zip Code: 94556

647. Sujana Patel
Zip Code: 90275

648. Suneun Reichert
Zip Code: 90807

649. Sunnie Noellert
Zip Code: 95519

650. Supporter Unknown
Zip Code: 90731

651. Susan Hampton
Zip Code: 94530

652. Susan Chung
Zip Code: 90032

653. Susan Burns
Zip Code: 91423

654. Susan Morales
Zip Code: 90808

655. Susanne Cumming
Zip Code: 90292

656. Susun Godwin
Zip Code: 90814

657. Suzanne Cook
Zip Code: 95519

658. Suzanne Torkar
Zip Code: 92009

659. Sylvia De Baca
Zip Code: 91773

660. Sylvia Ito
Zip Code: 92648

661. Tamara Mccready
Zip Code: 93063

662. Tara Ohta
Zip Code: 91101

663. Tara Sanchez
Zip Code: 90807

664. Ted Fishman
Zip Code: 95123

665. Terrie Smith
Zip Code: 91977

666. Theresa Bucher
Zip Code: 91356

667. Theresa Smith
Zip Code: 90806

668. Therese DeBing
Zip Code: 93950

669. Thomas Sepko
Zip Code: 90740

670. Thomas Whiting
Zip Code: 94534

671. Thomas Russell
Zip Code: 90731

672. Tim Maurer
Zip Code: 92808

673. Todd Hack
Zip Code: 91913

674. Tom Butler
Zip Code: 95124

675. Tom Fray
Zip Code: 92117

676. Tony Ramirez
Zip Code: 90802

677. Tonya Cockrell
Zip Code: 92882

678. Tree Wright
Zip Code: 93022

679. Tristan Dunker
Zip Code: 92845

680. Tyler FITZGERALD
Zip Code: 92081

681. Utkarsh Nath
Zip Code: 94555

682. Val Farrelly
Zip Code: 94403

683. Valerie Kuo
Zip Code: 91748

684. Veronica Michael
Zip Code: 94533

685. Vicki Bookless
Zip Code: 93405

686. Victoria Jensen
Zip Code: 90405

687. Victoria Shepherd
Zip Code: 91201

688. Virginia Turner
Zip Code: 91367

689. Vonya Morris
Zip Code: 94402

690. Wallace Rhine
Zip Code: 95421

691. Walter Erhorn
Zip Code: 91979

692. Warren Gold
Zip Code: 94941

693. Warren M. Gold

Zip Code: 94941

694. Wendy Brunell
Zip Code: 91306

695. William Briggs
Zip Code: 90254

696. Yvonne Olivares
Zip Code: 91730

697. Zach Dietrich
Zip Code: 91505

698. Zara Jaffe
Zip Code: 94010

699. Zora Hollie
Zip Code: 90043

From: Nicole Levin [mailto:nicole.levin@sierraclub.org]
Sent: Tuesday, March 21, 2023 9:10 AM
To: Tom Modica <Tom.Modica@longbeach.gov>; Rex Richardson <Rex.Richardson@longbeach.gov>; Suely Saro <Suely.Saro@longbeach.gov>; Cindy Allen <Cindy.Allen@longbeach.gov>; Kristina Duggan <Kristina.Duggan@longbeach.gov>; Mary Zendejas <Mary.Zendejas@longbeach.gov>; Roberto Uranga <Roberto.Uranga@longbeach.gov>; Joni Ricks-Oddie <Joni.Ricks-Oddie@longbeach.gov>; Al Austin <Al.Austin@longbeach.gov>
Cc: Dawn McIntosh <Dawn.McIntosh@longbeach.gov>; CityClerk <CityClerk@longbeach.gov>; Brady Bradshaw <bbradshaw@biologicaldiversity.org>; Connor Lock <Connor.Lock@longbeach.gov>; Paul Monge <Paul.Monge@longbeach.gov>
Subject: Re: Support for Health and Safety Buffer Zones

-EXTERNAL-

Similarly, on behalf of the Sierra Club, I am sending in this letter signed by 700 members asking decision makers to support setbacks, ban new oil drilling within 3200 feet. Furthermore, today we ask you to reject the five year plan for expanding oil drilling and instead create a new plan to phase out oil drilling under the same timeline.

Best,

Nicole Levin

On Tue, Mar 21, 2023 at 8:55 AM Brady Bradshaw <bbradshaw@biologicaldiversity.org> wrote:

Dear Mr. Modica,

Please find the attached letter from 14 organizations representing membership in Long Beach in support of 2022 Senate Bill 1137. We request your office's support for, and cooperation with, necessary 3200-foot health and safety buffer zones for the Long Beach community.

All the best,

Brady Bradshaw (he/el)

Senior Oceans Campaigner

Center for Biological Diversity

Living and working from sacred Chumash and Tongva lands

Nicole Levin *(Pronouns: they/them)*
Campaign Representative
Beyond Dirty Fuels Campaign
nicole.levin@sierraclub.org

Long Beach City Council and Staff
411 W. Ocean Blvd.
Long Beach, CA 90802

March 21, 2023

Re: Long Beach's "5 Year Plan" item #8 on today's agenda

Dear Long Beach Decisionmakers,

I am writing in support of Senate Bill 1137 (SB 1137) and setbacks between oil and gas wells and sensitive sites. I am deeply disappointed to see your office's letter to Governor Newsom in defiance of SB 1137 and your continued public denouncement of these critical health and safety protection zones for your constituents.

This stance runs contrary to well-established science and fails to accurately represent the voices of the Long Beach community. We encourage you to retract your statements on SB 1137 and prohibit new drilling and rework permits within the 3,200 foot setback zone while we await the results of the referendum.

Neighborhood oil drilling exposes Long Beach residents to toxic chemicals and smog-forming gasses, which can cause respiratory illness, cardiovascular disease, leukemia, lymphoma, lung cancer, nervous system damage, reproductive and endocrine disruption, birth defects, and premature death. Neighbors adjacent to urban oil drilling suffer the most from these health effects. Even once a well is no longer active, it can continue to leak oil, methane, and other gasses, leaving nearby communities at continued risk.

An estimated 140,138 Long Beach residents live within 3,200 feet of an operational oil and gas well within the city limits. This amounts to about 30.2% of the population. Of those, 101,498 (72.4%) identify as non-white, including Latina/Hispanic origin. Communities of color and low-income households are most affected by neighborhood oil drilling. Many neighborhoods with urban oil drilling operations have already been identified as high-risk because of their exposure to other environmental hazards and pollution.

The stance on setbacks as currently set by your office is allowing for the expansion of an already catastrophic public health crisis.

Instead of using city resources fighting these overdue protections, we urge you to use your time and resources to adapt to the health and safety standards that Long Beach residents need; standards that protect basic human health and the right to breathe clean air.

1. Lisa Atkinson
Zip Code: 90230
Air Quality and Water quality in Los Angeles area including all surrounding counties is critical stage of needing to improve. The next generation needs more health than the last generation.

2. Allie Bussjaeger
Zip Code: 90712
As a CSULB graduate and someone who works out of an office in Long Beach, I feel strongly that it is critical the City phase out oil drilling ASAP.

3. Amber Lara
Zip Code: 90804
As a family medicine physician and a resident of Long Beach, I am very much aware of the environmental and health impacts of drilling in communities. End oil drilling now!

4. Christina Farnsworth
Zip Code: 93950
As a former Long Beach resident and California native, it is important to me that we not elevate the desires of HUGELY profiting oil companies above the health and safety of the human and other community.

5. Steve Askin
Zip Code: 90804
As a Long Beach resident I want our city to stop poisoning our planet.

6. Stephanie Felix
Zip Code: 90815
As a new mom and new resident to Long Beach, I was super disappointed to hear our pediatrician say that our child has to acclimate to living in one of the most polluted cities in the country. I knew Long Beach air quality wasn?t great but I didn?t realize it?s that terrible. Beyond my personal experience what we do now to combat climate change matters so much and what we do now to right the wrongs against marginalized communities matters. I believe this city can and should rise to the occasion and be leaders for change and justice.

7. Lorenzo Gonzalez
Zip Code: 90043
As a physician treating many Long Beach residents, We can no longer ignore the health ramifications of chronic exposure to oil drilling. It is time that we use government for its purpose of protecting the people. Therefore, facing out oil drilling can no longer wait.

8. Marilyn Eng
Zip Code: 91765
As a resident of Southern California this is very important to me. Please begin transitioning away from fossil fuels and make Long Beach cleaner. Fight climate change NOW.

9. Linda Hernandez
Zip Code: 90703
As a teacher in the area for the past 50+ years, I think it is time to stop exposing students and their families to these dangers!

10. Sadie Johnson
Zip Code: 90802
As a voting resident of Long Beach, O want my city council members to being looking out for the wellbeing of my neighbors and myself! Please vote to start curbing and eliminating oil wells in our neighborhoods.

11. Varenka Lorenzi

Zip Code: 90814
As both a Long Beach resident and an environmental toxicologist,
I find it unacceptable that the City is still allowing oil drilling near urban areas. The toxic effects of chemicals leaking out are now clear and the health of residents should come before profit.
We cannot wait any more, every day that goes by, is one more day breathing in carcinogenic compounds.

12. Barb Hensleigh
Zip Code: 90027
Because we all live on one planet and what you do in Long Beach effects us all. Please do the right thing.

13. Norma Williamson
Zip Code: 90703
Climate Change is a clear and present danger. We have renewable energy technologies that make it possible to live a comfortable modern lifestyle with oil or gas. Ban oil drilling!

14. Rachel Cristy
Zip Code: 95670
Climate change is already causing deadly disasters around the world. If we are to have any chance of mitigating the damage, we must immediately stop the extraction of fossil fuels.

15. Ted Stolze
Zip Code: 90815
Deal with the climate crisis now?and locally!

16. Scott Holmes
Zip Code: 90815
Do need more harmful pollutants in Long Beach. Fossil fuels are going by the wayside.

17. Richard Ramirez
Zip Code: 96143
Drilling for oil in Los Angles is not only anti-environmental, it's done in districts of color more than where Alien Euro-Americans reside, Environment racism is as real as it is wrong.

18. Tara Gilmaher
Zip Code: 91020
Drilling in Long Beach has created neighborhoods of sick kids and families for too many years. Climate change, social & ecological justice mean we should stop drilling for fossil fuels, and especially in harmful ways that threaten BIPOC people and wildlife.

19. v and b Jones
Zip Code: 90510
Enough carcinogenic fossil fuels.

20. Kayla Partridge
Zip Code: 91342
Enough pollution, and poor drilling practices.

21. Tina Bowman
Zip Code: 90803
For our health and the planet's health, it's time to move away from oil.

22. Daren Black
Zip Code: 90066
Fossil fuel technology is ANTIQUE!
It is past time to end all drilling for fossil fuels!

23. Jan Hansen
Zip Code: 92122
Fossil fuels are the past; renewables are the future!

24. Danett Abbott-Wicker

Zip Code: 92865
Global crop failures hit at 1.5-2 degrees C/Billions die at 3C/most humans dead at 4C/Earth uninhabitable at 6C/We're heading for 1.5 C by 2025/2C by 2035/4-6C by 2075

25. Diane Meyerson
Zip Code: 90740
Health and wellness matters!!!

26. Chris Weidenbach
Zip Code: 94611
Health over short-term profit EVERY TIME!

27. Louis Cangemi
Zip Code: 90066
Here is your opportunity to conform to the phasing out of oil drilling in Southern California and help us live with cleaner air.

28. Cynthia Kameya
Zip Code: 90808
I am a cancer survivor and I believe this can contribute to causing cancer in some individuals.

29. Ian Beavis
Zip Code: 90803
I am a LB resident. The smell and noise is simply unacceptable.

30. Cory O?Neill
Zip Code: 90804
I am a resident of Long Beach and want to live and raise my children in a healthy environment

31. Val Lopez
Zip Code: 90808
I am against oil drilling in Long Beach, especially in areas close to public spaces- schools, parks, and residential areas.

32. Eugenie Lewis
Zip Code: 90278
I am concerned about the adverse health impact of oil drilling on people who live nearby. Also we need to focus our efforts on renewable energy sources and phase out fossil fuels.

33. Louis Cangemi
Zip Code: 90066
I am constantly coughing up mucus in my system due to chemicals in the air. It makes a difference to have cleaner air to breathe.

34. Jane Affonso
Zip Code: 90278
I am involved with the South Coast Interfaith Council and we believe the drilling should be phased out to protect front line communities and to address climate change.

35. Christine Miller
Zip Code: 92127
I can't believe this is still going on in beautiful Long Beach. Enough! Time to move forward on clean energy!

36. Laura and Paul Muenchow
Zip Code: 90266
I care about the planet and all of the environmental issues caused by fossil fuels. We need to turn to alternatives now. Bye Bye oil drilling. It's not needed or wanted. thank you

37. Barbara Mais
Zip Code: 90807
I don't know if this drilling benefits our community.

38. Jim Stewart
Zip Code: 90813

I don't want our Long Beach officials opening wanting our residents to be poisoned! The science report is clear, people living withing 3200 feet of wells have MUCH higher illness rates!

39. Janice Sampson
Zip Code: 90815
I feel it is very important to move forward on cleaning up our air, water, and land so our children have a happy and healthy life..

40. Diana Parmeter
Zip Code: 90805
I grew up in LB and moved back 15 years ago. Oil is what built LB and is why the city originally grew and prospered. But we need to stop polluting the air, water and ground which is the byproduct of the drilling/fracking process. Fossil fuels are finite and killing us and they need to be obsolete. Thank you for your attention to this urgent matter!

41. George Bates
Zip Code: 96052
I grew up surfing beautiful Southern California beaches. We must protect them as we also stop the burning of all fossil fuels and their terrible impact on global warming

42. Leo Olofsson
Zip Code: 90804
I have a family here. The air gets polluted by drilling and the damages are seen much later.

43. Rachael Lehmberg
Zip Code: 90740
I have seen the effects of our bad air on friends, family and even plants. Please protect us!!

44. Peggy Haught
Zip Code: 92506
I haven't been to Long Beach in forever but when I did, I found it to be very dirty Beach, please don't drill there anymore. It is filthy enough, thank you, Peggy Haught

45. Serena Palmer
Zip Code: 92801
I just want to ensure a safe, healthy environment for the future kids of this planet. Enough of the oil drilling near our schools, and pollution in our air.

46. Supun Edirisinghe
Zip Code: 90746
I live close to Long Beach in Carson. The surrounding areas are affected by so much drilling and over developed infrastructure for gas and oil! I hope they also help clean up Signal Hill and especially the area from Wilmington to Carson that's been abused by drilling companies for decades. They have been ruining the environment and need to stop and help clean up and restore as well!

47. Antoinette Nolan
Zip Code: 90710
I live in Harbor City and worry about the effects oil drilling sites have on my health. It's time for a change, to find solutions the protect health, to phase out oil drilling, and to help workers find jobs in climate-protecting rather than climate-destroying energy industry. Now is the time for the City Council to take a major first step into a clean future.

48. Melinda Cotton
Zip Code: 90803
I live in Long Beach and care about my City and the people who live in it. We have more than 100 additional oil wells proposed for the Los Cerritos Wetlands just two miles

east of where I live. Hundreds of new homes are proposed within a quarter of a mile of those new proposed wells. This is dangerous and unnecessary and with an earthquake fault running directly under the Wetlands, indeed an additional dangerous situation and destructive to the Wetlands we're trying to save.

49. Denis Berardo
Zip Code: 90807
I live next to a oil pump

50. Jim Peugh
Zip Code: 92106
I lived in Long Beach for much of my childhood. I can remember getting black oil stains on my legs when we went to the beach. Swimming in that oil tainted water was bad for my health. Stopping will also reduce global warming. It is way past time to stop,
Jim Peugh

51. Merrill Bobele
Zip Code: 92122
I lived near Long Beach for27 years before moving to San Diego, which is close. enough. I remember Long Beach a attending Long Beach City College I was benefited by the oil wells. But Global Warming and Climate Changed the benefits to be harmful ! Oil drilling and the use of petroleum must end and with to renewable energy sources.

52. debbie gibson
Zip Code: 90405
I love the ocean and the amount of toxins we have already put into them is enough - it needs to stop. Not only that but drilling for new sources of a non renewable finite resource is just plain not healthy! We need to use our financial resources to discover new renewable resources and build up the ones we already know.

53. Sherrill Futrell
Zip Code: 95618
I NEVER GO THERE ANYMORE. THE WATER'S FILTHY AND OIL CRAP'S EVERYWHERE.

54. Linda Stock
Zip Code: 90630
I own half of an oil well and I believe this issue is so important that I am willing to forego the revenue from it to help curb the harmful effects on those who live near it.

55. Pete Marsh
Zip Code: 90814
I realize that this action is largely symbolic, because the downstream consumers of oil drilled in Long Beach can - under present market conditions - procure their fossil products from many other sources.
And yet, there are two tangible benefits:
(1) The more rapidly the city phases down oil production, the more rapidly we will purge the effects of the oil industry's "dark money" on our local decision making.
(2) If Long Beach phases down rapidly, AND other sources do also, the global supply of fossil fuels will tighten rapidly, which is exactly the outcome we need in order to provide a prosperous economy and safe, healthy life for our children and grandchildren.

56. Ashley Craig
Zip Code: 90266
I recently purchased a house in Long Beach, and my husband and I plan to make Long Beach our permanent family home. We are avid environmentalists and are very concerned about the climate crisis. I urge

the City Council to do the right thing and phase our oil drilling in Long Beach!

57. Jane Illades
Zip Code: 92103
I remember seeing these as a child driving though Long Beach and thinking how ugly they were. Little did I realize at that age, the contamination and problems they caused their near neighbors: actual PEOPLE who were affected by them in so many ways.
It IS time to phase them out and be rid of them forever!

58. Kayla Andersen
Zip Code: 91101
I support the phase out of oil drilling in Long Beach county! Oil drilling is harmful to our vulnerable communities and the environment - we can do better.
Follow in the historic footsteps of Culver City and Los Angeles and phase out oil drilling in Long Beach now!

59. Siena R
Zip Code: 91377
I value the lives of our generations and future ones, and in order to ensure that we have a habitable planet to live on, we need to curb greenhouse gas emissions from burning fossil fuels. Banning oil drilling in this important city is a crucial step in California?s clean energy transition.

60. Sara Hayes
Zip Code: 90814
I was under the impression that this drilling was supposed to stop because of laws passed here in California. This has been needed for a very long time. This drilling negatively especially affects individuals with lung issues, both old and young. This should NOT be a big part of the budget. Our lives should take precedent.

61. Joshua Goldstein
Zip Code: 90089
I write to encourage Long Beach leaders to take this necessary and historic step to phase out all oil drilling in Long Beach. As a life-long visitor to Long Beach's beautiful beaches and attractions, I know Long Beach to be a beautiful area. But Long Beach residents who live or go to school near oil wells experience a much less beautiful side of the city. Please let them live in a city as wonderful and healthy as I get to visit.

62. Thomas Chang
Zip Code: 90808
If you love Long Beach a clean transition from an extractive economy is critical. Please be a leader in the energy field by moving forward with phasing out oil drilling in Long Beach. Precedent wells and refineries do not need additional developments. We need to shift our mindsets and focus for a sustainable future generation. Please research the hard done to families and children who reside near oil wells and understand the decisions you make today will affect future generations. Thank you!

63. Ashley Flynn
Zip Code: 90802
I'm a long Beach resident and the air pollution, caused by the diesel trucks at the port and also from oil drilling, caused me to develop asthma. This led to me having a more difficult time when I contracted COVID. Now that we have a deadly respiratory virus running loose, as well as climate change underway, we need to move away from fossil fuels!!

64. Claire Broome
Zip Code: 94708

I'm a public health physician. Please prioritize the health of your communities.

65. Diana Waters
Zip Code: 90277
I'm fed up with breathing this noxious toxic and carcinogenic air. Fed up with the high and increasing rates of cancer in our communities.
You wonder why Long Beach is considered a slum compared to other coastal cities in California? This is the major reason. BAN IT, RIP IT OUT.

66. Alexander Kurz
Zip Code: 92867
It is time to change direction and phase out fossil fuels. California should be leading the world in renewables.

67. Andrew Milhan
Zip Code: 90807
It is time to make true progress against climate change by stopping the use of fossil fuels.

68. Janice Graef
Zip Code: 95746
It is time to phase out the oil drilling in Long Beach and see what can be done to take down those ugly oil drills. They are a blight to the community.

69. Marianne Buchanan
Zip Code: 90814
It is well past time for Long Beach to face the harsh reality that drilling for oil and gas is harmful to the health and happiness of many Long Beach residents. When you take into account the drilling itself, the noxious air from oil truck emissions, freeway traffic and oil refineries, O&G is a public health hazard that must be addressed. Long Beach has a Climate Action & Adaptation Plan with goals that cannot be reached if we continue down this fossil fuel path!

70. Kenneth Giannotti
Zip Code: 94550
It takes big and bold steps to save our planet. Please eliminate our dependence on oil.

71. Linda Engel
Zip Code: 95407
It?s not healthy for the environment.

72. Adam Gomez
Zip Code: 90805
It's time long beach focuses on new energy. We have no excuses to continue harming our communities.

73. Gwen Shaffer
Zip Code: 90803
Just last Saturday, my son and I joined a guided a walk sponsored by the Los Cerritos Wetlands. It is so wrong that oil drilling continues to take place on this land that is critical for groundwater purification, migratory birds and other habitat. In addition, our reliance on fossil fuels is killing the planet.

74. Cherie Holcomb
Zip Code: 94605
Keep it in the ground! The recent IPCC report shows that we MUST stop all new fossil fuel infrastructure development. In addition we MUST transition away from fossil fuels, , making significant progress on this in the next 2 years. We are out of "tomorrows". The time for action is today.

75. Jean Riehl
Zip Code: 94533
Let Long Beach Breathe !

76. Ryan Malone
Zip Code: 90035
Let us lead the country and the world through our actions in helping to do what?s right to save our planet. A renewable and sustainable energy solution is available and ready to be implemented. Let?s do it.

77. Jim Franzi
Zip Code: 95629
Let's head in the right direction

78. Anna Christensen
Zip Code: 90803
Long Beach has been an oil town for a century and shows no sign of abandoning this status even as its nothing to brag about anymore. As the seas rise due to the emissions from drilling, transporting, refining , and consuming oil fossil fuel, the City has yet to reduce our own dependency on oil and gas revenues. Instead we readily approve expanded drilling in sensitive wetlands and increased storage at our Port. We get to zero emissions by adding new bike lanes and green buildings to offset the deteriorating health of our most vulnerable residents exposed to toxic emissions from active and abandoned wells, refineries, and the import and export of fossil fuels through our port. The fact that elected officials and even the LBUSD continue to accept donations from fossil fuel companies and lobbyists means that residents have not been able to count on them to advocate for what is really needed most - to clean up 100 years of environmental damage, and stop making more.

79. Anne Proffit
Zip Code: 90802
Long Beach is addicted to oil and this must stop now. No more drilling; no more health issues for the public that puts you in office. Not only does oil drilling need to be phased out at our earliest convenience, but we must move forward with innovative ways to replace the Tidelands money that will run dry once oil is where it belongs. Underground.

80. Karen Jacques
Zip Code: 95811
Long Beach is horribly polluted. The City Council needs to do everything in its power to phase out drilling immediately and protect and preserve the health of its constituents.

81. Mary Barton Mayes
Zip Code: 90814
My entire family lives here--and we don't like the health or environmental implications of oil drilling here!! That's why we bought solar panels, and drive high-mileage vehicles, recycle anything possible, and avoid plastic. It's time our City takes a bold and brave step to help reduce carbon pollution by banning oil drilling NOW.

82. Chuck Barrick
Zip Code: 90804
My family has been living, working, going to school, and running businesses in Long Beach for nearly 100 years. Although the city has made great strides in environmental cleanup and protection, we need to do more. Please ensure that LA County's second largest City is setting the important example of putting our people and our properties first with this important initiative.

83. Helene Whitson
Zip Code: 94709
My husband grew up in Long Beach. I remember going there to visit his parents and going by what I think is called Oil Hill. It

stank and was disgusting. The time for extracting fossil fuels is over. The drilling process exposes people living nearby to harmful chemicals, and it makes a total mess of the land on which the drilling takes place. It's time for green and renewable energy, as well as turning the oil drilling areas into something compatible with life, not the extinction of it.

84. V & B Jones
Zip Code: 90508
No more carcinogenic, climate-hijacking fossil fuels please.

85. Edward Costello
Zip Code: 90402
No more drilling for oil & gas

86. Allison Slay
Zip Code: 90814
No more oil to decrease the world temperatures

87. Edward Costello
Zip Code: 90402
No NEW oil drilling in Long Beach.

88. Linda Morgan
Zip Code: 94806
Oil drilling doesn?t belong in a city.

89. Elizabeth Gonzalez
Zip Code: 90805
Oil drilling in residential areas is toxic. It's long overdue to end it.

90. Jessie Gaskell
Zip Code: 90042
Oil drilling is a public health crisis that disproportionately affects low-income residents. I support the City?s steps to expedite the phase out of drilling and strongly encourage the Council to act on this with the urgency it requires.

91. Ann Cantrell
Zip Code: 90808
Oil drilling pollutes the air and water; many wells are on an earthquake fault; oil spills and pipeline leaks can destroy wetlands habitat.

92. Sara Bruce
Zip Code: 95110
Oil is potentially ruining the future for all of us, and drilling is ruining the present for some of us. It is time for the oil industry to re-assess its values!

93. Susanna Marshland
Zip Code: 94707
Oil is ruining the planet and our communities.

94. James Hines
Zip Code: 90814
Oil Slicks like the recent one in Long Beach and last year's Orange County spills highlight the fact that fossil fuel production has no place, anywhere in California, but especially offshore and near our beaches. How many more oil spills and fossil fuel accidents do we need until the city and the state begins to prioritize public health and the environment?

95. Alice Nguyen
Zip Code: 95136
On May 8, CA produced more than enough renewable electricity to power the entire state. We don't need or want dirty fossil fuels.

96. Sharon Fritsch
Zip Code: 95928

Our beaches have suffered from too much pollution.

97. Susan Perez
Zip Code: 90731
Our kids deserve clean air and water! Childhood asthma and toxic air and water are preventable. End this!

98. Jeffrey Wang
Zip Code: 90012
Please act with urgency!

99. Patricia Essick
Zip Code: 93023
Please do what is right for our environment and the health of your citizens.

100. Abbie Bernstein
Zip Code: 90069
Please don't subject less affluent citizens to environmentally dangerous projects in their backyards.

101. Catherine Ronan
Zip Code: 90066
Please help lead the way to phasing out oil drilling in our state. The climate crisis demands it. Thank you!

102. Christina Mancebo
Zip Code: 90808
Please invest in clean energy that is sustainable. Oil drilling is neither.

103. Emily Canata
Zip Code: 90814
Please phase out drilling in Long Beach and restore our natural environment. This will make Long Beach more beautiful and safer for everyone in our community. It will make the land more valuable and would be something we could brag about-look how we care about our environment and actually did something about it that everyone can understand and see.

104. Rachelle Sartini Garner
Zip Code: 90802
Please phase out drilling in our communities, and stop valuing profit over the health of the people of Long Beach. Highly support transitioning workers into jobs that allow them to fully care for their families without putting themselves at risk, and that can set them up with crucial skills needed as we transition into sustainable forms of energy production. Climate change is already affecting our state drastically, please be leaders that work swiftly and proactively to improve and protect the lives of your residents.

105. Austin Rice
Zip Code: 96130
Please reduce environmental & societal harm & risks by incrementally shutting down drilling in/near Long Beach, CA. Thank you.

106. Bruce Allen
Zip Code: 92075
Please stop ALL oil drilling in Long Beach to stop contributing to carbon-dioxide emissions that occur when oil & gas are burned. It is critical that we stop these emissions and transfer our energy sources to clean energy like hydro dams, solar farms and wind farms!!!

107. Anna Hornick
Zip Code: 94401
Please stop pollution from oil drilling. As a California resident, I find highly important that you pass this measure. Thank

108. Mindy Thomas
Zip Code: 90803

Please think of the environment-by your wallets

109. Dalila Hardwick
Zip Code: 90803
Please, please, please... stop the oil pumpjacks in Long Beach. Many are extremely close to homes and businesses, and some are not far from schools.
The fumes are poisonous and fumes travel far and wide.
We already have microplastic in our lungs, carcinogens from all kinds of poisons that should be illegal. Do contribute to making the air we breathe less noxious Hopefully, one day not too far most chemicals that are now "legal" will be banned and substituted by things that do not kill us.
Thank you
Dalila Hardwick

110. Lionel Mares
Zip Code: 91352
Please, protect impoverished neighborhoods.

111. Madlyn Monchamp
Zip Code: 93111
Protect our climate

112. Elizabeth Moreno
Zip Code: 95117
Quickly phasing out (5 yr.) of oil drilling in Long Beach would be a win-win, for residents' health and the health of the planet. Do it, Long Beach!

113. Marti Roach
Zip Code: 94556
Scientists in the lates IPCC report said that in order to prevent unimaginably challenging negative tipping points for our climate, we must not have new fossil fuel infrastructure and we must rapidly phase out burning fossil fuels. Wells release methane, a highly potent ghg that warms the planet fast. Even more importantly, the health benefits of using clean energy and avoiding health risks from air, water and soil contamination of wells are high. We have a healthy way for our energy future. Let's put our human energy into this transition to a clean energy economy that is fair to workers, communities and all.

114. Martin Holman
Zip Code: 90806
So much wealth has been made removing oil from the ground in Long Beach, it's a shame that none of that wealth can stand up and say ENOUGH!

115. Sherrill Futrell
Zip Code: 95618
SOMEONE MUST BE ON THE TAKE. THIS HAS GONE ON FOR DECADES.

116. Michael Wauschek
Zip Code: 90703
Standing rock is everywhere

117. Eanthy Zeltman
Zip Code: 92308
stop drillinmg where people live.

118. Kathleen Monteleone
Zip Code: 92530
STOP oil drilling today! It truly saddens me on a daily basis that our precious Mother Earth has been destroyed, ravaged, and abused because of greedy, heartless, business men. Our planet, wildlife, and humanity take precedence over money! STOP corporate greed now!

119. Karl Eggers
Zip Code: 90815

Stop selling Long Beach residents future for money today. The city is already on the hook for millions of dollars to properly abandon wells that their bankrupt commercial (private) partner is unwilling to fund. And are you using oil money to offset effects of climate change in the city, or just ongoing expenses (e.g., city employee retirement and health expenses).

120. Michael Mansfield
Zip Code: 94702
Surely we can do better and think more long-term.
More jobs and healthier communities await your leadership.
Peace.
Michael Mansfield

121. Kennedy Trawick
Zip Code: 90503
The citizens of Long Beach, and quite frankly the world, don?t deserve to be subjected to the detriments cause by the oil industry. Please put lives over profit.

122. Martin Holman
Zip Code: 90806
The City of Long Beach has long benefited from oil drilling. It really is past time to stop.

123. Cindy Koch
Zip Code: 90807
The entire world needs to phase out oil drilling if we want to survive decades to come! This should be important to EVERYONE!!

124. Marie Gaillac
Zip Code: 92868
The Long Beach community should become a model of a community that can transform itself from being an anti environment community to a model one. It is fortunate in its placement , climate .and potential.sgenic beauty.

125. Joshua Trotter
Zip Code: 90026
The most recent IPCC reports make it clear that transitioning away from fossil fuels as quickly as possible is essential. Now is the time for action.

126. Deborah Weinrauch
Zip Code: 90230
The oil fields are dangerous to everyone's health and safety and belong to a bygone era.

127. Aaron Valdespino
Zip Code: 90806
The oil island's are a huge eye sore to our beautiful ocean. The capped oil wells are also leaking over time and are NEVER maintained. Pure disregard and negligence by the politicians agreeing to these oil wells and islands. Please do what's best for your stakeholders and protect the land and ocean we love.

128. Daniel Nakashima
Zip Code: 90806
The tax per barrel is too low also. Raise the tax until it?s no longer profitable, then convert these sites
to solar and wind. There is no time to wait for Long Beach?s children.

129. Tab Buckner
Zip Code: 94117
The time to phase out Long Beach oil drilling is NOW!!!

130. Elizabeth Zenker
Zip Code: 95501

There is far more than simple oil gain from this precious piece of Earth!

131. Lizann Keyes
Zip Code: 95062
There is no acceptable place for oil drilling in California. I took part in the huge clean-up in the early 70s after the giant oil spill that spurred the Earth Day Movement. Now, over fifty years later, we should not be negotiating for fossil fuel rights. Protect our precious earth! Phase out drilling now!

132. Elen Lauper
Zip Code: 90803
These are my beaches, my neighborhoods. Protect our waters.

133. G Friaz
Zip Code: 95112
They've drilled long enough!

134. F. Michael Montgomery
Zip Code: 95403
This affects the health of Americans, our environment, and our climate crisis!

135. John Candela
Zip Code: 94121
This is unacceptable! Neighborhood oil drilling exposes Long Beach residents to toxic chemicals and smog-forming gasses, which can increase the risk of severe chronic conditions including respiratory illness and cardiovascular disease.

136. Susan Brunelle
Zip Code: 90807
This needs to be done for the health of our entire community. The health of residents must be protected by it's elected representatives.

137. Frederick Cliver
Zip Code: 90815
To the best of my knowledge, the city and state aren't even getting severance fees. What is the upside of this for the populace, especially when we need to be weaning ourselves off of fossil fuels?

138. Daryl Gale
Zip Code: 90013
We all have to do our part to segue to cleaner energy!

139. Stacey Meinzen
Zip Code: 95405
We are in a climate emergency and neighborhood drilling is not OK. It's time to stop sacrificing our communities' health for fossil fuel executive pocketbooks. We have clean energy options and we should be focused on accelerating those - electrifying everything, not creating more toxic liabilities. There are already too many abandoned oil wells that taxpayers are on the hook to clean up. Let's stop stranding more assets and invest in a climate-safe future.

140. Gary Charles
Zip Code: 90813
WE AVE SO MUCH SOLAR AVAILABLE HERE AND THE PORTS FREE WIND ENERGY ALL DAY AND NIGHT I DON'T CARE IF THE OIL COMPANIES DON'T GET A BIG XMAS BONUS EVER AGAIN AFTER ALL THE SPILLS TAXPAYERS HAVE PAID FOR THE CLEAN UP.

141. Sydney Pitcher
Zip Code: 91945
We cannot forget about the oil spill that happened off the California Coast in 2021. This is a wake up call once again, reminding us of the dangers of offshore drilling. We are in a climate crisis and we?re running out of time to save our health and the planet

from irreversible, extremely catastrophic outcomes.

142. Sue Gupta
Zip Code: 94556
We do not need oil drilling in this age of climate crisis and sea level rise that is threatening the future of our communities. People definitely do not want any more catastrophic oil spills.

143. Nancy Hubbs-Chang
Zip Code: 91105
We don't need fossil fuels any more. This year is proving beyond the shadow of a doubt how damaging they are to our city, county, country, and planet.

144. Felix Mbuga
Zip Code: 95035
We have a moral responsibility to our children and our grandchildren to not leave them a planet in worse condition than we received it that is devastated by climate pollution. The science is clear that this means: no more fossil fuel subsidies or expansion or investment in fossil fuel infrastructure, winding down existing fossil fuel production and consumption as quickly as possible, and rapidly expanding clean carbon-free energy production.

145. Kristie Guzman
Zip Code: 90713
We have enough pollution

146. Stephanie Oliver
Zip Code: 90803
We have the means to make this happen now. Let?s do it, we?re counting on you to make this wonderful community even better!

147. Gabriela Worrel
Zip Code: 90016
We have waited too long for environmental Justice. Stop harmful drilling now!

148. Richard Lindemann
Zip Code: 90804
We know that oil facilities are a harm to residents near or far from them. With the use of more electric means of transportation, OIL needs to be phased out in LB and SH as quickly as possible, within the next 5 to 7years. The time for this begins, NOW! Begin this process to better the health of generations to come. Clean up is MANDATORY for ALL OIL COMPANIES involved.

149. Paul Lewis
Zip Code: 90807
We live within a few blocks of several oil rigs, and it's a terrible thing! How dare the city where we live allow such toxic pollution to take place in residential neighborhoods? Other cities have outlawed it--as well it should be--so what is the City of Long Beach waiting for?

150. Nishanga Bliss
Zip Code: 94702
We must act now to keep oil in the ground and protect the climate!

151. Suzanna Byrne
Zip Code: 92649
We MUST stop being so dependent on fossil fuels especially oil. I cannot afford to buy a hybrid or an electric car but support the effort to get rid of gasoline powered cars for the future. Therein lies some hope of less damage to the only home we have - EARTH1

152. Ann Dorsey
Zip Code: 91325

We must stop extracting fossil fuels if we want a livable future.

153. Brady Bradshaw
Zip Code: 91302
We need drastic reductions in climate pollution if we are to avoid exponentially more catastrophic wildfires, droughts, and intensified storms.
My children's children will need a livable planet, and right now, people suffer at the hands of the oil industry's death-grip on our local, state, and federal governments. The misinformation campaign they are employing right now to lock in decades of further climate chaos and health impacts to our communities, is shameful. Big Oil's propaganda should be ignored outright as lies and deceit.
Do what is needed- phase out oil and gas immediately.

154. Sarah Butler
Zip Code: 94563
We need to ban new oil drilling now since oil wells are not healthy for people!

155. Paige Fordice
Zip Code: 95018
We need to build infrastructure for alternative energy sources. Stop producing oil.

156. Peter Canavan
Zip Code: 90803
We need to cut fossil fuels now! They are destroying our air our water our children and our lives! When are we going to wake up?

157. Denise Berringer-Wood
Zip Code: 90807
We need to focus on the health of our community and a clean climate future, not corporate profits!

158. Patricia Williams
Zip Code: 94571
We need to protect our beaches!

159. Kathleen Petricca
Zip Code: 94553
We need to push faster to get solar technology and storage to more residents. It's a race against time.

160. Mary Rojeski
Zip Code: 90405
What if it was next to Your home?

161. JB Jb
Zip Code: 94603
What! This is STILL happening? It's got to go!

162. Susan Hathaway
Zip Code: 90660
Why are you so eager to make people sick by putting more and more oil wells near their homes?

163. Dylan Michlin
Zip Code: 90254
Why don?t you invest in EV infrastructure instead?

164. Jeannine Pearce
Zip Code: 90814
You know why. Our kids are born and have infant asthma, Long Beach has a 17 year life expectancy difference due to health impacts of this climate crisis.
You got this and the Community has your back.

165. A.J. Averett

Zip Code: 91942

166. Ad Clayton
Zip Code: 92081

167. Adam Bernstein
Zip Code: 90012

168. Adam Resnick
Zip Code: 90026

169. Adria Tenisson
Zip Code: 93003

170. AIXA FIELDER
Zip Code: 90028

171. AJ Cho
Zip Code: 94579

172. Alan Chen
Zip Code: 90025

173. Alan Gonzalez
Zip Code: 90815

174. Alexis Georgiou
Zip Code: 95054

175. Alice Neuhauser
Zip Code: 90266

176. Allie Palmer
Zip Code: 92672

177. Alyza Cornett
Zip Code: 90056

178. Amaan Nabeel
Zip Code: 91301

179. Amanda DeJesus
Zip Code: 90806

180. Amira Mansour
Zip Code: 92612

181. AmirAli Siassi
Zip Code: 90049

182. Analisa Swan
Zip Code: 91504

183. Anastasia FIANDACA
Zip Code: 94901

184. Andarin Arvola
Zip Code: 95437

185. Andrea Scott
Zip Code: 94507

186. Andrea Milton
Zip Code: 91304

187. Andrew Philpot
Zip Code: 93463

188. Andy Lupenko
Zip Code: 91945

189. Angela Carter
Zip Code: 90731

190. Angela Gantos
Zip Code: 94920

191. Angela Clayton
Zip Code: 92081

192. Angie Klein
Zip Code: 94501

193. Annamarie Jones
Zip Code: 96101

194. Anne Mohr
Zip Code: 92626

195. Annemarie Weibel
Zip Code: 95410

196. Annette Benton
Zip Code: 94565

197. Annette Pirrone
Zip Code: 94960

198. Annie Hallatt
Zip Code: 94703

199. Anthony Montapert
Zip Code: 93455

200. Anthony Sandoval
Zip Code: 90710

201. Anthony Ramirez
Zip Code: 90802

202. Armando A. Garcia
Zip Code: 92571

203. Audrey Higbee
Zip Code: 90814

204. B Nemiroff
Zip Code: 90035

205. B Sandow
Zip Code: 94804

206. b edwards
Zip Code: 94973

207. Barbara Lovejoy
Zip Code: 94804

208. Barbara Mais
Zip Code: 90807

209. Barbara M
Zip Code: 90803

210. Barbara Marrs
Zip Code: 92371

211. Barbara Scheinman
Zip Code: 92691

212. Barbara Bellano
Zip Code: 91107

213. barbara poland
Zip Code: 91214

214. Barbara Mesney
Zip Code: 90066

215. Barbara Lehman
Zip Code: 91350

216. Barry & Tracy Kogen
Zip Code: 90808

217. Baty Family
Zip Code: 92373

218. Ben Keller
Zip Code: 94608

219. Ben Ruwe
Zip Code: 95005

220. Ben Hauck
Zip Code: 90808

221. Berna Cliffe
Zip Code: 90803

222. Bert Gfreenberg
Zip Code: 95135

223. Bob Flagg
Zip Code: 95436

224. Bonita Lacy
Zip Code: 91724

225. Bonnie Arbuckle
Zip Code: 95367

226. Bonny Davis
Zip Code: 95949

227. Brandon Gallegos
Zip Code: 92707

228. Brenda Haig
Zip Code: 90803

229. Brenda Haig
Zip Code: 90803

230. Brian Murphy
Zip Code: 91423

231. Brian Boortz
Zip Code: 95030

232. Bruce Burns
Zip Code: 92108

233. Bryan Callejo
Zip Code: 92114

234. Bryant Odega
Zip Code: 90501

235. bud hoekstra
Zip Code: 95232

236. Caephren Mckenna
Zip Code: 94609

237. Candace Rocha
Zip Code: 90032

238. Carol Drake
Zip Code: 94536

239. Carol Ng
Zip Code: 90026

240. Carol Lawson
Zip Code: 95821

241. carol schaffer
Zip Code: 94806

242. Carol Wiley
Zip Code: 92394

243. Carolyn Anders
Zip Code: 90230

244. Carolyn Leonard
Zip Code: 92404

245. Carolyn Yee
Zip Code: 95822

246. Carolyn Rosenstein
Zip Code: 90067

247. Carrie Weil
Zip Code: 90404

248. Caryn Cowin
Zip Code: 93308

249. Catherine Loudis
Zip Code: 94960

250. Cati Glasser
Zip Code: 90038

251. Caylee Hong
Zip Code: 90755

252. Celeste Anacker
Zip Code: 93105

253. Charlene Kerchevall

Zip Code: 92054

254. Charles Wieland
Zip Code: 94583

255. Charles Modjeski
Zip Code: 94555

256. Charles Heinrichs
Zip Code: 96097

257. CHARLOTTE WILLIAMS
Zip Code: 90302

258. Cheryl Albert
Zip Code: 95019

259. Chris Loo
Zip Code: 95037

260. Chris Geukens
Zip Code: 91343

261. Chris Gilbert
Zip Code: 94707

262. Christian Heinold
Zip Code: 94612

263. Christina Nielsen
Zip Code: 95120

264. Christina Medina
Zip Code: 90744

265. Christine Brockman
Zip Code: 92881

266. Christine Hayes
Zip Code: 91786

267. Christopher Cusack
Zip Code: 90016

268. Christopher Ware
Zip Code: 94539

269. Christopher Lish
Zip Code: 94903

270. Cindy Stein
Zip Code: 91320

271. Claire Perricelli
Zip Code: 95501

272. Claudia Monahan
Zip Code: 92253

273. Clay Thibodeaux
Zip Code: 90293

274. Consuelo Valenzuela
Zip Code: 95917

275. Corey Vanderwouw
Zip Code: 95949

276. Courtney Gartin
Zip Code: 95120

277. curt sanders
Zip Code: 93541

278. Damon Brown
Zip Code: 90016

279. Dan Esposito
Zip Code: 90266

280. Dana Kinonen
Zip Code: 90505

281. Danijel Mikulja
Zip Code: 90016

282. Darrell Neft
Zip Code: 92626

283. David Dexter
Zip Code: 94941

284. David Doering
Zip Code: 94109

285. David Boyer
Zip Code: 94304

286. David Hardy
Zip Code: 93065

287. David Garfinkle
Zip Code: 91356

288. David Peevers
Zip Code: 90066

289. David Murillo
Zip Code: 91351

290. Davin Peterson
Zip Code: 95503

291. Dean Campbell
Zip Code: 90807

292. Deborah Wardly
Zip Code: 95726

293. Debra Wills
Zip Code: 94610

294. Delores Yanko
Zip Code: 92543

295. Denise Fidel
Zip Code: 92007

296. Dennis Lynch
Zip Code: 95018

297. Dennis Trembly
Zip Code: 90275

298. Dennis Mcintyre
Zip Code: 92677

299. Dennis Trembly
Zip Code: 90275

300. Desendorf Mark
Zip Code: 90066

301. Diana Koeck
Zip Code: 92626

302. Diane Stotler
Zip Code: 93940

303. Diane Cottrell
Zip Code: 94803

304. Don Meehan
Zip Code: 95124

305. Donna Davies
Zip Code: 94040

306. Donna Mize
Zip Code: 94805

307. Donna Sharee
Zip Code: 94112

308. Donna Shellabarger
Zip Code: 90505

309. donnal poppe
Zip Code: 91325

310. Earl Frounfelter
Zip Code: 93454

311. Edgar Flores
Zip Code: 90808

312. Edward Landler
Zip Code: 90065

313. Edward Macan
Zip Code: 95501

314. Edwin and Jean Aiken
Zip Code: 94087

315. Elaine Russell
Zip Code: 90815

316. Elizabeth Levy
Zip Code: 94805

317. Elizabeth Ramsey
Zip Code: 95616

318. Elizabeth Estes
Zip Code: 91107

319. elizabeth myrin shore
Zip Code: 94979

320. Ellen Kaufman
Zip Code: 91311

321. Ellen Koivisto
Zip Code: 94122

322. Elliot Gonzales
Zip Code: 90813

323. Elsa Tung
Zip Code: 90807

324. Emmanuel Garcia-Rojas
Zip Code: 90066

325. Eric Muller
Zip Code: 94024

326. Eric Ericson
Zip Code: 90210

327. Erica Brown
Zip Code: 95602

328. Erin Suyehara
Zip Code: 90503

329. Erin Foley
Zip Code: 90813

330. Erin Mccune
Zip Code: 93117

331. Erlinda Cortez
Zip Code: 90807

332. Ernie Walters
Zip Code: 94587

333. Esther Moreno
Zip Code: 94505

334. Etta Robin
Zip Code: 93312

335. Evette Andersen
Zip Code: 95945

336. Fatima Iqbal-Zubair
Zip Code: 90248

337. Fiorella Russo-Jang
Zip Code: 94553

338. Flor Murray
Zip Code: 94044

339. Flora Rosas
Zip Code: 90038

340. Florence Litton
Zip Code: 92082

341. Gabriel Vargas

Zip Code: 90802

342. Gaille Heidemann
Zip Code: 90024

343. Gary Cote
Zip Code: 90803

344. Gary Goetz
Zip Code: 93950

345. Gary Popejoy
Zip Code: 96062

346. Gary Kuehn
Zip Code: 91321

347. Gavin Ford
Zip Code: 92104

348. Gavin0 Composer
Zip Code: 92618

349. Genesis Delgado
Zip Code: 90731

350. George Yenoki
Zip Code: 91016

351. Gerald Shaia
Zip Code: 91352

352. Gerard Ridella
Zip Code: 94546

353. Gladys Delgadillo
Zip Code: 92129

354. Gregg Lichtenstein
Zip Code: 92131

355. Gregory Perkins
Zip Code: 90814

356. Heather White
Zip Code: 90275

357. Heidi Buech
Zip Code: 90066

358. Helen Moncayo
Zip Code: 91784

359. Henry Schlinger
Zip Code: 91201

360. Henry Rosenfeld
Zip Code: 92506

361. Hildy Meyers
Zip Code: 92648

362. Howard Cohen
Zip Code: 94306

363. Inger Acking
Zip Code: 94710

364. Irene Hilgers
Zip Code: 94582

365. Iris Edinger
Zip Code: 91367

366. Iyela Palidine
Zip Code: 92672

367. J Lasahn
Zip Code: 94530

368. J P
Zip Code: 95521

369. J.W. Oman
Zip Code: 94618

370. Jack Cooper
Zip Code: 90807

371. Jackson Casimiro
Zip Code: 90731

372. Jacob Lang
Zip Code: 90041

373. Jacoba Dolloff
Zip Code: 91941

374. Jacqueline McVicar
Zip Code: 92115

375. Jacquelyn Heitman
Zip Code: 90814

376. Jaime Nahman
Zip Code: 90290

377. James Dawson
Zip Code: 95618

378. James Samis
Zip Code: 90275

379. James Symington
Zip Code: 90240

380. Jamie Le
Zip Code: 94501

381. Jan Warren
Zip Code: 94598

382. Jana Frazier
Zip Code: 90731

383. jane drexler
Zip Code: 93117

384. Jane Spini
Zip Code: 95521

385. Janet Maker
Zip Code: 90024

386. Jason Nolasco
Zip Code: 90706

387. Javier Del Valle
Zip Code: 90640

388. Jeanine Metildi
Zip Code: 90806

389. Jeannette Hanna
Zip Code: 95864

390. Jeff Slayton
Zip Code: 90806

391. Jeffrey Hurwitz
Zip Code: 94121

392. Jeffrey Streicher
Zip Code: 90808

393. Jen Rund
Zip Code: 94947

394. Jennifer Celio
Zip Code: 90802

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Fisheries Economics of the United States 2017

Economics and Sociocultural Status and Trends Series

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
NOAA Technical Memorandum NMFS-F/SPO-219
September 2021

Front cover: Commercial fishing vessel. Photo: Pacific Fishery Management Council
Inside cover: Seward Boat Harbor in Alaska. Photo: NOAA Fisheries Office of Science and Technology/Noelle Olsen

Fisheries Economics of the United States 2017

Economics and Social Analysis Division
Office of Science and Technology
NOAA Fisheries (NMFS)
1315 East-West Highway, 12th floor
Silver Spring, MD 20910

NOAA TECHNICAL MEMORANDUM NMFS-F/SPO-219
SEPTEMBER 2021

U.S. Department of Commerce
Gina M. Raimondo, Secretary of Commerce

National Oceanic and Atmospheric Administration
Dr. Richard W. Spinrad, NOAA Administrator

National Marine Fisheries Service
Janet Coit, Assistant Administrator for Fisheries

NOAA Fisheries Publications

Each year NOAA Fisheries produces three annual reports covering different aspects of the status of United States marine fisheries.

Status of Stocks is an annual report to Congress on the status of U.S. fisheries and is required by the Magnuson-Stevens Fishery Conservation and Management Act. This report, which is published each spring, summarizes the number of stocks on the overfished, overfishing, and rebuilt lists for U.S. federally managed fish stocks and stock complexes. The report also shows trends over time, discusses the value and contributions of our partners, and highlights how management actions taken by NOAA Fisheries have improved the status of U.S. federally managed stocks. For example, the 2017 report shows that the number of stocks on the overfished list just reached a new all-time low.
https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates#2018-quarterly-updates

Fisheries of the United States, published each fall, has been produced in its various forms for more than 100 years. It is the NOAA Fisheries yearbook of fishery statistics for the United States. It provides a snapshot of data, primarily at the national level, on U.S. recreational catch and commercial fisheries landings and value. In addition, data are reported on U.S. aquaculture production, the U.S. fishery processing industry, imports and exports of fishery-related products, and domestic supply and per capita consumption of fishery products. The focus is not on economic analysis, although value of landings, processed products, and foreign trade are included.
https://www.fisheries.noaa.gov/national/commercial-fishing/fisheries-united-states

Fisheries Economics of the United States, published each fall, provides a detailed look at the economic performance of commercial and recreational fisheries and other marine-related sectors on a state, regional, and national basis. The economic impact of commercial and recreational fishing activities in the United States is also reported in terms of employment, sales and value-added impacts. The report provides management highlights for each region that include a summary of stock status, updates on catch share programs, and other selected management issues.
https://www.fisheries.noaa.gov/national/commercial-fishing/fisheries-economics-united-states

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Or online at:

https://www.fisheries.noaa.gov/national/sustainable-fisheries/fisheries-economics-united-states

Contents


Measuring opilio crab with calipers.
Photo: North Pacific Fishery Management Council

Preface

Fisheries Economics of the United States, 2017

Fisheries Economics of the United States, 2017, is the twelfth volume in this annual series, which is intended to provide the public with easily accessible economic information about the nation's commercial and recreational fishing activities and fishing-related industries. Summary data is available online in the FEUS tool, available from https://www.st.nmfs.noaa.gov/data-and-tools/FEUS/explore-the-data.

This year's report covers the years 2008 to 2017 and provides descriptive statistics for the following categories: economic impacts of the commercial fishing and seafood industry; commercial fisheries landings, revenue, and price trends; saltwater angler expenditures and economic impacts of marine recreational fishing; recreational fishing catch, effort, and participation rates; and employer and non-employer establishments, payroll, employees, and annual receipt information for fishing-related industries.

The report also provides management highlights for each region that include a summary of stock status, updates on catch share programs, and other selected management issues. Economic performance indicators for catch share programs are reported.

Sources of Data

Information in this report came from many sources. Commercial landings, revenue, and price data, as well as recreational fishing effort and participation data, were primarily obtained from the Fisheries Statistics Division, Office of Science and Technology, NOAA Fisheries. Other data sources included the NOAA Alaska Fisheries Science Center; Alaska Department of Fish and Game; California Department of Fish and Game; Oregon Department of Fish and Wildlife; Washington Department of Fish and Wildlife; the Pacific Coast Fisheries Information Network (PacFIN); Texas Parks and Wildlife Department; and Western Pacific Fisheries Information Network (WPacFIN). Economic impacts from the commercial fishing and seafood industry and recreational fishing sectors are from two separate national IMPLAN models of the Economics and Sociocultural Analysis Division, Office of Science and Technology, NOAA Fisheries. Fishing-related industry information was obtained from the U.S. Census Bureau, Bureau of Economic Analysis, and the Bureau of Labor Statistics.

Acknowledgments

Many people participated in the production of this report. Shelley Arenas, Emily Markowitz, and Alex Richardson are the editors of this report series; Rita Curtis, Sabrina Lovell, Emily Markowitz, and Alex Richardson were primary authors and analysts on this edition of Fisheries Economics of the United States. Key collaborators include Ben Fissel, Molly Graham, Drew Kitts, Scott Miller, Noelle Olsen, David Tomberlin, Cara Mayo, Lauren Dolinger Few, Karen Greene, Stephen Kasperski, Emily Rollins, Jean Lee, Michael Lewis, Alan Lowther, Cameron Speir, and Mike Travis. The report's design and layout was done by Avi Litwack and Jacqui Fenner.

Special thanks to Emily Markowitz, whose tireless work in digitizing, automating, and improving this report has made for a stronger product in these pages and going forward. This work would not have been possible without her.

NOAA Fisheries staff in the regional fisheries science centers and regional offices provided expertise: Hing Ling Chan, Valerie Post, Jarad Makaiau, Abigail Harley, Scott Crosson, Alan Haynie, Justin Hospital, and Christopher Liese. Other colleagues who provided information and expertise included Mike Brown (California Department of Fish and Wildlife), and Jason Edwards and Rob Ames (Pacific States Marine Fisheries Commission).

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Commercial Fisheries

What Does the Term Mean?

Commercial fisheries, in this report, refers to fishing operations that sell their catch for profit. It does not include saltwater anglers who fish for sport or subsistence fishermen. It also excludes the for-hire sector, which earns its revenue from selling recreational fishing trips to saltwater anglers. The commercial fisheries section reports on economic impacts, landings revenue, landings, and ex-vessel prices of key species and species groups.

Metrics Definitions[1]

Economic Impacts
The employment, personal income, and output generated by the commercial harvest sector and other major components of the U.S. seafood industry.

Landings Revenue
The price that fishermen are paid for their catch.

Landings
The poundage or number of fish unloaded by commercial fishermen or brought to shore.

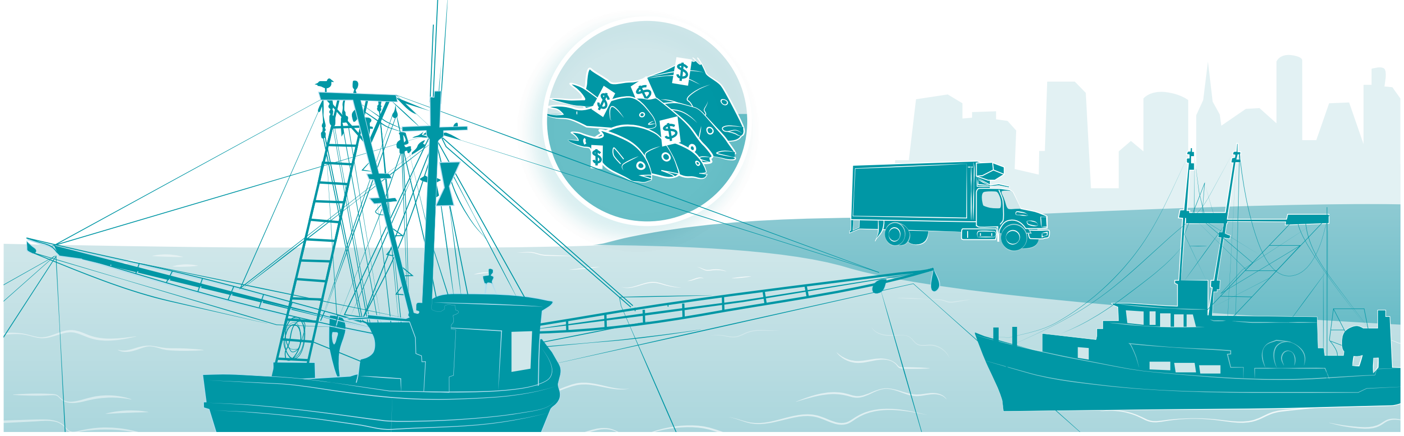
Ex-vessel Prices
The price received by a captain, at the point of landing, for the catch.

Frequently Asked Questions

What are fish caught with in commercial fishing?
Fish can be caught using a variety of gear, including potts and traps, trawls and seines, gillnets, dredges, and hooks and lines.

What happens to seafood caught by commercial fishermen?
Fish caught by commercial fishermen are first processed and packaged. Then they are sold to various establishments for consumption, such as restaurants and supermarkets. They can also be used as animal food and for medical purposes (such as fish oil pills).

Does the United States get seafood from anywhere else?
Not all fish are caught by U.S. commercial fishermen. A large percent of the seafood the U.S. receives is imported.



[1] For full definitions, see the Glossary at the back of this publication.

Recreational Fisheries

What Does the Term Mean?

Recreational fisheries, or recreational fishing, refer to fishing for pleasure rather than selling the fish for profit (i.e., commercial fishing) or for subsistence. The recreational fisheries section of Fisheries Economics of the U.S. reports on angler trips, participation, expenditures and economic impacts, and catch of key species and species groups. Only saltwater, or marine, recreational fishing is included in FEUS.

Metrics Definitions

Economic Impacts and Expenditures
The employment, sales, and personal income generated by expenditures on fishing trips and fishing-related durable goods (i.e. equipment used for recreational fishing).

Fishing Trips/ Effort
The number of fishing trips taken by recreational fishermen (anglers).

Participation
The number of anglers who fish in a given state or region. Anglers can be from in-state or out-of-state and from a coastal county or non-coastal county.

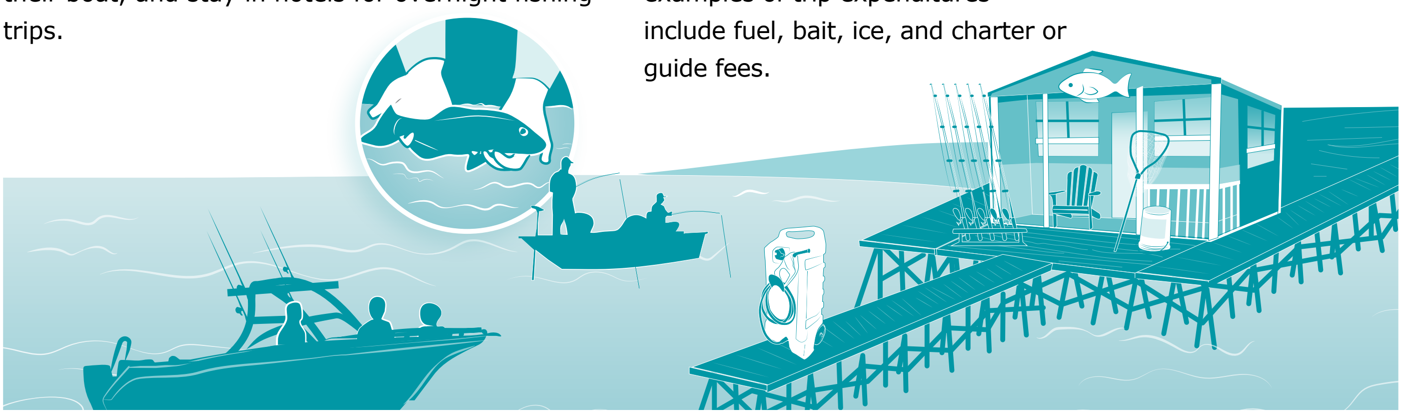
Harvest and Release
The total number or fish either: 1) caught and kept (**harvested**), or 2) caught and **released**, by recreational anglers from an area over a period of time. Total catch is the sum of the number of fish harvested and released.

Frequently Asked Questions

How do anglers affect the fishing economy?
When anglers participate in fishing activities, they support sales and employment in recreational fishing and other types of businesses. Anglers buy fishing equipment from bait and tackle shops, rent or buy boats, or pay to have others take them on charter boats to fish. They may also pay for food and drink at local restaurants, purchase gas for their boat, and stay in hotels for overnight fishing trips.

What do anglers spend their money on?
Durable goods, such as fishing tackle and boat, vehicle, and second home expenses. **Trips**, which can be taken in one of three modes: as for-hire (charter or party boat), private (or rental boat), and shore (fishing from shore). Some examples of trip expenditures include fuel, bait, ice, and charter or guide fees.

What do anglers do with their catch?
Some anglers catch fish to eat (i.e., harvest), while others practice catch and release. In recreational fishing, anglers do not sell the fish they catch for profit.



Marine Economy

What Does the Term Mean?

The "Marine Economy," in this report, refers to the economic activity generated by sectors of the economy that depend directly on oceans (or Great Lakes). We report on two industry sectors within the marine economy: 1) seafood sales and processing; and 2) transport, support, and marine operations. Information such as the number of establishments, number of employees, and annual payroll for these fishing and marine-related industries is used to determine their relative levels of economic activity in a state.

Metrics Definitions

Seafood Sales and Processing
These sectors are a direct representation of the Establishments, Employees, Sales, and Payroll for seafood processors, wholesalers, and retailers that buy fish from commercial fishermen and distribute to consumers.

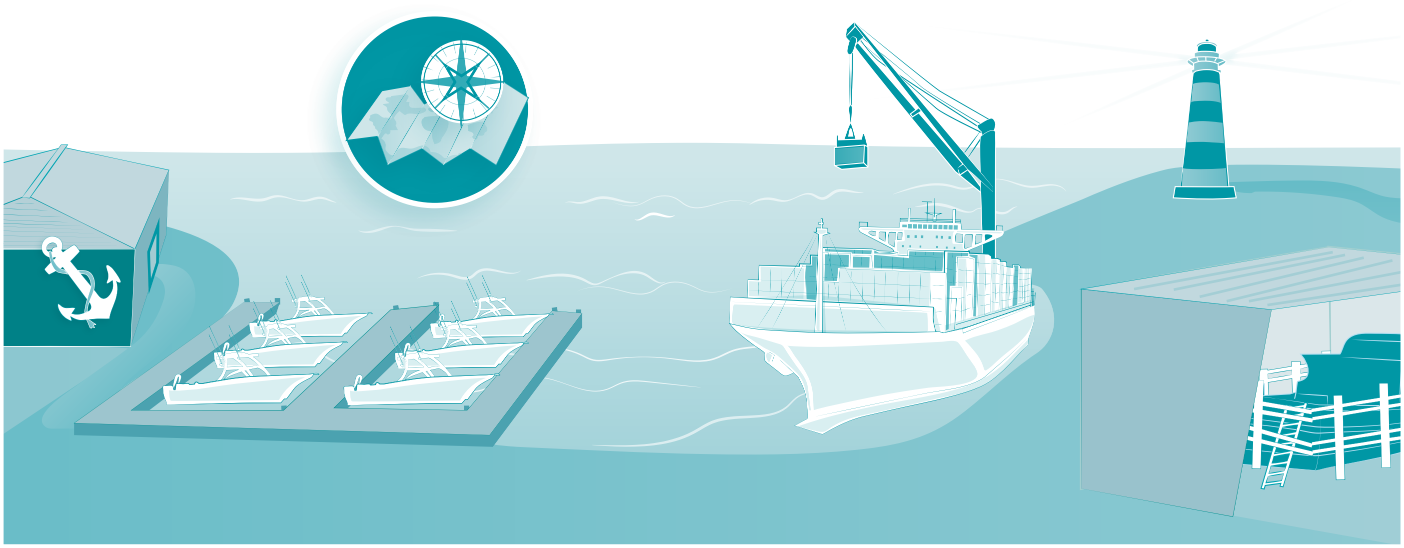
Transport, Support, and Marine Operations
The various sectors that contribute to the overall marine economy that may or may not support the fishing economy.

Frequently Asked Questions

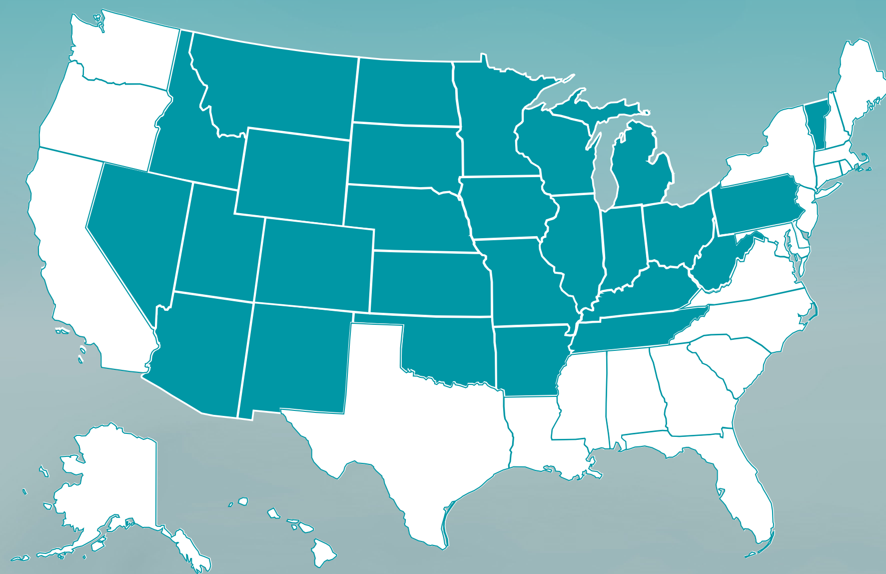
Does the marine economy include commercial and recreational fisheries?
Yes, commercial and recreational fisheries contribute to the overall marine economy.

What marine economy sectors, featured in the report, are related to commercial and recreational fisheries?
The seafood product preparation & packaging, wholesale, and retail seafood sales sectors are major parts of the commercial fishing industry. The Marinas, Navigational Services, Port & Harbor operations, and Ship & Boat Building sectors provide goods and services used in both commercial and recreational fisheries.

Why does the report include sectors that are independent of the fishing economy?
Information on sectors that are independent of the fishing economy, like freight transportation, provides context for how national and regional economies are affected by the use of ocean resources.



National Overview



Recreational fishermen show off their latest catch.
Photo: NOAA Fisheries/Kristy Wallmo

MANAGEMENT CONTEXT

The authority to manage federal fisheries in the United States was granted to the Secretary of Commerce by the Magnuson-Stevens Fishery Conservation and Management Act (P.L. 94-265 as amended by P.L. 109-479). NOAA Fisheries is the federal agency with delegated authority from the Secretary of Commerce to oversee fishing activities in federal waters. Federal fisheries are generally defined as fishing activities that take place in the U.S. Exclusive Economic Zone (EEZ, between 3 and 200 nautical miles from the coastline). Generally, individual states retain management authority over fishing activities within three nautical miles of their coasts.

Regional Fishery Management Councils

- North Pacific
- Pacific
- Western Pacific
- New England
- Mid-Atlantic
- South Atlantic
- Gulf of Mexico
- Caribbean

Nationwide, 46 fishery management plans (FMPs) provide a framework for managing the harvest of 474 fish stocks and stock complexes.[1] These plans aim to manage the harvest of fish in U.S. and shared waters, using sound scientific research, to maximize fishing opportunity while ensuring the sustainability of fisheries and fishing communities. Regional Fishery Management Councils (FMCs) develop FMPs in eight regions nationwide: North Pacific, Pacific, Western Pacific, New England, Mid-Atlantic, South Atlantic, Gulf of Mexico, and Caribbean. After an FMP is developed, the Secretary of Commerce in consultation with NOAA Fisheries must approve it before it is implemented.

Fishery management plans must specify objective and measurable criteria to determine when a stock is overfished or subject to overfishing. Enough information exists to determine the overfishing status for 317 (or 67%) of the 474 stocks and stock complexes. Of these 317, 30 stocks are subject to overfishing (or 9% of stocks with known status). The overfished status of 235 (or 50%) of the 474 stocks and stock complexes is known. Of these 235 stocks, 35 (or 15% of stocks with known status) are categorized as overfished.[2]

Transboundary and International Fisheries

NOAA Fisheries is also actively involved in negotiating conservation and management measures including total allowable catch levels, fishery allocations, and monitoring and control schemes for internationally shared fisheries resources. Shared fisheries resources include those in areas where the EEZ of the United States overlaps with other nations (transboundary areas), and in areas beyond the U.S. EEZ, i.e., international waters or the high seas. The Gulf of Alaska and the Gulf of Maine are examples of these transboundary areas. An area in the Bering Sea outside the EEZs of Canada, Japan, and Russia, called the Donut Hole, is an example of international waters. Loss of sea ice will create new transboundary areas and international waters in the Arctic.

Regional Fishery Management Organizations (RFMOs) are multinational organizations with interests in internationally shared fish stocks and associated fishing activities. Primary objectives of these RFMOs are to research, assess, and adopt measures for the conservation and coordinated management of target species, such as bigeye tuna. Some RFMOs also collect data and evaluate and adopt measures for the conservation and scientific assessment of non-target species, also known as bycatch. Non-target species include seabirds, marine mammals, sea turtles, and fish species caught incidentally while fishing for target species. The commitment to conserving and protecting all species associated with, or affected by, fishing activities is outlined in the Food and Agriculture Organization's (FAO) Code of Conduct for Responsible Fisheries established in 1995.

Regional Fishery Management Organizations: NOAA Fisheries participates in eight RFMOs globally. Each RMFO is listed by ocean basin on the following page.[3]

[1] Fishery management plans and fishery ecosystem plans for each region covered in this report are listed in their respective sections. The four FMPs developed by the Caribbean Fishery Management Council and the Atlantic Highly Migratory Species FMP developed by NOAA Fisheries are not included in this report.
[2] Source: NOAA Fisheries Office of Sustainable Fisheries, Status of Stocks 2017. https://www.fisheries.noaa.gov/national/2017-report-congress-status-us-fisheries.
[3] See https://www.fisheries.noaa.gov/topic/international-affairs. Source: http://www.nmfs.noaa.gov/ia/agreements/regional_agreements/intlagree.html.

Pacific

- Pacific Salmon Commission
- International Pacific Halibut Commission
- Inter-American Tropical Tuna Commission
- Western and Central Pacific Fishery Commission

Atlantic

- International Commission for the Conservation of Atlantic Tunas
- North Atlantic Salmon Conservation Organization
- Northwest Atlantic Fisheries Organization

Antarctic

- Commission for the Conservation of Antarctic Marine Living Resources

Another issue of particular concern for NOAA Fisheries is illegal, unreported, and unregulated (IUU) fishing activities. IUU fishing generally refers to fishing that violates national laws or internationally agreed conservation and management measures in effect in oceans around the world. IUU fishing can include fishing without a license or quota for certain species, unauthorized trans-shipments to cargo vessels, failing to report catches or making false reports, keeping undersized fish or fish that are otherwise protected by regulations, fishing in closed areas or during closed seasons, and using prohibited fishing gear.

NOAA Fisheries is actively collaborating with other federal agencies as part of the National Ocean Council Committee on IUU Fishing and Seafood Fraud. This network of agencies works together to implement measures outlined in an action plan developed by the Presidential Task Force on Combatting IUU Fishing and Seafood Fraud. As part of this effort, in December 2016 NOAA Fisheries issued the final rule establishing the Seafood Import Monitoring Program to further combat IUU fishing practices and to identify misrepresented seafood imports before they enter the U.S. market. The data collected under this program will allow certain priority species, identified as especially vulnerable to IUU fishing and seafood fraud, to be traced from the point of entry into U.S. commerce back to the point of harvest or production to verify whether it was lawfully harvested or produced. For 11 of the 13 species/species groups covered in the final rule, the rule went into effect January 1, 2018; shrimp and abalone compliance will be mandatory by December 31, 2018. By not allowing IUU fish products into the U.S., the Seafood Import Monitoring Program helps level the playing field for commercial fishermen by reducing unfair competition in the marketplace.

Threatened and Endangered Species

NOAA Fisheries is also the lead agency for the conservation and protection of marine and anadromous species that fall within the purview of the Endangered Species Act (ESA). Currently, there are 160 threatened and endangered marine species under the ESA (see Table 1).

Table 1. Endangered and Threatened Species under NOAA Fisheries Jurisdiction[4]

Species Group	Number of Species
Marine and Anadromous Fish	72
Marine Mammals	34
Reptiles and Sea Turtles	26
Marine Invertebrates	27
Plants	1
Total Threatened and Endangered Marine Species	160

In addition to threatened and endangered marine and anadromous species, NOAA Fisheries also helps identify candidate and proposed species. Candidate species are actively being considered for listing as endangered or threatened under the ESA. These species also include those for which NOAA Fisheries has initiated a status review that it has announced in the *Federal Register*. Proposed species are candidate species that were found to warrant listing as either threatened or endangered. These species were officially proposed as such in a *Federal Register* notice after the completion of a status review and consideration of other protective measures. Currently, 12 candidate species and no proposed species are under consideration for listing.

NOAA Fisheries is also responsible for protecting marine mammals under the Marine Mammal Protection Act.[5] In authorizing this act in 1972, Congress recognized that marine mammal species or stocks may be in danger of extinction or depletion as a result of human activities; marine mammal species or stocks should not be allowed to fall below their optimum sustainable population levels; measures should be taken to replenish marine mammal

[4] See NOAA Fisheries Office of Protected Resources's Endangered Species Conservation website (https://www.fisheries.noaa.gov/topic/endangered-species-conservation#conservation-and-management) for current and proposed ESA species listings.
[5] The U.S. Fish and Wildlife Service protects walrus, manatees, otters, and polar bears.

species or stocks; there is inadequate knowledge of the marine mammal ecology and population dynamics; and marine mammals have proven to be resources of great international significance. NOAA Fisheries engages in activities such as preventing the harassment, capture, or killing of marine mammals; preparing marine mammal stock assessments; and studying interactions between marine mammals and fisheries.

Essential Fish Habitats

Sustainable commercial and recreational fisheries depend on healthy habitats. These habitats include rivers, estuaries, coastal waters, and the open ocean where marine and anadromous species feed, grow, and reproduce. Consideration of these habitat areas is part of an ecosystem-based management approach for managing fisheries in a more sustainable and holistic manner. Since 1996, federal fishery management plans are required to identify and describe essential fish habitat (EFH) for all federally managed species. Habitat areas that are necessary for a fish species' growth, reproduction, and development are considered EFH. To the extent practicable, NOAA Fisheries and the FMCs must minimize adverse effects to EFH caused by fishing.

Though not required, Habitat Areas of Particular Concern (HAPC) can be identified to help focus EFH conservation efforts. The HAPC designation alone does not confer additional protection to or place restrictions on an area, but helps to focus EFH conservation, management, and research priorities. HAPC designation is a valuable way to acknowledge areas based on their ecological importance, rarity, and/or vulnerability, indicating a greater need for conservation and management. To date, 229 HAPCs have been designated, a combination of habitat types, discrete areas, and waterways. Some of these areas do overlap.

In order to help prioritize efforts related to EFH, NOAA Fisheries held an EFH Summit in 2016 and then published an updated Marine Fisheries Habitat Assessment Improvement Plan in 2018.[6] Both efforts focused on identifying habitats that are most essential for sustaining federally managed species and supporting research to understand how these habitats directly contribute to fisheries productivity. A continued priority is refining EFH and HAPC designations for habitat-limited species and habitats that play a key role in offshore stock productivity.

Catch Share Programs

Market-based management tools are used by fishery managers to reduce over-capitalization, increase the economic viability of fisheries, and promote individual accountability for harvest and harvesting practices. Catch share programs are one of these tools, and they encompass a range of management strategies that share a common feature: A secure share of fish is dedicated to individual fishermen, cooperatives, fishing communities, and other entities for their exclusive use. In 2010, the NOAA catch share policy was released to encourage well-designed catch share programs to help maintain or rebuild fisheries.[7] The policy also aims to sustain fishermen, communities, and vibrant working waterfronts, including the cultural and resource-access traditions that have been part of this country since its founding.

Currently, there are 17 federal catch share programs nationwide. These programs include limited access privilege programs (LAPPs), individual fishing quota programs (IFQs), individual transferable quota programs (ITQs), fishing community development quota programs (CDQs), fishing cooperatives, and fishing sectors.[8] Implementation dates of these programs span three decades, with five programs established in the 1990s and six established since 2010 (see Table 2). Eleven programs manage a single species or, in some cases, two species but as separate management units; the other six programs manage multiple species. Seven of the programs operate in the North Pacific (Alaska) Region.

[6] The Habitat Assessment Improvement Plan Update is available at: https://spo.nmfs.noaa.gov/sites/default/files/TMSPO181_0.pdf.
[7] See https://www.fisheries.noaa.gov/national/laws-and-policies/catch-shares.
[8] See Section 303A of the Magnuson-Stevens Act for more information on LAPP requirements.

Table 2. Existing Catch Share Programs in Federal Fisheries[9,10]

Region	Program	Year Implemented
North Pacific	Western Alaska Community Development Quota (CDQ) Program	1992
	Alaska Halibut and Sablefish IFQ Program	1995
	American Fisheries Act (AFA) Pollock Cooperatives	1998
	Bering Sea and Aleutian Islands (BSAI) King and Tanner Crab Rationalization	2005
	Aleutian Islands Pollock Fishery	2005
	Bering Sea and Aleutian Islands (BSAI) Non-Pollock Trawl Catcher/Processor Groundfish Cooperatives (Amendment 80)	2008
	Central Gulf of Alaska (GOA) Rockfish Program (pilot implemented in 2007)	2011
Pacific	Pacific Coast Sablefish Permit Stacking Program	2001
	Pacific Groundfish Trawl Rationalization Program (Whiting and Non-Whiting trawl)	2011
Northeast	Northeast Multispecies Sectors: Georges Bank Cod - Hook Gear (2004) and Georges Bank Cod - Fixed Gear (2007)	2010
	Northeast General Category Sea Scallop IFQ Program	2010
Mid-Atlantic	Mid-Atlantic Surfclam and Ocean Quahog IFQ Program	1990
	Mid-Atlantic Golden Tilefish IFQ Program	2009
Atlantic Highly Migratory Species	Atlantic Bluefin Tuna Individual Bluefin Quota Program	2015
South Atlantic	South Atlantic Wreckfish ITQ Program	1992
Gulf of Mexico	Red Snapper IFQ Program	2007
	Grouper and Tilefish IFQ Program	2010

In 2010, NOAA Fisheries initiated an effort to track catch share program performance.[11] Findings from the initial report show that existing catch share programs have ended the race to fish (in their respective fisheries) resulting in longer fishing seasons, safer working conditions, and improved management performance. The report also shows that existing catch share programs have resulted in reduced fishing capacity to better match stock size—a management objective in the majority of catch share programs evaluated. Economic performance for the vessels remaining in the program improved, as measured by such metrics as revenue per vessel and average price.

Updated information on selected performance indicators is provided in Table 3. Briefly, results show that inflation-adjusted revenue from catch share species increased in 8 of the 16 programs and/or sub-components of the programs since their implementation. In addition, the number of active vessels decreased in all but one program (Central Gulf of Alaska (GOA) Rockfish program), while inflation-adjusted revenue per active vessel increased in all but two programs since their implementation (Mid-Atlantic Golden Tilefish IFQ program and Atlantic Bluefin Tuna Individual Bluefin Quota Program). Further, the results show that no stocks exceeded the annual catch limit (ACL) in 2016.

National Overview | North Pacific | Pacific | Western Pacific | New England | Mid-Atlantic | South Atlantic | Gulf of Mexico

[9] From 1996 to 2002 in the West Pacific, there was a congressional moratorium on the establishment of new IFQ programs. There are no catch share programs in the Caribbean.
[10] In 2007, Congress reauthorized the Magnuson-Stevens Act, Section 303A with provisions for limited access privilege programs.
[11] See https://www.fisheries.noaa.gov/national/laws-and-policies/catch-shares.

Table 3. Economic Performance Indicators for U.S. Federal Catch Share Programs (2016 dollars)[12]

Region	Program	ACL Exceeded		Number of Active Vessels		Total Revenue from Catch Share Species		Revenue per Active Vessel	
		Baseline	2016	Baseline	2016	Baseline	2016	Baseline	2016
North Pacific	Alaska Halibut IFQ Program	Y	N	3,432	863	$104,235,187	$108,551,827	$27,168	$122,867
	Alaska Sablefish IFQ Program	Y	N	1,139	304	$76,304,219	$73,724,937	$82,467	$236,892
	American Fisheries Act (AFA) Pollock Cooperatives	Y	N	147	102	$376,474,782	$344,219,874	$1,720,368	$3,296,437
	Bering Sea and Aleutian Islands (BSAI) King and Tanner Crab Rationalization	Y	N	264	72	$249,522,884	$190,513,888	$706,482	$2,511,131
	Bering Sea and Aleutian Islands (BSAI) Non-Pollock Trawl Catcher/Processor Groundfish Cooperatives (Amendment 80)	N	N	22	19	$88,806,736	$97,197,440	$4,187,808	$5,513,528
	Central Gulf of Alaska (GOA) Rockfish Program	Y	N	42	53	$6,828,753	$10,904,804	$162,589	$205,751
Pacific	Pacific Coast Sablefish Permit Stacking Program	-	N	135	85	$6,713,015	$9,125,751	$49,726	$107,361
	Pacific Groundfish Trawl Rationalization Program (Whiting and Non-Whiting trawl)	-	N	124	95	$40,047,400	$44,000,623	$322,962	$463,164
New England	Northeast Multispecies Sectors: Georges Bank Cod - Hook Gear (2004) and Georges Bank Cod - Fixed Gear (2007)	Y	N	417	198	$86,411,185	$46,478,813	$207,221	$234,741
	Northeast/Atlantic General Category Sea Scallop IFQ Program	-	-	271	161	$28,413,936	$43,986,489	$104,848	$273,208
Mid-Atlantic	Mid-Atlantic Ocean Quahog ITQ	N	N	67	16	$29,456,676	$24,067,464	$439,651	$1,504,216
	Mid-Atlantic Surfclam ITQ	N	N	137	38	$39,692,251	$29,247,462	$289,724	$769,670
	Mid-Atlantic Golden Tilefish IFQ	-	N	14	12	$4,715,655	$3,962,827	$336,832	$330,235
Atlantic Highly Migratory Species	Atlantic Bluefin Tuna Individual Bluefin Quota Program	-	-	116	85	$976,646	$706,981	$8,419	$8,317
Gulf of Mexico	Red Snapper IFQ Program	Y	N	482	430	$13,982,161	$26,849,941	$29,008	$62,441
	Grouper and Tilefish IFQ Program	Y	N	630	441	$22,809,890	$28,248,052	$36,206	$64,054

[12] The South Atlantic Wreckfish ITQ program and Aleutian Island Pollock Fishery are not included due to confidentiality restrictions. The Western Alaska CDQ program was excluded because CDQs are fundamentally different from the other programs. In addition, note that some programs did not have a catch quota prior to the catch share program. For these programs, "-" indicates that the question of whether the ACL was exceeded is not applicable. All values have been adjusted by the GDP deflator for 2013. BSAI Crab data for 2016/2017.

Other Market-Based Management Tools

Vessel or permit buyback programs are another market-based tool used by fishery managers. Under these programs, the government purchases fishing vessels or permits. Doing so permanently decreases the number of participants in the fishery and eases fishing-related pressure on marine resources. Recent buyback programs include BSAI Crab, Pacific Coast Groundfish, Longline CP Non-Pollock Groundfish, Southeast Alaska Purse Seine Salmon, and AFA Pollock.

Limited Access Privilege Programs (LAPPs), also known as limited entry programs, are another management tool available to fishery managers. In these programs, the number of fishing vessels allowed to harvest a specific fish stock or stock complex is limited to fishermen or vessels with permission to fish. LAPPs have been implemented in almost all federally managed commercial fisheries and in every region except the Caribbean.

Ecolabels are market-based tools offered by third-party entities. An eco-labeling program entitles a fishery product to bear a distinctive logo or statement that certifies the fishery resource was harvested in compliance with specified conservation and sustainability standards. It allows the buyer to potentially influence the sustainable harvest of fishery resources through the purchase of such ecolabeled seafood products at a price premium. The Marine Stewardship Council (MSC) has one of the most recognizable ecolabeling programs in the world. Currently, nearly 300 fisheries worldwide meet MSC sustainability standards, 20 of which are U.S. fisheries (see Table 4). Fisheries obtaining MSC certification for the first time in 2016 include the U.S. Atlantic Surfclam and Ocean Quahog fishery and the Gulf of Maine Lobster fishery.[13]

Table 4. U.S. Fisheries with MSC Certification[13]

Region	Fishery	Certified
North Pacific	Alaska salmon	2000
	Alaska pollock - Bering Sea and Aleutian Islands	2005
	Alaska pollock - Gulf of Alaska	2005
	Alaska North Pacific halibut	2006
	Alaska North Pacific sablefish	2006
	Alaska flatfish - Bering Sea and Aleutian Islands	2010
	Alaska flatfish - Gulf of Alaska	2010
	Alaska Pacific cod - Bering Sea and Aleutian Islands	2010
	Alaska Pacific cod - Gulf of Alaska	2010
	Annette Islands Reserve salmon	2011
Pacific	Oregon and Washington pink shrimp	2007
	Pacific hake mid-water trawl	2010
	West Coast limited entry groundfish trawl	2014
Northeast	Atlantic spiny dogfish, winter skate and little skate	2012
	Atlantic sea scallop	2013
	North Atlantic swordfish, yellowfin, and albacore tuna fishery	2013
	Acadian redfish, pollock and haddock otter trawl fishery	2016
	Atlantic surfclam and ocean quahog fishery	2016
	Gulf of Maine lobster fishery	2016
Southeast	Louisiana blue crab	2012

COMMERCIAL FISHERIES — NATIONAL OVERVIEW

In this report, commercial fisheries refer to fishing operations that sell their catch for profit. The term does not include subsistence fishermen or saltwater anglers who fish for sport. It also excludes the for-hire sector, which earns its revenue from selling recreational fishing trips to saltwater anglers. The commercial fisheries section reports on economic impacts, landings revenue, landings, and ex-vessel prices of key species/species groups.

Key U.S. Commercial Species

- Alaska pollock
- American lobster
- Blue crab
- Menhaden
- Pacific halibut
- Pacific salmon
- Sablefish
- Sea scallop
- Shrimp
- Tunas

Regional Highlights

At the national level, this report includes landings revenue, landings, and prices for 10 key species or species

[13] Marine Stewardship Council Certifications as of December 31, 2017. For more information about these fisheries and the Marine Stewardship Council certification process, see https://www.msc.org/. The Gulf of Maine Lobster fishery certification was suspended in 2020.

groups, which were selected so that each region has at least one species in the top 10. Results show that commercial fishermen in Alaska caught the most salmon (985.9 million pounds) and earned $645.7 million for their catch in 2017. Tunas were caught in large numbers in Hawaiʻi (25 million pounds) and generated $87.3 million in landings revenue. Maine fishermen contributed the most to American lobster landings (108 million pounds) and earned $423 million for their catch in 2017. In Massachusetts, sea scallopers harvested 32.4 million pounds of scallop and earned $330.2 million for their catch. More blue crabs were caught in Louisiana (43.9 million pounds) than in any other state, earning more than $54.2 million. Louisiana accounted for the greatest quantity of menhaden landed in 2017, with fishermen landing 716.1 million pounds worth $60.9 million in dockside revenue. Sea scallop garnered the highest average ex-vessel price per pound ($9.80) among the key species and species groups in 2017, with state-specific prices ranging from $8.50 in New York to $13.12 in New Hampshire.

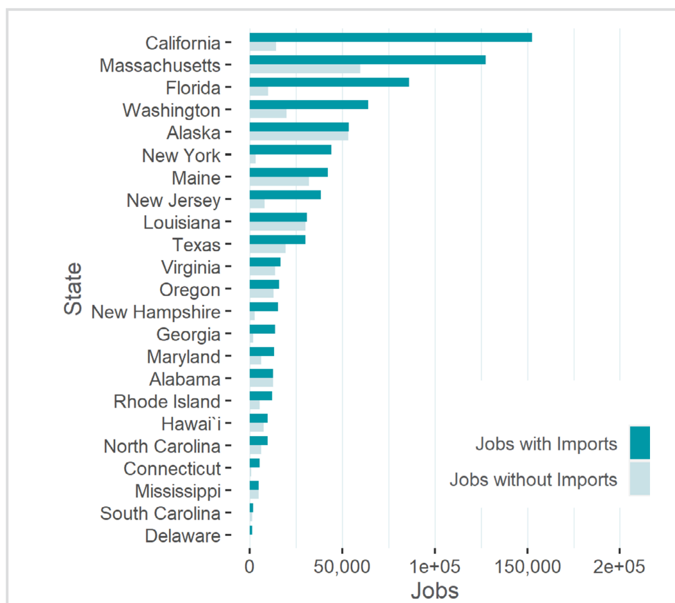
Economic Impacts

The premise behind economic impact modeling is that every dollar spent in a regional economy (direct impact) is either saved or re-spent on additional goods or services. If those dollars are re-spent on other goods and services in the regional economy, this spending generates additional economic activity in the region.[14]

Four different measures are commonly used to show how commercial fisheries landings affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as commercial fishing. The category includes both the direct sales of fish landed and sales made between businesses and households resulting from the original sale. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the sales of seafood or purchases of inputs to commercial fishing. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in numbers of jobs. Note that these categories are not additive. The U.S. seafood industry is defined here as the commercial fishing sector, seafood processors and dealers, seafood wholesalers and distributors, importers, and seafood retailers.[15]

This report provides estimates of total economic impacts for the nation and for each of the 23 coastal states. Total economic impacts for each state and the nation represent the sum of direct impacts; indirect impacts (in this case, the impact from suppliers to the seafood industry); and induced impacts (spending by employees on personal and household expenditures, where employees of both the seafood industry and its full supply chain are included). That is, the total economic impact estimates reported here measure jobs, sales, value-added, and income impacts from the seafood industry as well as the economic activity generated throughout each region's broader economy from this industry.

In 2017, the seafood industry supported 1.2 million full- and part-time jobs and generated $170.3 billion in sales, $44.6 billion in income, and $69.2 billion in value-added impacts nationwide (Table 5). The retail sector generated the largest employment impacts (549,922 jobs) and income impacts ($13.3 billion). The importers sector generated the largest sales impacts ($81.1 billion) and value-added impacts ($24.7 billion).



Graph 1. Jobs supported by the U.S. Seafood Industry (Jobs with and without Imports), 2017

[14] Summary data is available online in the FEUS webtool (Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool).
[15] The NMFS Commercial Fishing Industry Input/Output Model was used to generate the impact estimates (Available at: http://www.st.nmfs.noaa.gov/documents/commercial_seafood_impacts_2007-2009.pdf).

Table 5. U.S. Seafood Industry Economic Impacts Trends (jobs, millions of dollars)

Impacts	2012	2013	2014	2015	2016	2017
Jobs	1,270,141	1,350,627	1,394,833	1,179,848	1,190,092	1,246,366
Sales	$140,661	$142,249	$153,341	$144,194	$144,293	$170,314
Income	$38,722	$39,747	$41,956	$39,744	$39,905	$44,595
Value Added	$59,017	$60,309	$64,071	$60,566	$60,768	$69,177
Total Revenue	$5,099	$5,547	$5,473	$5,184	$5,337	$5,409

Table 6. Sales, Income and Value-Added Impacts Generated by the U.S. Seafood Industry, 2017 (millions of dollars)

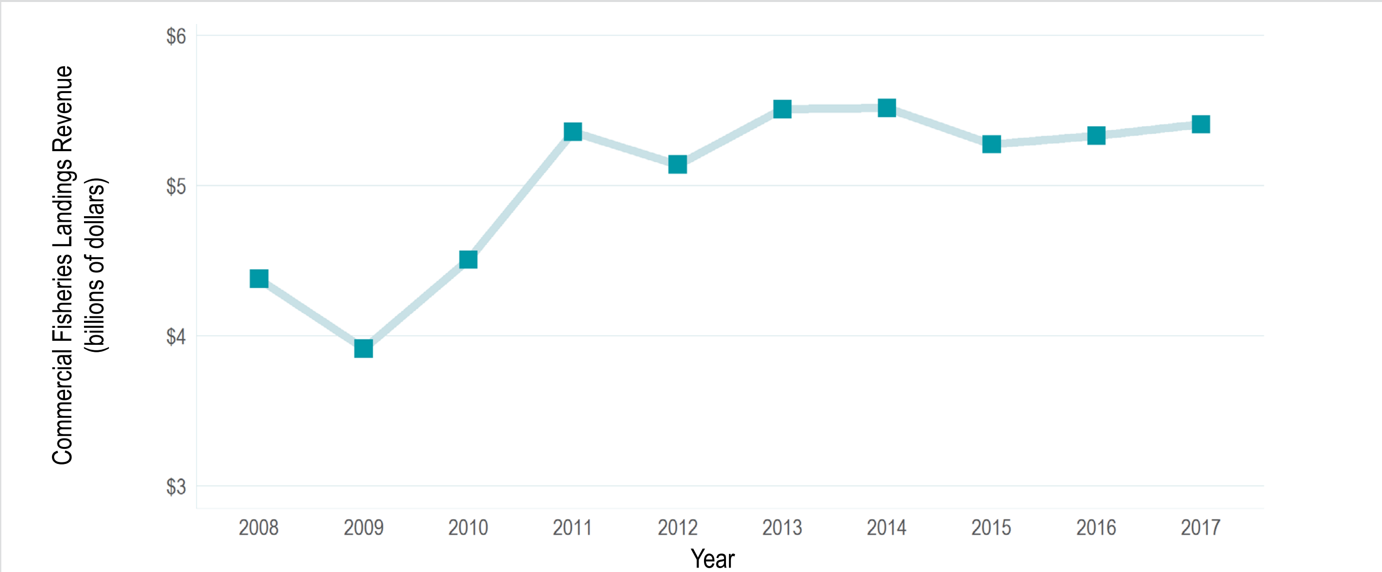
State	Sales	Income	Value Added
U.S. Total	$170,314	$44,595	$69,177
California	$28,833	$6,158	$10,247
Florida	$19,677	$3,676	$6,578
Massachusetts	$14,144	$3,428	$5,367
Washington	$9,291	$2,411	$3,708
New Jersey	$7,328	$1,555	$2,589
New York	$6,119	$1,308	$2,165
Alaska	$4,398	$1,904	$2,377
Maine	$3,630	$1,016	$1,539
Texas	$3,254	$887	$1,352
New Hampshire	$2,503	$553	$902
Georgia	$2,193	$486	$800
Louisiana	$1,813	$665	$909
Maryland	$1,689	$417	$648
Rhode Island	$1,661	$393	$628
Virginia	$1,484	$455	$659
Oregon	$1,357	$440	$631
Connecticut	$1,087	$219	$372
North Carolina	$969	$268	$402
Hawai‘i	$901	$275	$402
Alabama	$591	$235	$308
Delaware	$335	$60	$108
Mississippi	$234	$93	$121
South Carolina	$159	$50	$72

Landings Revenue

Landings revenue in the United States totaled $5.4 billion in 2017 (Table 7). This represented a 24% increase in nominal value from 2008 levels (an 8% increase in real terms after adjusting for inflation) and, year-over-year, a 1% increase from 2016 (Graph 2). Finfish landings revenue accounted for 47% of all landings revenue. Pacific salmon had the highest landings revenue in 2017.

Table 7. Commercial Fisheries Landings Revenue by Region, 2017 (thousands of dollars)

Region	Revenue
U.S. Total	$5,409,361
North Pacific	$1,764,462
New England	$1,266,062
Gulf of Mexico	$890,269
Pacific	$670,651
Mid-Atlantic	$508,063
South Atlantic	$193,484
Western Pacific (Hawai‘i)	$116,368



Graph 2. U.S. Commercial Fisheries Landings Revenue, 2008-2017 (nominal values, billions of dollars)

From 2008 to 2017, Pacific salmon (74%, 52% in real terms), American lobster (70%, 48% in real terms), and tunas (43%, 25% in real terms) had the largest increases, while Pacific halibut (-43%, -50% in real terms) had the largest decrease. From 2016 to 2017, Pacific salmon (63%), sablefish (23%), and shrimp (7%) had the largest increases, while menhaden (-31%), American lobster (-18%), and blue crab (-8%) had the largest decreases.

Commercial Revenue: Largest Increases

From 2008:
- Pacific salmon (74%, 52% in real terms)
- American lobster (70%, 48% in real terms)
- Tunas (43%, 25% in real terms)

From 2016:
- Pacific salmon (63%)
- Sablefish (23%)
- Shrimp (7%)

Commercial Revenue: Largest Decreases

From 2008:
- Pacific halibut (-43%, -50% in real terms)

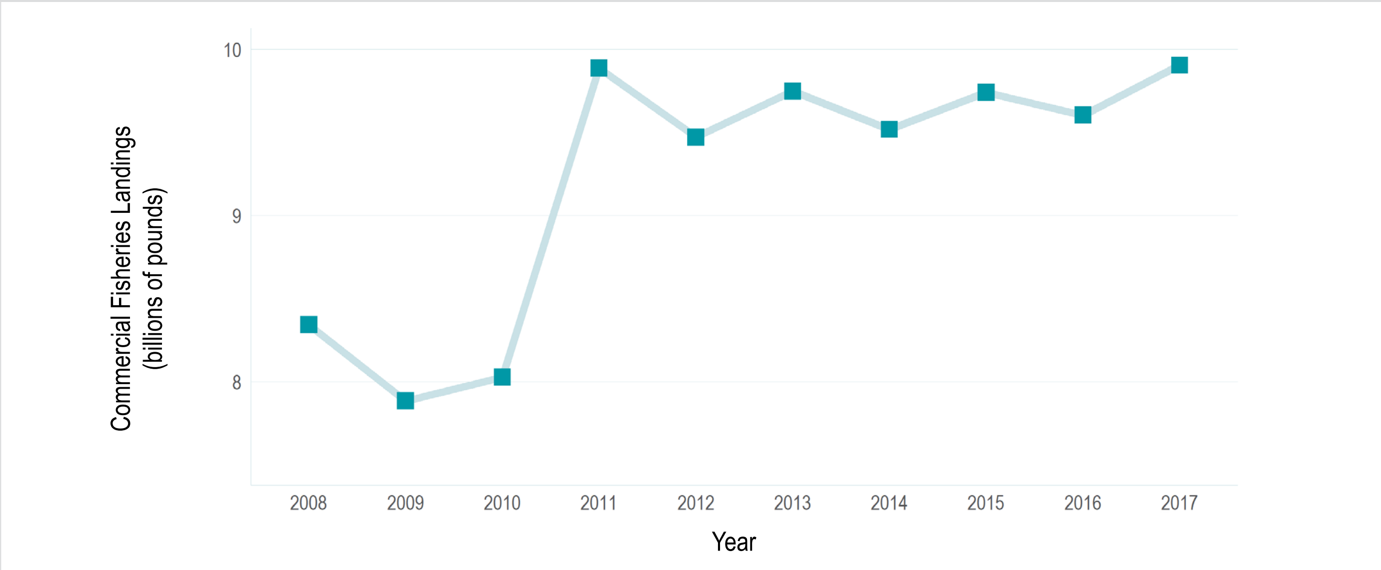
From 2016:
- Menhaden (-31%)
- American lobster (-18%)
- Blue crab (-8%)

The North Pacific Region earned the greatest share of landings revenue in 2017 ($1.8 billion), contributing 33% of the national total (Table 7). Massachusetts ($508.8 million, or 18% of U.S. shellfish revenue) and Maine ($454.4 million, or 16% of U.S. shellfish revenue) earned the most ex-vessel revenue from shellfish landings.

Landings

Landings volume in the United States totaled 9.9 billion pounds in 2017 (Table 8). This represented a 19% increase from 2008 levels and, year-over-year, a 3% increase from 2016 (Graph 3). Finfish landings revenue accounted for 89% of all landed weight. Alaska pollock had the highest landings volume in 2017.

From 2008 to 2017, Pacific salmon (53%), American lobster (52%), and Alaska pollock (49%) had the largest increases, while Pacific halibut (-61%), sablefish (-13%), and blue crab (-9%) had the largest decreases. From 2016 to 2017, Pacific salmon (80%), sea scallop (27%), and sablefish (13%) had the largest increases, while menhaden (-20%), American lobster (-17%), and blue crab (-10%) had the largest decreases.



Graph 3. U.S. Commercial Fisheries Landings, 2008-2017 (billions of pounds)

Table 8. Commercial Fisheries Landings by Region, 2017 (millions of pounds)

Region	Landings Volume
U.S. Total	9,905,033
North Pacific	6,004,882
Gulf of Mexico	1,402,221
Pacific	1,177,043
Mid-Atlantic	620,317
New England	555,661
South Atlantic	107,747
Western Pacific (Hawai'i)	37,162

Commercial Landings: Largest Increases

From 2008:
- Pacific salmon (53%)
- American lobster (52%)
- Alaska pollock (49%)

From 2016:
- Pacific salmon (80%)
- Sea scallop (27%)
- Sablefish (13%)

Commercial Landings: Largest Decreases

From 2008:
- Pacific halibut (-61%)
- Sablefish (-13%)
- Blue crab (-9%)

From 2016:
- Menhaden (-20%)
- American lobster (-17%)
- Blue crab (-10%)

Prices

Of all key species or species groups, sea scallop ($9.84 per pound) had the highest national ex-vessel price. Menhaden ($0.09 per pound) had the lowest ex-vessel price of all key species nationally.

From 2008 to 2017, Pacific halibut (46%, 27% in real terms), sea scallop (42%, 24% in real terms), and blue crab (35%, 18% in real terms) had the largest increases, while Alaska pollock (-14%, -25% in real terms) had the largest decrease. From 2016 to 2017, sablefish (9%), shrimp (6%), and blue crab (2%) had the largest increases, while sea scallop (-18%), menhaden (-14%), and Pacific salmon (-9%) had the largest decreases.

RECREATIONAL FISHERIES — NATIONAL OVERVIEW

In this report, recreational fishing refers to fishing for leisure rather than to sell fish (commercial fishing) or for subsistence. The key species/species groups included in this report were chosen because they are caught in large numbers, highly prized by recreational anglers, associated with federal fishery management plans, or a combination of one or more of these factors. The recreational fisheries section reports on angler participation, trips, economic impacts and expenditures, and catch of key species/species groups.[16,17]

[16] Atlantic and Gulf recreational catch and effort estimates are based upon the MRIP estimates released in 2018.
[17] See data sources section for more information about where each region or state's data comes from.

Key U.S. Recreational Species[18]

- Dolphinfish (Western Pacific and Atlantic)
- Drum (Atlantic croaker and spot) (Atlantic regions)
- Drum (seatrouts) (Atlantic regions): sand seatrout, seatrout genus, silver seatrout, spotted seatrout, and weakfish
- Pacific halibut (North Pacific)
- Pacific salmon (Pacific and North Pacific): Chinook salmon, chum salmon, coho salmon, and pink salmon
- Rockfishes and scorpionfishes (Pacific and North Pacific)
- Striped bass (Atlantic regions)
- Summer flounder (Atlantic regions)
- Tunas (Atlantic regions): albacore, bigeye tuna, blackfin tuna, bluefin tuna, tuna genus, and yellowfin tuna
- Tunas (Pacific and Western Pacific regions): albacore, albacore and other tunas, bigeye tuna, bluefin tuna, frigate mackerel, mackerel family, and yellowfin tuna

The economic contributions for both trip and durable expenditures from recreational fishing in 2017 were estimated using IMPLAN version 3, with base year data from 2017. Models for each state and for the nation were created in IMPLAN using trip expenditures (based on 2016/2017 survey data on average trip expenditures and total 2017 trips) and for durable expenditures (based on 2014 survey data on average durable expenditures and 2017 participants).

Regional Highlights

At the national level, the report includes fishing trips, participation, and the harvest and release numbers of 10 key species or species groups, which were selected so that each region has at least one species in the top 10. Results show that in 2017, recreational anglers in West Florida took the most trips (41.8 million trips) and spent the most on trips ($87.5 million). Alabama spent the second most on trips ($724.7 million). West Florida also had the most recreational anglers participate in fishing in their state, with 3.8 million anglers. Virginia caught the most Atlantic croaker and spot (35.4 million fish), West Florida caught the most seatrouts (41 million fish), Massachusetts caught the most striped bass (13.3 million fish), and New York caught the most summer flounder (13.5 million fish). Alaska caught the most Pacific halibut (551,600 fish) and Pacific salmon (1 million fish).

Economic Impacts and Expenditures

The economic contributions or impacts of recreational fishing activities in the United States is based on spending by recreational anglers.[19] Total annual trip expenditures were estimated at the state level by multiplying mean trip expenditures by the estimated number of adult trips in each trip mode (for-hire, private boat, and shore) and adjusting by the CPI (consumer price index) to the current year. Total annual durable expenditures were estimated by multiplying mean durable expenditures by the estimated annual number of adult participants in the United States and adjusting by the CPI (consumer price index) to the current year.[20]

Four different measures are commonly used to show how angler expenditures affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as recreational fishing. It includes both the direct sales made to the angler and sales made between businesses and households resulting from that original sale to the angler. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the purchases made by anglers. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in numbers of jobs. Note that these categories are not additive. NOAA Fisheries uses a regional impact modeling software, called IMPLAN, to estimate these four types of impacts.

Economic impacts from recreational fishing activities supported 487,024 jobs across the United States in 2017 (Table 9). Recreational fishing also generated about

[18] Atlantic Regions refer to those states within New England, Mid-Atlantic, South Atlantic, and the Gulf of Mexico.
[19] Trip expenditure estimates were generated from the 2016/2017 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2020). Durable goods expenditures were generated from the 2014 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2016). (For citations: Publications-U.S. Coastal and Marine Recreation.)
[20] Summary data is available online in the FEUS webtool. (Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.)

$73.8 billion in sales impacts, $24.7 billion in income impacts, and $41.5 billion in value-added impacts.

Impacts from durable equipment expenditures (e.g., rods and reels, fishing-related equipment, boats, vehicles, and second homes) accounted for 66% of total job impacts, 67% of sales impacts, 68% of income impacts, and 66% of value added impacts. Of the three fishing trip modes, shore-boat-based fishing trips had the greatest economic impact, accounting for 17% of employment, 16% of sales, 16% of income impacts, and 17% of value-added impacts.

Table 9. Recreational Economic Impacts Trends for the United States (millions of dollars)[21]

Impacts	2016	2017
Number of Jobs	486,164	487,024
Sales	$72,757	$73,752
Income	$24,377	$24,684
Value Added	$40,885	$41,474

Graph 4. Jobs supported by the U.S. Recreational Fishing Industry, 2017

The greatest employment impacts (Graph 4) and sales impacts (Table 10) from saltwater recreational fishing were both generated in West Florida, followed by East Florida and North Carolina.

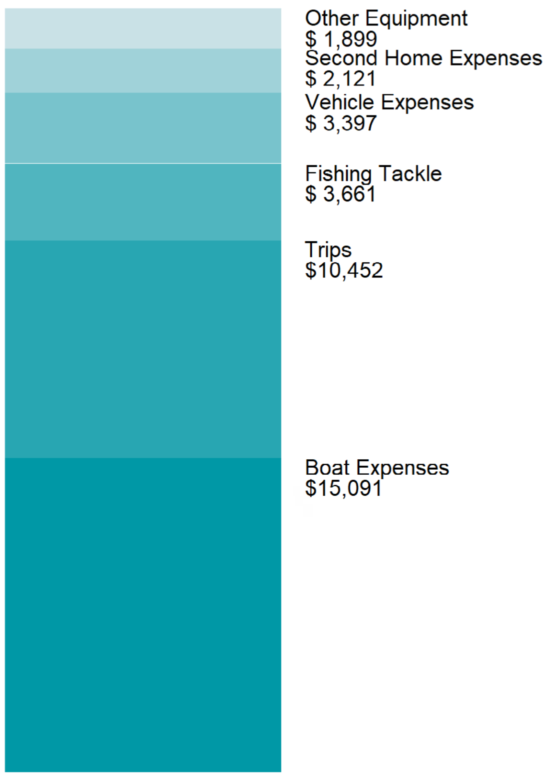
Table 10. Sales, Income, and Value-Added Impacts Generated by the Recreational Fishing Industry, 2017 (millions of dollars)

State	Jobs	Sales	Income	Value Added
U.S. Total	487,024	$73,752	$24,684	$41,474
West Florida	79,498	$9,142	$3,271	$5,535
East Florida	45,267	$5,137	$1,840	$3,159
North Carolina	30,170	$3,086	$1,112	$1,869
Alabama	23,721	$2,209	$802	$1,442
California	19,750	$2,483	$976	$1,567
Louisiana	16,853	$1,899	$625	$1,136
New Jersey	14,478	$1,876	$804	$1,255
Texas	13,583	$1,720	$643	$1,080
New York	11,410	$1,154	$496	$849
South Carolina	9,803	$902	$310	$557
Washington	9,533	$1,198	$459	$766
Massachusetts	8,469	$1,005	$466	$686
Maryland	8,048	$847	$335	$559
Virginia	7,176	$764	$296	$499
Alaska	5,550	$567	$198	$331
Connecticut	5,259	$608	$264	$425
Mississippi	5,162	$505	$171	$314
Rhode Island	4,046	$419	$178	$276
Georgia	3,865	$341	$121	$219
Oregon	3,548	$364	$157	$238
Delaware	1,672	$182	$68	$121
Maine	1,616	$160	$60	$98
Hawai'i	1,093	$146	$45	$81
New Hampshire	497	$49	$21	$33

[21] Atlantic and Gulf recreational catch and effort estimates are based upon the MRIP estimates released in 2018.

In 2017, expenditures for fishing trips and durable goods equipment in the United States totaled $36.6 billion.

Approximately $10.5 billion of these expenditures were related to trip expenses. Total trip expenditures were composed of expenses on trips in the shore (47.9%), private boat (40.2%), and for-hire (11.9%) sectors. Durable goods expenditures totaled $26.2 billion in 2017, with the largest portion coming from Boat Expenses ($15.1 billion) (Graph 5).



Graph 5. Recreational Fishing Trip and Durable Goods Expenditures, 2017 (billions of dollars)

Participation

Nationwide, 9.1 million recreational saltwater anglers fished in their home states in 2017. This number represented a 27% decrease from 2008 and a 9% decrease from 2016. Coastal county residents made up 86% of this total while non-coastal county residents made up 14%. West Florida had the highest participation of anglers (3.8 million), followed by East Florida and North Carolina.

Fishing Trips

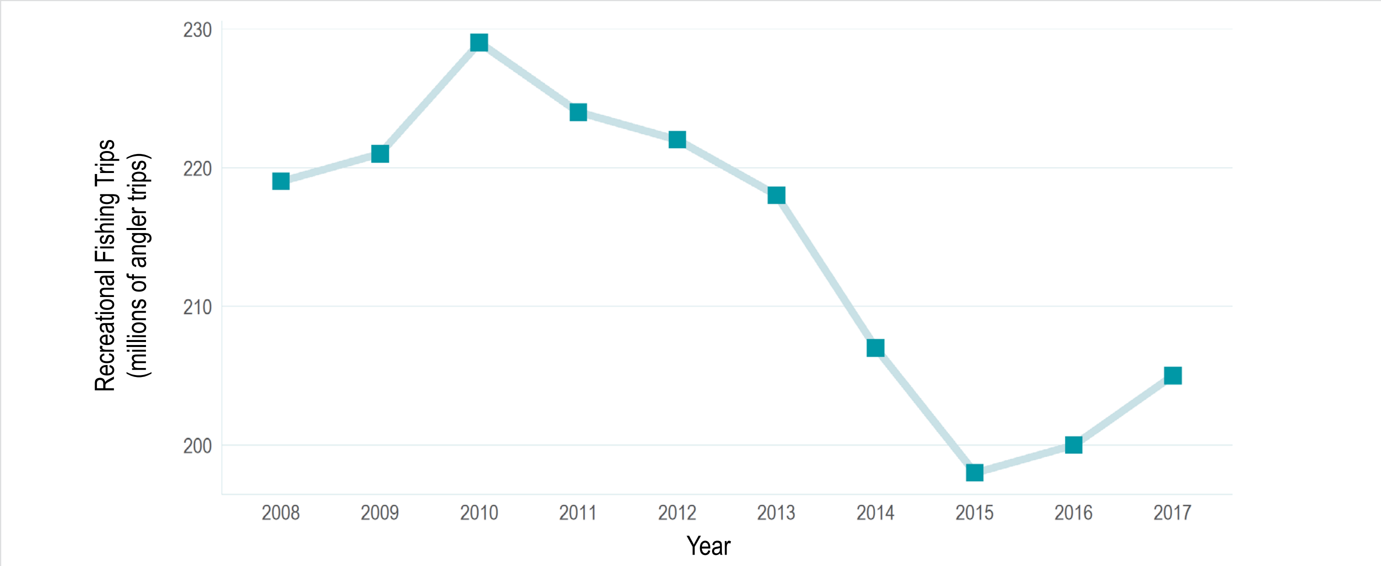
Nationwide, anglers took approximately 205.3 million saltwater fishing trips around the country (Table 11). This number represented a 6% decrease from 2008 and a 3% increase from 2016 (Graph 6). Approximately 62% of fishing trips were taken via shore. West Florida anglers took the most fishing trips (41.8 million trips), followed by those in East Florida and North Carolina (Table 12).

Table 11. Recreational Fishing Trips by Region, 2017 (thousands of fishing trips)

Region	Trips
U.S. Total	205,385
South Atlantic	76,869
Gulf of Mexico	58,638
Mid-Atlantic	46,005
New England	16,750
Pacific	5,843
Western Pacific (Hawai'i)	1,280

Table 12. Recreational Fishing Trips by State, 2017 (thousands of trips)

State	Trips
West Florida	41,840
East Florida	40,404
North Carolina	22,452
New York	16,634
New Jersey	12,288
South Carolina	9,389
Alabama	8,493
Maryland	8,343
Massachusetts	7,775
Virginia	6,749
Mississippi	4,852
Georgia	4,624
Connecticut	3,937
California	3,542
Rhode Island	2,318
Louisiana	2,308
Delaware	1,991
Maine	1,748
Washington	1,608
Hawai'i	1,280
Texas	1,144
New Hampshire	972
Oregon	693



Graph 6. Recreational Fishing Trips, 2008-2017 (millions of angler trips)

Harvest and Release

In 2017, drum (seatrouts) (85.9 million fish), drum (Atlantic croaker and spot) (81.3 million fish), and striped bass (44.7 million fish), were most frequently caught by recreational fishermen in the United States. The text box to the right shows the species with the largest percentage increases and decreases in the past 10 years and in the past year.

From 2008 to 2017, rockfishes and scorpionfishes (84%), tunas (Pacific and Western Pacific regions) (72%), and striped bass (43%) had the largest increases, while Pacific halibut (-37%), tunas (Atlantic regions) (-29%), and summer flounder (-29%) had the largest decreases. From 2016 to 2017, tunas (Pacific and Western Pacific regions) (84%), dolphinfish (47%), and Pacific salmon (41%) had the largest increases, while Pacific halibut (-14%) and summer flounder (-10%) had the largest decreases.

Harvest and Release: Largest Increases

From 2008:
- Rockfishes and scorpionfishes (84%)
- Tunas (Pacific and Western Pacific regions) (72%)
- Striped bass (43%)

From 2016:
- Tunas (Pacific and Western Pacific regions) (84%)
- Dolphinfish (47%)
- Pacific salmon (41%)

Harvest and Release: Largest Decreases

From 2008:
- Pacific halibut (-37%)
- Tunas (Atlantic regions) (-29%)
- Summer flounder (-29%)

From 2016:
- Pacific halibut (-14%)
- Summer flounder (-10%)

MARINE ECONOMY — UNITED STATES

For this report, the marine economy refers to the economic activity generated by fishing and marine-related industries in a coastal state. The state marine economy consists of two industry sectors: 1) seafood sales and processing (employer establishments and non-employer firms); and 2) transport, support, and marine operations (employer establishments). These sectors include several different marine-related industries.[22]

[22] Unless otherwise stated, data are from the U.S. Census Bureau (For more information: www.census.gov).

Note that Census Bureau data for the Marine Economy section of this report are available only through 2016. Percentage changes in inflation-adjusted (real dollar) terms are calculated using the annual Gross Domestic Product implicit price deflator published by the U.S. Bureau of Economic Analysis and the Federal Reserve Bank of St. Louis.[23]

The Commercial Fishing Location Quotient (CFLQ) measures the proportional size of this sector in a state's economy relative to the size of the commercial fishing sector in the national economy.[24] The CFLQ is calculated as the ratio of the percentage of regional employment in the commercial fishing sector relative to the percentage of national employment in the commercial fishing sector. The U.S. CFLQ is 1. If a state CFLQ is less than 1, then less commercial fishing occurs in this state than the national average. If a state CFLQ is greater than 1, then more commercial fishing occurs in this state than the national average.

In 2016, 7.8 million employer establishments operated throughout the entire United States (including marine and non-marine related establishments). These establishments employed 126.8 million workers and had a total annual payroll of $6.4 trillion. The nation's gross domestic product was approximately $18.8 trillion in 2016.

Seafood Sales and Processing

Seafood Product Preparation and Packaging: In 2016, the United States had 2,208 non-employer firms in the seafood product preparation and packaging sector (remains unchanged from 2008). Annual receipts for these firms totaled about $176.6 million (an 11% decrease in real terms from 2008). There were 586 employer firms in the seafood product preparation and packaging sector (a 12% decrease from 2008). These establishments employed 30,554 workers (an 8% decrease from 2008) and had a total annual payroll of $1.4 billion (a 6% increase in real terms from 2008).

Seafood Sales, Retail: In 2016, there were 2,392 non-employer firms engaged in retail sales of seafood in the nation (remains unchanged from 2008). Annual receipts for these firms totaled about $207.4 million (an 11% decrease in real terms from 2008). There were 2,067 employer firms in the retail sales of seafood sector (a 1% increase from 2008). These establishments employed 12,114 workers (a 24% increase from 2008) and had a total annual payroll of $312.2 million (a 35% increase in real terms from 2008).

Seafood Sales, Wholesale: There were 2,176 employer firms in the wholesale sales of seafood sector in the nation in 2016 (a 5% increase from 2008). These establishments employed 22,273 workers (an 11% increase from 2008), and had a total annual payroll of $1 billion (an 18% increase in real terms from 2008).

Transport, Support, and Marine Operations

Coastal and Great Lakes Freight Transportation: There were 603 employer firms providing coastal and Great Lakes freight transportation (an 18% increase from 2008). These establishments employed 19,004 workers (a 10% decrease from 2008) and had a total annual payroll of about $1.7 billion (a 12% decrease in real terms from 2008). Louisiana (104), Alaska (79), and New York (73) had the greatest number of these employer establishments.

Deep Sea Freight Transportation: There were 313 employer firms providing deep sea freight transportation (a 14% decrease from 2008). These establishments employed 7,009 workers (a 31% decrease from 2008) and had a total annual payroll of about $638.9 million. Florida (65), California (45), and Texas (36) had the greatest number of these employer establishments.

Deep Sea Passenger Transportation: There were 62 employer firms in the deep sea passenger transportation sector (a 13% decrease from 2008). These establishments employed 14,596 workers and had a total annual payroll of about $1.2 billion. Florida (33), California (7), and Washington (4) had the greatest number of these employer establishments.

Marinas: There were 3,826 employer firms classified as marinas (a 4% decrease from 2008). These establishments employed 27,471 workers (a 4% decrease from 2008) and had a total annual payroll of about $1.1 billion (a 1% increase in real terms from 2008). Florida (458),

[23] U.S. Bureau of Economic Analysis, 'Table 1.1.5 Gross Domestic Product' and 'Table SA6N Compensation of Employees by NAICS Industry (Available at: https://apps.bea.gov/regional/histdata/releases/0518gdpstate/).
[24] U.S. Bureau of Labor Statistics, 'Location Quotient Calculator' (For more information: https://www.bls.gov/cew/about-data/location-quotients-explained.htm).

New York (422), and California (243) had the greatest number of these employer establishments.

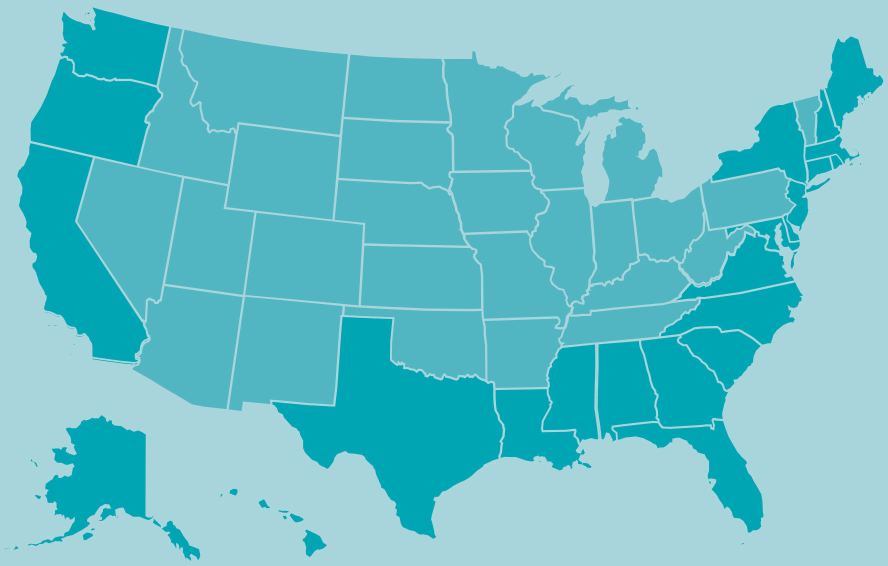
Marine Cargo Handling: There were 492 employer firms providing marine cargo handling services (an 8% decrease from 2008). These establishments employed 62,680 workers (a 2% decrease from 2008) and had a total annual payroll of about $4.4 billion (a 19% increase in real terms from 2008). California (70), Florida (63), and Texas (57) had the greatest number of these employer establishments.

Navigational Services to Shipping: There were 877 employer firms providing navigational services to the shipping industry (a 1% increase from 2008). These establishments employed 12,457 workers (a 7% decrease from 2008) and had a total annual payroll of about $920.5 million (a 3% decrease in real terms from 2008). Florida (194), Louisiana (144), and Texas (80) had the greatest number of these employer establishments.

Port and Harbor Operations: There were 332 employer firms in the port and harbor operations sector (a 24% increase from 2008). These establishments employed 8,003 workers (a 43% increase from 2008) and had a total annual payroll of about $424.4 million (a 34% increase in real terms from 2008). Florida (54), California (30), and Texas (26) had the greatest number of these employer establishments.

Ship and Boat Building: There were 1,508 employer firms in the ship and boat building sector (a 15% decrease from 2008). These establishments employed 140,179 workers (an 11% decrease from 2008) and had a total annual payroll of about $8 billion (a 3% decrease in real terms from 2008). Florida (281), Washington (129), and Louisiana (105) had the greatest number of these employer establishments.

Tables | National Overview



2017 Economic Impacts of the United States Seafood Industry (jobs, thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	1,246,366	170,314,474	44,594,835	69,177,123	708,388	53,568,226	19,679,153	27,888,194
Commercial Havesters	168,746	14,310,038	4,825,989	7,471,652	168,746	14,310,038	4,825,989	7,471,652
Seafood Processors and Dealers	201,273	31,539,936	9,953,798	13,836,893	53,765	8,425,141	2,658,920	3,696,196
Importers	257,503	81,098,206	12,997,535	24,722,284	0	0	0	0
Seafood Wholesalers and Distributors	68,922	10,701,815	3,516,691	5,031,905	24,932	3,871,311	1,272,140	1,820,258
Retail	549,922	32,664,480	13,300,822	18,114,389	460,945	26,961,737	10,922,104	14,900,088

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (millions of dollars)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	4,377	3,913	4,507	5,357	5,139	5,509	5,517	5,275	5,332	5,409
Finfish and Other	2,242	1,863	2,153	2,572	2,396	2,621	2,413	2,391	2,291	2,524
Shellfish	2,135	2,051	2,354	2,785	2,743	2,888	3,104	2,885	3,041	2,885
Key Species	-	-	-	-	-	-	-	-	-	-
Alaska pollock	323	271	282	363	343	406	400	442	417	413
American lobster	325	311	404	423	431	461	567	622	670	552
Blue crab	161	163	205	184	193	192	215	220	214	197
Menhaden	91	90	93	133	126	125	114	179	181	125
Pacific halibut	217	140	207	213	152	117	115	118	125	124
Pacific salmon	396	370	555	619	489	757	617	461	421	688
Sablefish	125	129	124	184	141	102	111	114	117	143
Sea scallop	370	376	456	585	559	467	424	440	487	507
Shrimp	445	379	409	538	510	597	702	503	511	546
Tunas	107	96	108	137	164	146	135	137	154	153

Total Landings and Landings of Key Species/Species Groups (millions of pounds)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	8,342	7,883	8,027	9,888	9,472	9,748	9,518	9,742	9,604	9,905
Finfish and Other	7,287	6,613	6,719	8,514	8,150	8,481	8,249	8,613	8,487	8,783
Shellfish	1,056	1,270	1,308	1,373	1,322	1,267	1,269	1,129	1,117	1,122
Key Species	-	-	-	-	-	-	-	-	-	-
Alaska pollock	2,276	1,866	1,948	2,811	2,872	3,003	3,146	3,263	3,355	3,389
American lobster	88	101	118	126	151	151	148	147	159	133
Blue crab	162	176	199	202	185	136	140	161	164	148
Menhaden	1,344	1,407	1,260	1,899	1,598	1,341	1,232	1,631	1,756	1,413
Pacific halibut	67	60	56	43	34	30	23	24	25	26
Pacific salmon	660	705	788	780	636	1,070	721	1,067	561	1,008
Sablefish	43	43	40	41	41	39	35	35	34	38
Sea scallop	53	58	58	59	57	41	34	36	41	51
Shrimp	249	305	249	312	309	293	326	339	289	291
Tunas	48	49	48	50	60	56	58	57	56	55

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alaska pollock	0.14	0.14	0.15	0.13	0.12	0.14	0.13	0.14	0.12	0.12
American lobster	3.71	3.09	3.44	3.35	2.86	3.06	3.83	4.23	4.20	4.15
Blue crab	0.99	0.93	1.03	0.91	1.05	1.41	1.53	1.36	1.31	1.34
Menhaden	0.07	0.06	0.07	0.07	0.08	0.09	0.09	0.11	0.10	0.09
Pacific halibut	3.25	2.35	3.67	4.98	4.48	3.92	4.97	4.88	5.03	4.74
Pacific salmon	0.60	0.52	0.70	0.79	0.77	0.71	0.86	0.43	0.75	0.68
Sablefish	2.88	3.01	3.09	4.46	3.41	2.58	3.13	3.23	3.48	3.80
Sea scallop	6.93	6.48	7.92	9.89	9.83	11.40	12.54	12.32	12.00	9.84
Shrimp	1.79	1.24	1.64	1.72	1.65	2.04	2.16	1.48	1.77	1.88
Tunas	2.23	1.96	2.26	2.74	2.75	2.62	2.30	2.40	2.76	2.81

[1] The Pacific Region includes landings by Pacific at-sea processors. However, revenue from these landings are not included in the California, Oregon, and Washington information presented.

2017 Economic Impacts of Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	24,221	2,948,145	981,981	1,678,969
	Private Boat	59,362	9,654,003	3,029,178	5,480,283
	Shore	83,535	11,821,369	3,924,656	6,863,200
Total Durable Expenditures		319,906	49,328,910	16,748,277	27,451,473
Total Impacts		487,024	73,752,427	24,684,092	41,473,925

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	1,243,022	Fishing Tackle	3,660,934
Private Boat	4,199,394	Other Equipment	1,898,847
Shore	5,009,745	Boat Expenses	15,091,348
Total	10,452,161	Vehicle Expenses	3,397,285
		Second Home Expenses	2,120,768
		Total Durable Expenditures	26,169,183
Total State Trip and Durable Goods Expenditures			36,621,344

Recreational Anglers by Residential Area (thousands of anglers)[1,2]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	10,898	9,571	9,839	9,446	9,461	9,821	9,593	8,491	8,752	7,899
Non-Coastal	1,564	1,445	1,489	1,420	1,436	1,419	1,373	1,319	1,326	1,247
Total Anglers	12,462	11,016	11,328	10,866	10,896	11,240	10,966	9,809	10,079	9,146

Recreational Fishing Effort by Mode (thousands of angler trips)[3,4]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	3,464	3,377	2,731	3,359	3,529	4,024	4,262	4,216	3,459	3,660
Private	86,494	87,561	92,313	88,468	87,684	84,259	78,292	73,480	73,280	74,403
Shore	129,535	129,906	134,069	131,902	130,631	129,575	124,779	120,663	122,822	127,322
Total Trips	219,493	220,844	229,113	223,729	221,844	217,858	207,333	198,359	199,560	205,385

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[5,6]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Dolphinfish	H	2,386	2,424	1,851	3,080	2,509	2,460	2,586	4,080	1,963	2,546
	R	1,025	340	496	1,356	496	3,372	1,338	1,952	341	839
Drum (Atlantic croaker and spot)	H	46,357	42,568	40,953	43,579	42,048	53,580	56,250	35,598	29,356	38,128
	R	50,582	53,837	47,751	56,743	63,520	81,918	56,454	41,335	41,899	43,208
Drum (seatrouts)	H	37,437	40,051	37,342	43,229	45,404	36,529	17,051	19,386	25,143	27,322
	R	66,106	61,616	64,045	72,817	78,095	64,490	38,680	41,357	56,323	58,564
Pacific halibut	H	516	440	398	394	388	454	408	420	400	352
	R	359	321	304	311	324	324	251	271	244	199
Pacific salmon[7]	H	622	889	632	708	639	948	937	902	562	809
	R	349	448	280	357	273	484	291	444	276	370
Rockfishes and scorpionfishes	H	2,162	2,439	2,448	3,116	3,677	4,160	4,380	4,215	3,830	3,943
	R	537	534	617	698	773	1,024	986	931	891	1,021
Striped bass	H	4,415	4,746	5,430	5,049	4,077	5,217	4,055	3,141	3,528	3,008
	R	26,948	21,880	19,850	17,032	21,049	26,985	24,521	25,991	34,183	41,718
Summer flounder	H	3,804	3,715	3,540	4,366	5,758	6,625	5,373	4,051	4,306	3,228
	R	35,704	47,039	55,389	51,722	38,969	38,362	39,214	30,141	26,951	24,878
Tunas (Atlantic regions)	H	429	247	225	302	386	383	209	224	280	312
	R	93	46	50	116	55	26	52	22	71	58
Tunas (Pacific and Western Pacific regions)	H	701	530	646	424	853	889	962	953	556	992
	R	28	89	47	98	32	38	216	150	124	264

[1] All anglers reported in this table are U.S. residents.
[2] Connecticut, Delaware, Rhode Island, West Florida, and East Florida anglers estimates are not available for the non-coastal mode. Hawai'i and Texas anglers estimates are not available by mode.
[3] Effort for 2014-2017 is estimated using data from a state creel survey and does not capture shore-based effort separately from private boat effort.
[4] Hawai'i trip estimates are not available for the for-hire mode. Texas trip estimates are not available for the shore mode.
[5] Atlantic Regions refer to those states within New England, Mid-Atlantic, South Atlantic, and the Gulf of Mexico.
[6] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[7] Salmon harvest estimates exclude release mortality.

2016 United States Economy

#Non-Employer Firms (millions)	#Establishments (millions)	#Employees (millions)	Annual Payroll ($ trillions)	Employee Compensation ($ trillions)	Gross Domestic Product ($ trillions)	Commercial Location Quotient[1]
24.8	7.8	127	6.4	10.0	18.8	1

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. and packaging	Firms	1,308	1,395	1,617	1,757	1,766	1,812	1,947	2,108	2,208
	Receipts	89,670	95,219	104,990	110,745	115,167	128,927	146,626	163,625	176,593
Seafood sales, retail	Firms	2,522	2,455	2,513	2,514	2,657	2,497	2,557	2,471	2,392
	Receipts	233,002	207,139	199,810	212,679	217,702	205,555	203,459	206,676	207,428

Seafood Sales and Processing — Employer Establishments (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. and packaging	Establishments	663	645	638	620	589	604	640	618	586
	Employees	33,323	30,894	31,789	31,261	30,988	31,390	32,180	30,708	30,554
	Payroll	1,161,637	1,091,727	1,116,305	1,200,263	1,196,207	1,228,826	1,311,910	1,354,572	1,380,087
Seafood sales, wholesale	Establishments	2,063	2,099	2,183	2,287	1,954	2,098	2,100	2,132	2,176
	Employees	20,116	19,290	19,386	20,622	20,030	20,367	21,155	22,060	22,273
	Payroll	782,178	758,332	798,794	848,454	867,179	884,645	910,527	999,264	1,036,051
Seafood sales, retail	Establishments	2,044	1,967	1,982	1,972	1,957	1,995	2,015	2,059	2,067
	Employees	9,732	9,439	9,857	10,006	10,293	10,631	11,037	11,443	12,114
	Payroll	205,423	211,264	219,045	222,508	237,619	253,490	271,732	292,726	312,224

Transport, Support, and Marine Operations — Employer Establishments (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	1,782	1,615	1,540	1,497	1,560	1,514	1,524	1,541	1,508
	Employees	157,512	137,759	127,691	127,522	136,365	135,287	138,687	143,287	140,179
	Payroll	7,269,306	6,674,187	6,529,523	6,845,322	7,543,402	7,556,373	7,882,846	8,030,983	7,951,338
Deep Sea Freight Transportation	Establishments	365	376	372	378	375	305	332	350	313
	Employees	10,231	11,180	10,288	10,362	12,375	8,704	8,646	8,014	7,009
	Payroll	852,063	863,363	867,797	921,990	1,073,529	703,003	683,281	671,624	638,900
Deep Sea Passenger Transportation	Establishments	71	78	56	55	58	62	56	61	62
	Employees	ds	ds	ds	ds	ds	ds	ds	15,157	14,596
	Payroll	ds	ds	ds	ds	ds	ds	ds	1,246,384	1,155,308
Coastal and Great Lakes Freight Transportation	Establishments	513	513	547	549	496	497	598	593	603
	Employees	21,019	20,919	17,528	18,590	19,099	18,659	20,884	19,983	19,004
	Payroll	1,694,613	1,470,159	1,288,001	1,400,267	1,467,709	1,512,053	1,835,024	1,746,612	1,677,305
Port and Harbor Operations	Establishments	268	258	287	255	525	383	351	337	332
	Employees	5,608	5,100	4,844	4,933	25,396	7,000	6,769	7,855	8,003
	Payroll	282,671	250,358	290,467	306,882	1,345,857	420,664	399,502	434,209	424,370
Marine Cargo Handling	Establishments	532	541	507	545	343	458	482	492	492
	Employees	63,736	56,386	57,275	59,517	43,824	66,301	69,830	66,414	62,680
	Payroll	3,272,723	2,776,791	3,026,861	3,159,964	2,601,146	4,086,182	4,406,525	4,334,958	4,392,350
Navigational Services to Shipping	Establishments	868	846	847	836	850	847	881	889	877
	Employees	13,419	12,689	13,529	13,441	12,532	12,485	12,148	11,864	12,457
	Payroll	847,938	826,384	937,980	893,889	838,959	929,419	907,763	923,303	920,450
Marinas	Establishments	3,972	3,891	3,937	3,896	3,782	3,844	3,811	3,881	3,826
	Employees	28,686	26,643	26,657	26,557	25,764	26,373	26,709	26,999	27,471
	Payroll	954,032	905,488	927,499	953,497	913,140	951,123	995,248	1,036,253	1,081,496

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.

North Pacific Region

- Alaska

Recreational fishing charter in South Central Alaska.
Photo: North Pacific Fishery Management Council/Andy Mezirow

MANAGEMENT CONTEXT

The North Pacific Region includes the fisheries in the Exclusive Economic Zone (EEZ) off the state of Alaska. Federal fisheries in this region are managed by the North Pacific Fishery Management Council (NPFMC) and NOAA Fisheries under six fishery management plans (FMPs).

North Pacific Region FMPs

- Bering Sea/Aleutian Islands (BSAI) groundfish
- Gulf of Alaska (GOA) groundfish
- BSAI king and tanner crabs
- Alaska scallop
- Salmon in the EEZ
- Arctic

Of the stocks or stock complexes covered in these FMPs, only the blue king crab (Pribilof Islands stock) is listed as overfished. No stocks were listed as subject to overfishing. In 2017, the blue king crab (Pribilof Islands stock) was removed from the overfishing list. Enough information was acquired to determine, for the first time, that the golden king crab (Aleutian Islands stock) is not being overfished.

Catch Share Programs

The North Pacific Region has seven catch share programs, more than any other region. These are the: 1) Western Alaska CDQ Program; 2) Alaska Halibut and Sablefish IFQ Program; 3) American Fisheries Act (AFA) Pollock Cooperatives; 4) Bering Sea and Aleutian Islands (BSAI) King and Tanner Crab Rationalization Program; 5) Aleutian Islands Pollock Fishery; 6) Bering Sea and Aleutian Islands (BSAI) Non-Pollock Trawl Catcher/Processor Groundfish Cooperatives (Amendment 80); and 7) Central Gulf of Alaska Rockfish Program *(pilot implemented in 2007)*. The landings revenues for these programs totaled $810.5 million in 2016, exceeding the total landings revenue of any other state. The following are descriptions of these catch share programs and their performance.

Western Alaska Community Development Quota (CDQ) Program: The program was originally implemented in 1992 as part of a restructuring of the BSAI groundfish fishery. Under this program, a percentage of the total allowable catch for groundfish, prohibited species, halibut, and crab is apportioned to 65 eligible villages in Western Alaska that are organized into six CDQ groups. The program has the following goals: 1) Provide eligible Western Alaska villages with the opportunity to participate and invest in fisheries in the Bering Sea and Aleutian Islands Management Area; 2) Support economic development in Western Alaska; 3) Alleviate poverty and provide economic and social benefits to residents; and 4) Achieve a sustainable and diversified local economy.

Alaska Halibut and Sablefish IFQ Program: The program was implemented in 1995. The primary objectives of this IFQ program include the following: 1) Eliminate gear conflicts; 2) Address safety concerns; and 3) Improve product quality. The 2016 key performance indicators of the halibut program show that relative to the baseline period, quota, landings, and the number of active vessels decreased, while inflation-adjusted landings revenue and inflation-adjusted revenue per active vessel increased. The 2016 key performance indicators of the sablefish program show that relative to the baseline period, quota, landings, the number of active vessels and inflation-adjusted landings revenue decreased while inflation-adjusted landings revenue per active vessel increased.

American Fisheries Act (AFA) Pollock Cooperatives: The program was established in 1999 and 2000 with the goals of settling allocation disputes between inshore (catcher vessels), offshore (catcher/processors), and mothership sectors and ending the race for fish. The 2016 key performance indicators of the program show that relative to the baseline period the number of active vessels and inflation-adjusted revenue decreased, while quota, landings, inflation-adjusted landings revenue, and inflation-adjusted revenue per active vessel increased.

Bering Sea and Aleutian Islands (BSAI) King and Tanner Crab Rationalization Program: The program was implemented for the 2005–2006 crab fishing season to address the race to harvest; high bycatch and discard mortality; and product quality issues. The program also aims to balance the interests of those who depend on crab fisheries. This program includes share allocations to harvesters and processors. Processor quota was incorporated to preserve the viability of processing facilities in dependent communities and, particularly, to maintain competitive conditions in ex-vessel markets. The CDQ and Adak Community allocations, regional landings and processing requirements, and several community protection measures protect community interests. The 2016/2017 key performance indicators of the program show that relative to the baseline period, quota, landings, and the number of active vessels decreased, while inflation-adjusted landings revenue and inflation-adjusted revenue per active vessel increased.

Aleutian Islands Pollock Fishery: In 2005, Amendment 82 to the Fishery Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands Management Area established a framework for the management of the Aleutian Islands subarea (AI) directed pollock fishery. The FMP Amendment was proposed by the North Pacific Fishery Management Council to implement a provision of the Consolidated Appropriations Act of 2004 (Public Law 108–199, Sec. 803), which requires that the AI directed pollock fishery be allocated to the Aleut Corporation for the purpose of economic development in Adak, Alaska.

BSAI Non-Pollock Trawl Catcher/Processor Groundfish Cooperatives (Amendment 80): The program, commonly referred to as the Amendment 80 Program, was implemented in 2008 to create economic incentives that would improve retention of all fish caught. The cooperatives also seek to reduce bycatch by commercial fishing vessels using trawl gear in the non-pollock groundfish fisheries. The 2016 key performance indicators of the program show that relative to the baseline period the number of active vessels decreased, while quota, landings, inflation-adjusted landings revenue, and inflation-adjusted revenue per active vessel increased.

Central Gulf of Alaska Rockfish Program: The program was initially established as a 2-year (2007–2008) pilot program by the U.S. Congress and was later extended to 5 years. NOAA Fisheries implemented this catch share program in 2012. The objectives of this program are to reduce bycatch and discards, encourage conservation-minded practices, improve product quality and value, and provide stability to the processing labor force. The 2016 key performance indicators for the program show that relative to the baseline period, quota, landings, the number of active vessels, inflation-adjusted landings revenue and inflation-adjusted revenue per vessel all increased.

Policy Updates

In March of 2016, the Assistant Administrator for Fisheries, National Oceanic and Atmospheric Administration (NOAA), on behalf of the International Pacific Halibut Commission (IPHC), published annual management measures governing the Pacific halibut fishery recommended as regulations by the IPHC and accepted by the Secretary of State.[1] This action was intended to enhance the conservation of Pacific halibut and further the goals and objectives of the Pacific Fishery Management Council and the North Pacific Fishery Management Council (NPFMC). This rule was effective until superseded by an interim final rule published in 2018 and the new management measures final rule in 2019. Thus, this rule was effective in 2017.

NMFS issued a final rule, effective January 1, 2017 to modify the recordkeeping and reporting requirements for the groundfish fisheries in the Gulf of Alaska and the Bering Sea/Aleutian Islands management areas.[2] This rule is organized into four actions. Under the first action, NMFS implemented a requirement for tender vessel operators to use the applications software "tLandings" to prepare electronic landing reports. Under the second action, NMFS modified the definition of a buying station. Under the third action, NMFS removed the requirement for buying stations to complete the buying station report because this report is no longer necessary. Under the fourth action, NMFS revised the definition of a mothership to remove unnecessary formatting without changing the substance of the definition.

Effective January 19, 2017, NMFS issued regulations to implement Amendment 47 to the Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs (Crab FMP) and to make minor clarifications to regulations implementing the Crab FMP.[3] This final rule addressed how individual processing quota (IPQ) use caps apply to the Bering Sea *Chionoecetes bairdi* (Tan-

[1] "Pacific Halibut Fisheries; Catch Sharing Plan." Federal Register. Available at https://www.federalregister.gov/documents/2016/03/16/2016-05948/pacific-halibut-fisheries-catch-sharing-plan [accessed on July 7, 2021]
[2] "Fisheries of the Exclusive Economic Zone off Alaska; Modifications to Recordkeeping and Reporting Requirements." Federal Register. Available at https://www.federalregister.gov/documents/2016/10/13/2016-24457/fisheries-of-the-exclusive-economic-zone-off-alaska-modifications-to-recordkeeping-and-reporting#p-1 [accessed July 7, 2021]
[3] "Fisheries of the Exclusive Economic Zone Off Alaska; Bering Sea and Aleutian Islands Crab Rationalization Program." Federal Register. Available at https://www.federalregister.gov/documents/2016/12/20/2016-30068/fisheries-of-the-exclusive-economic-zone-off-alaska-bering-sea-and-aleutian-islands-crab#p-1 [accessed July 7, 2021]

ner crab) fisheries: the eastern *C. bairdi* Tanner (EBT) and the western *C. bairdi* Tanner (WBT).

Amendment 101 to the Gulf of Alaska Groundfish FMP took effect in January 2017, authorizing the use of longline pot gear in the GOA sablefish IFQ fishery.[4] The same rule established measures to minimize conflict between gear types in the sablefish fishery and to authorize harvest of halibut caught incidentally in the sablefish fishery.

NMFS renewed two prohibited species donation (PSD) permits to SeaShare, authorizing this organization to distribute Pacific salmon and Pacific halibut to economically disadvantaged individuals under the PSD program.[5] Salmon and halibut are caught incidentally during directed fishing for groundfish with trawl gear off Alaska. This action is necessary to comply with provisions of the PSD program and is intended to promote the goals and objectives of the North Pacific Fishery Management Council. These permits are valid through June 15, 2020.

NMFS issued a rule in September 2017 to implement amendments to the Groundfish FMPs for the Bering Sea / Aleutian Islands (A114) and the Gulf of Alaska (A104).[6] The amendments integrated electronic monitoring into these FMPs. The rule specified processes by which owners or operators using non-trawl gear request participation in the electronic monitoring selection pool.

In February 2017, NMFS announced final 2017 and 2018 harvest specifications and prohibited species catch allowances for the groundfish fishery of the Bering Sea and Aleutian Islands management area (BSAI).[7] This action is necessary to establish harvest limits for groundfish during the 2017 and 2018 fishing years, and to accomplish the goals and objectives of the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (FMP). The intended effect of this action is to conserve and manage the groundfish resources in the BSAI in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). [Specification Tables][8]

In December 2017, NMFS issued a rule to implement Amendment 48 to the Crab Fishery Management Plan and to revise regulations implementing the American Fisheries Act (AFA) Program and the Crab Rationalization (CR) Program.[9] In particular, the rule revised the Crab FMP and associated regulations that govern how NMFS determines the amount of limited access privileges held and used by groups in the Western Alaska Community Development Quota Program for the purposes of monitoring excessive share limits under the AFA Program and CR Program.

COMMERCIAL FISHERIES — NORTH PACIFIC REGION

In this report, commercial fisheries refer to fishing operations that sell their catch for profit. The term does not include subsistence fishermen or saltwater anglers who fish for sport. It also excludes the for-hire sector, which earns its revenue from selling recreational fishing trips to saltwater anglers. The commercial fisheries section reports on economic impacts, landings revenue, landings, and ex-vessel prices of key species/species groups.

Key North Pacific Commercial Species

- Alaska pollock
- Atka mackerel
- Crab
- Flatfish
- Pacific cod
- Pacific halibut
- Pacific herring
- Rockfish
- Sablefish
- Salmon

The North Pacific groundfish fishery is different from

[4] "Fisheries of the Exclusive Economic Zone Off Alaska; Allow the Use of Longline Pot Gear in the Gulf of Alaska Sablefish Individual Fishing Quota Fishery; Amendment 101." Federal Register. Available at https://www.federalregister.gov/documents/2016/12/28/2016-31057/fisheries-of-the-exclusive-economic-zone-off-alaska-allow-the-use-of-longline-pot-gear-in-the-gulf#p-1 [accessed July 7, 2021]
[5] "Fisheries of the Exclusive Economic Zone Off Alaska; Prohibited Species Donation Program." Federal Register. Available at https://www.federalregister.gov/documents/2017/06/14/2017-12313/fisheries-of-the-exclusive-economic-zone-off-alaska-prohibited-species-donation-program [accessed July 7, 2021]
[6] "Fisheries of the Exclusive Economic Zone Off Alaska; Integrating Electronic Monitoring Into the North Pacific Observer Program." Federal Register. Available at https://www.federalregister.gov/documents/2017/08/08/2017-16703/fisheries-of-the-exclusive-economic-zone-off-alaska-integrating-electronic-monitoring-into-the-north#p-1 [accessed July 7, 2021]
[7] "Fisheries of the Exclusive Economic Zone Off Alaska; Bering Sea and Aleutian Islands; 2017 and 2018 Harvest Specifications for Groundfish." Federal Register. Available at https://www.federalregister.gov/documents/2017/02/27/2017-03698/fisheries-of-the-exclusive-economic-zone-off-alaska-bering-sea-and-aleutian-islands-2017-and-2018 [accessed July 7, 2021]
[8] https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/2017-2018-alaska-groundfish-harvest-specifications
[9] "Fisheries of the Exclusive Economic Zone Off Alaska; Bering Sea and Aleutian Islands Management Area; American Fisheries Act; Bering Sea and Aleutian Islands Crab Rationalization Program." Federal Register. Available at https://www.federalregister.gov/documents/2017/11/09/2017-24403/fisheries-of-the-exclusive-economic-zone-off-alaska-bering-sea-and-aleutian-islands-management-area#p-1 [accessed July 7, 2021]

most other United States fisheries in that a large portion of the fishery is processed at sea and, therefore, no landings revenues are reported. The landings revenue for the species landed and processed at sea is estimated by using prices obtained from the shore-side sector. These species include Atka mackerel, flatfish, Pacific cod, rockfish, sablefish, and Alaska pollock. When data from the shore-side sector are inadequate, historical information about the relationship between the ex-vessel price and the wholesale price of finished products is used to estimate ex-vessel prices and revenue for portions of the fishery mostly processed at sea.

Economic Impacts

The premise behind economic impact modeling is that every dollar spent in a regional economy (direct impact) is either saved or re-spent on additional goods or services. If those dollars are re-spent on other goods and services in the regional economy, this spending generates additional economic activity in the region.[10]

Four different measures are commonly used to show how commercial fisheries landings affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as commercial fishing. The category includes both the direct sales of fish landed and sales made between businesses and households resulting from the original sale. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the sales of seafood or purchases of inputs to commercial fishing. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in numbers of jobs. Note that these categories are not additive. The United States seafood industry is defined here as the commercial fishing sector, seafood processors and dealers, seafood wholesalers and distributors, importers, and seafood retailers.[11]

This report provides estimates of total economic impacts for the nation and for each of the 23 coastal states. Total economic impacts for each state and the nation represent the sum of direct impacts; indirect impacts (in this case, the impact from suppliers to the seafood industry); and induced impacts (spending by employees on personal and household expenditures, where employees of both the seafood industry and its full supply chain are included). That is, the total economic impact estimates reported here measure jobs, sales, value-added, and income impacts from the seafood industry as well as the economic activity generated throughout each region's broader economy from this industry.

In 2017, the commercial fishing and seafood industry supported 53,543 full- and part-time jobs and generated $4.4 billion in sales, $1.9 billion in income, and $2.4 billion in value-added impacts in the North Pacific Region. Commercial harvesters generated the largest sales impacts ($3.1 billion), value-added impacts ($1.7 billion), income impacts ($1.3 billion), and employment impacts (38,272 jobs).

Landings Trends

Alaska landings in 2017 increased 8% to 6 billion pounds. Among Alaska's key species: Alaska pollock landings, which accounted for 56% of Alaska's landings volume, were at a decadal high (3.4 billion pounds) with high abundance. Salmon catches were strong (986 million pounds) as pink salmon landings are typically higher in "odd years" due to their biennial cycle. Pacific cod landings (657 million pounds) were down with a prominent decrease in the Gulf of Alaska landings from poor fishing conditions and low abundance. Crab landings (39 million pounds) were down due to a closure in the Bering Sea tanner crab fishery and lower than average landing of Bering Sea snow crab.

Landings revenues increased 14% to $1.76 billion in 2017, which was the combined effect of the increase in landings and a 6% increase in the average price across species. Alaska pollock revenues decreased marginally to $413 million but remained strong with high landings, though ex-vessel prices have been low compared to the last 10 years. Low pollock fillet and head and gut prices were contributing factors in the low ex-vessel price. Salmon revenues increased 70%, which was largely the

[10] Summary data is available online in the FEUS webtool. [Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.]
[11] The NMFS Commercial Fishing Industry Input/Output Model was used to generate the impact estimates. [Available at: https://www.st.nmfs.noaa.gov/documents/commercial_seafood_impacts_2007-2009.pdf.]

result of the increased landings from the biennial cycle as ex-vessel prices were down 7%. Pacific cod revenues decreased 9% to $156 million with the decrease in landings, as ex-vessel prices were stable. Crab revenues decreased 30% to $152 million, as the decrease in landings was partially offset by the 24% increase in crab ex-vessel prices as reduced supply put upward pressure on prices. Other species with notable percent changes in revenues were Pacific herring (up 48%), sablefish (up 28%), and rockfish (down 17%).

In contrast to ex-vessel value, first-wholesale value of the 2017 groundfish catch was $2.52 billion, an increase of 3.4% in real terms from 2016. This change was primarily the result of an increase in the real aggregate 2017 first-wholesale price, up 5.6% to $1.20 per pound while aggregate production volumes decreased 1.4% to 959 thousand mt. In the BSAI, aggregate first-wholesale value increased 6.1% and value was increasing for all species with the exception of pollock, where aggregate value, price, and volume showed little change. In the Gulf of Alaska (GOA), aggregate first-wholesale value increased only slightly (1.5%). First-wholesale value in the GOA was increasing for flatfish and sablefish with increases in both first-wholesale prices and production volume. The decrease in GOA cod value was the result of decreased production volume. The decrease in the value of GOA pollock was largely the result of a decrease in the average price of products.

Landings Revenue

In 2017, landings revenue in North Pacific totaled $1.8 billion, a 4% increase from 2008 (a 9% decrease in real terms after adjusting for inflation) and a 14% increase from 2016.

Finfish and other landings revenue accounted for 91% of all landings revenue. In 2017, salmon ($645.7 million), Alaska pollock ($413.3 million), and Pacific cod ($156 million) had the highest landings revenue in this region. Together, these top three species accounted for 69% of total landings revenue.

From 2008 to 2017, salmon (75%, 53% in real terms), Atka mackerel (74%, 52% in real terms), and Alaska pollock (28%, 12% in real terms) had the largest increases, while Pacific herring (-65%, -70% in real terms), Pacific halibut (-44%, -51% in real terms), and Pacific cod (-43%, -50% in real terms) had the largest decreases. From 2016 to 2017, salmon (70%), Pacific herring (48%), and sablefish (28%) had the largest increases, while crab (-30%), rockfish (-17%), and Pacific cod (-9%) had the largest decreases.

Commercial Revenue: Largest Increases

From 2008:
- Salmon (75%, 53% in real terms)
- Atka mackerel (74%, 52% in real terms)
- Alaska pollock (28%, 12% in real terms)

From 2016:
- Salmon (70%)
- Pacific herring (48%)
- Sablefish (28%)

Commercial Revenue: Largest Decreases

From 2008:
- Pacific herring (-65%, -70% in real terms)
- Pacific halibut (-44%, -51% in real terms)
- Pacific cod (-43%, -50% in real terms)

From 2016:
- Crab (-30%)
- Rockfish (-17%)
- Pacific cod (-9%)

Landings

In 2017, North Pacific Region commercial fishermen landed over 6 billion pounds of finfish and shellfish. This represents a 32% increase from 2008 and an 8% increase from 2016. Alaska pollock contributed the highest landings volume in the region, accounting for 56% of total landing weight.

From 2008 to 2017, rockfish (54%), salmon (54%), and Alaska pollock (49%) had the largest increases, while Pacific halibut (-62%), crab (-61%), and Pacific herring (-18%) had the largest decreases. From 2016 to 2017, salmon (82%), Pacific herring (32%), and Atka mackerel (18%) had the largest increases, while crab (-44%), Pacific cod (-7%), and rockfish (-6%) had the largest decreases.

Commercial Landings: Largest Increases

From 2008:
- Rockfish (54%)
- Salmon (54%)
- Alaska pollock (49%)

From 2016:
- Salmon (82%)
- Pacific herring (32%)
- Atka mackerel (18%)

Commercial Landings: Largest Decreases

From 2008:
- Pacific halibut (-62%)
- Crab (-61%)
- Pacific herring (-18%)

From 2016:
- Crab (-44%)
- Pacific cod (-7%)
- Rockfish (-6%)

Prices

In 2017, Pacific halibut ($4.74 per pound) received the highest ex-vessel price in the region. Landings of Pacific herring ($0.12 per pound) had the lowest ex-vessel price. From 2008 to 2017, crab (63%, 42% in real terms), Atka mackerel (55%, 35% in real terms), and Pacific halibut (47%, 28% in real terms) had the largest increases, while Pacific herring (-58%, -63% in real terms), Pacific cod (-57%, -63% in real terms), and flatfish (-24%, -33% in real terms) had the largest decreases. From 2016 to 2017, crab (24%), Pacific herring (12%), and sablefish (9%) had the largest increases, while rockfish (-12%), Atka mackerel (-9%), and salmon (-7%) had the largest decreases.

RECREATIONAL FISHERIES — NORTH PACIFIC REGION

In this report, recreational fishing refers to fishing for leisure rather than to sell fish (commercial fishing) or for subsistence. This recreational fisheries section reports on economic impacts and expenditures, angler participation, fishing trips, and catch of key species/species groups.[12]

Key North Pacific Recreational Species[13]

- Chinook salmon
- Chum salmon
- Coho salmon
- Lingcod
- Pacific cod
- Pacific halibut
- Pink salmon
- Razor clams
- Rockfish species
- Shark species
- Sockeye salmon

Economic Impacts and Expenditures

The economic contribution of recreational fishing activities in the North Pacific Region is based on spending by recreational anglers.[14] Total annual trip expenditures are estimated at the state level by multiplying mean trip expenditures by the estimated number of adult trips in each trip mode (for-hire, private boat, and shore) and adjusting by the CPI (consumer price index) to the current year. Total annual durable expenditures are estimated by multiplying mean durable expenditures in each state by the estimated annual number of adult participants for each state and adjusting by the CPI (consumer price index) to the current year.[15]

Four different measures are commonly used to show how angler expenditures affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as recreational fishing. The category includes both the direct sales made to the angler and sales made between businesses and households resulting from that original sale to the angler. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the purchases made by anglers. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in number of jobs. Note that these categories are not additive. NOAA Fisheries uses a regional impact modeling software, called IMPLAN, to estimate these four types of impacts.

National Overview | North Pacific | Pacific | Western Pacific | New England | Mid-Atlantic | South Atlantic | Gulf of Mexico

[12] Information reported in this table is from the Sport Fish Division of the Alaska Department of Fish and Game (ADF&G) for saltwater fishing activities.
[13] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[14] Trip expenditure estimates were generated from the 2016/2017 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2020). Durable goods expenditures were generated from the 2014 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2016). (For citations: Publications-U.S. Coastal and Marine Recreation.)
[15] Summary data is available online in the FEUS webtool. (Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.)

The economic contributions for both trip and durable expenditures from recreational fishing in 2017 were estimated using IMPLAN version 3, with base year data from 2017. Models for each state and for the nation were created in IMPLAN using trip expenditures (based on 2016/2017 survey data on average trip expenditures and total 2017 trips) and for durable expenditures (based on 2014 survey data on average durable expenditures and 2017 participants).

In 2017, economic impacts from recreational fishing activities in the North Pacific Region generated 5,550 jobs, $566.7 million in sales, $197.7 million in income, and $330.8 million in value-added impacts. Impacts from durable equipment expenditures (e.g., rods and reels, fishing-related equipment, boats, vehicles, and second homes) accounted for 28% of employment, 21% of sales, 24% of income, and 22% of value-added impacts.

Expenditures for fishing trips and durable equipment across the North Pacific Region in 2017 totaled $467.5 million. This total included $126.2 million in durable goods expenditures, with the largest portion coming from boat expenses ($57.7 million).

Participation

In 2017, there were 295,247 recreational anglers who fished in the North Pacific Region. This number represented a 4% decrease from 2008 and remains unchanged from 2016. The anglers are categorized as either out-of-state anglers (60%) or residents of coastal/non-coastal county (40%).

Days Fished

The state of Alaska records recreational fishing effort in terms of the number of days fished, rather than the number of fishing trips. Anglers who fished in Alaska spent approximately 896,749 days fishing in 2017. This number represented a 4% decrease from the days spent fishing in 2008. From 2016 to 2017, there was a 4% increase in the number of days fished.

Harvest and Release Trends

Of the North Pacific Region's key species and species groups, Pacific halibut (551,600 fish), coho salmon (539,119 fish), and rockfish species (407,200 fish), were most frequently caught by recreational fishermen.

The text box below shows the species with the largest percentage increases and decreases in the past 10 years and in the past year.

Harvest and Release: Largest Increases

From 2008:
- Chinook salmon (27%)
- Sockeye salmon (18%)
- Pink salmon (13%)

From 2016:
- Pink salmon (19%)
- Sockeye salmon (12%)
- Lingcod (2%)

Harvest and Release: Largest Decreases

From 2008:
- Razor clams (-97%)
- Shark species (-82%)
- Lingcod (-52%)

From 2016:
- Razor clams (-80%)
- Pacific cod (-50%)
- Shark species (-41%)

From 2008 to 2017, Chinook salmon (27%), sockeye salmon (18%), and pink salmon (13%) had the largest increases, while razor clams (-97%), shark species (-82%), and lingcod (-52%) had the largest decreases. From 2016 to 2017, pink salmon (19%), sockeye salmon (12%), and lingcod (2%) had the largest increases, while razor clams (-80%), Pacific cod (-50%), and shark species (-41%) had the largest decreases.

There was approximately a 50% decrease in the amount of Pacific cod harvested and released from 2016 to 2017. There is no bag, possession, size, or seasonal limit for recreational Pacific cod fisheries in the North Pacific Region. Low population abundances and small sized individuals may be a result of an expanse of exceptionally warm water, commonly referred to as the "blob," that was first detected in 2013 and persisted through 2016.[16] Despite no policy changes, the amount of coho salmon harvested and released in the North Pacific Region increased from 2016 to 2017. Run forecasts and harvest

[16] Crozier, L. 2016. Impacts of Climate Change on Salmon of the Pacific Northwest: A review of the scientific literature published in 2015. Northwest Fisheries Science Center, National Marine Fisheries Service, NOAA, Seattle, Washington. 32 p. [Available at https://www.nwfsc.noaa.gov/assets/4/9042_02102017_105951_Crozier.2016-BIOP-Lit-Rev-Salmon-Climate-Effects-2015.pdf].

projections conducted by ADFG showed that coho salmon abundances were projected to increase in the year 2017 based on the review of the 2016 season.[17]

MARINE ECONOMY — NORTH PACIFIC REGION

For this report, the marine economy refers to the economic activity generated by fishing and marine-related industries in a coastal state. The national marine economy consists of two industry sectors: 1) seafood sales and processing (employer establishments and non-employer firms); and 2) transport, support, and marine operations (employer establishments). These sectors include several different marine-related industries.[18,19]

To measure the size of the commercial fishing sector in a state's economy relative to the size of the commercial fishing sector in the national economy, researchers use an index called the Commercial Fishing Location Quotient (CFLQ).[20,21] The CFLQ is calculated as the ratio of the percentage of regional employment in the commercial fishing sector relative to the percentage of national employment in the commercial fishing sector. The United States CFLQ is 1. If a state CFLQ is less than 1, then less commercial fishing occurs in this state than the national average. If a state CFLQ is greater than 1, then more commercial fishing occurs in this state than the national average.

The Bureau of Labor Statistics suppressed the CFLQ value for Alaska for 2016.

In 2016, 21,077 employer establishments operated throughout the entire North Pacific Region (including marine and non-marine related establishments). These establishments employed 266,072 workers and had a total annual payroll of $15.2 billion. The combined gross state product of Alaska, was approximately $51.3 billion in 2016.

Seafood Sales and Processing

Seafood Product Preparation and Packaging: In 2016, the North Pacific Region had 22 non-employer firms in the seafood product preparation and packaging sector (a 29% decrease from 2008). Annual receipts for these firms totaled about $1.7 million (a 7% increase in real terms from 2008). There were 104 employer firms in the seafood product preparation and packaging sector (a 15% decrease from 2008). These establishments employed 8,654 workers (a 12% increase from 2008) and had a total annual payroll of $355.1 million (a 24% increase in real terms from 2008).

Seafood Sales, Retail: In 2016, there were 13 non-employer firms engaged in retail sales of seafood in the North Pacific region (remains unchanged from 2008). Annual receipts for these firms totaled about $1.5 million (an 8% decrease in real terms from 2008). There were 16 employer firms in the retail sales of seafood sector (a 78% increase from 2008). These establishments employed 77 workers (a 108% increase from 2008) and had a total annual payroll of $2.5 million (a 23% increase in real terms from 2008).

Seafood Sales, Wholesale: There were 33 employer firms in the wholesale sales of seafood sector in the North Pacific Region in 2016 (a 42% decrease from 2008). These establishments employed 79 workers (a 45% decrease from 2008), and had a total annual payroll of $6 million (a 36% decrease in real terms from 2008).

Transport, Support, and Marine Operations

Data for the transport, support, and marine operations sector of North Pacific Region's economy were largely suppressed for confidentiality reasons. It is clear, however, that these sectors play an important role in the regional economy. For example, in 2016, the coastal and Great Lakes freight transportation sector in the North Pacific Region accounted for $86.8 million in payroll (a 128% increase in real terms from 2008).

[17] Brenner, Richard E., and Andrew R. Munro (editors). 2017. Run Forecasts and Harvest Projections for 2017 Alaska Salmon Fisheries and Review of the 2016 Season. Alaska Department of Fish and Game. Anchorage, Alaska. Special Publication 17-08, 104 p. [Available at http://www.adfg.alaska.gov/FedAidPDFs/SP17-08.pdf].
[18] Unless otherwise stated, data are from the U.S. Census Bureau. [For more information: www.census.gov.]
[19] U.S. Bureau of Economic Analysis, 'Table 1.1.5 Gross Domestic Product' and 'Table SA6N Compensation of Employees by NAICS Industry. [Available at: https://apps.bea.gov/regional/histdata/releases/0518gdpstate/.]
[20] Percentage changes in inflation adjusted (real dollar) terms are calculated using the annual Gross Domestic Product implicit price deflator published by the U.S. Bureau of Economic Analysis and the Federal Reserve Bank of St. Louis. [Available at: https://fred.stlouisfed.org/series/GDPDEF.]
[21] U.S. Bureau of Labor Statistics, 'Location Quotient Calculator.' [For more information: www.bls.gov/cew/cewlq.htm.]

Tables | Alaska

2017 Economic Impacts of the Alaska Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	53,543	4,398,212	1,904,219	2,376,629	53,418	4,373,511	1,898,777	2,367,828
Commercial Harvesters	38,272	3,083,903	1,339,107	1,670,140	38,272	3,083,903	1,339,107	1,670,140
Seafood Processors & Dealers	11,972	1,100,912	480,414	595,635	11,935	1,097,443	478,897	593,757
Importers	60	18,980	3,042	5,786	0	0	0	0
Seafood Wholesalers & Distributors	366	43,729	14,973	19,552	355	42,410	14,521	18,962
Retail	2,873	150,687	66,684	85,517	2,857	149,755	66,252	84,970

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (millions of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	1,701	1,334	1,584	1,893	1,692	1,878	1,712	1,763	1,551	1,764
Finfish & Other	1,449	1,138	1,377	1,626	1,406	1,638	1,464	1,470	1,321	1,598
Shellfish	252	196	207	267	286	240	248	294	230	166
Key Species	-	-	-	-	-	-	-	-	-	-
Alaska pollock	323	271	282	363	343	406	400	442	417	413
Atka mackerel	20	27	28	23	15	15	22	42	32	34
Crab	241	180	190	249	276	230	238	284	219	153
Flatfish	110	83	78	85	95	122	99	69	68	71
Pacific cod	274	133	147	203	186	156	153	257	171	156
Pacific halibut	209	135	200	205	145	111	107	111	117	116
Pacific herring	23	29	23	12	19	16	11	7	5	8
Rockfish	20	16	20	24	27	35	28	33	30	25
Sablefish	97	94	88	139	113	82	86	85	86	110
Salmon	368	345	506	565	441	680	546	413	381	646

Total Landings and Landings of Key Species/Species Groups (millions of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	4,534	4,064	4,347	5,353	5,344	5,792	5,671	6,038	5,586	6,005
Finfish & Other	4,427	3,968	4,262	5,267	5,228	5,701	5,580	5,909	5,513	5,961
Shellfish	107	96	86	86	116	91	91	129	73	44
Key Species	-	-	-	-	-	-	-	-	-	-
Alaska pollock	2,276	1,866	1,948	2,811	2,872	3,003	3,146	3,263	3,355	3,388
Atka mackerel	127	157	145	113	104	51	70	118	121	143
Crab	99	90	80	80	112	87	85	121	69	39
Flatfish	595	493	551	640	635	657	661	506	517	499
Pacific cod	494	491	539	663	717	681	717	697	707	657
Pacific halibut	65	58	55	41	32	29	22	23	23	25
Pacific herring	84	87	108	99	75	85	97	68	52	68
Rockfish	89	84	100	106	114	123	133	142	146	138
Sablefish	30	27	25	27	30	30	26	24	22	26
Salmon	640	671	757	738	611	1,013	683	1,041	543	986

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alaska pollock	0.14	0.14	0.14	0.13	0.12	0.14	0.13	0.14	0.12	0.12
Atka mackerel	0.15	0.17	0.19	0.21	0.15	0.30	0.32	0.36	0.26	0.24
Crab	2.42	2.01	2.37	3.09	2.46	2.64	2.79	2.35	3.19	3.95
Flatfish	0.19	0.17	0.14	0.13	0.15	0.19	0.15	0.14	0.13	0.14
Pacific cod	0.55	0.27	0.27	0.31	0.26	0.23	0.21	0.37	0.24	0.24
Pacific halibut	3.23	2.33	3.65	4.97	4.47	3.89	4.93	4.85	5.03	4.74
Pacific herring	0.27	0.34	0.21	0.12	0.26	0.19	0.12	0.10	0.10	0.12
Rockfish	0.23	0.20	0.20	0.22	0.24	0.28	0.21	0.23	0.21	0.18
Sablefish	3.21	3.49	3.50	5.13	3.79	2.72	3.37	3.57	3.93	4.29
Salmon	0.58	0.51	0.67	0.77	0.72	0.67	0.80	0.40	0.70	0.65

2017 Economic Impacts of Alaska Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	3,040	301,617	104,574	169,395
	Private Boat	901	137,271	42,124	83,530
	Shore	68	9,096	3,045	5,654
Total Durable Expenditures		1,541	118,749	47,954	72,183
Total State Economic Impacts		5,550	566,733	197,697	330,762

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)[1]

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	209,465	Fishing Tackle	27,578
Private Boat	123,861	Other Equipment	36,172
Shore	7,957	Boat Expenses	57,675
Total	341,283	Vehicle Expenses	4,768
		Second Home Expenses	0
		Total Durable Expenditures	126,194
Total State Trip and Durable Goods Expenditures			467,477

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Out-of-State	119	127	122	124	118	129	122	128	115	117
Coastal/Non-Coastal	190	158	159	161	160	178	170	181	181	178
Total Anglers	309	284	281	286	278	307	292	309	296	295

Recreational Fishing Effort by Mode (thousands of angler fishing days)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Days Fished	935	914	811	812	808	980	960	975	864	897

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[2,3,4]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Chinook salmon	H	71	89	78	85	63	81	111	111	101	85
	R	80	96	66	95	62	120	94	116	87	106
Chum salmon	H	12	22	11	21	11	25	12	13	10	10
	R	28	34	19	38	20	39	19	25	22	22
Coho salmon	H	404	418	350	386	263	493	390	479	263	468
	R	89	94	74	88	50	122	60	99	41	71
Lingcod	H	37	32	32	33	33	34	32	28	26	22
	R	65	46	39	36	36	33	29	27	23	27
Pacific cod	H	25	36	37	48	42	38	61	58	44	20
	R	39	63	81	76	50	48	73	75	43	24
Pacific halibut	H	516	440	398	394	388	454	408	420	400	352
	R	359	321	304	311	324	324	251	271	244	199
Pink salmon	H	88	117	82	72	78	113	69	110	103	102
	R	152	224	121	135	141	203	118	204	126	170
Razor clams	H	593	556	357	436	324	291	90	39	77	15
	R	0	0	0	0	0	3	3	0	3	< 1
Rockfish species	H	226	209	224	211	230	256	335	332	347	279
	R	171	149	151	122	121	121	148	143	157	129
Shark species	H	< 1	< 1	< 1	< 1	< 1	< 1	2	< 1	< 1	< 1
	R	52	33	29	14	13	11	28	20	16	10
Sockeye salmon	H	29	34	28	31	28	40	35	33	34	36
	R	10	10	6	10	8	13	12	9	7	10

[1] All data reported in this table are from saltwater fishing activities.
[2] Information reported in this table is from the Sport Fish Division of the Alaska Department of Fish and Game (ADF&G) for saltwater fishing activities.
[3] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[4] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.

2016 Alaska State Economy (% of national total)[1]

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[2]
56,946 (0.2%)	21,077 (0.3%)	266,072 (0.2%)	15.2 (0.2%)	27.2 (0.3%)	51.3	ds

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	31	32	28	26	25	35	31	30	22
	Receipts	1,455	1,693	2,482	2,882	2,708	3,268	2,472	4,091	1,743
Seafood sales, retail	Firms	13	16	23	15	15	11	17	11	13
	Receipts	1,431	1,350	1,595	903	1,626	1,458	1,539	761	1,483

Seafood Sales and Processing — Employer Establishments (thousands of dollars)[1]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	122	121	119	122	116	115	108	109	104
	Employees	7,707	7,572	8,074	8,578	8,289	8,638	9,115	8,472	8,654
	Payroll	254,894	255,403	268,208	296,851	297,284	308,961	337,171	356,855	355,129
Seafood sales, wholesale	Establishments	57	54	52	48	47	43	43	37	33
	Employees	143	ds	ds	159	143	102	120	94	79
	Payroll	8,389	8,445	9,141	9,985	10,943	7,205	7,024	7,306	6,037
Seafood sales, retail	Establishments	9	10	10	10	15	14	14	15	16
	Employees	37	44	ds	ds	ds	ds	ds	64	77
	Payroll	1,839	1,824	1,986	2,487	2,019	2,337	2,687	2,498	2,549

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[1]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	17	21	22	23	23	20	27	23	23
	Employees	ds	ds	ds	ds	ds	ds	335	344	394
	Payroll	ds	ds	ds	ds	ds	ds	15,845	17,748	18,762
Deep Sea Freight Transportation	Establishments	3	3	3	1	2	3	6	5	5
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	0
Deep Sea Passenger Transportation	Establishments	1	1	NA	1	1	2	1	1	1
	Employees	ds	ds	NA	ds	ds	ds	ds	0	0
	Payroll	ds	ds	NA	ds	ds	ds	ds	0	0
Coastal and Great Lakes Freight Transportation	Establishments	49	50	55	63	47	53	72	74	79
	Employees	ds	ds	ds	ds	ds	ds	ds	1,067	966
	Payroll	33,888	33,132	ds	ds	ds	82,692	89,020	89,281	86,849
Port and Harbor Operations	Establishments	7	8	9	8	18	13	12	11	11
	Employees	ds	ds	ds	ds	582	ds	ds	0	14
	Payroll	ds	ds	ds	1,790	25,545	ds	ds	0	904
Marine Cargo Handling	Establishments	12	13	13	14	8	9	9	9	8
	Employees	ds	ds	ds	ds	334	ds	ds	437	410
	Payroll	ds	ds	ds	ds	26,481	ds	ds	32,326	32,171
Navigational Services to Shipping	Establishments	25	23	25	22	21	22	25	24	23
	Employees	296	312	303	321	97	103	138	140	126
	Payroll	23,233	25,630	27,543	27,156	9,938	10,805	13,015	13,596	14,221
Marinas	Establishments	14	13	14	14	13	12	11	11	10
	Employees	66	56	ds	ds	ds	ds	ds	30	33
	Payroll	2,303	2,181	1,932	2,053	1,613	1,449	ds	1,423	1,568

[1] ds = Data are suppressed.
[2] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.

Pacific Region

- California
- Oregon
- Washington

The crew of the fishing vessel *Sea Storm* fishing for hake off of Washington and Oregon. Arctic Storm, the catcher-processor vessel, is in the background. Photo: Sea Storm crew member/Franco Cruz

MANAGEMENT CONTEXT

The Pacific Region includes California, Oregon, and Washington. Federal fisheries in this region are managed by the Pacific Fishery Management Council (PFMC) and NOAA Fisheries under four fishery management plans (FMPs).

Pacific Region FMPs

- Coastal pelagic species
- Pacific coast salmon
- Pacific coast groundfish
- West Coast highly migratory species

In 2017, the only stock/complex managed under these FMPs remaining on the overfished list was Pacific bluefin tuna (Pacific stock).[1] Pacific ocean perch (Pacific Coast stock) and yelloweye rockfish (Pacific Coast stock) were removed from the overfished list. Three stocks/complexes were subject to overfishing in 2017: Coho salmon (Puget Sound: Stillaguamish stock, newly added to the list in 2017);[1] Pacific bluefin tuna (Pacific stock);[1] and swordfish (Eastern Pacific stock).[1,2] Coho salmon (Puget Sound: Hood Canal stock)[1] was removed from the overfishing list. Additionally, for the first time, spiny dogfish (Pacific coast stock) stock status was determined to be not subject to overfishing.

Also in 2017, three groundfish stocks were declared rebuilt—bocaccio (Southern Pacific Coast stock), darkblotched rockfish (Pacific Coast stock), and Pacific ocean perch (Pacific Coast stock). Pacific ocean perch has been overfished since the mid-1960s when foreign fleets targeted groundfish stocks off the U.S. West Coast. Under its rebuilding plan, Pacific ocean perch was not projected to be rebuilt until 2051; achieving rebuilt status in 2017 puts this achievement 34 years ahead of schedule.

Overall, management strategies have been used to successfully rebuild eight groundfish stocks, including Pacific whiting, lingcod, canary rockfish, widow rockfish, petrale sole, and, in 2017, bocaccio (Southern Pacific Coast stock), darkblotched rockfish (Pacific Coast stock), and Pacific ocean perch (Pacific Coast stock). Only two overfished groundfish stocks—cowcod and yelloweye rockfish—continue to be managed under rebuilding plans. Cowcod is projected to be rebuilt by 2019 and yelloweye rockfish as soon as 2027.

Conservative management techniques are employed in the Pacific Region's fisheries. For example, the Pacific groundfish and salmon fisheries are subject to "weak stock management" where access to the surplus of healthier stocks that can be harvested is often restricted to protect weaker stocks with which they commingle in the ocean. These weaker stocks include seven rebuilding groundfish stocks, salmon (listed under the Endangered Species Act), and other non-listed stocks that constrain the fishery.

Salmon management is further complicated by the need to ensure equal allocation of harvest among diverse user groups and coordination with other entities that have jurisdiction over various aspects of salmon management. Decades of habitat modification, hatchery practices, harvest, and growing competition for water have affected the viability of salmon stocks and made them more vulnerable to adverse environmental conditions. These conditions include the prolonged drought and adverse ocean conditions experienced in recent years. Low returns of salmon to the Klamath River in 2006, and to the Sacramento River in 2008 and 2009, resulted in unprecedented closures of ocean and in-river fisheries, leading to federal disaster relief for affected entities.

Coastal pelagic species (CPS) are highly variable, environmentally sensitive stocks that provide food for marine mammals, birds, and fish. These species include Pacific sardine, northern anchovy, Pacific and jack mackerel, and market squid. Of these species, Pacific sardine is the most commonly targeted CPS finfish and is managed according to an innovative harvest control rule: Allowable harvest varies with sea surface temperature. Because the geographic range of sardine tends to expand with abundance, harvest allocation between the California and Pacific Northwest fisheries is an ongoing and dynamic issue. The annual guideline for sardine harvest is allocated coast-wide on a seasonal basis. Recent decreases in harvest guideline limits have contributed to the development of an intense derby fishery.

Catch limits for Pacific halibut, a transboundary fish stock, are set in January by the International Pacific

[1] This stock is fished by U.S. and international fleets.
[2] The geographic boundary of this stock extends from Mexico south and west to the Palmyra Atoll.

Halibut Commission (IPHC). This bilateral commission between the United States and Canada determines total allowable catch levels (TACs) for Pacific halibut that will be caught in the United States and Canadian exclusive economic zones (EEZs). After catch levels are determined, the PFMC develops a catch-sharing plan for tribal and non-tribal (i.e., commercial and recreational) fisheries in the federal waters of California, Oregon, and Washington. Pacific Halibut is targeted only with hook gear, but there are allocations to the trawl sector for bycatch, including individual bycatch quotas, in the Pacific groundfish trawl IFQ.

The Highly Migratory Species (HMS) FMP includes tunas, billfish, and pelagic sharks as managed species. The albacore surface hook-and-line fishery is by far the most economically important commercial HMS fishery, followed by the drift gillnet fishery for swordfish and thresher shark. HMS is also a very important component of the catch for the Pacific Region's commercial passenger fishing vessel fleet and the private recreational boat fleet.

Catch Share Programs

The Pacific Region has two catch share programs: 1) the Pacific Coast Sablefish Permit Stacking Program; and 2) the Pacific Groundfish Trawl Rationalization Program (Whiting and Non-Whiting trawl). The landings revenues for these programs totaled more than $53.1 million in 2016. The following are descriptions of these catch share programs and their performance.

Pacific Coast Sablefish Permit Stacking Program: This program was implemented in 2001 and allows vessels to stack multiple vessel permits on a single vessel. The goal of this approach is to improve economic efficiency through rationalization of the fixed gear fleet, increase benefits for fishing communities, promote equity, lessen reallocation effects of previous harvest regulations, promote safety, and improve product quality and value. The 2016 key performance indicators of the program show that relative to the baseline period, landings and the number of active vessels decreased, while inflation-adjusted landings revenue and inflation-adjusted revenue per active vessel increased. Baselines for quota were not calculated and therefore cannot be compared.

A recent study[3] of this fleet demonstrated that after the catch share program was implemented, the probability of fishermen taking a fishing trip in high wind conditions decreased 82%. This provides evidence that institutional changes can significantly reduce risk taking behavior and result in safer fisheries.

Pacific Groundfish Trawl Rationalization Program (Whiting and Non-Whiting trawl): This program was implemented by the PFMC in January 2011. This program involves individual fishing quotas (IFQs) for non-whiting groundfish and whiting trawlers delivering to shoreside plants, and cooperatives for whiting mothership and catcher processor sectors. The objectives of this program are to provide a mechanism for total catch accounting; provide a viable, profitable, and efficient groundfish fishery; promote practices that reduce bycatch and discard mortality and minimize ecological impacts; increase operational flexibility; minimize adverse effects from the IFQ program on fishing communities and other fisheries; promote measurable economic and employment benefits through the seafood catching, processing, distribution, and support sectors of the industry; provide quality product for the consumer; and increase safety in the fishery.

In 2017, the Council review of the Program[4] found that overall average annual net revenue for all sectors of the fishery from 2011 through 2015 was $54 million, which was over twice the 2009-2010 average of $25 million. Shorebased processors saw the greatest increase in net benefits between the pre-catch share and catch share periods (over $13 million) while net benefits nearly tripled in the shoreside catcher vessel sector and increased by a lesser percentage for the catcher-processor sector. The at-sea mothership sector, however, saw a slight decrease in net benefits during this period.

Expanded observer coverage and dockside monitoring, which were implemented with the catch share program, coupled with long-term adherence to catch targets and improved stock assessment models, have to varying degrees also contributed to improved fishery performance. For example, in the first three years of catch shares, the total catch of rebuilding stocks (of which two—canary rockfish and petrale sole—are now declared rebuilt) was 50% lower than in the previous three years.

[3] Pfeiffer, Lisa and Trevor Gratz. The effect of rights-based fisheries management on risk taking and fishing safety (March 8, 2016). Proceedings of the National Academy of Sciences 113 (10) 2615-2620; DOI: 10.1073/pnas.1509456113.
[4] PFMC and NMFS. 2017. West Coast Groundfish Trawl Catch Share Program: Five-year review. Approved by the Pacific Fishery Management Council November 16th 2017, Costa Mesa, CA.

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Policy Updates

In June 2017, bocaccio and darkblotched rockfish were declared rebuilt, both well before their original target dates. Later in the year, Pacific ocean perch, which has been overfished since the mid-1960s when foreign fleets targeted groundfish stocks, was also declared rebuilt. This follows on the heels of two other important West Coast groundfish stocks—canary rockfish and petrale sole—being declared rebuilt in June 2015. These stocks had been subject to strict rebuilding plans that severely constrained West Coast fisheries for more than a decade: bocaccio was declared overfished in 1999, darkblotched rockfish and canary rockfish were declared overfished in 2000, and petrale sole was declared overfished in 2010. Overall, these strategies were successfully used to rebuild eight groundfish stocks by 2017, including Pacific whiting, lingcod, and widow rockfish in addition to the five stocks cited here.[5]

Another bright spot in 2017, the Pacific whiting stock assessment estimated that the stock was at its highest level since the 1980s. Based on this assessment and recommendations of the Joint Management Committee,[6] the U.S. and Canada unadjusted total allowable catch (TAC) for 2017 Pacific whiting fisheries was set at 531,501 metric tons (mt). The unadjusted U.S. share of the TAC (392,673 mt) is 6.8 percent greater than in 2016.[7]

An emerging success story is the use of deep-set buoy gear in the swordfish fishery to reduce bycatch. In 2014, the Council approved a preliminary exempted fishing permit to test the efficacy of alternative gear types at reducing bycatch in the swordfish fishery relative to the drift gillnet gear type. Only a limited number of permits were issued in 2015 and 2016 but in 2017, having proved successful at minimizing bycatch, the number of deep set buoy gear EFPs was significantly expanded.[8]

At the April 2017 Council meeting, the PFMC recommended closing the directed commercial sardine fishery for the third year in a row based upon an estimated a biomass of 86,586 metric tons, an 18% decline from the previous year. The fishery was first closed in 2015 as a result of the biomass declining below a precautionary biomass threshold that automatically results in the closure of the fishery well in advance of population reaching an overfished condition.

In July 2017, the United States and the 20 other member nations of the Inter-American Tropical Tuna Commission (IATTC) adopted new science-based conservation and management measures for tropical tuna (bigeye, yellowfin, and skipjack tuna) from 2018 to 2020 to support continued conservation of these tuna stocks.

In December 2017, parties of the *United States v. Oregon* agreement, which provides the framework for fisheries and hatchery programs on the Columbia River Basin, agreed on a new ten-year framework.[9] NMFS, Washington State, and tribal co-managers began development of a comprehensive ten-year management plan for Puget Sound chinook salmon.[10]

There were a number of changes affecting California recreational fisheries in 2017. California regulations for chinook salmon divide the state into five areas, each of which can have different season lengths.[11] In 2017, the two regions that encompass most of the coastline north of San Francisco had significantly shorter seasons or were closed entirely compared to 2016. The northernmost of these two regions were completely closed in 2017 but was open for 68 days in 2016 between May and September and accounted for 10% of all open days in 2016 across the state. The other area saw a 33% decrease in season length in 2017 and accounted for 34% of the 2016 open dates across the state. The central and southern areas saw minor changes in season lengths from 2016 to 2017.

For the California recreational groundfish fishery, the canary rockfish daily sub-bag limit changed from zero to one and the bocaccio sub-bag limit went from 3 to 10 fish as a result of canary rockfish being declared rebuilt in 2015 and bocaccio rockfish declared rebuilt in 2017.

[5] This rebuilding summary is drawn directly from Pacific Fishery Management Council documents available at https://www.pcouncil.org/documents/2017/12/pacific-ocean-perch-rebuilt.pdf/ and https://www.pcouncil.org/documents/2017/06/bocaccio-and-darkblotched-rockfish-rebuilt.pdf/
[6] Under the terms of the Agreement with Canada on Pacific Hake/Whiting (the Agreement) and the Pacific Whiting Act of 2006, the Joint Management Committee is the decision-making body tasked with making TAC recommendations to the two parties, the United States and Canada.
[7] https://www.federalregister.gov/documents/2017/05/08/2017-09288/magnuson-stevens-act-provisions-fisheries-off-west-coast-states-pacific-coast-groundfish-fishery
[8] https://www.govinfo.gov/content/pkg/FR-2017-08-28/html/2017-18146.htm
[9] For historical background as well as additional information on the new 10-year agreement see: https://www.fisheries.noaa.gov/west-coast/sustainable-fisheries/salmon-and-steelhead-fisheries-west-coast-united-states-v-oregon
[10] https://wdfw.wa.gov/publications/01947
[11] Salmon Technical Team. 2018. Review of 2017 Ocean Salmon Fisheries; Stock Assessment and Fishery Evaluation Document for the Pacific Coast Salmon Fishery Management Plan. Portland, OR. Pacific Fishery Management Council. 335 p. [Available at https://www.pcouncil.org/documents/2018/02/review-of-2017-ocean-salmon-fisheries.pdf/].

Anglers had not been able to retain canary rockfish since 2003, and the bocaccio bag limit had been three or less since 1999. Additionally, recreational fishing depth limits increased by 10 fathoms along a large part of the north and central coast. The extra 10 fathoms of fishable waters had not been open to recreational anglers since 2003. However, due to high catches of yelloweye rockfish during the summer, depth restrictions were reverted to the 2016 depths in October 2017.[12]

In Oregon, the 2017 Chinook and coho salmon seasons were largely unchanged from 2016, except for the complete closure of one of the five management areas. For Chinook, the season was open for 75 days in 2016 in this area and accounted for 19% of all open season dates in the state in 2016; for coho, the season was open 44 days in 2016 and represented 22% of the open dates in 2016.[13]

In Washington, the 2017 Chinook salmon season was open for an additional 21 days in the two most northern management areas compared to 2016, whereas the other two management regions had very minor changes. However, for coho, three out of four management areas that were closed in 2016 were open in 2017. The season was open for 73 days in each of two areas and 53 days in the third area.[14]

COMMERCIAL FISHERIES — PACIFIC REGION

In this report, commercial fisheries refer to fishing operations that sell their catch for profit. The term does not include subsistence fishermen or saltwater anglers who fish for sport. It also excludes the for-hire sector, which earns its revenue from selling recreational fishing trips to saltwater anglers. The commercial fisheries section reports on economic impacts, landings revenue, landings, and ex-vessel prices of key species/species groups.

Key Pacific Region Commercial Species

- Albacore tuna
- Crab
- Flatfish
- Other shellfish
- Pacific hake (whiting)
- Rockfish
- Sablefish
- Salmon
- Shrimp
- Squid

Economic Impacts

The premise behind economic impact modeling is that every dollar spent in a regional economy (direct impact) is either saved or re-spent on additional goods or services. If those dollars are re-spent on other goods and services in the regional economy, this spending generates additional economic activity in the region.[15]

Four different measures are commonly used to show how commercial fisheries landings affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as commercial fishing. The category includes both the direct sales of fish landed and sales made between businesses and households resulting from the original sale. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the sales of seafood or purchases of inputs to commercial fishing. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in numbers of jobs. Note that these categories are not additive. The United States seafood industry is defined here as the commercial fishing sector, seafood processors and dealers, seafood wholesalers and distributors, importers, and seafood retailers.[16]

This report provides estimates of total economic impacts for the nation and for each of the 23 coastal states. Total economic impacts for each state and the nation represent the sum of direct impacts; indirect impacts (in this case,

[12] Monk, M. Research Statistician, Southwest Fisheries Science Center. May 29, 2019. Personal Communication.
[13] Salmon Technical Team. 2018. Review of 2017 Ocean Salmon Fisheries; Stock Assessment and Fishery Evaluation Document for the Pacific Coast Salmon Fishery Management Plan. Portland, OR. Pacific Fishery Management Council. 345. [Available at https://www.pcouncil.org/documents/2018/02/review-of-2017-ocean-salmon-fisheries.pdf/].
[14] Salmon Technical Team. 2018. Review of 2017 Ocean Salmon Fisheries; Stock Assessment and Fishery Evaluation Document for the Pacific Coast Salmon Fishery Management Plan. Portland, OR. Pacific Fishery Management Council. 345. [Available at https://www.pcouncil.org/documents/2018/02/review-of-2017-ocean-salmon-fisheries.pdf/].
[15] Summary data is available online in the FEUS webtool. [Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.]
[16] The NMFS Commercial Fishing Industry Input/Output Model was used to generate the impact estimates. [Available at: https://www.st.nmfs.noaa.gov/documents/commercial_seafood_impacts_2007-2009.pdf.]

the impact from suppliers to the seafood industry); and induced impacts (spending by employees on personal and household expenditures, where employees of both the seafood industry and its full supply chain are included). That is, the total economic impact estimates reported here measure jobs, sales, value-added, and income impacts from the seafood industry as well as the economic activity generated throughout each region's broader economy from this industry.

In 2017, the commercial fishing and seafood industry in California generated the largest employment impacts in the Pacific region with 152,508 full- and part-time jobs. California also generated the largest sales impacts ($28.8 billion), value-added impacts ($10.2 billion), and income impacts ($6.2 billion).

Landings Trends

Landings revenue in the Pacific Region declined $18.3 million (-3%) from 2016 to 2017, with each state declining 3%. In California, the sizable increase in squid landings revenue (up $29.4 million year over year) was more than offset by the decline in crab landings revenue (down $36.1 million, largely due to Dungeness crab landings revenue decline of $21.0 million). Squid is California's largest fishery by both value and volume and represented 67% of U.S. squid harvest in 2017. Squid landings increased 64% following two El Niño years, which significantly depressed landings. Strong global and domestic demand for squid buoyed prices, which were up 5% despite the increase in production and a 22% increase in squid imports. Nationally, squid exports increased 24% from 2016 to 2017. China's import of squid from the United States increased 46% in 2017 relative to the previous year. Overall, China purchased 54% of U.S. squid exports in 2017.[17]

In Oregon and Washington, the increase in Pacific hake (whiting) landings revenue from 2016 to 2017 could not offset the decline in pink shrimp landings revenue in Oregon and the decline in pink shrimp and oyster landings revenue in Washington for this time period. The decline in pink shrimp landings revenue has been attributed to a decline in landings during the latter portion of the season, which coincided with a hypoxic event off of these two states.[18]

Rockfish landings revenue was up $17.2 million (164%) in 2017 relative to 2016 levels. The recently rebuilt rockfish stocks—bocaccio, darkblotched, and canary rockfish—all showed sizable gains.

Landings Revenue

In 2017, landings revenue in the Pacific region totaled $670.7 million, a 34% increase from 2008 (a 17% increase in real terms after adjusting for inflation) and a 3% decrease from 2016. Landings revenue was highest in Washington ($277.7 million), followed by California ($209.8 million).

Shellfish landings revenue accounted for 63% of all landings revenue. In 2017, crab ($208.8 million), other shellfish ($113.6 million), and squid ($68.6 million) had the highest landings revenue in this region. Together, these top three species accounted for 58% of total landings revenue.

From 2008 to 2017, squid (158%, 125% in real terms), crab (95%, 70% in real terms), and rockfish (62%, 42% in real terms) had the largest increases, while other shellfish (-8%, -19% in real terms) and flatfish (-4%, -16% in real terms) had the largest decreases. From 2016 to 2017, squid (70%), rockfish (58%), and Pacific hake (whiting) (29%) had the largest increases, while shrimp (-38%), other shellfish (-27%), and albacore tuna (-8%) had the largest decreases.

[17] See NOAA Fisheries US Trade in Fishery Products web query tool; data accessed January 15, 2021.
[18] https://wdfw.wa.gov/sites/default/files/2019-02/newsletter_2018.pdf and https://today.oregonstate.edu/news/scientists-oregon-dodges-%E2%80%98dead-zone%E2%80%99-bullet-2017-hypoxia-season-similar-wildfire

Commercial Revenue: Largest Increases

From 2008:
- Squid (158%, 125% in real terms)
- Crab (95%, 70% in real terms)
- Rockfish (62%, 42% in real terms)

From 2016:
- Squid (70%)
- Rockfish (58%)
- Pacific hake (whiting) (29%)

Commercial Revenue: Largest Decreases

From 2008:
- Other shellfish (-8%, -19% in real terms)
- Flatfish (-4%, -16% in real terms)

From 2016:
- Shrimp (-38%)
- Other shellfish (-27%)
- Albacore tuna (-8%)

Commercial Landings: Largest Increases

From 2008:
- Rockfish (192%)
- Squid (62%)
- Pacific hake (whiting) (46%)

From 2016:
- Rockfish (164%)
- Squid (62%)
- Pacific hake (whiting) (39%)

Commercial Landings: Largest Decreases

From 2008:
- Other shellfish (-53%, -59% in real terms)
- Flatfish (-38%, -46% in real terms)
- Albacore tuna (-33%, -41% in real terms)

From 2016:
- Other shellfish (-47%)
- Shrimp (-36%)
- Albacore tuna (-29%)

Landings

In 2017, Pacific Region commercial fishermen landed over 1.2 billion pounds of finfish and shellfish. This represents an 8% increase from 2008 and a 26% increase from 2016. Pacific hake (whiting) contributed the highest landings volume in the region, accounting for 66% of total landing weight.

From 2008 to 2017, rockfish (192%), squid (62%), and Pacific hake (whiting) (46%) had the largest increases, while other shellfish (-53%), flatfish (-38%), and albacore tuna (-33%) had the largest decreases. From 2016 to 2017, rockfish (164%), squid (62%), and Pacific hake (whiting) (39%) had the largest increases, while other shellfish (-47%), shrimp (-36%), and albacore tuna (-29%) had the largest decreases.

Prices

In 2017, other shellfish ($13.85 per pound) received the highest ex-vessel price in the region. Landings of Pacific hake (whiting) ($0.08 per pound) had the lowest ex-vessel price. From 2008 to 2017, other shellfish (96%, 71% in real terms), albacore tuna (80%, 58% in real terms), and squid (60%, 40% in real terms) had the largest increases, while rockfish (-44%, -51% in real terms) and Pacific hake (whiting) (-29%, -38% in real terms) had the largest decreases. From 2016 to 2017, other shellfish (37%), albacore tuna (29%), and flatfish (9%) had the largest increases, while rockfish (-40%), salmon (-12%), and Pacific hake (whiting) (-7%) had the largest decreases.

RECREATIONAL FISHERIES — PACIFIC REGION

In this report, recreational fishing refers to fishing for leisure rather than to sell fish (commercial fishing) or for subsistence. This recreational fisheries section reports on economic impacts and expenditures, angler participation, fishing trips, and catch of key species/species groups.[19]

[19] Pacific recreational catch and effort estimates are based on multiple data sources. See data sources section.

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Key Pacific Region Recreational Species[20]

- Albacore and other tunas
- Barracuda, bass and bonito
- Croakers
- Flatfishes
- Greenlings
- Mackerel
- Rockfishes and scorpionfishes
- Salmon: Chinook salmon and coho salmon
- Sculpins
- Surfperches

Economic Impacts and Expenditures

The economic contribution of recreational fishing activities in the Pacific Region is based on spending by recreational anglers.[21] Total annual trip expenditures are estimated at the state level by multiplying mean trip expenditures by the estimated number of adult trips in each trip mode (for-hire, private boat, and shore) and adjusting by the CPI (consumer price index) to the current year. Total annual durable expenditures are estimated by multiplying mean durable expenditures in each state by the estimated annual number of adult participants for each state and adjusting by the CPI (consumer price index) to the current year.[22]

Four different measures are commonly used to show how angler expenditures affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as recreational fishing. The category includes both the direct sales made to the angler and sales made between businesses and households resulting from that original sale to the angler. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the purchases made by anglers. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in number of jobs. Note that these categories are not additive. NOAA Fisheries uses a regional impact modeling software, called IMPLAN, to estimate these four types of impacts.

The economic contributions for both trip and durable expenditures from recreational fishing in 2017 were estimated using IMPLAN version 3, with base year data from 2017. Models for each state and for the nation were created in IMPLAN using trip expenditures (based on 2016/2017 survey data on average trip expenditures and total 2017 trips) and for durable expenditures (based on 2014 survey data on average durable expenditures and 2017 participants).

The greatest employment impacts from expenditures on saltwater recreational fishing in the Pacific Region were generated in California (19,750 jobs), followed by Washington (9,533 jobs) and Oregon (3,548 jobs).The largest sales impacts were observed in California ($2.5 billion), followed by Washington ($1.2 billion) and Oregon ($364.2 million). The biggest income impacts were generated in California ($976 million), followed by Washington ($458.7 million) and Oregon ($156.6 million). The greatest value-added impacts were in California ($1.6 billion), followed by Washington ($766 million) and Oregon ($238.2 million).

Expenditures for fishing trips and durable equipment across the Pacific Region in 2017 totaled $3.1 billion. This total included $2.2 billion in durable goods expenditures, with the largest portion coming from boat expenses ($1.2 billion).

Participation

In 2017, there were 1.3 million recreational anglers who fished in the Pacific Region. This number represented a 15% decrease from 2008 and an 11% increase from 2016. The anglers are categorized as either residents from coastal (73%) or non-coastal (27%) counties.

Fishing Trips

In 2017, recreational fishermen took 5.8 million fishing trips in the Pacific Region. This number represented a 1% increase from 2008 and a 12% increase from 2016. The largest proportions of trips were taken in the shore mode (53%) and private boat (33%). States with the highest number of recorded trips in the Pacific Region were California (3.5 million trips) and Washington (1.6 million trips).

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[20] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[21] Trip expenditure estimates were generated from the 2016/2017 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2020). Durable goods expenditures were generated from the 2014 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2016). (For citations: Publications-U.S. Coastal and Marine Recreation.)
[22] Summary data is available online in the FEUS webtool. (Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.)

Harvest and Release Trends

Of the Pacific Region's key species and species groups, rockfishes and scorpionfishes (4.6 million fish), mackerel (2.2 million fish), and surfperches (2 million fish), were most frequently caught by recreational fishermen. The text box below shows the species with the largest percentage increases and decreases in the past 10 years and in the past year.

Harvest and Release: Largest Increases

From 2008:
- Albacore and other tunas (452%)
- Salmon (205%)
- Greenlings (93%)

From 2016:
- Albacore and other tunas (209%)
- Salmon (72%)
- Flatfishes (30%)

Harvest and Release: Largest Decreases

From 2008:
- Croakers (-52%)
- Sculpins (-16%)

From 2016:
- Greenlings (-15%)
- Barracuda, bass and bonito (-9%)
- Croakers (-4%)

From 2008 to 2017, albacore and other tunas (452%), salmon (205%), and greenlings (93%) had the largest increases, while croakers (-52%) and sculpins (-16%) had the largest decreases. From 2016 to 2017, albacore and other tunas (209%), salmon (72%), and flatfishes (30%) had the largest increases, while greenlings (-15%), barracuda, bass and bonito (-9%), and croakers (-4%) had the largest decreases.

MARINE ECONOMY — PACIFIC REGION

For this report, the marine economy refers to the economic activity generated by fishing and marine-related industries in a coastal state. The national marine economy consists of two industry sectors: 1) seafood sales and processing (employer establishments and non-employer firms); and 2) transport, support, and marine operations (employer establishments). These sectors include several different marine-related industries.[23,24]

To measure the size of the commercial fishing sector in a state's economy relative to the size of the commercial fishing sector in the national economy, researchers use an index called the Commercial Fishing Location Quotient (CFLQ).[25,26] The CFLQ is calculated as the ratio of the percentage of regional employment in the commercial fishing sector relative to the percentage of national employment in the commercial fishing sector. The United States CFLQ is 1. If a state CFLQ is less than 1, then less commercial fishing occurs in this state than the national average. If a state CFLQ is greater than 1, then more commercial fishing occurs in this state than the national average.

The Bureau of Labor Statistics suppressed the CFLQ value for Washington for 2016. Of the remaining states, Oregon had the highest CFLQ at 3.33. California had a CFLQ value of 0.57.

In 2016, 1.2 million employer establishments operated throughout the entire Pacific Region (including marine and non-marine related establishments). These establishments employed 18.8 million workers and had a total annual payroll of $1.1 trillion. The combined gross state product of California, Oregon, and Washington was approximately $3.4 trillion in 2016.

Seafood Sales and Processing

Seafood Product Preparation and Packaging: In 2016, the Pacific Region had 253 non-employer firms in the seafood product preparation and packaging sector (a 25% increase from 2008). Annual receipts for these firms totaled about $21.2 million (a 7% increase in real terms from 2008). There were 144 employer firms in the seafood product preparation and packaging sector (a 12% decrease from 2008). These establishments employed 7,792 workers (an 11% decrease from 2008) and had a total annual payroll of $457.8 million (a 2% increase in real terms from 2008). The greatest number of establishments in this sector was in California (256), followed by Washington (231) and Oregon (54).

National Overview | North Pacific | Pacific | Western Pacific | New England | Mid-Atlantic | South Atlantic | Gulf of Mexico

[23] Unless otherwise stated, data are from the U.S. Census Bureau. [For more information: www.census.gov.]
[24] U.S. Bureau of Economic Analysis, 'Table 1.1.5 Gross Domestic Product' and 'Table SA6N Compensation of Employees by NAICS Industry. [Available at: https://apps.bea.gov/regional/histdata/releases/0518gdpstate/.]
[25] Percentage changes in inflation adjusted (real dollar) terms are calculated using the annual Gross Domestic Product implicit price deflator published by the U.S. Bureau of Economic Analysis and the Federal Reserve Bank of St. Louis. [Available at: https://fred.stlouisfed.org/series/GDPDEF.]
[26] U.S. Bureau of Labor Statistics, 'Location Quotient Calculator.' [For more information: https://www.bls.gov/cew/about-data/location-quotients-explained.htm.]

Seafood Sales, Retail: In 2016, there were 275 non-employer firms engaged in retail sales of seafood in the states that make up the Pacific Region (a 6% increase from 2008). Annual receipts for these firms totaled about $22.7 million (a 15% decrease in real terms from 2008). There were 231 employer firms in the retail sales of seafood sector (a 2% increase from 2008). These establishments employed 1,742 workers (a 28% increase from 2008) and had a total annual payroll of $48 million (a 34% increase in real terms from 2008). The greatest number of establishments in this sector was in California (570), followed by Washington (107) and Oregon (60).

Seafood Sales, Wholesale: There were 518 employer firms in the wholesale sales of seafood sector in the Pacific Region in 2016 (a 29% increase from 2008). These establishments employed 5,579 workers, and had a total annual payroll of $282.8 million.[27] The greatest number of establishments in this sector was in California (371), followed by Washington (120) and Oregon (27).

Transport, Support, and Marine Operations

Data for the transport, support, and marine operations sector of Pacific Region's economy were largely suppressed for confidentiality reasons. It is clear, however, that these sectors play an important role in the regional economy. For example, in 2016, the ship and boat building sector in the Pacific Region accounted for $901.2 million in payroll (a 16% decrease in real terms from 2008).

[27] The Census Bureau suppressed number of employees and payroll data for this sector in one or more states in the this region in either 2016 or 2008, and thus cannot be compared.

Tables | Pacific Region

2017 Economic Impacts of the Pacific Seafood Industry (jobs, thousands of dollars)[1]

		With Imports				Without Imports			
	Landings Revenue	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
California	209,846	152,508	28,832,650	6,157,762	10,246,589	14,188	1,191,943	447,758	616,143
Oregon	147,058	15,803	1,357,124	439,829	631,161	13,026	775,319	320,793	430,857
Washington	277,740	64,017	9,290,973	2,411,092	3,708,329	20,051	1,490,096	610,753	830,633

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	500,447	501,938	566,579	729,785	674,465	814,834	776,098	557,669	688,918	670,651
Finfish & Other	218,718	170,610	206,161	267,963	252,144	282,370	265,357	203,535	227,249	249,978
Shellfish	281,729	331,327	360,418	461,821	422,321	532,464	510,742	354,134	461,669	420,673
Key Species										
Albacore tuna	28,845	27,541	28,780	43,347	45,827	41,930	32,792	29,387	37,744	34,875
Crab	107,107	123,865	132,843	182,085	176,880	249,579	199,222	105,053	216,733	208,778
Flatfish	18,016	16,716	12,828	13,377	13,492	17,417	15,664	16,751	17,791	17,250
Other shellfish	122,905	133,940	134,460	172,541	141,221	166,551	177,487	137,035	156,483	113,633
Pacific hake (whiting)	58,492	14,104	27,316	52,869	47,054	61,321	58,630	24,109	46,639	60,373
Rockfish	9,257	8,974	9,226	9,446	9,421	9,872	9,820	10,531	9,526	15,031
Sablefish	27,279	34,481	35,977	44,873	28,108	19,559	24,178	28,719	31,346	33,573
Salmon	27,548	25,549	49,534	54,267	48,197	77,754	71,416	48,157	40,453	42,330
Shrimp	25,132	16,594	21,941	40,638	40,326	42,614	61,100	87,556	48,139	29,627
Squid	26,585	56,928	71,173	66,557	63,894	73,720	72,932	24,491	40,315	68,636

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	1,091,673	899,043	1,065,499	1,176,780	1,070,065	1,255,594	1,208,811	747,113	937,751	1,177,043
Finfish & Other	908,242	583,273	652,515	758,522	721,080	850,058	816,757	526,113	719,615	935,607
Shellfish	183,431	315,771	412,984	418,258	348,985	405,537	392,053	221,000	218,136	241,436
Key Species										
Albacore tuna	24,507	27,055	25,477	24,284	30,638	28,471	27,247	24,821	23,010	16,431
Crab	45,075	59,158	61,668	66,518	52,860	87,157	52,133	22,745	62,945	60,570
Flatfish	37,852	41,192	33,785	25,959	24,779	29,106	24,188	24,861	26,508	23,618
Other shellfish	17,357	17,513	16,446	17,072	14,819	16,509	17,107	11,805	15,466	8,206
Pacific hake (whiting)	531,277	253,053	355,216	496,363	347,171	505,614	574,921	333,290	558,047	773,885
Rockfish	9,469	10,458	11,038	9,910	10,406	10,794	10,720	11,913	10,489	27,665
Sablefish	12,978	15,822	15,055	14,139	11,580	9,159	9,633	11,377	11,799	12,194
Salmon	19,503	34,132	31,107	42,224	24,619	56,892	37,187	26,134	18,757	22,376
Shrimp	35,799	33,456	46,191	66,686	66,319	71,505	93,150	105,324	55,017	35,019
Squid	85,200	205,643	288,678	267,983	214,988	230,365	229,664	81,127	84,708	137,641

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Albacore tuna	1.18	1.02	1.13	1.78	1.50	1.47	1.20	1.18	1.64	2.12
Crab	2.38	2.09	2.15	2.74	3.35	2.86	3.82	4.62	3.44	3.45
Flatfish	0.48	0.41	0.38	0.52	0.54	0.60	0.65	0.67	0.67	0.73
Other shellfish	7.08	7.65	8.18	10.11	9.53	10.09	10.38	11.61	10.12	13.85
Pacific hake (whiting)	0.11	0.06	0.08	0.11	0.14	0.12	0.10	0.07	0.08	0.08
Rockfish	0.98	0.86	0.84	0.95	0.91	0.91	0.92	0.88	0.91	0.54
Sablefish	2.10	2.18	2.39	3.17	2.43	2.14	2.51	2.52	2.66	2.75
Salmon	1.41	0.75	1.59	1.29	1.96	1.37	1.92	1.84	2.16	1.89
Shrimp	0.70	0.50	0.48	0.61	0.61	0.60	0.66	0.83	0.87	0.85
Squid	0.31	0.28	0.25	0.25	0.30	0.32	0.32	0.30	0.48	0.50

[1] The Pacific Region includes landings by Pacific at-sea processors. However, revenue from these landings are not included in the state tables.

2017 Economic Impacts of the Pacific Recreational Fishing Expenditures (thousands of dollars, trips)

	Trips	#Jobs	Sales	Income	Value Added
California	3,542	19,750	2,483,373	976,025	1,567,340
Oregon	693	3,548	364,171	156,642	238,219
Washington	1,608	9,533	1,198,318	458,671	766,018

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	275,797	Fishing Tackle	506,447
Private Boat	391,418	Other Equipment	255,408
Shore	249,523	Boat Expenses	1,163,688
Total	916,739	Vehicle Expenses	290,592
		Second Home Expenses	4,327
		Total Durable Expenditures	2,220,464
Total State Trip and Durable Goods Expenditures			3,137,203

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	1,183	1,203	1,297	1,193	1,056	1,382	1,307	1,236	849	966
Non-Coastal	358	336	371	382	346	384	429	426	332	350
Total Anglers	1,541	1,539	1,668	1,575	1,402	1,766	1,736	1,662	1,181	1,316

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	415	442	457	681	689	753	1,085	881	759	784
Private	1,517	2,114	1,726	1,832	1,972	2,070	1,991	1,876	1,341	1,940
Shore	3,859	4,345	3,770	3,791	4,973	4,859	4,352	3,131	3,123	3,119
Total Trips	5,791	6,901	5,953	6,304	7,634	7,682	7,427	5,888	5,223	5,843

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Albacore and other tunas	H	59	90	80	54	151	108	188	272	109	338
	R	2	2	< 1	< 1	2	1	4	8	< 1	1
Barracuda, bass and bonito	H	411	387	389	425	354	153	384	367	276	254
	R	1,127	1,236	998	747	792	1,173	1,727	1,277	1,674	1,515
Croakers	H	355	499	248	132	302	201	168	110	151	151
	R	242	290	270	93	185	229	148	123	148	136
Flatfishes	H	368	367	416	607	559	711	992	404	357	386
	R	351	250	277	221	295	453	341	241	200	340
Greenlings	H	164	178	194	276	309	362	393	458	419	379
	R	137	172	199	288	294	268	261	255	261	203
Mackerel	H	1,908	1,357	1,176	1,108	836	573	1,017	1,681	1,010	1,419
	R	827	664	581	532	409	332	728	533	591	772
Rockfishes and scorpionfishes	H	1,935	2,230	2,223	2,904	3,448	3,904	4,045	3,884	3,483	3,665
	R	367	386	466	576	652	903	838	788	734	892
Salmon	H	47	243	111	143	224	236	356	189	84	144
	R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sculpins	H	68	59	52	95	70	66	60	62	58	53
	R	218	198	199	234	226	300	200	187	180	187
Surfperches	H	937	788	721	1,075	1,279	1,060	1,244	1,477	1,072	1,126
	R	714	670	383	874	1,144	979	1,162	1,072	681	861

[1] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[2] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[3] 'NA' = not available.

Tables | California

2017 Economic Impacts of the California Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	152,508	28,832,650	6,157,762	10,246,589	14,188	1,191,943	447,758	616,143
Commercial Harvesters	3,917	423,090	144,567	212,334	3,917	423,090	144,567	212,334
Seafood Processors & Dealers	5,246	614,206	227,752	302,205	1,622	189,904	70,418	93,438
Importers	69,369	21,847,058	3,501,408	6,659,940	0	0	0	0
Seafood Wholesalers & Distributors	13,732	2,216,363	718,878	1,004,322	556	89,742	29,108	40,666
Retail	60,245	3,731,934	1,565,157	2,067,789	8,093	489,207	203,666	269,706

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	120,861	159,253	187,263	222,160	243,963	266,488	253,768	129,143	216,139	209,846
Finfish & Other	48,671	47,738	45,558	59,289	57,103	66,416	61,163	54,526	50,101	53,850
Shellfish	72,190	111,515	141,704	162,871	186,860	200,071	192,605	74,617	166,038	155,996
Key Species	-	-	-	-	-	-	-	-	-	-
Crab	24,227	32,508	43,016	53,762	88,207	91,851	70,563	20,467	85,620	49,498
Pacific sardine	7,575	5,544	4,366	4,398	4,249	1,510	2,003	343	95	61
Rockfish	5,781	5,330	5,453	5,644	5,170	5,748	5,604	5,797	5,400	6,812
Sablefish	6,224	9,765	11,491	15,121	8,988	7,047	8,945	8,870	8,804	9,039
Salmon	6	NA	1,215	5,096	12,850	22,957	12,127	8,058	5,277	4,794
Sea urchins	6,550	7,806	7,413	8,102	8,320	9,832	9,057	6,879	7,269	6,373
Shrimp	5,696	5,462	4,951	8,598	8,492	9,520	11,791	13,769	11,107	9,644
Spiny lobster	8,008	7,934	11,386	12,972	13,749	13,842	18,238	15,806	13,731	13,333
Squid	26,477	56,877	71,165	66,546	63,886	73,701	72,903	24,458	39,194	68,635
Swordfish	2,365	1,932	2,203	3,350	2,090	2,699	3,049	3,628	3,717	3,890

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	323,884	376,053	439,440	409,837	353,875	364,790	361,290	186,418	176,403	214,663
Finfish & Other	224,763	148,478	120,700	108,999	102,261	90,128	98,771	89,788	59,908	56,768
Shellfish	99,121	227,575	318,740	300,838	251,614	274,661	262,518	96,630	116,495	157,896
Key Species	-	-	-	-	-	-	-	-	-	-
Crab	9,845	16,660	23,352	22,206	27,589	33,094	20,888	5,412	28,135	14,288
Pacific sardine	126,945	82,842	73,814	60,993	50,660	15,636	17,112	3,724	913	744
Rockfish	3,933	3,984	3,949	3,450	3,457	3,862	3,555	3,239	2,530	3,200
Sablefish	3,507	5,089	5,501	5,646	3,916	3,291	3,960	4,033	3,858	3,816
Salmon	1	NA	255	1,133	2,862	4,337	2,558	1,339	709	568
Sea urchins	10,283	12,205	11,230	11,465	11,443	12,945	11,833	8,106	5,885	4,183
Shrimp	3,011	3,596	4,522	8,217	7,255	9,712	9,873	9,443	4,818	4,443
Spiny lobster	741	706	716	751	876	764	951	768	680	703
Squid	84,071	205,278	288,497	267,890	214,867	230,061	229,466	80,968	81,751	137,483
Swordfish	1,168	898	815	1,365	887	1,174	1,252	1,358	1,364	1,482

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Crab	2.46	1.95	1.84	2.42	3.20	2.78	3.38	3.78	3.04	3.46
Pacific sardine	0.06	0.07	0.06	0.07	0.08	0.10	0.12	0.09	0.10	0.08
Rockfish	1.47	1.34	1.38	1.64	1.50	1.49	1.58	1.79	2.13	2.13
Sablefish	1.77	1.92	2.09	2.68	2.29	2.14	2.26	2.20	2.28	2.37
Salmon	4.16	NA	4.76	4.50	4.49	5.29	4.74	6.02	7.44	8.44
Sea urchins	0.64	0.64	0.66	0.71	0.73	0.76	0.77	0.85	1.24	1.52
Shrimp	1.89	1.52	1.09	1.05	1.17	0.98	1.19	1.46	2.31	2.17
Spiny lobster	10.80	11.24	15.91	17.27	15.69	18.11	19.17	20.59	20.19	18.96
Squid	0.31	0.28	0.25	0.25	0.30	0.32	0.32	0.30	0.48	0.50
Swordfish	2.03	2.15	2.70	2.46	2.36	2.30	2.44	2.67	2.72	2.62

[1] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of California Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	3,264	366,220	140,152	224,213
	Private Boat	895	140,953	46,545	88,474
	Shore	2,152	287,571	102,841	185,787
Total Durable Expenditures		13,439	1,688,629	686,487	1,068,866
Total State Economic Impacts		19,750	2,483,373	976,025	1,567,340

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	211,542	Fishing Tackle	357,031
Private Boat	93,861	Other Equipment	177,628
Shore	183,361	Boat Expenses	568,641
Total	488,765	Vehicle Expenses	179,852
		Second Home Expenses	0
		Total Durable Expenditures	1,283,153
Total State Trip and Durable Goods Expenditures			1,771,918

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	913	812	992	863	722	1,024	964	893	591	576
Non-Coastal	215	177	220	230	190	222	264	263	182	189
Out-of-State	82	206	221	183	215	87	94	121	96	77
Total Anglers	1,210	1,195	1,433	1,276	1,127	1,333	1,322	1,277	869	842

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	305	308	334	554	557	613	929	727	632	636
Private	640	681	690	683	800	786	785	676	522	533
Shore	3,113	3,599	3,024	3,045	4,227	4,113	3,606	2,385	2,377	2,373
Total Trips	4,058	4,588	4,048	4,282	5,585	5,512	5,320	3,787	3,531	3,542

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2,3,4]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Albacore and other tunas	H	13	23	11	9	37	32	65	158	24	291
	R	2	2	< 1	< 1	2	1	4	8	< 1	1
Barracuda, bass and bonito[5]	H	411	387	389	425	354	153	384	367	276	254
	R	1,127	1,236	998	747	792	1,173	1,727	1,277	1,674	1,515
Croakers	H	355	499	248	132	302	201	168	110	151	151
	R	242	290	270	93	185	229	148	123	148	136
Flatfishes	H	298	300	351	541	490	640	921	333	280	295
	R	303	199	231	175	248	405	294	193	153	293
Greenlings	H	48	63	60	123	143	176	229	286	250	197
	R	53	84	92	169	183	160	169	153	156	110
Mackerel	H	1,907	1,357	1,176	1,108	835	572	1,016	1,681	1,010	1,419
	R	827	664	581	532	409	331	728	532	591	772
Rockfishes and scorpion-fishes	H	1,445	1,670	1,639	2,379	2,871	3,229	3,326	3,000	2,650	2,869
	R	311	320	383	506	583	823	752	674	635	760
Salmon[6,7]	H	< 1	< 1	15	50	124	116	75	38	38	62
	R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sculpins	H	37	27	19	62	39	37	32	34	30	19
	R	69	50	47	82	74	147	48	35	29	33
Surfperches	H	685	537	470	823	1,027	809	992	1,226	817	871
	R	554	510	223	714	984	819	1,002	912	520	700

[1] Pacific recreational catch and effort estimates are based on multiple data sources. See data sources section.
[2] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[3] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[4] 'NA' = not available.
[5] This species may not be equivalent to species with similar names listed in the commercial tables.
[6] Salmon include Chinook salmon and coho salmon.
[7] Salmon harvest estimates exclude release mortality.

2016 California State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
3,277,415 (13.2%)	922,477 (11.9%)	14,600,349 (11.5%)	887 (13.8%)	1,378 (13.8%)	2,667	0.57

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	139	159	184	187	151	157	164	169	174
	Receipts	11,460	10,852	9,695	9,788	9,283	9,866	11,112	12,978	14,725
Seafood sales, retail	Firms	210	202	203	209	236	218	227	221	228
	Receipts	19,892	17,095	19,021	18,006	18,238	18,581	17,055	17,896	19,375

Seafood Sales and Processing — Employer Establishments (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	45	47	48	48	41	44	53	48	41
	Employees	2,024	2,167	1,820	1,842	1,668	1,871	1,799	1,661	1,549
	Payroll	65,215	69,529	62,480	60,411	52,977	57,603	60,762	59,829	64,374
Seafood sales, wholesale	Establishments	278	289	314	404	275	320	341	349	371
	Employees	3,321	3,183	3,223	3,505	3,441	3,671	3,912	4,170	4,250
	Payroll	132,139	128,813	137,810	149,302	173,959	181,698	175,927	201,903	212,079
Seafood sales, retail	Establishments	161	153	158	157	149	155	167	170	171
	Employees	932	976	985	1,088	1,043	1,119	1,124	1,208	1,272
	Payroll	20,585	21,785	22,718	25,168	24,221	26,702	28,044	28,437	31,722

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	136	123	117	108	120	113	108	103	104
	Employees	11,630	10,483	9,720	9,165	12,681	12,651	9,814	11,379	11,236
	Payroll	477,300	460,239	448,338	434,449	544,819	537,438	534,787	583,717	548,198
Deep Sea Freight Transportation	Establishments	43	41	54	51	45	34	43	56	45
	Employees	ds	ds	2,562	2,464	2,431	2,073	2,467	2,554	2,399
	Payroll	ds	ds	236,235	256,962	236,423	218,054	187,383	235,546	230,946
Deep Sea Passenger Transportation	Establishments	5	5	3	2	2	4	5	6	7
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	0
Coastal and Great Lakes Freight Transportation	Establishments	28	30	25	21	22	24	30	34	32
	Employees	ds	ds	554	395	ds	ds	ds	851	759
	Payroll	ds	ds	30,431	24,708	ds	ds	ds	70,978	62,151
Port and Harbor Operations	Establishments	17	19	21	19	59	31	33	30	30
	Employees	256	345	435	508	ds	651	535	570	742
	Payroll	23,316	26,889	37,560	41,688	ds	52,401	33,599	40,887	46,859
Marine Cargo Handling	Establishments	61	62	63	71	38	64	64	67	70
	Employees	22,086	17,428	18,449	18,812	18,759	ds	ds	18,859	20,694
	Payroll	1,453,281	1,211,572	1,273,268	1,333,805	1,351,874	ds	ds	1,761,284	1,898,249
Navigational Services to Shipping	Establishments	40	39	41	45	35	36	37	38	37
	Employees	815	804	765	760	800	805	634	587	1,221
	Payroll	65,225	61,720	58,899	62,065	61,166	67,665	59,927	60,228	68,514
Marinas	Establishments	277	276	270	269	251	250	249	258	243
	Employees	2,652	2,514	2,390	2,401	2,237	2,199	2,332	2,439	2,432
	Payroll	85,315	78,890	80,631	82,958	71,777	72,737	79,840	84,427	86,510

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.

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2017 Economic Impacts of the Oregon Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	15,803	1,357,124	439,829	631,161	13,026	775,319	320,793	430,857
Commercial Harvesters	4,546	279,594	115,806	163,240	4,546	279,594	115,806	163,240
Seafood Processors & Dealers	1,813	175,848	67,536	88,240	1,297	125,782	48,308	63,117
Importers	1,482	466,665	74,792	142,260	0	0	0	0
Seafood Wholesalers & Distributors	681	92,989	31,545	42,310	392	53,600	18,183	24,388
Retail	7,281	342,027	150,149	195,111	6,790	316,344	138,496	180,113

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	103,042	106,959	106,378	148,354	128,222	179,215	158,080	113,990	151,707	147,058
Finfish & Other	56,912	52,750	58,730	76,718	72,329	81,445	78,214	60,860	64,925	71,673
Shellfish	46,130	54,210	47,648	71,636	55,893	97,770	79,866	53,130	86,782	75,385
Key Species	-	-	-	-	-	-	-	-	-	
Albacore tuna	10,666	10,191	12,425	18,766	15,168	16,085	11,023	9,212	12,502	10,803
Crab	29,168	42,413	32,757	44,696	29,189	71,208	48,149	11,935	55,737	58,728
Flatfish	9,163	8,468	6,861	6,779	7,315	9,854	8,651	9,765	10,716	10,418
Oysters	2,748	4,506	3,317	1,869	1,661	1,798	1,774	NA	3,615	3,102
Pacific hake (whiting)	6,830	3,783	5,414	16,518	14,611	20,405	18,274	7,146	8,601	16,369
Pacific sardine	5,665	5,291	5,252	3,192	8,979	6,299	3,522	813	0	NA
Rockfish	2,610	2,500	2,520	2,473	2,661	3,023	3,246	3,744	3,589	7,419
Sablefish	13,737	15,919	15,069	17,351	11,530	7,595	8,076	12,807	15,086	15,508
Salmon	4,166	3,546	7,698	6,737	6,950	12,422	20,115	11,864	8,311	5,549
Shrimp	14,056	6,994	11,313	24,901	24,848	24,430	29,605	40,634	25,245	12,859

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	195,688	199,458	201,974	274,533	296,091	339,589	291,655	194,575	209,486	296,485
Finfish & Other	155,837	154,147	153,588	208,445	237,822	265,454	227,318	138,601	153,909	253,358
Shellfish	39,851	45,310	48,386	66,088	58,269	74,136	64,337	55,974	55,578	43,127
Key Species	-	-	-	-	-	-	-	-	-	-
Albacore tuna	8,876	10,082	10,703	9,682	9,938	10,209	8,767	7,574	7,250	4,744
Crab	13,875	21,848	15,817	17,240	8,681	26,016	11,910	2,284	15,702	18,965
Flatfish	23,842	26,047	22,226	15,957	15,322	18,965	15,955	16,722	18,640	18,380
Oysters	162	1,127	829	467	415	449	443	NA	743	560
Pacific hake (whiting)	55,511	53,466	57,017	142,092	102,651	160,098	161,589	88,728	98,003	198,643
Pacific sardine	49,298	45,902	44,743	23,479	91,459	57,022	16,938	4,688	2	NA
Rockfish	3,820	4,207	4,533	3,819	3,918	4,745	5,293	6,628	6,324	19,680
Sablefish	6,514	7,219	6,269	5,074	4,739	3,840	3,293	5,002	5,502	5,490
Salmon	1,860	2,311	2,765	2,386	1,918	3,505	6,373	3,142	1,838	1,190
Shrimp	25,433	22,085	31,516	48,276	49,054	47,535	51,835	53,457	35,344	23,079

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Albacore tuna	1.20	1.01	1.16	1.94	1.53	1.58	1.26	1.22	1.72	2.28
Crab	2.10	1.94	2.07	2.59	3.36	2.74	4.04	5.22	3.55	3.10
Flatfish	0.38	0.33	0.31	0.42	0.48	0.52	0.54	0.58	0.57	0.57
Oysters	16.96	4.00	4.00	4.00	4.00	4.00	4.00	NA	4.87	5.53
Pacific hake (whiting)	0.12	0.07	0.09	0.12	0.14	0.13	0.11	0.08	0.09	0.08
Pacific sardine	0.11	0.12	0.12	0.14	0.10	0.11	0.21	0.17	0.18	NA
Rockfish	0.68	0.59	0.56	0.65	0.68	0.64	0.61	0.56	0.57	0.38
Sablefish	2.11	2.21	2.40	3.42	2.43	1.98	2.45	2.56	2.74	2.82
Salmon	2.24	1.53	2.78	2.82	3.62	3.54	3.16	3.78	4.52	4.66
Shrimp	0.55	0.32	0.36	0.52	0.51	0.51	0.57	0.76	0.71	0.56

[1] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of Oregon Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	414	38,671	13,597	22,904
	Private Boat	720	73,733	30,371	46,868
	Shore	256	25,803	10,342	16,107
Total Durable Expenditures		2,158	225,964	102,332	152,340
Total State Economic Impacts		3,548	364,171	156,642	238,219

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	25,117	Fishing Tackle	50,323
Private Boat	65,026	Other Equipment	28,045
Shore	21,697	Boat Expenses	83,900
Total	111,840	Vehicle Expenses	64,924
		Second Home Expenses	4,327
		Total Durable Expenditures	231,520
Total State Trip and Durable Goods Expenditures			343,360

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	79	85	83	82	86	90	92	90	86	87
Non-Coastal	121	129	126	125	129	134	137	135	129	130
Out-of-State	14	15	15	15	15	16	16	16	15	15
Total Anglers	214	229	224	222	230	240	245	241	230	232

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	48	55	51	51	57	64	67	71	63	65
Private	357	402	385	380	402	424	440	416	388	395
Shore	233	233	233	233	233	233	233	233	233	233
Total Trips	638	690	669	664	692	721	740	720	684	693

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2,3,4]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Albacore tuna	H	24	42	38	29	63	22	48	35	37	16
	R	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Baitfishes	H	221	221	223	221	220	220	221	221	220	220
	R	125	125	125	125	125	125	125	125	125	125
Flatfishes	H	20	16	14	15	17	18	15	17	18	33
	R	8	9	5	5	5	6	5	5	6	6
Greenlings	H	92	90	99	108	120	142	119	130	114	128
		70	72	82	88	85	90	74	85	84	81
Rockfishes[5]	H	266	317	332	251	278	361	376	516	443	503
	R	30	36	44	34	33	42	42	75	56	89
Salmon[6,7]	H	14	91	23	24	35	45	118	38	13	26
	R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sculpins	H	16	16	16	16	15	14	12	13	13	18
	R	58	58	61	61	61	63	60	60	61	63
Sturgeon	H	12	12	12	12	12	12	12	12	12	12
	R	25	25	25	25	25	25	25	25	25	25
Surfperches	H	118	118	118	118	118	118	118	118	118	118
	R	39	39	39	39	39	39	39	39	39	39

[1] Pacific recreational catch and effort estimates are based on multiple data sources. See data sources section.
[2] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[3] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[4] 'NA' = not available.
[5] This species may not be equivalent to species with similar names listed in the commercial tables.
[6] Salmon include Chinook salmon and coho salmon.
[7] Salmon harvest estimates exclude release mortality.

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2016 Oregon State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
286,538 (1.2%)	114,551 (1.5%)	1,551,192 (1.2%)	74.1 (1.2%)	118 (1.2%)	231	3.33

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	19	15	15	16	14	11	11	12	14
	Receipts	957	466	510	467	346	319	484	1,088	1,776
Seafood sales, retail	Firms	16	12	15	16	11	ds	16	15	14
	Receipts	2,101	1,140	1,907	1,896	1,600	ds	1,036	841	1,379

Seafood Sales and Processing — Employer Establishments (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	23	20	21	22	18	19	20	20	20
	Employees	850	812	806	805	934	907	980	916	989
	Payroll	27,616	26,202	27,007	32,438	31,970	37,265	39,290	41,181	42,832
Seafood sales, wholesale	Establishments	18	19	22	27	21	19	22	24	27
	Employees	ds	ds	ds	ds	180	189	192	196	187
	Payroll	ds	ds	ds	ds	7,602	8,065	8,601	9,121	9,892
Seafood sales, retail	Establishments	21	23	21	20	18	20	23	25	23
	Employees	178	151	162	163	126	147	170	181	174
	Payroll	3,370	3,515	3,651	3,613	2,851	4,238	4,440	4,951	5,239

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	41	35	34	34	33	32	30	29	26
	Employees	1,692	1,886	980	1,179	1,504	1,406	ds	1,506	1,278
	Payroll	74,583	90,446	42,004	55,068	77,718	79,913	ds	94,956	83,079
Deep Sea Freight Transportation	Establishments	4	3	3	3	3	3	2	3	2
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	0
Coastal and Great Lakes Freight Transportation	Establishments	8	9	8	8	8	7	8	8	12
	Employees	ds	ds	ds	ds	ds	ds	ds	437	506
	Payroll	ds	ds	ds	ds	ds	ds	ds	40,746	47,896
Port and Harbor Operations	Establishments	1	1	3	3	10	5	5	5	5
	Employees	ds	ds	ds	ds	90	ds	ds	49	45
	Payroll	ds	ds	ds	ds	6,512	ds	ds	3,437	2,686
Marine Cargo Handling	Establishments	13	13	12	13	5	8	7	7	6
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	0
Navigational Services to Shipping	Establishments	20	17	18	18	20	15	15	15	17
	Employees	200	189	144	152	176	81	67	74	69
	Payroll	11,808	10,154	9,577	9,592	12,219	6,534	3,958	3,998	4,789
Marinas	Establishments	37	33	30	33	32	34	34	36	35
	Employees	106	109	102	102	119	104	113	119	137
	Payroll	2,178	2,602	2,290	2,382	3,034	3,148	3,584	3,643	3,550

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.

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2017 Economic Impacts of the Washington Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	64,017	9,290,973	2,411,092	3,708,329	20,051	1,490,096	610,753	830,633
Commercial Harvesters	5,818	556,076	231,772	330,152	5,818	556,076	231,772	330,152
Seafood Processors & Dealers	17,742	1,925,187	723,072	956,875	2,195	238,215	89,470	118,400
Importers	16,894	5,320,487	852,709	1,621,917	0	0	0	0
Seafood Wholesalers & Distributors	2,738	401,588	134,548	183,568	730	107,039	35,862	48,928
Retail	20,825	1,087,636	468,990	615,817	11,307	588,766	253,649	333,153

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	232,841	227,773	255,332	329,785	275,585	335,450	329,109	299,952	287,543	277,740
Finfish & Other	69,445	62,173	84,269	102,481	96,026	100,844	90,855	73,583	78,694	88,448
Shellfish	163,396	165,600	171,063	227,305	179,560	234,606	238,254	226,368	208,849	189,292
Key Species	-	-	-	-	-	-	-	-	-	
Albacore tuna	17,225	16,390	14,575	22,253	28,440	24,745	21,177	19,961	24,769	23,494
Clams	64,142	72,647	73,625	88,774	69,445	83,788	83,643	75,342	82,882	67,021
Crab	53,712	48,944	57,070	83,627	59,485	86,520	80,509	72,651	75,376	100,553
Halibut	7,525	4,879	5,764	6,740	6,122	4,929	6,985	6,199	6,896	6,795
Mussels	5,293	4,851	4,318	4,740	6,065	9,253	6,830	7,704	6,452	2,465
Oysters	34,794	34,993	30,370	43,021	37,576	46,378	47,555	37,507	32,353	12,125
Pacific hake (whiting)	7,249	2,334	4,105	7,183	5,882	7,452	5,431	2,563	4,509	7,996
Sablefish	7,312	8,796	9,402	12,378	7,578	4,888	7,098	7,020	7,456	9,025
Salmon	23,376	22,003	40,622	42,434	28,398	42,376	39,174	28,235	26,866	31,987
Shrimp	5,380	4,139	5,677	7,140	6,986	8,664	19,704	33,152	11,786	7,124

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	173,176	163,937	189,486	210,282	213,578	263,639	191,391	153,568	168,136	215,976
Finfish & Other	128,825	121,060	143,705	159,034	174,597	207,194	126,364	85,300	122,279	175,718
Shellfish	44,351	42,877	45,782	51,248	38,982	56,445	65,027	68,268	45,856	40,258
Key Species	-	-	-	-	-	-	-	-	-	-
Albacore tuna	14,801	16,112	13,148	13,209	19,275	17,552	18,039	17,133	15,500	11,421
Clams	4,071	4,267	3,876	4,038	3,677	3,978	4,320	4,262	3,355	2,126
Crab	21,355	20,651	22,500	27,072	16,590	28,046	19,335	15,048	19,109	27,317
Halibut	2,055	1,731	1,371	1,301	1,295	1,065	1,284	1,157	1,370	1,433
Mussels	593	568	589	547	559	734	579	600	2,790	227
Oysters	10,258	9,386	8,650	9,389	8,143	9,420	9,329	5,911	5,748	3,071
Pacific hake (whiting)	67,159	36,378	58,900	73,494	38,524	58,696	49,654	32,977	77,808	128,888
Sablefish	2,954	3,514	3,277	3,410	2,916	2,006	2,345	2,317	2,391	2,661
Salmon	17,641	31,821	28,086	38,706	19,839	49,050	28,256	21,654	16,211	20,618
Shrimp	7,355	7,775	10,153	10,193	10,009	14,259	31,441	42,423	14,855	7,496

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Albacore tuna	1.16	1.02	1.11	1.68	1.48	1.41	1.17	1.17	1.60	2.06
Clams	15.76	17.03	18.99	21.98	18.89	21.06	19.36	17.68	24.70	31.53
Crab	2.52	2.37	2.54	3.09	3.59	3.08	4.16	4.83	3.94	3.68
Halibut	3.66	2.82	4.20	5.18	4.73	4.63	5.44	5.36	5.03	4.74
Mussels	8.93	8.54	7.33	8.66	10.85	12.60	11.79	12.85	2.31	10.88
Oysters	3.39	3.73	3.51	4.58	4.61	4.92	5.10	6.34	5.63	3.95
Pacific hake (whiting)	0.11	0.06	0.07	0.10	0.15	0.13	0.11	0.08	0.06	0.06
Sablefish	2.48	2.50	2.87	3.63	2.60	2.44	3.03	3.03	3.12	3.39
Salmon	1.33	0.69	1.45	1.10	1.43	0.86	1.39	1.30	1.66	1.55
Shrimp	0.73	0.53	0.56	0.70	0.70	0.61	0.63	0.78	0.79	0.95

2017 Economic Impacts of Washington Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	606	63,000	21,720	37,514
	Private Boat	2,133	310,044	101,224	185,541
	Shore	480	61,608	21,650	39,028
Total Durable Expenditures		6,314	763,666	314,077	503,935
Total State Economic Impacts		9,533	1,198,318	458,671	766,018

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	39,138	Fishing Tackle	99,093
Private Boat	232,531	Other Equipment	49,735
Shore	44,465	Boat Expenses	511,147
Total	316,134	Vehicle Expenses	45,816
		Second Home Expenses	0
		Total Durable Expenditures	705,791
Total State Trip and Durable Goods Expenditures			1,021,925

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	191	306	222	248	248	268	251	253	172	303
Non-Coastal	22	30	25	27	27	28	28	28	21	31
Out-of-State	17	24	19	21	21	22	22	22	17	24
Total Anglers	230	360	266	296	296	318	301	303	210	358

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	62	79	72	76	75	76	88	83	64	83
Private	520	1,031	651	770	770	860	766	784	431	1,012
Shore	513	513	513	513	513	513	513	513	513	513
Total Trips	1,095	1,623	1,236	1,358	1,358	1,449	1,367	1,381	1,008	1,608

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2,3,4]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Albacore tuna	H	22	25	31	15	51	54	75	79	47	30
	R	< 1	0	< 1	0	0	< 1	< 1	< 1	< 1	< 1
Baitfishes	H	2,486	2,486	2,486	2,486	2,486	2,486	2,486	2,486	2,486	2,486
	R	126	126	126	126	126	126	126	126	126	126
Flatfishes	H	50	51	50	51	52	53	55	54	59	58
	R	40	42	41	41	41	42	42	42	42	41
Greenlings	H	24	26	35	46	46	44	45	42	56	54
	R	14	16	25	31	25	19	18	17	21	12
Rockfishes[5]	H	179	198	208	229	253	268	298	322	345	247
	R	9	13	22	18	18	21	26	23	25	26
Salmon[6,7]	H	34	151	73	69	65	75	163	114	33	56
	R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sculpins	H	15	16	16	17	16	16	16	16	16	16
	R	91	91	91	91	91	91	91	91	91	91
Sharks and skates	H	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
	R	7	5	3	1	3	2	4	4	3	3
Sturgeon[8]	H	0	0	0	0	0	0	0	0	0	0
	R	0	0	0	0	0	0	0	0	0	0
Surfperches	H	134	133	133	133	134	134	134	133	137	137
	R	121	121	121	121	121	121	121	121	123	122

[1] Pacific recreational catch and effort estimates are based on multiple data sources. See data sources section.
[2] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[3] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[4] 'NA' = not available.
[5] This species may not be equivalent to species with similar names listed in the commercial tables.
[6] Salmon include Chinook salmon and coho salmon.
[7] Salmon harvest estimates exclude release mortality.
[8] Sturgeon harvest data is not available for some years.

2016 Washington State Economy (% of national total)[1]

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[2]
459,590 (1.9%)	186,164 (2.4%)	2,685,355 (2.1%)	157 (2.4%)	250 (2.5%)	489	ds

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	44	47	39	37	42	42	51	59	65
	Receipts	5,167	5,022	4,228	3,859	4,377	4,094	5,270	3,555	4,697
Seafood sales, retail	Firms	33	42	30	34	42	41	36	35	33
	Receipts	1,807	2,462	1,273	2,370	1,871	3,017	2,559	2,071	1,991

Seafood Sales and Processing — Employer Establishments (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	96	86	93	90	90	86	90	85	83
	Employees	5,893	4,860	5,296	5,387	6,118	6,224	5,945	5,753	5,254
	Payroll	306,213	232,543	254,592	293,112	326,827	315,379	329,739	325,389	350,599
Seafood sales, wholesale	Establishments	107	108	105	107	101	116	119	118	120
	Employees	996	1,103	970	911	1,085	999	1,098	1,077	1,142
	Payroll	48,251	48,044	45,871	45,543	51,508	49,683	52,761	54,339	60,854
Seafood sales, retail	Establishments	44	43	47	44	40	35	33	39	37
	Employees	247	239	282	253	256	266	276	279	296
	Payroll	7,947	8,324	9,098	7,786	8,210	9,069	9,938	10,865	11,059

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[1]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	169	162	152	135	141	138	131	143	129
	Employees	8,067	6,710	5,406	5,232	5,294	5,387	5,060	4,653	4,930
	Payroll	402,253	312,240	284,759	276,402	290,400	273,825	262,730	265,732	269,879
Deep Sea Freight Transportation	Establishments	21	25	20	14	12	8	8	8	5
	Employees	263	305	209	ds	ds	200	204	194	170
	Payroll	24,843	28,897	24,711	ds	14,014	14,892	14,991	13,981	13,822
Deep Sea Passenger Transportation	Establishments	4	5	4	2	2	5	4	6	4
	Employees	ds	ds	ds	ds	ds	ds	1,412	1,277	1,151
	Payroll	ds	ds	ds	ds	ds	ds	54,346	73,134	72,462
Coastal and Great Lakes Freight Transportation	Establishments	24	24	30	28	28	35	38	35	41
	Employees	2,222	2,245	1,731	1,684	1,557	2,186	2,020	1,879	1,956
	Payroll	168,832	168,783	130,398	132,068	126,401	170,003	163,075	162,635	163,240
Port and Harbor Operations	Establishments	11	11	9	9	48	28	27	23	23
	Employees	111	118	74	75	1,509	181	304	250	226
	Payroll	6,359	6,437	4,662	4,937	85,042	11,894	16,449	14,278	14,169
Marine Cargo Handling	Establishments	25	27	26	32	13	30	29	30	30
	Employees	4,821	2,953	ds	3,910	ds	ds	ds	3,966	4,143
	Payroll	334,193	239,490	ds	323,286	ds	ds	ds	424,469	436,086
Navigational Services to Shipping	Establishments	76	69	79	78	72	73	71	68	76
	Employees	1,213	1,168	1,225	1,207	ds	ds	1,297	1,176	1,175
	Payroll	100,542	102,934	102,766	94,781	ds	ds	101,251	88,363	88,045
Marinas	Establishments	116	110	117	114	100	110	106	102	97
	Employees	573	570	560	517	479	529	530	588	525
	Payroll	18,931	18,811	18,783	18,364	18,038	18,914	20,348	21,944	21,809

[1] ds = Data are suppressed.
[2] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.

Western Pacific Region

- Hawaiʻi

An opah (fish) found at the Honolulu Fish Auction.
Photo: NOAA Fisheries Office of Science and Technology/Noelle Olsen

MANAGEMENT CONTEXT

The U.S. Pacific Islands Region includes the state of Hawai'i; the territories of American Samoa and Guam; the Commonwealth of the Northern Mariana Islands (CNMI); and the Pacific Remote Island Areas. Federal fisheries in this region are managed by the Western Pacific Fishery Management Council (WPFMC) and NOAA Fisheries under five fishery ecosystem plans (FEPs). These plans focus on place-based rather than species- or fishery-based management.

Western Pacific Fishery Ecosystem Plans

- American Samoa
- Hawai'i
- Mariana Archipelago (Guam and the CNMI)
- Pacific Remote Island Areas
- Western Pacific Pelagics

Three of the stocks or stock complexes covered in these FMPs were listed as overfished in 2017: Pacific bluefin tuna (Pacific stock),[1] striped marlin (Western and Central Pacific stock),[1] and seamount groundfish complex (Hancock seamount stock).[1] Bluefin tuna (Western Atlantic) was removed from the overfished list because the stock's overfished status was determined to be unknown. Four stocks/complexes were subject to overfishing in 2017: Pacific bluefin tuna (Pacific stock),[1] swordfish (Eastern Pacific stock),[1,2] striped marlin (Western and Central Pacific stock), and bigeye tuna (Western and Central Pacific stock).[1]

Because fishery data are limited in most of these areas, only information for the Hawai'i and Western Pacific Pelagics fisheries is reported here. No catch share programs operate in this region.

Hawai'i FEP: NOAA Fisheries, the WPFMC, and the State of Hawai'i collaborate to manage fisheries across the Hawai'i Archipelago. The major fisheries in Hawai'i include trolling for pelagic species such as tuna, marlin, wahoo, and mahimahi; deepwater hook-and-line bottom fishing; and various forms of net fishing that target nearshore pelagic and reef fish species. Under this FEP, the Hancock Seamount groundfish complex is currently overfished. This fishery has been closed since 1986.

Western Pacific Pelagics FEP: The management species covered under this FEP include tunas, billfishes, sharks, squids, and an assortment of other species. These species include mahimahi, wahoo, moonfish, and pomfret caught by the Hawai'i longline fishery and smaller boats that use diverse gears including trolling, handline, and traditional fishing methods. Of these species, bigeye tuna, Pacific bluefin tuna, swordfish, and the Central Western Pacific striped marlin stock are considered subject to overfishing. The Central Western Pacific striped marlin stock and Pacific bluefin tuna stock are also listed as overfished.

In addition to management by the WPFMC and NOAA Fisheries, pelagic fish, such as bigeye and yellowfin tunas, are managed by two regional fishery management organizations (RFMOs). The Western and Central Pacific Fisheries Commission (WCPFC) has authority to manage pelagic fisheries in the Western and Central Pacific Ocean, while the Inter-American Tropical Tuna Commission (IATTC) manages pelagic fisheries in the Eastern Pacific Ocean. Fish species and fisheries under the purview of both RFMOs migrate across national boundaries and between RFMO areas, requiring coordinated management. Since 2009, the annual bigeye tuna catch limit has been recommended by the WCPFC and implemented by NOAA Fisheries for the U.S. longline fleet in the Western and Central Pacific. The IATTC establishes the harvest limit for bigeye tuna for U.S. longline vessels longer than 24 meters in the Eastern Tropical Pacific.

Policy Updates

The Hawai'i-based pelagic longline fleet accounts for most of the U.S. longline catch of bigeye tuna in the Western and Central Pacific Ocean (WCPO). Under the authority of the WCPFC Implementation Act, the 2017 bigeye catch limit for U.S. longline vessels was set at 3,138 metric tons, a 12% reduction from the 2016 levels due to an overage in 2016. Based upon its own prediction that the bigeye catch limit (3,138 metric tons) would be reached by September 1, 2017, NMFS closed the U.S. deep-set longline fishery in WCPO on that date (82 FR 37824, August 14, 2017). However, during the closure, if a Hawai'i longline vessel also holds a valid American Samoa longline permit (dual permitted vessels), the bigeye tuna caught by these vessels may still be landed in Ha-

[1] This stock is fished by U.S. and international fleets.
[2] The geographic boundary of this stock extends from Mexico south and west to the Palmyra Atoll.

wai`i, as long as the fish were not caught in the portion of the U.S. EEZ surrounding the Hawai`ian Archipelago. On October 10, 2017, the fishery was reopened.

In 2017, the bigeye tuna catch limit in the Eastern Pacific Ocean (EPO) was 500 mt for all U.S. vessels greater than 24 meters (vessels equal to or under 24 meters are not subjected to any catch limit). Because the catch limit of 500 mt was expected to be reached on September 8, 2017 (based on the PIFSC prediction model), NMFS closed the U.S. longline fishery for bigeye tuna for vessels over 24 meters in EPO starting from September 8, 2017 until the end of the year (82 FR 41562, September 1, 2017).

On February 3, 2016, NOAA Fisheries published a final rule allowing large federally permitted U.S. longline vessels to fish in certain areas of the American Samoa Large Vessel Prohibited Area (LVPA). The LVPA was established in 2002 to prevent the potential for gear conflicts and catch competition between large and small fishing vessels. However, by 2016 the American Samoa pelagic fisheries had changed so that the conditions that led to the establishment of the LVPA appeared no longer existed. The final rule allowed fishing in an additional 16,817 square nautical miles of federal waters. On March 20, 2017, however, a U.S. federal judge in American Samoa v. National Marine Fisheries Service, 16-cv-00095 (D.Haw) issued an order vacating this regulation, barring large federally permitted U.S. longline vessels from fishing within the LVPA.

COMMERCIAL FISHERIES — WESTERN PACIFIC (HAWAI`I) REGION

In this report, commercial fisheries refer to fishing operations that sell their catch for profit. The term does not include subsistence fishermen or saltwater anglers who fish for sport. It also excludes the for-hire sector, which earns its revenue from selling recreational fishing trips to saltwater anglers. The commercial fisheries section reports on economic impacts, landings revenue, landings, and ex-vessel prices of key species/species groups.

Key Western (Hawai`i) Pacific Commercial Species

- Dolphinfish (*mahi-mahi*)
- Lobsters (*ula*)
- Marlin (*a`u*)
- Moonfish (*opah*)
- Pomfrets (*mon-chong*)
- Scad (*opelu*)
- Snappers
- Swordfish (*meka-jiki*)
- Tunas (*aku*)
- Wahoo (*ono*)

Economic Impacts

The premise behind economic impact modeling is that every dollar spent in a regional economy (direct impact) is either saved or re-spent on additional goods or services. If those dollars are re-spent on other goods and services in the regional economy, this spending generates additional economic activity in the region.[3]

Four different measures are commonly used to show how commercial fisheries landings affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as commercial fishing. The category includes both the direct sales of fish landed and sales made between businesses and households resulting from the original sale. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the sales of seafood or purchases of inputs to commercial fishing. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in numbers of jobs. Note that these categories are not additive. The United States seafood industry is defined here as the commercial fishing sector, seafood processors and dealers, seafood wholesalers and distributors, importers, and seafood retailers.[4]

This report provides estimates of total economic impacts for the nation and for each of the 23 coastal states. Total economic impacts for each state and the nation represent the sum of direct impacts; indirect impacts (in this

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[3] Summary data is available online in the FEUS webtool. [Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.]
[4] The NMFS Commercial Fishing Industry Input/Output Model was used to generate the impact estimates. [Available at: http://www.st.nmfs.noaa.gov/documents/commercial_seafood_impacts_2007-2009.pdf.]

case, the impact from suppliers to the seafood industry); and induced impacts (spending by employees on personal and household expenditures, where employees of both the seafood industry and its full supply chain are included). That is, the total economic impact estimates reported here measure jobs, sales, value-added, and income impacts from the seafood industry as well as the economic activity generated throughout each region's broader economy from this industry.

In 2017, the commercial fishing and seafood industry supported 9,827 full- and part-time jobs and generated $900.6 million in sales, $275 million in income, and $402.2 million in value-added impacts in the Western Pacific (Hawai'i) Region. Importers generated the largest sales impacts ($350.8 million). Retail generated the largest value-added impacts ($132.1 million), income impacts ($101.4 million), and employment impacts (4,023 jobs).

Landings Trends

Landings revenue in Hawai'i decreased $1.7 million from 2016 to 2017, or about 1.5%. In inflation-adjusted terms (using 2015 dollars), landings revenue fluctuated within a range from $100-$120 million from 2012 to 2017, a leveling off after a period of increase from the previous decade. Tuna revenue, which accounted for 75% of the 2017 total, fell 1% from 2016. Notable changes among other species included a 21% increase in swordfish revenue and a 24% decrease in dolphinfish revenue.

In recent years, Hawai'i's landings and landings revenue trends largely reflect the growth of the tuna fishery. From 2008 to 2017, bigeye tuna dominated Hawai'i's landings revenue, accounting for between 55% and 68% of annual state landings revenue. Bigeye tuna revenues reached a record high of $72 million in 2016 before falling 10% to $65 million in 2017. This decrease in bigeye tuna revenue was largely offset by a $7 million increase in revenues for the second largest tuna fishery, yellowfin. This 50% increase in yellowfin tuna revenues over the previous year was due almost entirely to increased landings rather than a price change. Overall, Hawai'i accounted for 57% of U.S. tuna landings revenue in 2017. The state's share of national tuna landings revenue ranged between 49% and 60% during the previous decade.

Landings Revenue

In 2017, landings revenue in the Western Pacific (Hawai'i) region totaled $116.4 million, a 37% increase from 2008 (a 20% increase in real terms after adjusting for inflation) and an 1% decrease from 2016.

Commercial Revenue: Largest Increases

From 2008:
- Pomfrets (*monchong*) (98%, 73% in real terms)
- Marlin (*a'u*) (85%, 61% in real terms)
- Snappers (53%, 34% in real terms)

From 2016:
- Swordfish (*mekajiki*) (21%)
- Snappers (16%)

Commercial Revenue: Largest Decreases

From 2008:
- Lobsters (*ula*) (-83%, -85% in real terms)
- Swordfish (*mekajiki*) (-19%, -29% in real terms)

From 2016:
- Lobsters (*ula*) (-27%)
- Dolphinfish (*mahimahi*) (-24%)
- Scad (*opelu*) (-15%)

From 2008 to 2017, pomfrets (*monchong*) (98%, 73% in real terms), marlin (*a'u*) (85%, 61% in real terms), and snappers (53%, 34% in real terms) had the largest increases, while lobsters (*ula*) (-83%, -85% in real terms) and swordfish (*mekajiki*) (-19%, -29% in real terms) had the largest decreases. From 2016 to 2017, swordfish (*mekajiki*) (21%) and snappers (16%) had the largest increases, while lobsters (*ula*) (-27%), dolphinfish (*mahimahi*) (-24%), and scad (*opelu*) (-15%) had the largest decreases.

Landings

In 2017, Western Pacific (Hawai'i) Region commercial fishermen landed over 37.2 million pounds of finfish and shellfish. This represents a 21% increase from 2008 and a 6% increase from 2016. Tunas (*aku*) contributed the highest landings volume in the region, accounting for 67% of total landing weight.

From 2008 to 2017, pomfrets (*monchong*) (46%), moonfish (*opah*) (38%), and tunas (*aku*) (37%) had the largest increases, while lobsters (*ula*) (-68%), swordfish (*mekajiki*) (-33%), and dolphinfish (*mahimahi*) (-24%) had the largest decreases. From 2016 to 2017, swordfish (*mekajiki*) (56%), snappers (11%), and marlin (*a'u*) (11%) had the largest increases, while dolphinfish (*mahimahi*) (-20%), scad (*opelu*) (-17%), and pomfrets (*monchong*) (-16%) had the largest decreases.

Commercial Landings: Largest Increases

From 2008:
- Pomfrets (*monchong*) (46%)
- Moonfish (*opah*) (38%)
- Tunas (*aku*) (37%)

From 2016:
- Swordfish (*mekajiki*) (56%)
- Snappers (11%)
- Marlin (*a'u*) (11%)

Commercial Landings: Largest Decreases

From 2008:
- Lobsters (*ula*) (-68%)
- Swordfish (*mekajiki*) (-33%)
- Dolphinfish (*mahimahi*) (-24%)

From 2016:
- Dolphinfish (*mahimahi*) (-20%)
- Scad (*opelu*) (-17%)
- Pomfrets (*monchong*) (-16%)

Prices

In 2017, lobsters (*ula*) ($6.48 per pound) received the highest ex-vessel price in the region. Landings of marlin (*a'u*) ($1.48 per pound) had the lowest ex-vessel price. From 2008 to 2017, dolphinfish (*mahimahi*) (42%, 24% in real terms), marlin (*a'u*) (40%, 22% in real terms), and snappers (37%, 20% in real terms) had the largest increases, while lobsters (*ula*) (-47%, -53% in real terms) had the largest decreases. From 2016 to 2017, pomfrets (*monchong*) (12%), wahoo (*ono*) (10%), and snappers (4%) had the largest increases, while lobsters (*ula*) (-24%), swordfish (*mekajiki*) (-23%), and marlin (*a'u*) (-15%) had the largest decreases.

RECREATIONAL FISHERIES — WESTERN PACIFIC (HAWAI'I) REGION

In the Western Pacific (Hawai'i) Region, recreational fishing includes all non-commercial fishing, which is fishing that does not meet the definition of commercial fishing in the Magnuson-Stevens Fishery Conservation and Management Act, and includes, but is not limited to, sustenance, subsistence, traditional indigenous, and recreational fishing.[5] This recreational fisheries section reports on economic impacts and expenditures, angler participation, fishing trips, and catch of key species/species groups.[6]

Key Western Pacific (Hawai'i) Recreational Species[7]

- Bigeye (*akule*) and mackerel (*opelu*) scad
- Blue marlin (*a'u*)
- Dolphinfish (*mahimahi*)
- Goatfishes: bandtail goatfish, blue goatfish, doublebar goatfish, goatfish family, goatfishes, manybar goatfish, pflugers goatfish, whitesaddle goatfish, yellowfin goatfish, and yellowstripe goatfish
- Jacks (trevallys and other jacks): African pompano, bigeye trevally, black jack, black trevally, bluefin trevally, giant trevally, greater amberjack, island jack, jack family, and jack genus
- Skipjack tuna (*aku*)
- Smallmouth bonefish (*o'io*)
- Snappers: Binghams snapper, blacktail snapper, bluestipe snapper, green jobfish, ironjaw snapper, longtailed red snapper, pink snapper, ruby snapper, smalltooth jobfish, snapper family, snapper genus, and von Siebolds snapper
- Wahoo (*ono*)
- Yellowfin tuna (*'ahi*)

Economic Impacts and Expenditures

The economic contribution of recreational fishing activities in the Western Pacific (Hawai'i) Region is based on

[5] For a definition of non-commercial fishing see the electronic code of federal regulations. (Available at: https://gov.ecfr.io/cgi-bin/text-idx?SID=3a2527021 8fea2849201cc659f78167f&mc=true&node=se50.13.665_112&rgn=div8.).
[6] Data for this state is from MRIP estimates produced using pre-calibration methods.
[7] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[8] Trip expenditure estimates were generated from the 2016/2017 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2020). Durable goods expenditures were generated from the 2014 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2016). (For citations: Publications-U.S. Coastal and Marine Recreation.)

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spending by recreational anglers.[8] Total annual trip expenditures are estimated at the state level by multiplying mean trip expenditures by the estimated number of adult trips in each trip mode (for-hire, private boat, and shore) and adjusting by the CPI (consumer price index) to the current year. Total annual durable expenditures are estimated by multiplying mean durable expenditures in each state by the estimated annual number of adult participants for each state and adjusting by the CPI (consumer price index) to the current year.[9]

Four different measures are commonly used to show how angler expenditures affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as recreational fishing. The category includes both the direct sales made to the angler and sales made between businesses and households resulting from that original sale to the angler. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the purchases made by anglers. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in number of jobs. Note that these categories are not additive. NOAA Fisheries uses a regional impact modeling software, called IMPLAN, to estimate these four types of impacts.

The economic contributions for both trip and durable expenditures from recreational fishing in 2017 were estimated using IMPLAN version 3, with base year data from 2017. Models for each state and for the nation were created in IMPLAN using trip expenditures (based on 2016/2017 survey data on average trip expenditures and total 2017 trips) and for durable expenditures (based on 2014 survey data on average durable expenditures and 2017 participants).

In 2017, economic impacts from recreational fishing activities in Hawai'i generated 1,093 jobs, $145.9 million in sales, $44.9 million in income, and $80.8 million in value-added impacts.

Data for the for-hire mode is not available in Hawai'i. Of the two remaining fishing trip modes, shore fishing trips had the greatest economic impact, accounting for 65% of employment impacts. Trip expenditures for shore and private boat modes totaled $120.5 million, with a large portion of these trip expenditures coming from trips in the shore (60%) mode. Data for durable expenditures is not available due to unavailable participation estimates.

Participation

Participation estimates for Hawai'i are not available.

Fishing Trips

In 2017, recreational fishermen took 1.3 million saltwater fishing trips in the state of Hawai'i. This number represented a 49% decrease from 2008 and a 25% increase from 2016. Of all fishing trips, 80% were taken from the shore sector.

Harvest and Release Trends

Of the Western Pacific (Hawai'i) Region's key species and species groups, bigeye (*akule*) and mackerel (opelu) scad (1.2 million fish), goatfishes (438,939 fish), and jacks (trevallys and other jacks) (268,935 fish), were most frequently caught by recreational fishermen. The text box below shows the species with the largest percentage increases and decreases in the past 10 years and in the past year.

Harvest and Release: Largest Increases

From 2008:

- There were no percent increases (in nominal dollar values).

From 2016:

- Blue marlin (*a'u*) (80%)
- Skipjack tuna (*aku*) (29%)
- Dolphinfish (*mahimahi*) (7%)

Harvest and Release: Largest Decreases

From 2008:

- Yellowfin tuna (*'ahi*) (-82%)
- Skipjack tuna (*aku*) (-80%)
- Dolphinfish (*mahimahi*) (-74%)

From 2016:

- Wahoo (*ono*) (-28%)
- Yellowfin tuna (*'ahi*) (-4%)

[9] Summary data is available online in the FEUS webtool. (Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.)

From 2008 to 2017, there were no increases (in nominal dollar values). Yellowfin tuna (*'ahi*) (-82%), skipjack tuna (*aku*) (-80%), and dolphinfish (*mahimahi*) (-74%) had the largest decreases. From 2016 to 2017, blue marlin (*a'u*) (80%), skipjack tuna (*aku*) (29%), and dolphinfish (*mahimahi*) (7%) had the largest increases, while wahoo (*ono*) (-28%) and yellowfin tuna (*'ahi*) (-4%) had the largest decreases.

MARINE ECONOMY — WESTERN PACIFIC (HAWAI'I) REGION

For this report, the marine economy refers to the economic activity generated by fishing and marine-related industries in a coastal state. The national marine economy consists of two industry sectors: 1) seafood sales and processing (employer establishments and non-employer firms); and 2) transport, support, and marine operations (employer establishments). These sectors include several different marine-related industries.[10,11]

To measure the size of the commercial fishing sector in a state's economy relative to the size of the commercial fishing sector in the national economy, researchers use an index called the Commercial Fishing Location Quotient (CFLQ).[12,13] The CFLQ is calculated as the ratio of the percentage of regional employment in the commercial fishing sector relative to the percentage of national employment in the commercial fishing sector. The United States CFLQ is 1. If a state CFLQ is less than 1, then less commercial fishing occurs in this state than the national average. If a state CFLQ is greater than 1, then more commercial fishing occurs in this state than the national average.

Hawai'i had a CFLQ value of 4.33.

In 2016, 32,350 employer establishments operated throughout the entire Western Pacific (Hawai'i) region (including marine and non-marine related establishments). These establishments employed 528,415 workers and had a total annual payroll of $22.9 billion. The combined gross state product of Hawai'i was approximately $85.6 billion in 2016.

Seafood Sales and Processing

Seafood Product Preparation and Packaging: In 2016, the Western Pacific (Hawai'i) Region had 12 non-employer firms in the seafood product preparation and packaging sector (a 33% increase from 2008). Annual receipts for these firms totaled about $1.1 million (a 7% decrease in real terms from 2008). There were 2 employer firms in the seafood product preparation and packaging sector (a 100% increase from 2008). The Census Bureau suppressed 2016 employment and payroll data for this sector in this region.

Seafood Sales, Retail: In 2016, there were 31 non-employer firms engaged in retail sales of seafood in the Western Pacific (Hawai'i) region (a 16% decrease from 2008). Annual receipts for these firms totaled about $4 million (an 18% decrease in real terms from 2008). There were 22 employer firms in the retail sales of seafood sector (a 12% decrease from 2008). These establishments employed 313 workers (an 81% increase from 2008) and had a total annual payroll of $7.8 million (a 90% increase in real terms from 2008).

Seafood Sales, Wholesale: There were 30 employer firms in the wholesale sales of seafood sector in the Western Pacific (Hawai'i) region in 2016 (a 19% decrease from 2008). These establishments employed 697 workers (unchanged from 2008), and had a total annual payroll of $26.3 million (a 13% increase in real terms from 2008).

Transport, Support, and Marine Operations

Data for the transport, support, and marine operations sector of Western Pacific (Hawai'i) Region's economy were largely suppressed for confidentiality reasons. It is clear, however, that these sectors play an important role in the regional economy. For example, in 2016, the marine cargo handling sector in the Western Pacific (Hawai'i) region accounted for $115.6 million in payroll (a 15% increase in real terms from 2008).

National Overview | North Pacific | Pacific | Western Pacific | New England | Mid-Atlantic | South Atlantic | Gulf of Mexico

[10] Unless otherwise stated, data are from the U.S. Census Bureau. [For more information: www.census.gov.]
[11] U.S. Bureau of Economic Analysis, 'Table 1.1.5 Gross Domestic Product' and 'Table SA6N Compensation of Employees by NAICS Industry. [Available at: https://apps.bea.gov/regional/histdata/releases/0518gdpstate/.]
[12] Percentage changes in inflation adjusted (real dollar) terms are calculated using the annual Gross Domestic Product implicit price deflator published by the U.S. Bureau of Economic Analysis and the Federal Reserve Bank of St. Louis. [Available at: https://fred.stlouisfed.org/series/GDPDEF.]
[13] U.S. Bureau of Labor Statistics, 'Location Quotient Calculator.' [For more information: https://www.bls.gov/cew/about-data/location-quotients-explained.htm.]

Tables | Hawai`i

2017 Economic Impacts of the Hawai'i Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	9,827	900,570	274,994	402,195	7,528	462,739	183,308	248,970
Commercial Harvesters	3,566	202,681	73,978	106,346	3,566	202,681	73,978	106,346
Seafood Processors & Dealers	578	57,558	22,784	29,385	413	41,113	16,274	20,989
Importers	1,114	350,823	56,226	106,946	0	0	0	0
Seafood Wholesalers & Distributors	546	58,868	20,647	27,466	313	33,700	11,820	15,724
Retail	4,023	230,639	101,359	132,052	3,236	185,245	81,236	105,911

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	84,877	71,202	84,044	91,565	112,300	107,979	101,249	103,399	118,134	116,368
Finfish & Other	84,556	70,856	83,700	91,274	111,865	107,413	100,754	103,341	117,832	116,124
Shellfish	321	347	343	291	435	567	495	58	302	244
Key Species	-	-	-	-	-	-	-	-	-	
Dolphinfish (*mahimahi*)	3,174	2,853	3,303	4,314	5,309	4,130	4,412	3,427	4,512	3,451
Lobsters (*ula*)	120	136	117	104	98	95	105	NA	28	21
Marlin (*a'u*)	2,072	2,142	1,756	2,375	2,888	2,802	3,197	3,015	4,064	3,830
Moonfish (*opah*)	2,198	2,409	2,591	2,853	3,163	3,203	2,910	3,151	NA	3,203
Pomfrets (*monchong*)	1,662	1,381	1,549	1,449	2,097	2,576	2,466	2,874	3,502	3,287
Scad (*opelu*)	889	1,198	1,251	964	1,181	1,147	1,128	108	1,173	996
Snappers	1,715	1,860	1,681	1,415	1,738	2,003	2,223	1,124	2,272	2,625
Swordfish (*mekajiki*)	7,177	7,336	7,303	6,669	6,693	4,493	5,405	4,629	4,813	5,823
Tunas (*aku*)	60,863	47,710	59,775	66,628	83,298	81,819	73,657	81,576	88,467	87,285
Wahoo (*ono*)	2,225	1,673	1,746	1,806	2,330	2,375	2,800	2,328	3,279	3,066

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	30,652	26,906	28,069	29,289	31,048	32,447	33,474	34,623	35,051	37,162
Finfish & Other	30,599	26,849	28,007	29,240	30,968	32,346	33,387	34,612	34,999	37,123
Shellfish	52	57	62	49	79	101	86	11	52	39
Key Species	-	-	-	-	-	-	-	-	-	-
Dolphinfish (*mahimahi*)	1,250	1,287	1,518	1,423	1,746	1,515	1,689	1,132	1,193	954
Lobsters (*ula*)	10	11	9	10	8	9	10	NA	3	3
Marlin (*a'u*)	1,952	1,677	1,221	1,826	1,459	1,935	2,318	2,616	2,327	2,580
Moonfish (*opah*)	1,313	1,884	1,824	1,564	1,549	2,072	2,004	2,067	NA	1,812
Pomfrets (*monchong*)	671	627	593	427	731	1,142	1,243	1,339	1,166	980
Scad (*opelu*)	318	405	460	323	383	361	356	36	368	306
Snappers	378	391	342	269	308	357	369	178	380	422
Swordfish (*mekajiki*)	3,835	3,881	3,153	2,592	2,381	1,674	2,480	2,044	1,640	2,561
Tunas (*aku*)	18,295	14,594	16,706	18,519	20,147	20,900	20,296	22,932	23,507	25,028
Wahoo (*ono*)	849	605	600	564	652	744	1,056	993	1,144	973

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Dolphinfish (*mahimahi*)	2.54	2.22	2.18	3.03	3.04	2.73	2.61	3.03	3.78	3.62
Lobsters (*ula*)	12.14	12.37	12.36	10.39	11.84	10.71	10.21	NA	8.56	6.48
Marlin (*a'u*)	1.06	1.28	1.44	1.30	1.98	1.45	1.38	1.15	1.75	1.48
Moonfish (*opah*)	1.67	1.28	1.42	1.82	2.04	1.55	1.45	1.52	NA	1.77
Pomfrets (*monchong*)	2.48	2.20	2.61	3.39	2.87	2.25	1.98	2.15	3.00	3.35
Scad (*opelu*)	2.80	2.95	2.72	2.98	3.08	3.18	3.17	2.99	3.19	3.25
Snappers	4.54	4.76	4.92	5.26	5.65	5.60	6.03	6.31	5.98	6.22
Swordfish (*mekajiki*)	1.87	1.89	2.32	2.57	2.81	2.68	2.18	2.26	2.93	2.27
Tunas (*aku*)	3.33	3.27	3.58	3.60	4.13	3.91	3.63	3.56	3.76	3.49
Wahoo (*ono*)	2.62	2.77	2.91	3.20	3.57	3.19	2.65	2.34	2.87	3.15

[1] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of Hawai`i Recreational Fishing Expenditures (thousands of dollars)[1]

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	NA	NA	NA	NA
	Private Boat	385	58,767	16,494	30,404
	Shore	708	87,151	28,424	50,346
Total Durable Expenditures		NA	NA	NA	NA
Total State Economic Impacts		1,093	145,918	44,918	80,750

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)[1]

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	NA	Fishing Tackle	NA
Private Boat	48,756	Other Equipment	NA
Shore	71,698	Boat Expenses	NA
Total	120,454	Vehicle Expenses	NA
		Second Home Expenses	NA
		Total Durable Expenditures	NA
Total State Trip and Durable Goods Expenditures			120,454

Recreational Fishing Effort by Mode (thousands of angler trips)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Private Boat	564	441	484	224	325	297	324	273	235	261
Shore	1,966	1,722	1,907	1,158	1,195	1,216	1,051	1,158	790	1,019
Total Trips	2,531	2,163	2,390	1,382	1,519	1,513	1,374	1,431	1,024	1,280

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bigeye (*akule*) and mackerel (*opelu*) scad	H	402	1,102	840	662	608	889	899	1,245	690	1,172
	R	0	0	0	0	0	2	0	< 1	4	7
Blue marlin (*a'u*)	H	11	3	1	2	3	4	3	5	2	4
	R	0	< 1	0	0	0	0	< 1	0	0	< 1
Dolphinfish (*mahimahi*)	H	184	103	164	63	163	94	92	78	44	47
	R	0	0	0	0	0	0	< 1	0	< 1	< 1
Goatfishes	H	468	712	270	173	158	873	537	1,052	246	420
	R	6	7	18	13	13	3	22	15	16	18
Jacks (trevallys and other jacks)	H	277	123	140	99	110	144	156	170	112	115
	R	120	85	126	59	129	126	263	319	122	154
Skipjack tuna (*aku*)	H	568	230	289	125	197	380	199	268	88	113
	R	2	0	0	< 1	0	0	0	< 1	2	2
Smallmouth bonefish (*o'io*)	H	50	37	55	13	27	23	29	26	26	19
	R	4	2	13	2	8	10	20	17	9	17
Snappers	H	138	147	340	113	195	152	220	119	119	126
	R	7	24	25	14	15	10	3	9	14	10
Wahoo (*ono*)	H	78	61	41	15	32	37	43	55	45	32
	R	0	0	0	0	0	0	< 1	< 1	< 1	0
Yellowfin tuna (*'ahi*)	H	461	198	302	141	182	150	220	292	85	82
	R	0	1	1	0	0	0	< 1	1	< 1	0

[1] NA = these data are confidential and therefore not disclosable.
[2] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[3] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.

2016 Hawaiʻi State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
108,308 (0.4%)	32,350 (0.4%)	528,415 (0.4%)	22.9 (0.4%)	46.1 (0.5%)	85.6	4.33

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	9	7	11	14	14	16	14	12	12
	Receipts	1,020	712	741	866	965	821	1,048	1,271	1,071
Seafood sales, retail	Firms	37	35	37	39	42	40	38	39	31
	Receipts	4,394	3,666	4,124	3,558	4,086	3,764	3,727	4,053	4,025

Seafood Sales and Processing — Employer Establishments (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	1	1	1	1	2	2	2	2	2
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	0
Seafood sales, wholesale	Establishments	37	38	37	40	33	32	30	30	30
	Employees	695	538	531	538	483	542	567	639	697
	Payroll	20,665	19,347	19,290	19,416	19,413	20,039	21,369	24,477	26,323
Seafood sales, retail	Establishments	25	25	24	25	24	25	26	25	22
	Employees	173	158	177	187	303	318	305	293	313
	Payroll	3,674	3,559	3,533	3,521	6,493	7,366	7,142	7,410	7,849

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	14	13	15	15	18	18	14	14	15
	Employees	ds	ds	ds	ds	ds	ds	ds	660	727
	Payroll	ds	ds	ds	ds	ds	ds	ds	46,560	45,051
Deep Sea Freight Transportation	Establishments	1	NA	1	1	2	1	1	1	1
	Employees	ds	NA	ds	ds	ds	ds	ds	0	0
	Payroll	ds	NA	ds	ds	ds	ds	ds	0	0
Deep Sea Passenger Transportation	Establishments	1	1	1	1	1	1	1	1	1
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	0
Coastal and Great Lakes Freight Transportation	Establishments	5	5	2	2	5	5	6	7	7
	Employees	478	475	ds	ds	431	ds	ds	452	425
	Payroll	34,544	34,367	ds	ds	34,538	ds	ds	36,675	50,267
Port and Harbor Operations	Establishments	4	3	2	2	2	1	1	1	NA
	Employees	ds	ds	ds	ds	ds	ds	ds	0	NA
	Payroll	3,218	2,031	ds	ds	ds	ds	ds	0	NA
Marine Cargo Handling	Establishments	11	11	14	14	11	10	10	11	12
	Employees	1,098	1,075	1,236	1,278	664	709	700	782	846
	Payroll	89,104	87,833	109,059	109,134	54,309	61,651	66,034	83,408	115,582
Navigational Services to Shipping	Establishments	11	11	11	8	8	9	9	11	11
	Employees	105	120	90	105	97	100	80	70	69
	Payroll	5,846	5,258	5,113	5,310	5,567	6,518	5,416	4,463	5,697
Marinas	Establishments	9	10	13	13	9	11	9	9	9
	Employees	156	164	189	208	162	166	153	120	113
	Payroll	4,317	4,368	5,362	5,237	3,779	4,003	3,304	3,412	3,421

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.

New England Region

- Connecticut
- Maine
- Massachusetts
- New Hampshire
- Rhode Island

A commercial fisheries vessel sitting at the pier outside of the Northeast Fisheries Science Center in Woods Hole, Massachusetts. Photo: NOAA Fisheries Office of Science and Technology/Emily Markowitz

National Overview | North Pacific | Pacific | Western Pacific | New England | Mid-Atlantic | South Atlantic | Gulf of Mexico

MANAGEMENT CONTEXT

The New England Region includes Connecticut, Maine, Massachusetts, New Hampshire, and Rhode Island. Federal fisheries in this region are managed by the New England Fishery Management Council (NEFMC) and NOAA Fisheries under nine fishery management plans (FMPs). Two of these FMPs, monkfish and spiny dogfish, are developed in conjunction with the Mid-Atlantic Fisheries Management Council (MAFMC). The MAFMC is the lead council for the Spiny Dogfish FMP; the NEFMC is the lead for the Monkfish FMP.

New England Regional FMPs

- Northeast multi-species
- Sea scallops
- Monkfish (with the MAFMC)
- Atlantic herring
- Small mesh multi-species
- Spiny dogfish (with the MAFMC)
- Red crab
- Northeast skate complex
- Atlantic salmon

Fourteen of the stocks or stock complexes covered in these FMPs were listed as overfished in 2017: Atlantic cod (Georges Bank stock and Gulf of Maine stock), windowpane (Gulf of Maine/Georges Bank stock), witch flounder, yellowtail flounder (Cape Cod/Gulf of Maine stock, Georges Bank stock, and Southern New England/Mid-Atlantic stock), thorny skate (Gulf of Maine stock), Atlantic halibut, Atlantic salmon, Atlantic wolffish, ocean pout, winter flounder (Southern New England stock), red hake (Southern Georges Bank/Mid-Atlantic stock, newly added to the overfished list in 2017). Bluefin tuna (Western Atlantic stock) was removed from the overfished list because the status is now unknown.

Six stocks/complexes were subject to overfishing in 2017: Atlantic cod (Georges Bank stock and Gulf of Maine stock), yellowtail flounder (Cape Cod/Gulf of Maine stock, Georges Bank stock, and Southern New England/Mid-Atlantic stock), and red hake (Southern Georges Bank/Mid-Atlantic stock; newly added to the overfishing list in 2017). Two stocks/complexes were removed from the overfishing list in 2017: winter flounder (Georges Bank stock) and witch flounder (Northwestern Atlantic Coast stock; because the status is now unknown.

Catch Share Programs

Two catch share programs operate in the New England Region: 1) Northeast Multispecies Sectors: Georges Bank Cod - Hook Gear (2004) and Georges Bank Cod - Fixed Gear (2007); and 2) Northeast General Category Sea Scallop Individual Fishing Quota (IFQ) Program. The landings revenues for these programs totaled more than $90.5 million in 2016. The following are descriptions of these catch share programs and their performance.

Northeast Multispecies Sectors: This program was developed between 2004 and 2006 and included two pilot sectors that operated with an allocation of Georges Bank cod. The program was expanded in 2010 to 17 sectors, and approximately 55% of eligible, limited-access permit holders joined a sector. At the same time, annual catch limits were implemented for the first time and sharply reduced the available quota for fishermen. The 2016 key performance indicators of the program show that relative to the baseline period (the 3-year period prior to implementation), quota, landings, the number of active vessels, and inflation-adjusted landings revenue decreased, while inflation-adjusted revenue per active vessel increased.

Northeast General Category Sea Scallop IFQ Program: This program began in 2010 with two primary objectives: 1) Control capacity and mortality in the General Category Scallop fishery; and 2) Allow better and timelier integration of sea scallop assessment results in management. The 2016 key performance indicators of the program show that relative to the baseline period, landings and the number of active vessels decreased, while quota, inflation-adjusted landings revenue, and inflation-adjusted revenue per active vessel increased.

Policy Updates

In March of 2017, under Framework Adjustment 28 to the Atlantic Sea Scallop Fishery Management Plan developed by the New England Fishery Management Council, specifications were set for the 2017 fishing year which included the opening of two areas to rotational harvest: the "Nantucket Lightship Closed Area" and the "Closed Area II".[1]

In April 2016, NMFS issued a final rule to implement various recreational fishing management recommendations

[1] "Fishery Management Plans." New England Fishery Management Council. Available at https://www.nefmc.org/management-plans [accessed April 1, 2020].

made in Framework 55 of the Multispecies Fishery Management Plan. In particular, the final rule established a one fish per day possession limit for Gulf of Maine Atlantic cod. This final rule included a minimum size of 24 inches and a seasonal limit of August 1 to September 30. Prior to this ruling, there was a year-round prohibition on recreational Gulf of Maine cod fishing due to the 2015 stock assessment for Gulf of Maine cod finding the stock to be overfished and experiencing overfishing. In July 2017, however, NMFS prohibited anglers from retaining cod, reduced the haddock bag limit, and also implemented a new closed season for haddock because the measures currently in place for these species were not expected to constrain fishing year 2017 catch to the sub-ACLs.

Also in 2017, Framework Adjustment 56 to the Northeast Multispecies Fisheries Management Plan was implemented, which set catch limits for 4 of 20 stocks and adjusted other allocations and accountability measures. Framework 10 to the Monkfish Plan set specifications through fishing year 2019. The Atlantic deep-sea red crab specifications were also set for the 2017 fishing year.

COMMERCIAL FISHERIES — NEW ENGLAND REGION

In this report, commercial fisheries refer to fishing operations that sell their catch for profit. The term does not include subsistence fishermen or saltwater anglers who fish for sport. It also excludes the for-hire sector, which earns its revenue from selling recreational fishing trips to saltwater anglers. The commercial fisheries section reports on economic impacts, landings revenue, landings, and ex-vessel prices of key species/species groups.

Key New England Region Commercial Species

- American lobster
- Atlantic herring
- Atlantic mackerel
- Bluefin tuna
- Cod and haddock
- Flounders
- Goosefish
- Quahog clam
- Sea scallop
- Squid

Economic Impacts

The premise behind economic impact modeling is that every dollar spent in a regional economy (direct impact) is either saved or re-spent on additional goods or services. If those dollars are re-spent on other goods and services in the regional economy, this spending generates additional economic activity in the region.[2]

Four different measures are commonly used to show how commercial fisheries landings affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as commercial fishing. The category includes both the direct sales of fish landed and sales made between businesses and households resulting from the original sale. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the sales of seafood or purchases of inputs to commercial fishing. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in numbers of jobs. Note that these categories are not additive. The United States seafood industry is defined here as the commercial fishing sector, seafood processors and dealers, seafood wholesalers and distributors, importers, and seafood retailers.[3]

This report provides estimates of total economic impacts for the nation and for each of the 23 coastal states. Total economic impacts for each state and the nation represent the sum of direct impacts; indirect impacts (in this case, the impact from suppliers to the seafood industry); and induced impacts (spending by employees on personal and household expenditures, where employees of both the seafood industry and its full supply chain are included). That is, the total economic impact estimates reported here measure jobs, sales, value-added, and income impacts from the seafood industry as well as the economic activity generated throughout each region's broader economy from this industry.

In 2017, the commercial fishing and seafood industry in Massachusetts generated the largest employment impacts in the New England region with 127,563 full- and part-time jobs. Massachusetts also generated the largest sales impacts ($14.1 billion), value-added impacts ($5.4

[2] Summary data is available online in the FEUS webtool. [Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.]
[3] The NMFS Commercial Fishing Industry Input/Output Model was used to generate the impact estimates. [Available at: http://www.st.nmfs.noaa.gov/documents/commercial_seafood_impacts_2007-2009.pdf.]

billion), and income impacts ($3.4 billion).

Landings Trends

New England landings revenue was down $65.1 million in 2017 from the previous year, with lobster (down $118.3 million) and squid (down $10.3 million) comprising the majority of this decrease. The lobster fishery is New England's largest fishery in terms of landings revenue. In 2016 it reached a maximum of $666.9 million over the 10-year period (2008-2017). In 2017, this fishery experienced its first landings revenue decline since 2009, falling 18% from 2016 levels. This decline was due to a large decline in landings (19%) in Maine that caused landings revenue to decline 22%. Despite the 2017 decline, landings revenue is 73% higher than it was in 2008. This is due to a 53% increase in landings during this period.

Lobster prices were off 2016 levels by only 1%, declining from $4.20/pound to $4.15/pound. Strong demand has kept prices well above the 10-year average (up 12%). The higher landings trend is due to record abundance levels of Gulf of Maine lobsters, which have comprised between 85-90% of landings in recent years. Indeed, average annual landings in the past five years are more than three times the average annual landings for the previous 60 years. On average, Maine has accounted for 80% of New England's lobster landings revenue since 2007.

Sea scallop landings value was up 21% from 2016 (from $304.8 million to $368.6 million). Landings were up 46%, reversing a downward trend from 2012 to 2016. Sea scallop landings had declined primarily due to a 35% reduction in the catch limit that was implemented in 2012 to protect young sea scallops and prevent localized overfishing. In 2017, two scallop fishing areas that were previously closed were opened to fishing: 1) the "Nantucket Lightship Closed Area" and the "Closed Area II," which are off the coasts of Massachusetts and Rhode Island. Increased landings accounted for the value increase since prices declined by 17% from $12.27/pound in 2016 to $10.19/pound in 2017. Sea scallop landings in Rhode Island increased nearly three-fold between 2016 and 2017. Despite the 14% price decrease, Rhode Island's sea scallop landings value increased by 131%.

Rhode Island is the center of the New England squid fishery, which comprised 28% of Rhode Island's total landings revenue in 2017. Overall, squid landings in New England decreased 9% from 2016 to 2017. Prices were down 17% from $1.06/pound in 2016 to $0.88 in 2017. While landings were up slightly in Rhode Island (3%), the 18% decline in squid prices accounted for Rhode Island's 17% decline in landings value. Squid price declines may have been driven by the increase in global production of squid, which ticked up 7% from 2016 levels.

Massachusetts' two largest fisheries are American lobster and sea scallops. Lobster landings value remained essentially unchanged while sea scallop values increased 17% due to the opening of nearby sea scallop areas.

Landings Revenue

In 2017, landings revenue in New England totaled $1.3 billion, a 57% increase from 2008 (a 37% increase in real terms after adjusting for inflation) and a 5% decrease from 2016. Landings revenue was highest in Massachusetts ($605.3 million), followed by Maine ($511.3 million).

Shellfish landings revenue accounted for 85% of all landings revenue. In 2017, American lobster ($548.6 million), sea scallop ($368.6 million), and squid ($31.5 million) had the highest landings revenue in this region. Together, these top three species accounted for 75% of total landings revenue.

From 2008 to 2017, bluefin tuna (152%, 120% in real terms), sea scallop (81%, 58% in real terms), and American lobster (73%, 51% in real terms) had the largest increases, while cod and haddock (-65%, -70% in real terms), Atlantic mackerel (-36%, -44% in real terms), and goosefish (-23%, -33% in real terms) had the largest decreases. From 2016 to 2017, sea scallop (21%), Atlantic mackerel (7%), and goosefish (2%) had the largest increases, while squid (-25%), bluefin tuna (-21%), and American lobster (-18%) had the largest decreases.

Commercial Revenue: Largest Increases

From 2008:
- Bluefin tuna (152%, 120% in real terms)
- Sea scallop (81%, 58% in real terms)
- American lobster (73%, 51% in real terms)

From 2016:
- Sea scallop (21%)
- Atlantic mackerel (7%)
- Goosefish (2%)

Commercial Revenue: Largest Decreases

From 2008:
- Cod and haddock (-65%, -70% in real terms)
- Atlantic mackerel (-36%, -44% in real terms)
- Goosefish (-23%, -33% in real terms)

From 2016:
- Squid (-25%)
- Bluefin tuna (-21%)
- American lobster (-18%)

Commercial Landings: Largest Increases

From 2008:
- Bluefin tuna (221%)
- American lobster (53%)
- Sea scallop (25%)

From 2016:
- Sea scallop (46%)
- Goosefish (32%)
- Flounders (10%)

Commercial Landings: Largest Decreases

From 2008:
- Atlantic mackerel (-68%)
- Cod and haddock (-58%)
- Atlantic herring (-38%)

From 2016:
- Atlantic herring (-23%)
- American lobster (-17%)
- Bluefin tuna (-14%)

Landings

In 2017, New England Region commercial fishermen landed over 555.7 million pounds of finfish and shellfish. This represents an 8% decrease from 2008 and a 7% decrease from 2016. American lobster contributed the highest landings volume in the region, accounting for 24% of total landing weight.

From 2008 to 2017, bluefin tuna (221%), American lobster (53%), and sea scallop (25%) had the largest increases, while Atlantic mackerel (-68%), cod and haddock (-58%), and Atlantic herring (-38%) had the largest decreases. From 2016 to 2017, sea scallop (46%), goosefish (32%), and flounders (10%) had the largest increases, while Atlantic herring (-23%), American lobster (-17%), and bluefin tuna (-14%) had the largest decreases.

Prices

In 2017, sea scallop ($10.19 per pound) received the highest ex-vessel price in the region. Landings of Atlantic herring ($0.25 per pound) had the lowest ex-vessel price. From 2008 to 2017, Atlantic herring (108%, 81% in real terms), Atlantic mackerel (101%, 75% in real terms), and quahog clam (49%, 30% in real terms) had the largest increases, while goosefish (-35%, -44% in real terms), bluefin tuna (-21%, -31% in real terms), and cod and haddock (-18%, -28% in real terms) had the largest decreases. From 2016 to 2017, Atlantic herring (20%), Atlantic mackerel (6%), and quahog clam (3%) had the largest increases, while goosefish (-23%), squid (-17%), and sea scallop (-17%) had the largest decreases.

RECREATIONAL FISHERIES — NEW ENGLAND REGION

In this report, recreational fishing refers to fishing for leisure rather than to sell fish (commercial fishing) or for subsistence. This recreational fisheries section reports on economic impacts and expenditures, angler participation, fishing trips, and catch of key species/species groups.[4]

[4] Atlantic and Gulf recreational catch and effort estimates are based upon the MRIP estimates released in 2018.

Key New England Recreational Species[5]

- Atlantic cod
- Atlantic mackerel
- Bluefin tuna
- Bluefish
- Little tunny
- Porgies (scup)
- Striped bass
- Summer flounder
- Winter flounder
- Wrasses (tautog)

Economic Impacts and Expenditures

The economic contribution of recreational fishing activities in the New England Region is based on spending by recreational anglers.[6] Total annual trip expenditures are estimated at the state level by multiplying mean trip expenditures by the estimated number of adult trips in each trip mode (for-hire, private boat, and shore) and adjusting by the CPI (consumer price index) to the current year. Total annual durable expenditures are estimated by multiplying mean durable expenditures in each state by the estimated annual number of adult participants for each state and adjusting by the CPI (consumer price index) to the current year.[7]

Four different measures are commonly used to show how angler expenditures affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as recreational fishing. The category includes both the direct sales made to the angler and sales made between businesses and households resulting from that original sale. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the purchases made by anglers. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in number of jobs. Note that these categories are not additive. NOAA Fisheries uses a regional impact modeling software, called IMPLAN, to estimate these four types of impacts.

The economic contributions for both trip and durable expenditures from recreational fishing in 2017 were estimated using IMPLAN version 3, with base year data from 2017. Models for each state and for the nation were created in IMPLAN using trip expenditures (based on 2016/2017 survey data on average trip expenditures and total 2017 trips) and for durable expenditures (based on 2014 survey data on average durable expenditures and 2017 participants).

The greatest employment impacts from expenditures on saltwater recreational fishing in the New England Region were generated in Massachusetts (8,469 jobs), followed by Connecticut (5,259 jobs) and Rhode Island (4,046 jobs).The largest sales impacts were observed in Massachusetts ($1 billion), followed by Connecticut ($608.2 million) and Rhode Island ($419 million). The biggest income impacts were generated in Massachusetts ($466.1 million), followed by Connecticut ($264.1 million) and Rhode Island ($177.9 million). The greatest value-added impacts were in Massachusetts ($686.5 million), followed by Connecticut ($424.9 million) and Rhode Island ($276.4 million).

Expenditures for fishing trips and durable equipment across the New England Region in 2017 totaled $2.1 billion. This total included $1.6 billion in durable goods expenditures, with the largest portion coming from boat expenses ($955.4 million).

Participation

In 2017, there were 968,664 recreational anglers who fished in the New England Region. This number represented a 39% decrease from 2008 and a 19% decrease from 2016. The anglers are categorized as either residents from coastal (95%) or non-coastal (5%) counties.

Fishing Trips

In 2017, recreational fishermen took 16.7 million fishing trips in the New England Region. This number represented a 27% decrease from 2008 and a 4% decrease from 2016. The largest proportions of trips were taken in the shore mode (59%) and private boat mode (39%). States with the highest number of recorded trips in the New England Region were Massachusetts (7.8 million trips) and Connecticut (3.9 million trips).

[5] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[6] Trip expenditure estimates were generated from the 2016/2017 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2020). Durable goods expenditures were generated from the 2014 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2016). (For citations: Publications-U.S. Coastal and Marine Recreation.)
[7] Summary data is available online in the FEUS webtool. (Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.)

Harvest and Release Trends

Of the New England Region's key species and species groups, striped bass (24.1 million fish), Atlantic mackerel (20.5 million fish), and porgies (scup) (15.2 million fish), were most frequently caught by recreational fishermen. The text box below shows the species with the largest percentage increases and decreases in the past 10 years and in the past year.

Harvest and Release: Largest Increases

From 2008:
- Little tunny (631%)
- Bluefin tuna (545%)
- Wrasses (tautog) (185%)

From 2016:
- Bluefin tuna (255%)
- Wrasses (tautog) (27%)
- Winter flounder (19%)

Harvest and Release: Largest Decreases

From 2008:
- Bluefish (-44%)
- Summer flounder (-38%)
- Winter flounder (-14%)

From 2016:
- Little tunny (-65%)
- Summer flounder (-24%)
- Bluefish (-3%)

From 2008 to 2017, little tunny (631%), bluefin tuna (545%), and wrasses (tautog) (185%) had the largest increases, while bluefish (-44%), summer flounder (-38%), and winter flounder (-14%) had the largest decreases. From 2016 to 2017, bluefin tuna (255%), wrasses (tautog) (27%), and winter flounder (19%) had the largest increases, while little tunny (-65%), summer flounder (-24%), and bluefish (-3%) had the largest decreases.

The standard coastwide recreational possession limit for Atlantic striped bass of one fish, 28 inches or longer has remained unchanged since it was established by the Atlantic States Marine Fisheries Commission (ASMFC) in 2015.[8,9] From 2016 to 2017, there was a 95% increase in the total amount harvested and released combined. This represents a 55% increase in the total amount of striped bass harvested and released since 2008. Between 2016 and 2017, there was a 17% increase in the total amount of cod from both Gulf of Maine and Georges Bank harvested and released combined.[10]

MARINE ECONOMY — NEW ENGLAND REGION

For this report, the marine economy refers to the economic activity generated by fishing and marine-related industries in a coastal state. The national marine economy consists of two industry sectors: 1) seafood sales and processing (employer establishments and non-employer firms); and 2) transport, support, and marine operations (employer establishments). These sectors include several different marine-related industries.[11,12]

To measure the size of the commercial fishing sector in a state's economy relative to the size of the commercial fishing sector in the national economy, researchers use an index called the Commercial Fishing Location Quotient (CFLQ).[13,14] The CFLQ is calculated as the ratio of the percentage of regional employment in the commercial fishing sector relative to the percentage of national employment in the commercial fishing sector. The United States CFLQ is 1. If a state CFLQ is less than 1, then less commercial fishing occurs in this state than the national average. If a state CFLQ is greater than 1, then more commercial fishing occurs in this state than the national average.

The Bureau of Labor Statistics suppressed the CFLQ value for Connecticut, Massachusetts, and New Hampshire for 2016. Of the remaining states, Maine had the highest CFLQ at 21.54. Rhode Island had a CFLQ value of 3.59.

In 2016, 374,778 employer establishments operated throughout the entire New England Region (including

[8] Atlantic States Marine Fisheries Commission. 2014. Addendum IV to Amendment 6 to the Atlantic Striped Bass Interstate Fishery Management Plan. 20. [Available at http://www.asmfc.org/uploads/file/54d2aa96AtlStripedBassAddendumIV_Oct2014.pdf].
[9] Appelman, M., C. Godwin, W. Laney, G. Shepherd, and D. Orner. 2016. 2016 Review of the Atlantic States Marine Fisheries Commission Fishery Management Plan for Atlantic Striped Bass. Atlantic States Marine Fisheries Commission. 37. [Available at http://www.asmfc.org/uploads/file/57b22f6dsbfmpreview2016.pdf].
[10] Northeast Fisheries Science Center (NEFSC). 2019. 66th Northeast Regional Stock Assessment Workshop (66th SAW) Assessment Summary Report. Woods Hole, MA. Northeast Fisheries Science Center Reference Document 19-01. 40. [Available at http://www.asmfc.org/uploads/file/5d0d2c882019SFlounderBenchmarkAssmtSummary_SAW_SARC.pdf].
[11] Unless otherwise stated, data are from the U.S. Census Bureau. [For more information: www.census.gov.]
[12] U.S. Bureau of Economic Analysis, 'Table 1.1.5 Gross Domestic Product' and 'Table SA6N Compensation of Employees by NAICS Industry.' [Available at: https://apps.bea.gov/regional/histdata/releases/0518gdpstate/.]
[13] Percentage changes in inflation adjusted (real dollar) terms are calculated using the annual Gross Domestic Product implicit price deflator published by the U.S. Bureau of Economic Analysis and the Federal Reserve Bank of St. Louis. [Available at: https://fred.stlouisfed.org/series/GDPDEF.]
[14] U.S. Bureau of Labor Statistics, 'Location Quotient Calculator.' [For more information: https://www.bls.gov/cew/about-data/location-quotients-explained.htm.]

marine and non-marine related establishments). These establishments employed 6.3 million workers and had a total annual payroll of $370.1 billion. The combined gross state product of Connecticut, Maine, Massachusetts, New Hampshire, and Rhode Island, was approximately $964.3 billion in 2016.

Seafood Sales and Processing

Seafood Product Preparation and Packaging: In 2016, the New England Region had 101 non-employer firms in the seafood product preparation and packaging sector. Annual receipts for these firms totaled about $11.3 million.[15] There were 72 employer firms in the seafood product preparation and packaging sector (a 21% decrease from 2008). These establishments employed 2,485 workers and had a total annual payroll of $127.6 million.[15] The greatest number of establishments in this sector was in Massachusetts (112), followed by Maine (85) and Connecticut (22).

Seafood Sales, Retail: In 2016, there were 148 non-employer firms engaged in retail sales of seafood in the states that make up the New England Region (a 13% decrease from 2008). Annual receipts for these firms totaled about $18.6 million (a 17% decrease in real terms from 2008). There were 231 employer firms in the retail sales of seafood sector (a 2% decrease from 2008). These establishments employed 1,338 workers (a 24% increase from 2008) and had a total annual payroll of $44.1 million (a 38% increase in real terms from 2008). The greatest number of establishments in this sector was in Massachusetts (260), followed by Maine (165) and Connecticut (97).

Seafood Sales, Wholesale: There were 331 employer firms in the wholesale sales of seafood sector in the New England Region in 2016 (an 11% decrease from 2008). These establishments employed 3,456 workers (a 9% increase from 2008), and had a total annual payroll of $188.8 million (a 31% increase in real terms from 2008). The greatest number of establishments in this sector was in Maine (150), followed by Massachusetts (128) and Rhode Island (26).

Transport, Support, and Marine Operations

Data for the transport, support, and marine operations sector of New England Region's economy were largely suppressed for confidentiality reasons. It is clear, however, that these sectors play an important role in the regional economy. For example, in 2016, the ship and boat building sector in the New England Region accounted for $496.9 million in payroll (in real terms from 2008).[16]

[15] The Census Bureau suppressed number of firms and receipt data for this sector in one or more states in the this region in either 2016 or 2008, and thus cannot be compared.
[16] Connecticut data for the ship and boat building sector is suppressed.

Tables | New England Region

2017 Economic Impacts of the New England Seafood Industry (thousands of dollars)

		With Imports				Without Imports			
	Landings Revenue	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Connecticut	13,717	5,295	1,087,408	218,948	371,531	721	48,482	16,617	23,166
Maine	511,315	42,353	3,630,283	1,016,423	1,538,973	31,934	1,857,960	642,926	918,865
Massachusetts	605,250	127,563	14,143,543	3,428,282	5,366,611	59,821	2,546,342	937,737	1,278,180
New Hampshire	35,011	15,287	2,503,450	552,670	902,419	2,665	168,700	62,428	85,371
Rhode Island	100,768	12,031	1,661,409	393,191	627,780	5,539	357,456	130,592	182,284

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	808,816	787,206	958,085	1,103,176	1,192,359	1,161,230	1,198,744	1,243,401	1,331,209	1,266,062
Finfish & Other	190,526	176,399	187,840	212,020	242,701	204,278	193,265	182,958	189,670	184,158
Shellfish	618,290	610,806	770,245	891,156	949,658	956,953	1,005,479	1,060,443	1,141,539	1,081,904
Key Species	-	-	-	-	-	-	-	-	-	
American lobster	317,909	305,195	397,818	418,105	426,223	456,654	563,341	618,839	666,917	548,635
Atlantic herring	20,507	24,459	20,686	24,751	28,548	31,365	27,947	24,279	28,613	26,566
Atlantic mackerel	5,265	7,892	3,458	294	3,480	1,738	3,111	3,355	3,149	3,364
Bluefin tuna	2,993	4,448	8,470	9,258	8,388	3,649	6,114	7,723	9,599	7,554
Cod and haddock	47,166	38,745	49,698	48,745	29,666	16,278	20,307	18,898	19,189	16,368
Flounders	30,654	27,286	27,684	30,851	35,148	32,092	30,609	28,103	26,569	25,343
Goosefish	19,945	14,321	14,064	19,791	19,675	13,575	14,101	14,628	15,041	15,305
Quahog clam	8,901	9,002	9,713	8,316	9,276	9,075	9,973	11,286	11,935	11,332
Sea scallop	203,124	209,168	265,531	352,642	389,597	366,294	297,797	287,480	304,708	368,573
Squid	19,848	16,696	14,788	22,889	18,187	15,547	21,411	24,263	41,859	31,539

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	602,950	648,988	581,193	612,922	664,960	634,600	647,779	599,191	596,382	555,661
Finfish & Other	400,732	422,141	335,009	357,143	380,272	358,036	376,458	333,879	298,437	271,279
Shellfish	202,219	226,848	246,184	255,779	284,688	276,564	271,321	265,312	297,945	284,382
Key Species	-	-	-	-	-	-	-	-	-	-
American lobster	86,229	99,199	116,035	125,212	149,132	149,276	147,190	146,379	158,746	132,351
Atlantic herring	167,709	210,784	140,759	174,287	190,554	203,673	197,908	171,779	135,156	104,673
Atlantic mackerel	38,359	39,398	16,904	913	9,680	9,049	12,934	10,140	12,080	12,208
Bluefin tuna	447	772	1,201	1,085	914	523	971	1,502	1,663	1,437
Cod and haddock	33,122	32,470	39,249	30,089	14,649	9,037	15,133	15,257	14,237	13,947
Flounders	15,501	16,232	14,530	17,913	18,349	16,320	14,270	12,304	8,866	9,784
Goosefish	17,757	14,256	12,378	14,699	16,406	14,320	14,557	15,272	15,983	21,083
Quahog clam	1,468	1,628	1,782	1,513	1,570	1,558	1,542	1,424	1,357	1,252
Sea scallop	28,867	31,604	32,888	35,286	39,212	32,093	23,490	23,343	24,833	36,168
Squid	28,615	28,014	21,722	27,909	16,153	14,575	28,781	23,698	39,376	35,851

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
American lobster	3.69	3.08	3.43	3.34	2.86	3.06	3.83	4.23	4.20	4.15
Atlantic herring	0.12	0.12	0.15	0.14	0.15	0.15	0.14	0.14	0.21	0.25
Atlantic mackerel	0.14	0.20	0.20	0.32	0.36	0.19	0.24	0.33	0.26	0.28
Bluefin tuna	6.69	5.76	7.05	8.54	9.18	6.98	6.29	5.14	5.77	5.26
Cod and haddock	1.42	1.19	1.27	1.62	2.03	1.80	1.34	1.24	1.35	1.17
Flounders	1.98	1.68	1.91	1.72	1.92	1.97	2.15	2.28	3.00	2.59
Goosefish	1.12	1.00	1.14	1.35	1.20	0.95	0.97	0.96	0.94	0.73
Quahog clam	6.06	5.53	5.45	5.50	5.91	5.82	6.47	7.93	8.80	9.05
Sea scallop	7.04	6.62	8.07	9.99	9.94	11.41	12.68	12.32	12.27	10.19
Squid	0.69	0.60	0.68	0.82	1.13	1.07	0.74	1.02	1.06	0.88

2017 Economic Impacts of the New England Recreational Fishing Expenditures (thousands of dollars, trips)

	Trips	#Jobs	Sales	Income	Value Added
Connecticut	3,937	5,259	608,157	264,087	424,856
Maine	1,748	1,616	160,121	60,337	98,136
Massachusetts	7,775	8,469	1,005,025	466,082	686,460
New Hampshire	972	497	49,485	21,013	32,886
Rhode Island	2,318	4,046	418,996	177,906	276,443

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	48,387	Fishing Tackle	355,465
Private Boat	282,747	Other Equipment	123,882
Shore	234,888	Boat Expenses	955,413
Total	566,023	Vehicle Expenses	115,221
		Second Home Expenses	1,387
		Total Durable Expenditures	1,551,366
Total State Trip and Durable Goods Expenditures			2,117,389

Recreational Anglers by Residential Area (thousands of anglers)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	1,389	1,222	1,317	1,156	1,171	1,043	1,080	924	1,104	916
Non-Coastal	187	165	169	131	144	100	99	95	94	53
Total Anglers	1,576	1,387	1,486	1,288	1,316	1,143	1,179	1,018	1,198	969

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	543	490	322	380	374	515	488	348	237	362
Private	8,006	8,331	8,982	8,888	8,347	7,962	7,552	7,017	6,625	6,580
Shore	14,553	15,053	15,550	14,004	13,818	11,272	10,690	9,581	10,620	9,808
Total Trips	23,102	23,874	24,855	23,271	22,538	19,749	18,730	16,945	17,482	16,750

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Atlantic cod	H	688	726	957	967	690	842	408	59	167	87
	R	1,505	1,670	2,350	1,684	991	1,799	1,168	1,074	1,787	2,200
Atlantic mackerel	H	9,149	6,150	16,156	15,554	10,443	9,986	8,440	15,579	16,577	17,361
	R	1,629	1,080	1,447	1,867	1,456	716	1,253	3,194	2,027	3,155
Bluefin tuna	H	9	15	2	6	12	< 1	14	2	12	14
	R	1	7	< 1	11	5	< 1	< 1	7	7	55
Bluefish	H	2,165	1,658	3,279	1,799	4,744	5,720	2,383	1,293	1,676	1,599
	R	4,946	4,247	4,809	5,033	4,819	5,304	4,215	2,781	2,464	2,407
Little tunny	H	< 1	6	6	0	18	3	15	54	70	28
	R	42	95	42	85	202	26	1,034	159	811	285
Porgies (scup)	H	3,196	2,950	5,405	5,261	5,421	8,170	6,655	4,394	4,693	5,190
	R	7,546	7,890	9,386	7,161	8,249	7,298	6,481	5,325	9,253	9,969
Striped bass	H	865	1,097	1,199	1,270	1,347	1,373	930	718	454	606
	R	14,690	10,285	7,808	6,872	6,635	10,837	8,942	8,971	11,905	23,539
Summer flounder	H	735	281	568	663	592	844	878	686	556	343
	R	2,571	1,566	1,854	3,143	2,138	2,765	3,101	1,947	2,153	1,705
Winter flounder	H	373	345	287	431	162	115	178	194	83	317
	R	150	338	187	305	73	53	134	214	296	133
Wrasses (tautog)	H	605	820	798	294	849	1,087	1,199	873	730	995
	R	1,115	1,513	1,488	1,369	2,481	3,081	5,498	3,045	3,124	3,906

[1] Connecticut and Rhode Island anglers estimates are not available for the non-coastal mode.
[2] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[3] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.

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2017 Economic Impacts of the Connecticut Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	5,295	1,087,408	218,948	371,531	721	48,482	16,617	23,166
Commercial Harvesters	360	24,325	6,672	10,280	360	24,325	6,672	10,280
Seafood Processors & Dealers	197	23,210	8,864	11,458	45	5,265	2,011	2,599
Importers	2,797	880,861	141,175	268,525	0	0	0	0
Seafood Wholesalers & Distributors	389	70,767	23,163	31,122	14	2,559	838	1,125
Retail	1,552	88,245	39,074	50,146	303	16,332	7,097	9,161

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	17,206	15,007	16,095	20,031	21,128	14,629	14,143	15,791	15,014	13,717
Finfish & Other	3,962	3,108	3,698	4,818	5,467	5,122	4,428	5,411	4,475	4,051
Shellfish	13,243	11,899	12,397	15,213	15,662	9,507	9,715	10,380	10,539	9,666
Key Species	-	-	-	-	-	-	-	-	-	
American lobster	2,102	1,763	1,894	943	1,057	577	608	1,073	1,298	700
Goosefish	551	591	564	976	1,040	1,022	510	680	467	360
Loligo squid	546	260	473	694	1,861	1,257	1,354	1,631	2,199	996
Other flounders	172	87	42	33	65	184	89	164	250	171
Red hake	181	137	76	89	88	115	104	112	109	88
Scups or porgies	383	196	272	408	837	705	573	820	779	565
Sea scallop	10,032	8,952	9,458	13,007	12,005	7,220	7,219	7,039	5,881	7,204
Silver hake	1,436	1,011	1,341	1,617	1,380	1,301	1,586	1,164	917	647
Summer flounder	680	649	850	1,005	940	902	921	1,078	808	673
Whelks and conchs	453	796	449	159	616	295	336	487	997	586

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	7,131	6,568	6,698	7,403	8,940	7,957	7,523	9,390	12,149	10,118
Finfish & Other	4,520	4,155	4,409	5,218	5,756	5,874	5,221	7,110	9,235	8,251
Shellfish	2,611	2,414	2,288	2,186	3,184	2,082	2,302	2,280	2,914	1,867
Key Species	-	-	-	-	-	-	-	-	-	-
American lobster	426	412	442	199	248	127	127	205	254	126
Goosefish	424	546	358	630	765	967	493	605	431	398
Loligo squid	523	256	366	498	1,518	1,098	1,318	1,317	1,823	650
Other flounders	88	58	26	27	40	142	60	86	108	76
Red hake	284	310	176	158	185	173	167	146	164	133
Scups or porgies	282	204	324	644	907	1,195	811	983	942	752
Sea scallop	1,407	1,386	1,260	1,318	1,231	640	609	577	530	777
Silver hake	2,178	1,881	1,973	2,041	1,848	1,647	2,037	1,320	948	746
Summer flounder	221	251	308	401	315	284	253	287	191	134
Whelks and conchs	174	229	113	28	91	81	98	81	211	221

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
American lobster	4.93	4.27	4.29	4.74	4.26	4.53	4.78	5.23	5.10	5.55
Goosefish	1.30	1.08	1.58	1.55	1.36	1.06	1.04	1.12	1.08	0.90
Loligo squid	1.04	1.01	1.29	1.39	1.23	1.15	1.03	1.24	1.21	1.53
Other flounders	1.96	1.50	1.60	1.23	1.60	1.29	1.49	1.91	2.33	2.27
Red hake	0.64	0.44	0.43	0.56	0.47	0.66	0.62	0.77	0.66	0.66
Scups or porgies	1.36	0.96	0.84	0.63	0.92	0.59	0.71	0.83	0.83	0.75
Sea scallop	7.13	6.46	7.51	9.87	9.75	11.29	11.85	12.20	11.09	9.27
Silver hake	0.66	0.54	0.68	0.79	0.75	0.79	0.78	0.88	0.97	0.87
Summer flounder	3.08	2.59	2.76	2.50	2.98	3.18	3.63	3.76	4.23	5.02
Whelks and conchs	2.61	3.47	3.98	5.63	6.75	3.65	3.43	6.04	4.72	2.65

2017 Economic Impacts of Connecticut Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	55	5,980	2,351	3,870
	Private Boat	354	44,460	18,667	33,756
	Shore	504	55,727	24,083	44,181
Total Durable Expenditures		4,346	501,990	218,986	343,049
Total State Economic Impacts		5,259	608,157	264,087	424,856

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	4,111	Fishing Tackle	99,129
Private Boat	53,082	Other Equipment	26,715
Shore	54,264	Boat Expenses	294,314
Total	111,457	Vehicle Expenses	21,345
		Second Home Expenses	0
		Total Durable Expenditures	441,504
Total State Trip and Durable Goods Expenditures			552,961

Recreational Anglers by Residential Area (thousands of anglers)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	381	438	402	420	397	198	209	252	297	296
Non-Coastal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Out-of-State	123	93	112	98	67	43	64	57	88	102
Total Anglers	504	531	514	518	464	240	273	309	385	398

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	73	43	42	45	27	64	62	77	38	36
Private	1,763	1,567	1,807	1,688	1,776	1,730	1,693	1,576	1,629	1,337
Shore	1,733	1,777	1,847	1,746	1,931	1,712	1,885	2,192	2,563	2,565
Total Trips	3,569	3,388	3,696	3,479	3,734	3,506	3,641	3,844	4,230	3,937

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Atlantic cod	H	NA	NA	NA	NA	2	NA	NA	NA	19	2
	R	NA	NA	NA	NA	0	NA	NA	NA	12	< 1
Bluefish	H	833	564	1,482	697	1,399	3,476	1,179	501	554	584
	R	1,599	654	1,552	1,958	1,495	1,594	1,062	890	818	1,763
Hickory shad	H	0	0	4	65	61	15	92	0	36	19
	R	15	1	0	0	0	4	29	7	40	22
Little tunny	H	NA	0	2	0	< 1	NA	2	0	< 1	14
	R	NA	68	15	20	105	NA	17	3	45	50
Porgies (scup)	H	735	767	2,217	1,940	1,840	1,879	1,189	1,198	1,352	1,694
	R	1,662	2,484	2,305	1,170	2,052	2,775	2,729	1,814	3,288	4,650
Striped bass	H	133	100	170	91	137	270	132	141	63	95
	R	5,063	2,427	1,416	1,571	892	2,312	740	1,761	1,208	4,993
Summer flounder	H	188	62	73	99	135	529	281	252	338	121
	R	1,248	614	801	778	650	1,684	1,544	1,075	1,409	811
White perch	H	8	135	NA	0	50	0	9	< 1	22	114
	R	87	144	NA	2	115	6	26	< 1	29	5
Winter flounder	H	NA	20	39	44	52	0	1	45	1	< 1
	R	NA	9	33	2	29	8	1	83	7	< 1
Wrasses (tautog)	H	245	357	274	42	411	307	516	389	312	219
	R	407	337	576	72	1,287	1,276	2,908	1,260	1,809	1,473

National Overview | North Pacific | Pacific | Western Pacific | New England | Mid-Atlantic | South Atlantic | Gulf of Mexico

[1] 'NA' = not available.
[2] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[3] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.

2016 Connecticut State Economy (% of national total)[1]

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[2]
277,699 (1.1%)	89,416 (1.2%)	1,533,879 (1.2%)	94.7 (1.5%)	138 (1.4%)	259	ds

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	18	17	17	14	13	25	26	25	22
	Receipts	2,375	2,550	1,518	1,066	882	3,058	3,969	2,692	1,635
Seafood sales, retail	Firms	25	23	25	21	21	20	18	19	33
	Receipts	3,247	2,142	2,473	2,165	1,388	1,543	1,655	1,813	3,965

Seafood Sales and Processing — Employer Establishments (thousands of dollars)[1,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	3	2	2	2	1	1	1	1	NA
	Employees	59	ds	ds	ds	ds	ds	ds	0	NA
	Payroll	1,040	ds	ds	ds	ds	ds	ds	0	NA
Seafood sales, wholesale	Establishments	24	25	23	24	16	17	19	20	18
	Employees	185	212	216	212	187	178	172	211	158
	Payroll	8,551	8,842	9,219	9,224	8,237	7,920	8,174	20,558	18,205
Seafood sales, retail	Establishments	35	36	39	37	37	36	35	34	32
	Employees	203	205	204	171	233	218	244	230	261
	Payroll	5,248	5,551	5,563	4,824	6,349	6,344	7,380	7,533	8,742

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[1,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	15	13	12	11	8	7	9	8	10
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	0
Deep Sea Freight Transportation	Establishments	12	12	10	11	14	11	11	11	12
	Employees	243	222	225	225	297	184	ds	164	162
	Payroll	46,595	45,045	29,407	41,302	37,711	28,513	26,891	26,880	27,211
Deep Sea Passenger Transportation	Establishments	1	1	1	1	1	NA	NA	NA	1
	Employees	ds	ds	ds	ds	ds	NA	NA	NA	0
	Payroll	ds	ds	ds	ds	ds	NA	NA	NA	0
Coastal and Great Lakes Freight Transportation	Establishments	5	5	6	5	10	9	9	9	8
	Employees	ds	ds	ds	95	256	ds	ds	216	232
	Payroll	ds	ds	8,148	7,856	32,789	ds	ds	27,698	34,550
Port and Harbor Operations	Establishments	8	8	6	5	4	5	5	5	4
	Employees	179	166	122	34	ds	ds	ds	22	19
	Payroll	6,136	5,787	2,162	848	1,414	ds	ds	1,142	1,465
Marine Cargo Handling	Establishments	4	3	3	3	NA	1	1	1	2
	Employees	ds	ds	ds	ds	NA	ds	ds	0	0
	Payroll	ds	ds	ds	ds	NA	ds	ds	0	0
Navigational Services to Shipping	Establishments	6	6	6	5	2	2	4	3	1
	Employees	ds	5	ds	5	ds	ds	3	2	0
	Payroll	338	696	242	898	ds	ds	185	159	0
Marinas	Establishments	125	126	129	128	130	130	128	125	125
	Employees	1,352	1,261	1,284	1,283	1,257	1,265	1,174	1,153	1,193
	Payroll	60,016	58,065	58,877	59,851	60,803	63,211	59,054	59,526	62,504

[1] ds = Data are suppressed.
[2] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[3] NA = Not applicable.

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2017 Economic Impacts of the Maine Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	42,353	3,630,283	1,016,423	1,538,973	31,934	1,857,960	642,926	918,865
Commercial Harvesters	15,027	981,108	269,232	439,606	15,027	981,108	269,232	439,606
Seafood Processors & Dealers	3,145	250,141	100,428	128,325	2,291	182,251	73,172	93,497
Importers	4,507	1,419,375	227,482	432,688	0	0	0	0
Seafood Wholesalers & Distributors	1,835	199,377	71,519	93,064	892	96,863	34,746	45,213
Retail	17,839	780,283	347,761	445,290	13,724	597,738	265,777	340,548

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	308,233	292,315	380,422	412,073	451,647	477,666	551,072	594,058	638,086	511,315
Finfish & Other	37,440	30,367	30,185	43,794	77,524	72,881	50,904	49,607	60,190	56,880
Shellfish	270,793	261,948	350,237	368,279	374,123	404,785	500,168	544,450	577,896	454,435
Key Species	-	-	-	-	-	-	-	-	-	
American lobster	245,146	237,519	318,299	334,688	342,519	371,080	461,897	502,565	540,962	422,961
Atlantic cod and haddock	5,257	1,752	1,520	1,653	1,337	951	1,267	1,069	886	770
Atlantic herring	8,396	7,867	8,643	14,395	14,494	15,492	16,212	13,526	19,488	18,086
Bloodworms	5,913	6,196	5,893	5,847	5,191	5,644	6,085	6,333	6,585	4,745
Blue mussel	1,627	2,203	2,074	1,969	1,930	2,341	2,153	2,458	2,422	1,915
Goosefish	1,478	526	393	578	1,059	773	566	616	459	623
Ocean quahog clam	2,195	1,821	1,721	2,117	1,737	1,378	1,238	1,311	1,299	1,203
Pollock	2,321	2,047	1,503	1,929	2,527	2,562	2,878	1,965	1,663	1,182
Sea urchins	5,410	5,866	5,490	5,113	5,024	5,781	5,282	5,387	6,619	6,118
Softshell clam	12,826	11,686	12,960	15,852	15,657	18,102	20,232	22,841	16,231	9,644

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	186,696	188,388	200,888	249,467	263,693	266,646	266,012	243,158	249,086	208,677
Finfish & Other	98,951	82,505	79,361	122,883	121,327	120,461	127,697	104,434	97,608	79,332
Shellfish	87,745	105,883	121,526	126,583	142,366	146,185	138,315	138,723	151,478	129,345
Key Species	-	-	-	-	-	-	-	-	-	-
American lobster	69,863	81,179	96,244	104,954	127,462	128,017	124,953	122,686	132,662	107,989
Atlantic cod and haddock	2,455	1,401	869	835	536	400	685	658	489	449
Atlantic herring	67,731	64,606	57,557	97,066	92,528	98,769	103,530	86,441	78,425	66,600
Bloodworms	537	574	534	526	457	470	448	401	413	294
Blue mussel	2,289	2,760	2,589	2,810	2,427	2,282	2,270	2,401	1,745	1,201
Goosefish	1,178	603	404	533	1,075	874	633	740	542	883
Ocean quahog clam	669	556	549	645	698	557	438	416	367	346
Pollock	4,064	3,040	1,640	2,325	2,666	2,227	2,319	1,381	1,049	848
Sea urchins	2,900	3,487	2,592	2,407	1,904	1,988	1,958	1,951	2,058	1,956
Softshell clam	1,998	1,902	2,077	2,365	2,258	2,297	2,080	1,891	1,569	1,109

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
American lobster	3.51	2.93	3.31	3.19	2.69	2.90	3.70	4.10	4.08	3.92
Atlantic cod and haddock	2.14	1.25	1.75	1.98	2.50	2.38	1.85	1.62	1.81	1.71
Atlantic herring	0.12	0.12	0.15	0.15	0.16	0.16	0.16	0.16	0.25	0.27
Bloodworms	11.01	10.79	11.03	11.12	11.36	12.00	13.59	15.80	15.93	16.13
Blue mussel	0.71	0.80	0.80	0.70	0.80	1.03	0.95	1.02	1.39	1.60
Goosefish	1.25	0.87	0.97	1.09	0.99	0.88	0.89	0.83	0.85	0.71
Ocean quahog clam	3.28	3.27	3.13	3.28	2.49	2.47	2.82	3.15	3.54	3.48
Pollock	0.57	0.67	0.92	0.83	0.95	1.15	1.24	1.42	1.58	1.39
Sea urchins	1.87	1.68	2.12	2.12	2.64	2.91	2.70	2.76	3.22	3.13
Softshell clam	6.42	6.14	6.24	6.70	6.93	7.88	9.73	12.08	10.34	8.69

2017 Economic Impacts of Maine Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	52	4,725	1,644	2,747
	Private Boat	138	15,957	5,353	9,009
	Shore	524	54,603	20,012	32,799
Total Durable Expenditures		902	84,836	33,328	53,581
Total State Economic Impacts		1,616	160,121	60,337	98,136

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	2,863	Fishing Tackle	25,090
Private Boat	15,322	Other Equipment	9,161
Shore	40,223	Boat Expenses	45,080
Total	58,408	Vehicle Expenses	402
		Second Home Expenses	0
		Total Durable Expenditures	79,733
Total State Trip and Durable Goods Expenditures			138,141

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	121	117	122	85	116	102	79	67	114	114
Non-Coastal	9	12	9	7	6	4	5	4	13	10
Out-of-State	180	324	159	107	126	129	129	74	110	145
Total Anglers	310	453	290	198	248	235	213	145	237	269

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	27	28	24	23	23	30	27	23	17	16
Private	1,038	947	857	892	788	821	711	660	664	650
Shore	1,340	1,663	1,177	856	958	1,045	1,239	1,022	1,268	1,082
Total Trips	2,405	2,637	2,058	1,771	1,768	1,896	1,976	1,705	1,948	1,748

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
American shad	H	< 1	2	0	0	0	0	6	6	4	4
	R	12	42	20	15	43	5	0	50	20	40
Atlantic cod	H	62	77	21	98	48	110	70	3	4	< 1
	R	71	57	97	309	207	157	147	225	148	128
Atlantic mackerel	H	2,554	3,462	3,402	5,416	3,917	2,268	2,331	3,172	4,929	1,934
	R	1,000	625	643	1,215	739	214	603	488	963	221
Blue shark	H	NA	0	NA	0	0	0	0	0	0	NA
	R	NA	3	NA	24	7	36	20	35	2	NA
Bluefin tuna	H	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	R	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bluefish	H	78	10	26	2	22	67	< 1	1	< 1	< 1
	R	134	58	22	10	144	65	0	0	< 1	0
Haddock	H	34	18	5	25	6	13	9	36	45	60
	R	2	2	10	8	30	94	212	122	166	179
Pollock	H	161	143	133	206	122	267	371	194	82	123
	R	496	99	289	493	291	839	441	310	206	133
Striped bass	H	133	146	37	49	31	73	86	14	14	22
	R	1,157	674	522	453	657	985	1,023	824	2,162	2,719
Winter flounder	H	0	0	NA	NA	NA	0	0	NA	0	12
	R	6	23	NA	NA	NA	2	17	NA	47	0

[1] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[2] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[3] 'NA' = not available.

2016 Maine State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
114,473 (0.5%)	41,178 (0.5%)	511,936 (0.4%)	21.3 (0.3%)	34.6 (0.3%)	60.0	21.54

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	64	63	59	51	51	36	37	32	31
	Receipts	4,261	6,605	4,480	3,077	3,294	2,757	4,142	2,583	3,070
Seafood sales, retail	Firms	46	48	47	48	46	49	57	50	47
	Receipts	4,035	4,882	5,835	4,608	4,492	4,200	4,664	5,848	7,586

Seafood Sales and Processing — Employer Establishments (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	29	25	27	28	29	28	30	32	27
	Employees	490	545	594	500	492	376	546	552	509
	Payroll	9,288	10,427	12,851	10,353	12,011	11,797	18,713	18,506	18,774
Seafood sales, wholesale	Establishments	168	164	164	152	136	150	142	146	150
	Employees	1,210	1,126	1,153	1,109	1,047	1,340	1,047	1,123	1,174
	Payroll	36,185	37,687	39,915	38,412	40,734	46,782	40,392	42,337	49,043
Seafood sales, retail	Establishments	45	49	51	51	48	51	54	60	59
	Employees	148	152	176	177	215	243	235	237	229
	Payroll	4,148	4,481	5,126	5,108	6,902	7,618	7,558	9,601	9,162

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[3,4]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	90	82	75	76	76	79	84	84	83
	Employees	6,930	ds	ds	ds	ds	ds	ds	6,654	7,091
	Payroll	354,899	ds	ds	ds	ds	ds	ds	418,591	422,525
Deep Sea Freight Transportation	Establishments	1	1	1	NA	NA	NA	NA	NA	NA
	Employees	ds	ds	ds	NA	NA	NA	NA	NA	NA
	Payroll	ds	ds	ds	NA	NA	NA	NA	NA	NA
Deep Sea Passenger Transportation	Establishments	1	1	1	1	NA	NA	NA	NA	NA
	Employees	ds	ds	ds	ds	NA	NA	NA	NA	NA
	Payroll	ds	ds	ds	ds	NA	NA	NA	NA	NA
Coastal and Great Lakes Freight Transportation	Establishments	5	4	4	4	3	3	3	3	3
	Employees	ds	22	28	ds	ds	ds	ds	17	0
	Payroll	1,058	1,037	1,067	1,105	ds	ds	ds	1,071	0
Port and Harbor Operations	Establishments	2	1	1	1	6	3	3	3	3
	Employees	ds	ds	ds	ds	ds	2	ds	4	0
	Payroll	ds	ds	ds	ds	ds	130	113	142	0
Marine Cargo Handling	Establishments	3	3	2	2	1	2	2	2	4
	Employees	ds	ds	ds	ds	ds	ds	ds	0	20
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	1,857
Navigational Services to Shipping	Establishments	15	14	13	13	13	14	14	13	13
	Employees	138	93	68	63	65	86	75	77	65
	Payroll	6,148	5,369	4,928	4,776	4,730	5,660	5,243	4,752	3,852
Marinas	Establishments	87	89	86	84	80	79	79	80	79
	Employees	411	376	395	349	428	403	435	430	471
	Payroll	15,206	14,654	14,699	15,426	17,102	17,476	19,694	20,400	22,618

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.
[3] 'NA' = not available.

Tables | Massachusetts

2017 Economic Impacts of the Massachusetts Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	127,563	14,143,543	3,428,282	5,366,611	59,821	2,546,342	937,737	1,278,180
Commercial Harvesters	12,487	1,106,970	352,007	516,429	12,487	1,106,970	352,007	516,429
Seafood Processors & Dealers	12,596	1,851,613	705,945	917,852	1,710	251,346	95,828	124,593
Importers	27,666	8,713,061	1,396,434	2,656,123	0	0	0	0
Seafood Wholesalers & Distributors	4,826	869,370	284,096	385,475	1,082	194,837	63,670	86,390
Retail	69,988	1,602,529	689,800	890,733	44,542	993,189	426,232	550,768

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	399,822	400,473	478,247	571,661	615,212	562,707	522,799	523,637	550,857	605,250
Finfish & Other	121,567	113,973	125,850	132,373	125,525	93,901	103,205	99,179	99,156	96,479
Shellfish	278,254	286,500	352,397	439,288	489,687	468,806	419,594	424,458	451,702	508,772
Key Species	-	-	-	-	-	-	-	-	-	
American lobster	45,418	42,731	50,384	53,365	53,360	58,663	68,376	78,290	82,394	82,291
Atlantic herring	11,342	15,062	10,251	8,802	11,529	10,750	9,432	8,787	7,589	6,719
Atlantic mackerel	4,265	4,528	1,486	137	654	1,223	2,421	1,949	2,600	2,756
Clams, all other	15,255	16,745	17,967	19,158	36,633	28,360	26,347	27,452	39,179	31,608
Cod and haddock	38,696	33,684	45,206	43,379	25,847	14,037	18,065	17,433	17,735	15,146
Eastern oyster	5,496	6,432	8,226	9,079	12,071	13,896	19,575	22,679	22,512	28,378
Flounders	20,924	19,645	19,975	22,025	25,051	20,612	17,949	17,340	17,201	17,486
Goosefish	14,035	9,902	9,922	13,429	13,578	8,870	10,028	10,251	11,291	11,838
Ocean quahog clam	9,575	10,710	8,974	7,995	NA	10,229	9,814	9,063	NA	10,719
Sea scallop	189,891	197,280	252,292	330,954	364,902	334,221	271,373	264,741	281,205	330,247

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	326,632	356,105	284,109	264,992	294,948	261,901	273,353	259,804	244,607	242,137
Finfish & Other	255,603	278,908	201,693	179,740	192,899	163,928	181,793	169,504	148,553	138,589
Shellfish	71,029	77,197	82,417	85,252	102,048	97,972	91,560	90,301	96,054	103,548
Key Species	-	-	-	-	-	-	-	-	-	-
American lobster	10,600	11,782	12,772	13,385	14,486	15,159	15,323	16,450	17,787	16,686
Atlantic herring	94,266	133,531	71,922	66,970	81,781	74,992	77,873	70,888	47,149	30,706
Atlantic mackerel	35,406	30,199	12,156	515	4,131	7,279	10,755	7,059	10,556	10,170
Clams, all other	4,376	6,552	10,518	13,352	34,453	22,502	20,685	20,135	33,504	20,351
Cod and haddock	28,537	28,515	36,457	27,153	13,028	8,107	13,977	14,393	13,445	13,296
Eastern oyster	138	159	215	231	310	328	444	528	570	618
Flounders	11,609	12,405	11,159	13,692	14,246	11,517	9,018	8,294	5,973	7,263
Goosefish	12,680	10,015	8,887	10,142	11,567	9,498	10,533	11,084	12,476	17,192
Ocean quahog clam	18,126	18,691	15,645	12,479	NA	14,476	13,422	13,340	NA	14,190
Sea scallop	27,011	29,782	31,160	33,093	36,722	29,253	21,335	21,491	22,845	32,395

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
American lobster	4.28	3.63	3.94	3.99	3.68	3.87	4.46	4.76	4.63	4.93
Atlantic herring	0.12	0.11	0.14	0.13	0.14	0.14	0.12	0.12	0.16	0.22
Atlantic mackerel	0.12	0.15	0.12	0.27	0.16	0.17	0.23	0.28	0.25	0.27
Clams, all other	3.49	2.56	1.71	1.43	1.06	1.26	1.27	1.36	1.17	1.55
Cod and haddock	1.36	1.18	1.24	1.60	1.98	1.73	1.29	1.21	1.32	1.14
Eastern oyster	39.77	40.36	38.31	39.25	38.99	42.41	44.12	42.99	39.49	45.95
Flounders	1.80	1.58	1.79	1.61	1.76	1.79	1.99	2.09	2.88	2.41
Goosefish	1.11	0.99	1.12	1.32	1.17	0.93	0.95	0.92	0.90	0.69
Ocean quahog clam	0.53	0.57	0.57	0.64	NA	0.71	0.73	0.68	NA	0.76
Sea scallop	7.03	6.62	8.10	10.00	9.94	11.43	12.72	12.32	12.31	10.19

[1] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of Massachusetts Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	463	49,737	19,342	31,838
	Private Boat	1,118	139,187	68,344	95,335
	Shore	1,203	136,898	68,646	97,822
Total Durable Expenditures		5,685	679,203	309,750	461,465
Total State Economic Impacts		8,469	1,005,025	466,082	686,460

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	30,563	Fishing Tackle	151,049
Private Boat	181,933	Other Equipment	62,123
Shore	100,756	Boat Expenses	415,930
Total	313,252	Vehicle Expenses	72,595
		Second Home Expenses	686
		Total Durable Expenditures	702,382
Total State Trip and Durable Goods Expenditures			1,015,634

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	655	489	586	490	502	546	582	428	476	350
Non-Coastal	170	144	152	115	130	77	82	85	73	38
Out-of-State	469	421	433	293	309	275	532	199	289	211
Total Anglers	1,293	1,054	1,171	897	941	898	1,196	711	837	599

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	261	251	151	197	227	260	238	117	95	224
Private	3,892	4,448	5,027	4,721	4,380	3,898	3,695	3,064	3,069	3,390
Shore	8,453	8,253	8,980	8,544	7,614	5,967	4,875	4,102	4,080	4,161
Total Trips	12,605	12,952	14,158	13,462	12,221	10,125	8,808	7,282	7,244	7,775

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Atlantic bonito	H	8	12	4	15	12	0	31	12	1	3
	R	9	2	15	0	< 1	2	42	13	13	< 1
Atlantic cod	H	500	474	782	697	486	544	252	5	56	48
	R	1,077	1,333	1,969	1,006	533	1,382	806	317	1,145	1,709
Atlantic mackerel	H	5,454	1,566	12,007	6,911	4,165	5,114	4,334	11,514	9,199	12,295
	R	548	315	744	261	403	417	524	2,385	684	2,689
Bluefish	H	788	688	1,361	684	977	1,520	739	693	977	595
	R	2,153	3,064	3,060	1,877	1,808	1,644	2,888	479	1,059	528
Haddock	H	393	361	318	123	189	189	153	74	741	1,435
	R	299	105	63	41	215	583	666	213	2,487	2,026
Porgies (scup)	H	1,213	1,778	2,349	2,125	2,549	3,783	2,802	1,977	1,791	2,110
	R	2,743	4,193	5,687	4,506	4,527	2,854	2,302	1,906	3,004	3,455
Striped bass	H	514	695	808	873	1,011	659	524	485	230	392
	R	7,496	5,989	5,090	4,036	3,629	4,670	6,425	4,471	6,299	12,866
Summer flounder	H	323	91	149	184	233	80	256	213	106	65
	R	335	171	460	594	560	144	643	242	267	110
Winter flounder	H	349	285	237	365	110	115	168	134	71	285
	R	131	292	134	299	35	40	101	113	230	125
Wrasses (tautog)	H	72	66	154	173	96	240	444	188	74	636
	R	138	384	533	817	348	1,012	2,168	670	261	1,890

[1] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[2] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.

2016 Massachusett State Economy (% of national total)[1]

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[2]
529,496 (2.1%)	177,631 (2.3%)	3,254,781 (2.6%)	205 (3.2%)	295 (3%)	511	ds

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	26	22	27	36	25	28	33	38	38
	Receipts	1,250	1,943	2,082	2,433	1,699	1,857	2,356	4,474	3,800
Seafood sales, retail	Firms	64	64	61	66	65	51	56	52	46
	Receipts	7,982	7,686	6,287	7,640	5,213	3,842	5,782	5,154	4,566

Seafood Sales and Processing — Employer Establishments (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	44	44	44	44	39	40	42	41	37
	Employees	2,355	2,396	2,159	2,214	1,638	1,755	1,819	1,948	1,967
	Payroll	109,747	119,282	107,635	112,399	74,541	87,153	99,445	108,090	108,850
Seafood sales, wholesale	Establishments	141	144	149	141	140	142	130	129	128
	Employees	1,442	1,542	1,591	2,013	1,841	1,910	1,859	1,808	1,865
	Payroll	68,898	70,864	83,467	94,105	100,801	104,637	101,512	102,009	107,494
Seafood sales, retail	Establishments	118	115	112	106	114	114	114	106	107
	Employees	549	542	584	576	576	708	647	641	690
	Payroll	15,017	15,261	16,495	16,037	15,776	18,304	19,516	20,201	21,909

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[1,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	43	38	37	37	40	41	43	39	38
	Employees	603	579	535	445	446	463	623	576	525
	Payroll	28,402	20,685	20,196	22,066	23,195	23,615	31,451	31,153	30,808
Deep Sea Freight Transportation	Establishments	8	10	8	7	9	8	9	8	8
	Employees	361	ds	313	381	ds	ds	ds	0	0
	Payroll	38,908	35,473	36,069	38,797	ds	ds	ds	0	0
Deep Sea Passenger Transportation	Establishments	NA	1	NA	NA	NA	NA	NA	NA	NA
	Employees	NA	ds	NA	NA	NA	NA	NA	NA	NA
	Payroll	NA	ds	NA	NA	NA	NA	NA	NA	NA
Coastal and Great Lakes Freight Transportation	Establishments	14	12	12	10	14	8	12	12	10
	Employees	169	166	ds	ds	ds	22	25	36	34
	Payroll	11,701	10,011	ds	ds	3,266	1,352	1,478	2,766	3,026
Port and Harbor Operations	Establishments	4	4	8	6	5	3	1	1	1
	Employees	63	66	86	95	35	ds	ds	0	0
	Payroll	1,289	1,323	2,662	3,035	1,519	ds	ds	0	0
Marine Cargo Handling	Establishments	3	2	2	2	4	3	3	2	2
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	2,271	ds	ds	ds	ds	ds	ds	0	0
Navigational Services to Shipping	Establishments	8	11	9	9	8	11	9	8	10
	Employees	75	71	150	139	120	94	83	88	106
	Payroll	4,355	4,342	9,413	6,980	5,965	6,578	6,645	7,311	8,984
Marinas	Establishments	175	177	175	176	172	178	177	178	175
	Employees	1,138	1,188	1,150	1,125	977	1,054	1,161	1,076	1,143
	Payroll	53,694	56,663	57,002	58,251	48,657	55,053	57,797	63,422	67,077

[1] ds = Data are suppressed.
[2] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[3] 'NA' = not available.

Tables | New Hampshire

2017 Economic Impacts of the New Hampshire Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	15,287	2,503,450	552,670	902,419	2,665	168,700	62,428	85,371
Commercial Harvesters	920	61,406	17,355	26,952	920	61,406	17,355	26,952
Seafood Processors & Dealers	958	118,174	46,435	59,875	211	26,033	10,230	13,190
Importers	5,931	1,867,906	299,368	569,420	0	0	0	0
Seafood Wholesalers & Distributors	996	144,505	50,939	67,035	82	11,885	4,190	5,513
Retail	6,482	311,459	138,573	179,138	1,452	69,376	30,654	39,715

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	17,471	17,754	20,597	23,482	23,236	20,165	24,291	27,797	33,222	35,011
Finfish & Other	4,824	5,569	5,119	6,146	5,574	2,903	2,899	2,715	2,431	3,148
Shellfish	12,647	12,186	15,478	17,336	17,662	17,262	21,392	25,081	30,791	31,864
Key Species	-	-	-	-	-	-	-	-	-	
American lobster	12,267	11,919	14,836	16,343	17,169	16,602	20,751	24,544	30,373	31,704
Atlantic cod	2,311	2,587	2,186	2,500	1,750	546	571	93	109	149
Atlantic herring	134	271	375	208	349	216	NA	584	NA	815
Goosefish	290	280	212	207	153	186	NA	351	338	422
Haddock	89	68	29	35	91	20	18	8	14	22
Hake	167	215	237	445	475	374	NA	263	274	186
Pollock	1,093	1,283	839	1,355	1,224	1,133	860	356	207	188
Sea scallop	16	4	3	26	143	288	347	399	287	64
Shrimp	NA	NA	NA	NA	NA	NA	NA	NA	23	NA
Spiny dogfish	419	557	291	451	420	94	NA	NA	NA	178

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	10,464	13,886	11,802	12,311	12,145	8,247	9,117	11,093	7,937	10,621
Finfish & Other	7,180	10,093	7,018	7,140	7,543	3,985	4,302	6,148	1,972	4,984
Shellfish	3,284	3,793	4,784	5,171	4,603	4,262	4,815	4,946	5,965	5,637
Key Species	-	-	-	-	-	-	-	-	-	-
American lobster	2,567	2,985	3,648	3,919	4,229	3,818	4,375	4,722	5,782	5,510
Atlantic cod	1,479	1,984	1,226	1,286	725	230	263	45	55	71
Atlantic herring	1,198	3,120	2,830	1,514	2,391	1,579	NA	3,999	NA	2,789
Goosefish	250	250	172	153	126	162	NA	314	331	549
Haddock	53	45	18	19	43	9	10	6	9	18
Hake	222	423	322	587	1,136	393	NA	309	330	267
Pollock	2,456	2,017	1,041	1,732	1,049	982	629	270	98	107
Sea scallop	2	1	0	3	12	25	27	31	24	5
Shrimp	NA	NA	NA	NA	NA	NA	NA	NA	4	NA
Spiny dogfish	1,370	2,073	1,207	1,643	1,788	508	NA	NA	NA	858

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
American lobster	4.78	3.99	4.07	4.17	4.06	4.35	4.74	5.20	5.25	5.75
Atlantic cod	1.56	1.30	1.78	1.94	2.41	2.38	2.17	2.09	1.97	2.10
Atlantic herring	0.11	0.09	0.13	0.14	0.15	0.14	NA	0.15	NA	0.29
Goosefish	1.16	1.12	1.23	1.36	1.21	1.15	NA	1.12	1.02	0.77
Haddock	1.70	1.52	1.57	1.91	2.14	2.28	1.74	1.41	1.55	1.26
Hake	0.75	0.51	0.74	0.76	0.42	0.95	NA	0.85	0.83	0.70
Pollock	0.45	0.64	0.81	0.78	1.17	1.15	1.37	1.32	2.12	1.76
Sea scallop	7.68	7.22	8.84	10.35	11.68	11.59	12.78	12.89	12.16	13.12
Shrimp	NA	NA	NA	NA	NA	NA	NA	NA	5.85	NA
Spiny dogfish	0.31	0.27	0.24	0.27	0.23	0.19	NA	NA	NA	0.21

[1] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of New Hampshire Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	100	9,393	3,593	5,680
	Private Boat	93	9,555	4,371	6,376
	Shore	185	18,166	7,249	12,569
Total Durable Expenditures		119	12,371	5,800	8,261
Total State Economic Impacts		497	49,485	21,013	32,886

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	6,168	Fishing Tackle	4,933
Private Boat	12,176	Other Equipment	1,520
Shore	14,107	Boat Expenses	6,193
Total	32,451	Vehicle Expenses	657
		Second Home Expenses	0
		Total Durable Expenditures	13,302
Total State Trip and Durable Goods Expenditures			45,753

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	63	67	46	56	58	68	50	54	69	24
Non-Coastal	8	9	7	10	9	19	11	6	8	4
Out-of-State	46	58	33	30	54	66	58	54	57	19
Total Anglers	118	134	86	96	121	153	120	115	134	48

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	112	108	65	76	55	114	110	82	38	51
Private	299	313	313	341	375	404	395	407	438	430
Shore	455	414	410	393	427	389	449	492	585	492
Total Trips	865	835	788	810	858	906	954	981	1,061	972

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Atlantic cod	H	124	170	148	165	97	188	66	3	12	32
	R	357	273	247	333	248	259	209	499	423	363
Atlantic mackerel	H	1,142	1,122	746	3,227	2,360	2,537	1,768	880	2,431	3,090
	R	81	141	60	391	312	51	125	315	362	243
Bluefin tuna	H	< 1	< 1	0	0	< 1	NA	NA	NA	NA	NA
	R	0	< 1	< 1	3	0	NA	NA	NA	NA	NA
Bluefish	H	9	< 1	4	1	33	0	2	8	< 1	NA
	R	5	13	3	3	16	< 1	9	0	0	NA
Bottomfish, unidentified	H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Haddock	H	129	120	75	94	101	107	104	153	195	159
	R	25	37	18	25	177	404	582	1,062	553	426
Pollock	H	93	57	135	186	119	228	268	149	213	260
	R	35	59	197	243	282	469	459	1,273	294	316
Striped bass	H	12	17	21	54	37	63	17	10	18	38
	R	197	124	161	191	164	295	316	262	819	1,418
Unidentified flounder	H	0	0	0	0	1	0	0	NA	0	0
	R	6	< 1	5	3	2	10	< 1	NA	3	5
Winter flounder	H	20	20	5	21	< 1	0	8	15	8	11
	R	11	9	17	4	5	3	13	18	12	8

[1] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[2] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[3] 'NA' = not available.

2016 New Hampshire State Economy (% of national total)[1]

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[2]
105,503 (0.4%)	37,868 (0.5%)	594,243 (0.5%)	29.2 (0.5%)	43.6 (0.4%)	77.5	ds

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)[1]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	ds	ds	3	7	7	6	6	4	4
	Receipts	ds	ds	687	856	1,166	1,239	1,019	1,411	1,435
Seafood sales, retail	Firms	17	14	11	11	12	15	15	9	8
	Receipts	1,894	1,870	1,502	2,152	2,096	1,861	2,419	1,722	899

Seafood Sales and Processing — Employer Establishments (thousands of dollars)[1]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	7	8	8	8	8	7	6	8	6
	Employees	ds	115	292	231	229	225	ds	182	0
	Payroll	ds	3,234	10,971	12,010	12,181	13,751	ds	11,160	0
Seafood sales, wholesale	Establishments	8	8	8	7	8	9	8	9	9
	Employees	101	88	80	84	99	113	106	108	95
	Payroll	4,142	4,268	4,171	4,123	5,738	4,562	4,271	4,543	5,480
Seafood sales, retail	Establishments	14	14	12	16	9	9	9	9	9
	Employees	83	95	102	88	48	45	ds	57	58
	Payroll	2,011	2,299	2,296	1,934	870	966	1,699	1,659	1,397

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[1,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	9	8	7	7	7	7	8	6	7
	Employees	ds	ds	ds	ds	ds	ds	ds	181	190
	Payroll	ds	ds	ds	ds	ds	ds	ds	9,800	9,413
Deep Sea Freight Transportation	Establishments	1	1	1	1	1	1	1	NA	NA
	Employees	ds	ds	ds	ds	ds	ds	ds	NA	NA
	Payroll	ds	ds	ds	ds	ds	ds	ds	NA	NA
Coastal and Great Lakes Freight Transportation	Establishments	NA	NA	NA	NA	1	NA	NA	NA	NA
	Employees	NA	NA	NA	NA	ds	NA	NA	NA	NA
	Payroll	NA	NA	NA	NA	ds	NA	NA	NA	NA
Port and Harbor Operations	Establishments	NA	NA	NA	NA	2	2	1	1	1
	Employees	NA	NA	NA	NA	ds	ds	ds	0	0
	Payroll	NA	NA	NA	NA	ds	ds	ds	0	0
Navigational Services to Shipping	Establishments	2	2	2	2	3	3	3	3	2
	Employees	ds	ds	ds	ds	ds	ds	ds	18	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	1,920	0
Marinas	Establishments	37	37	35	34	31	35	35	35	35
	Employees	173	146	135	139	131	155	144	153	162
	Payroll	8,114	7,022	6,920	7,090	6,927	8,031	8,043	8,788	10,070

[1] ds = Data are suppressed.
[2] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[3] NA = Not applicable.

Tables | Rhode Island

2017 Economic Impacts of the Rhode Island Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	12,031	1,661,409	393,191	627,780	5,539	357,456	130,592	182,284
Commercial Harvesters	2,509	174,328	53,931	83,187	2,509	174,328	53,931	83,187
Seafood Processors & Dealers	474	56,469	21,882	28,435	343	40,908	15,852	20,599
Importers	3,440	1,083,375	173,631	330,260	0	0	0	0
Seafood Wholesalers & Distributors	819	111,966	39,672	52,201	140	19,084	6,762	8,897
Retail	4,789	235,273	104,075	133,697	2,547	123,137	54,047	69,601

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	66,085	61,657	62,725	75,930	81,136	86,063	86,440	82,119	94,030	100,768
Finfish & Other	22,732	23,383	22,988	24,890	28,611	29,470	31,829	26,045	23,418	23,601
Shellfish	43,353	38,274	39,737	51,040	52,525	56,593	54,610	56,074	70,612	77,168
Key Species	-	-	-	-	-	-	-	-	-	
All other flounders	2,171	1,455	593	806	1,025	2,124	2,945	1,771	1,464	1,547
American lobster	12,976	11,264	12,404	12,765	12,119	9,732	11,709	12,368	11,889	10,978
Atlantic herring	631	1,260	1,417	1,343	2,174	4,907	2,303	1,373	1,525	939
Atlantic mackerel	882	3,301	1,886	99	2,804	339	309	1,074	448	286
Goosefish	3,590	3,022	2,973	4,600	3,844	2,725	2,996	2,730	2,486	2,062
Quahog clam	3,273	2,849	3,293	3,920	5,169	4,727	5,099	5,453	5,612	5,005
Scups or porgies	2,324	2,640	2,833	3,312	3,904	3,666	4,118	4,278	4,053	3,070
Sea scallop	2,170	2,342	2,156	6,834	9,191	18,639	10,273	8,079	9,367	21,652
Squid	17,687	15,249	12,590	20,381	12,744	13,208	17,718	20,288	33,938	28,332
Summer flounder	4,485	4,502	5,534	6,408	6,937	6,751	7,298	6,107	5,481	4,299

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	72,027	84,041	77,696	78,749	85,234	89,850	91,774	75,746	82,602	84,108
Finfish & Other	34,478	46,479	42,527	42,163	52,746	63,787	57,445	46,684	41,068	40,123
Shellfish	37,549	37,562	35,169	36,587	32,487	26,062	34,328	29,062	41,534	43,985
Key Species	-	-	-	-	-	-	-	-	-	-
All other flounders	1,144	1,027	358	615	664	1,368	2,158	1,057	767	938
American lobster	2,772	2,840	2,929	2,754	2,706	2,156	2,413	2,316	2,260	2,040
Atlantic herring	4,504	9,528	8,449	8,729	13,839	28,330	16,505	10,431	9,539	4,535
Atlantic mackerel	2,385	9,057	4,356	162	5,497	714	539	1,906	1,143	695
Goosefish	3,225	2,841	2,556	3,242	2,873	2,818	2,898	2,529	2,202	2,061
Quahog clam	556	511	599	666	903	784	764	684	660	545
Scups or porgies	2,151	3,619	4,298	6,336	6,311	7,346	6,949	6,794	6,809	5,968
Sea scallop	310	356	267	690	944	1,646	841	677	811	2,189
Squid	26,417	26,452	19,799	25,997	11,689	12,609	24,938	20,495	32,914	33,776
Summer flounder	1,473	1,794	2,289	2,824	2,409	2,193	2,056	1,716	1,306	896

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
All other flounders	1.90	1.42	1.66	1.31	1.54	1.55	1.36	1.68	1.91	1.65
American lobster	4.68	3.97	4.24	4.64	4.48	4.51	4.85	5.34	5.26	5.38
Atlantic herring	0.14	0.13	0.17	0.15	0.16	0.17	0.14	0.13	0.16	0.21
Atlantic mackerel	0.37	0.36	0.43	0.61	0.51	0.47	0.57	0.56	0.39	0.41
Goosefish	1.11	1.06	1.16	1.42	1.34	0.97	1.03	1.08	1.13	1.00
Quahog clam	5.88	5.58	5.50	5.89	5.72	6.03	6.67	7.98	8.51	9.18
Scups or porgies	1.08	0.73	0.66	0.52	0.62	0.50	0.59	0.63	0.60	0.51
Sea scallop	7.00	6.58	8.07	9.90	9.73	11.32	12.21	11.94	11.55	9.89
Squid	0.67	0.58	0.64	0.78	1.09	1.05	0.71	0.99	1.03	0.84
Summer flounder	3.04	2.51	2.42	2.27	2.88	3.08	3.55	3.56	4.20	4.80

2017 Economic Impacts of Rhode Island Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	81	7,595	2,995	4,573
	Private Boat	183	19,249	10,182	14,250
	Shore	315	32,112	15,682	23,358
Total Durable Expenditures		3,467	360,040	149,047	234,262
Total State Economic Impacts		4,046	418,996	177,906	276,443

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	4,682	Fishing Tackle	75,264
Private Boat	20,234	Other Equipment	24,363
Shore	25,538	Boat Expenses	193,896
Total	50,455	Vehicle Expenses	20,222
		Second Home Expenses	701
		Total Durable Expenditures	314,445
Total State Trip and Durable Goods Expenditures			364,900

Recreational Anglers by Residential Area (thousands of anglers)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	169	111	161	105	99	129	160	123	149	132
Non-Coastal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Out-of-State	297	209	225	190	169	255	304	175	243	194
Total Anglers	465	320	387	296	268	383	464	298	392	326

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	71	59	41	39	41	47	52	50	49	35
Private	1,015	1,057	978	1,247	1,028	1,109	1,058	1,310	825	774
Shore	2,572	2,947	3,136	2,464	2,888	2,159	2,241	1,774	2,124	1,508
Total Trips	3,658	4,063	4,155	3,750	3,957	3,316	3,351	3,134	2,999	2,318

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Atlantic bonito	H	< 1	< 1	< 1	NA	< 1	9	1	1	0	10
	R	2	0	0	NA	0	11	9	5	23	< 1
Atlantic cod	H	2	5	6	7	57	< 1	19	49	77	5
	R	< 1	8	37	36	3	< 1	7	33	59	< 1
Black seabass	H	77	92	346	102	226	166	404	434	508	329
	R	171	533	433	489	2,145	1,623	1,981	1,405	2,319	1,869
Bluefish	H	457	395	406	414	2,312	658	463	90	145	419
	R	1,054	459	173	1,185	1,356	2,000	257	1,412	587	116
Porgies (scup)	H	1,249	405	839	1,196	1,032	2,508	2,664	1,219	1,551	1,384
	R	3,141	1,213	1,394	1,486	1,670	1,669	1,451	1,604	2,961	1,864
Striped bass	H	73	138	162	202	131	308	172	67	128	60
	R	778	1,070	619	621	1,292	2,574	438	1,653	1,416	1,543
Summer flounder	H	223	128	346	380	224	235	340	222	113	156
	R	987	780	594	1,772	928	938	910	630	476	784
Winter flounder	H	4	21	5	0	0	NA	< 1	< 1	2	8
	R	2	4	3	< 1	3	NA	1	0	< 1	< 1
Wrasses (tautog)	H	288	397	370	79	341	540	239	296	344	141
	R	570	792	378	480	846	793	422	1,113	1,052	544
Yellowfin tuna	H	NA	NA	NA	NA	NA	13	1	8	< 1	NA
	R	NA	NA	NA	NA	NA	0	0	11	0	NA

[1] 'NA' = Non-coastal data are not available because all of the state's residents are considered coastal county residents.
[2] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[3] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[4] 'NA' = not available.

2016 Rhode Island's State Economy (% of national total)[1]

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[2]
78,381 (0.3%)	28,685 (0.4%)	435,148 (0.3%)	20.2 (0.3%)	32.6 (0.3%)	57.7	3.59

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	7	9	6	9	10	8	8	6	6
	Receipts	1,376	1,045	907	1,168	1,441	1,393	1,418	1,381	1,374
Seafood sales, retail	Firms	19	16	17	25	20	22	16	15	14
	Receipts	2,748	2,821	2,769	3,033	2,536	2,501	1,331	1,259	1,569

Seafood Sales and Processing — Employer Establishments (thousands of dollars)[3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	8	7	5	4	3	3	3	3	2
	Employees	270	275	193	178	ds	ds	ds	71	0
	Payroll	6,354	5,821	6,096	5,544	ds	ds	ds	2,243	0
Seafood sales, wholesale	Establishments	29	34	32	34	32	31	28	28	26
	Employees	226	202	204	230	278	182	188	182	164
	Payroll	10,505	9,534	9,815	10,264	13,064	8,412	8,763	8,140	8,567
Seafood sales, retail	Establishments	23	24	26	23	24	24	27	26	24
	Employees	94	127	113	109	111	113	114	113	100
	Payroll	2,027	2,398	2,309	2,232	2,388	2,610	2,608	2,925	2,932

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	39	33	29	30	37	33	33	33	30
	Employees	1,342	1,085	954	916	717	768	939	902	757
	Payroll	54,225	41,246	40,004	33,316	32,070	34,483	42,200	41,096	34,132
Deep Sea Freight Transportation	Establishments	2	2	2	2	2	1	1	2	2
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	0
Deep Sea Passenger Transportation	Establishments	1	1	1	1	1	2	3	3	2
	Employees	ds	ds	ds	ds	ds	ds	ds	18	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	1,574	0
Coastal and Great Lakes Freight Transportation	Establishments	2	1	1	2	1	1	1	1	1
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	0
Port and Harbor Operations	Establishments	2	1	1	1	5	2	3	3	3
	Employees	ds	ds	ds	ds	ds	ds	ds	18	14
	Payroll	ds	ds	ds	ds	ds	ds	ds	951	813
Marine Cargo Handling	Establishments	5	5	5	5	4	4	3	2	3
	Employees	ds	ds	ds	ds	ds	ds	ds	0	244
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	6,495
Navigational Services to Shipping	Establishments	8	8	8	8	7	7	6	6	6
	Employees	ds	ds	ds	107	ds	ds	ds	69	81
	Payroll	5,904	3,728	3,955	4,002	3,272	ds	ds	4,209	3,771
Marinas	Establishments	73	70	72	71	67	71	65	72	71
	Employees	476	459	428	460	424	466	449	409	435
	Payroll	23,204	21,372	22,227	22,618	20,811	24,214	24,876	25,206	26,264

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.

Mid-Atlantic Region

- Delaware
- Maryland
- New Jersey
- New York
- Virginia

An angler, André Price, fishing for black sea bass off of Ocean City, Maryland.
Photo: NOAA Fisheries Office of Science and Technology/Noelle Olsen

MANAGEMENT CONTEXT

The Mid-Atlantic Region includes Delaware, Maryland, New Jersey, New York, and Virginia. Federal fisheries in this region are managed by the Mid-Atlantic Fishery Management Council (MAFMC) and NOAA Fisheries under seven fishery management plans (FMPs). Two of these FMPs are developed in conjunction with the New England Fishery Management Council (NEFMC). The MAFMC is the lead council for the Spiny Dogfish FMP; the NEFMC is the lead for the Monkfish FMP.

Mid-Atlantic Region FMPs

- Atlantic mackerel, squid and butterfish
- Atlantic bluefish
- Spiny dogfish (with the NEFMC)
- Summer flounder, scup and black sea bass
- Surfclam and ocean quahog
- Golden tilefish
- Monkfish (with the NEFMC)

Summer flounder was the only stock/complex in the Mid-Atlantic region listed as experiencing overfishing in 2017.

Catch Share Programs

Two catch share programs operate in the Mid-Atlantic: 1) Mid-Atlantic Surfclam and Ocean Quahog IFQ Program; and 2) Mid-Atlantic Golden Tilefish IFQ Program. Following is a description of these catch share programs and their performance. Each program is described separately because the surfclam and ocean quahog fisheries are prosecuted as independent fisheries despite being in the same ITQ program. The landings revenues for these programs totaled more than $57.3 million in 2017.

Mid-Atlantic Surfclam and Ocean Quahog IFQ Program: This program was implemented in 1990 to conserve the surfclam and ocean quahog resource and stabilize harvest rates; simplify regulatory requirements to minimize public and private management costs; promote economic efficiency by bringing harvest capacity in line with processing and biological capacity; and create a management approach that is flexible and adaptive to short-term events or circumstances. The 2016 key performance indicators of the surfclam program show that relative to the baseline period (the 3-year period prior to implementation), landings, the number of active vessels, and inflation-adjusted landings revenue decreased, while quota and inflation-adjusted revenue per active vessel increased. The 2016 key performance indicators of the quahog program show that relative to the baseline period (the 3-year period prior to implementation), quota, landings, the number of active vessels, and inflation-adjusted landings revenue decreased, while inflation-adjusted revenue per active vessel increased.

Mid-Atlantic Golden Tilefish IFQ Program: This program was implemented in 2009 to reduce over-capacity and eliminate problems associated with the race to fish golden tilefish. This IFQ program is unique because many key events occurred outside the traditional management process. Prior to the implementation of the IFQ program, fishermen crafted internal agreements that promoted cooperation. Their cooperative processes helped fishing businesses stay viable under new regulations, which laid the foundation for implementing the IFQ program. The 2016 key performance indicators of the program show that relative to the baseline period (the 3-year period prior to implementation), quota, landings, the number of active vessels, inflation-adjusted landings revenue, and inflation-adjusted revenue per active vessel decreased, while no metrics increased.

Policy Updates

While there were a number of new regulatory actions developed by the Mid-Atlantic Fishery Management Council in 2017, all but one were not put into effect until 2018, which is beyond the time frame of this report.

In August 2017, NMFS implemented the Council's Unmanaged Forage Omnibus Amendment.[1] This amendment restricts the development of new, and expansion of existing, directed commercial fisheries on certain unmanaged forage species in mid-Atlantic federal waters until the Council has had an adequate opportunity to assess the scientific information relating to any new or expanded directed fisheries and consider potential

[1] For additional information on this amendment, see https://www.fisheries.noaa.gov/action/mid-atlantic-unmanaged-forage-omnibus-amendment.

impacts to existing fisheries, fishing communities, and the marine ecosystem. The final rule implements an annual landing limit, possession limits, and permitting and reporting requirements for Atlantic chub mackerel and 13 previously unmanaged forage species and species groups caught within Mid-Atlantic Federal waters; allows vessels to transit Mid-Atlantic Federal waters with forage species caught in other areas; and identifies measures that can be revised through a future framework. This is the first rule in the Atlantic to list forage species as ecosystem component species.

COMMERCIAL FISHERIES — MID-ATLANTIC REGION

In this report, commercial fisheries refer to fishing operations that sell their catch for profit. The term does not include subsistence fishermen or saltwater anglers who fish for sport. It also excludes the for-hire sector, which earns its revenue from selling recreational fishing trips to saltwater anglers. The commercial fisheries section reports on economic impacts, landings revenue, landings, and ex-vessel prices of key species/species groups.

Key Mid-Atlantic Region Commercial Species

- American lobster
- Atlantic surf clam
- Blue crab
- Eastern oyster
- Menhaden
- Quahog clam
- Sea scallop
- Squid
- Striped bass
- Summer flounder

Economic Impacts

The premise behind economic impact modeling is that every dollar spent in a regional economy (direct impact) is either saved or re-spent on additional goods or services. If those dollars are re-spent on other goods and services in the regional economy, this spending generates additional economic activity in the region.[2]

Four different measures are commonly used to show how commercial fisheries landings affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as commercial fishing. The category includes both the direct sales of fish landed and sales made between businesses and households resulting from the original sale. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the sales of seafood or purchases of inputs to commercial fishing. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in numbers of jobs. Note that these categories are not additive. The United States seafood industry is defined here as the commercial fishing sector, seafood processors and dealers, seafood wholesalers and distributors, importers, and seafood retailers.[3]

This report provides estimates of total economic impacts for the nation and for each of the 23 coastal states. Total economic impacts for each state and the nation represent the sum of direct impacts; indirect impacts (in this case, the impact from suppliers to the seafood industry); and induced impacts (spending by employees on personal and household expenditures, where employees of both the seafood industry and its full supply chain are included). That is, the total economic impact estimates reported here measure jobs, sales, value-added, and income impacts from the seafood industry as well as the economic activity generated throughout each region's broader economy from this industry.

In 2017, the commercial fishing and seafood industry in New York generated the largest employment impacts in the Mid-Atlantic region with 44,206 full- and part-time jobs. New Jersey generated the largest sales impacts ($7.3 billion), value-added impacts ($2.6 billion), and income impacts ($1.6 billion).

Landings Trends

Landings revenue decreased $46.3 million (-8%) in the Mid-Atlantic Region from 2016 to 2017, with all states experiencing declines. New Jersey's decline was minor (-0.3%). Virginia (down 12%) accounted for the majority of this decrease ($25.8 million). In Virginia, the landings revenue decrease was primarily due to a

[2] Summary data is available online in the FEUS webtool. [Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.]
[3] The NMFS Commercial Fishing Industry Input/Output Model was used to generate the impact estimates. [Available at: http://www.st.nmfs.noaa.gov/documents/commercial_seafood_impacts_2007-2009.]

decrease in landings value of scallops (a $16.5 million, 32% drop). While Virginia scallop landings volume were down 14%, the scallop price declined 21% from $11.33 per pound in 2016 to $8.94 per pound in 2017. Region-wide, sea scallop landings revenue was down $43.3 million (24%) due to a 22% decline in scallop prices. The scallop price decline was due to the 46% increase in landings of scallops in New England (Mid-Atlantic landings remained essentially unchanged at -2%) which drove prices down coast-wide.

The blue crab fishery is the most important fishery in terms of value for Maryland and Delaware and is the third most-valuable fishery in Virginia. Combined, these three states comprised 89.4% and 89.6% of regional blue crab landings and landings revenue, respectively, in 2017. There was, however, a sizable decrease in blue crab landings revenue in the region from 2016 to 2017 (down 18% or $20.3 million), in part due to conservation measures implemented to reduce the harvest of juvenile crab that were at very low abundance levels in 2017 (down 54%).[4] Landings revenue decreased in all three states from 2016 to 2017: Delaware was down by $2.5 million (27%), Maryland by $7.1 million (13%); and Virginia by $13.9 million (34%).

The most significant landings value increase was a $10.1 million (28%) increase in menhaden, followed by a $9.3 million (19%) increase in oysters. The menhaden value increase is due nearly entirely to a 33% increase in price from $0.09 per pound to $0.12 per pound, given landings were largely flat (up 1%) in the region. The menhaden price increase is coincident to the sharp decline in the Gulf of Mexico's menhaden landings, which fell 25% (347 million pounds) and resulted in a 20% national decline in landings. Oyster landings decreased by 14% but were accompanied by a 38% increase in the average price from $8.98 per pound to $12.41 per pound. Although 2017 oyster landings were down relative to the previous year, the 2017 landings are about 2.6 times greater than nine years prior and landings revenue are about 5.2 times greater due to surging aquaculture production in Virginia during this time period.

Landings Revenue

In 2017, landings revenue in the Mid-Atlantic totaled $508.1 million, a 12% increase from 2008 (a 2% decrease in real terms after adjusting for inflation) and an 8% decrease from 2016. Landings revenue was highest in New Jersey ($190.5 million), followed by Virginia ($183.2 million).

Shellfish landings revenue accounted for 76% of all landings revenue. In 2017, sea scallop ($137 million), blue crab ($90.7 million), and eastern oyster ($57.9 million) had the highest landings revenue in this region. Together, these top three species accounted for 56% of total landings revenue.

From 2008 to 2017, eastern oyster (416%, 351% in real terms), squid (99%, 74% in real terms), and menhaden (87%, 64% in real terms) had the largest increases, while Atlantic surf clam (-54%, -60% in real terms), American lobster (-53%, -59% in real terms), and sea scallop (-17%, -28% in real terms) had the largest decreases. From 2016 to 2017, Atlantic surf clam (35%), menhaden (28%), and striped bass (23%) had the largest increases, while sea scallop (-24%), quahog clam (-19%), and blue crab (-18%) had the largest decreases.

Commercial Revenue: Largest Increases

From 2008:

- Eastern oyster (416%, 351% in real terms)
- Squid (99%, 74% in real terms)
- Menhaden (87%, 64% in real terms)

From 2016:

- Atlantic surf clam (35%)
- Menhaden (28%)
- Striped bass (23%)

Commercial Revenue: Largest Decreases

From 2008:

- Atlantic surf clam (-54%, -60% in real terms)
- American lobster (-53%, -59% in real terms)
- Sea scallop (-17%, -28% in real terms)

From 2016:

- Sea scallop (-24%)
- Quahog clam (-19%)
- Blue crab (-18%)

[4] NOAA/NWS/National Data Buoy Center. 2019. "National Data Buoy Center". Stennis Space Center, MS. [Available at https://www.ndbc.noaa.gov/. (Accessed October 17, 2019)].

Landings

In 2017, Mid-Atlantic Region commercial fishermen landed over 620.3 million pounds of finfish and shellfish. This represents a 10% decrease from 2008 and a 1% increase from 2016. Menhaden contributed the highest landings volume in the region, accounting for 63% of total landing weight.

From 2008 to 2017, squid (265%) and eastern oyster (162%) had the largest increases, while American lobster (-59%), Atlantic surf clam (-57%), and sea scallop (-38%) had the largest decreases. From 2016 to 2017, squid (94%), Atlantic surf clam (22%), and striped bass (5%) had the largest increases, while summer flounder (-25%), quahog clam (-20%), and blue crab (-17%) had the largest decreases.

Commercial Landings: Largest Increases

From 2008:

- Squid (265%)
- Eastern oyster (162%)

From 2016:

- Squid (94%)
- Atlantic surf clam (22%)
- Striped bass (5%)

Commercial Landings: Largest Decreases

From 2008:

- American lobster (-59%)
- Atlantic surf clam (-57%)
- Sea scallop (-38%)

From 2016:

- Summer flounder (-25%)
- Quahog clam (-20%)
- Blue crab (-17%)

Prices

In 2017, eastern oyster ($12.41 per pound) received the highest ex-vessel price in the region. Landings of menhaden ($0.12 per pound) had the lowest ex-vessel price. From 2008 to 2017, striped bass (147%, 116% in real terms), eastern oyster (97%, 72% in real terms), and menhaden (92%, 68% in real terms) had the largest increases, while squid (-45%, -52% in real terms) had the largest decrease. From 2016 to 2017, eastern oyster (38%), menhaden (27%), and striped bass (17%) had the largest increases, while squid (-49%), sea scallop (-22%), and blue crab (-1%) had the largest decreases.

RECREATIONAL FISHERIES — MID-ATLANTIC REGION

In this report, recreational fishing refers to fishing for leisure rather than to sell fish (commercial fishing) or for subsistence. This recreational fisheries section reports on economic impacts and expenditures, angler participation, fishing trips, and catch of key species/species groups.[5]

Key Mid-Atlantic Region Recreational Species[6]

- Black sea bass
- Bluefish
- Drum (Atlantic croaker)
- Drum (spot)
- Drum (weakfish)
- Porgies (scup)
- Striped bass
- Summer flounder
- Winter flounder
- Wrasses (tautog)

Economic Impacts and Expenditures

The economic contribution of recreational fishing activities in the Mid-Atlantic Region is based on spending by recreational anglers.[7] Total annual trip expenditures are estimated at the state level by multiplying mean trip expenditures by the estimated number of adult trips in each trip mode (for-hire, private boat, and shore) and adjusting by the CPI (consumer price index) to the current year. Total annual durable expenditures are estimated by multiplying mean durable expenditures in each state by the estimated annual number of adult participants for each state and adjusting by the CPI (consumer price index) to the current year.[8]

Four different measures are commonly used to show how angler expenditures affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity,

[5] Atlantic and Gulf recreational catch and effort estimates are based upon the MRIP estimates released in 2018.
[6] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[7] Trip expenditure estimates were generated from the 2016/2017 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2020). Durable goods expenditures were generated from the 2014 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2016). (For citations: Publications-U.S. Coastal and Marine Recreation.)
[8] Summary data is available online in the FEUS webtool. [Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.]

such as recreational fishing. The category includes both the direct sales made to the angler and sales made between businesses and households resulting from that original sale to the angler. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the purchases made by anglers. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in number of jobs. Note that these categories are not additive. NOAA Fisheries uses a regional impact modeling software, called IMPLAN, to estimate these four types of impacts.

The economic contributions for both trip and durable expenditures from recreational fishing in 2017 were estimated using IMPLAN version 3, with base year data from 2017. Models for each state and for the nation were created in IMPLAN using trip expenditures (based on 2016/2017 survey data on average trip expenditures and total 2017 trips) and for durable expenditures (based on 2014 survey data on average durable expenditures and 2017 participants).

The greatest employment impacts from expenditures on saltwater recreational fishing in the Mid-Atlantic Region were generated in New Jersey (14,478 jobs), followed by New York (11,410 jobs) and Maryland (8,048 jobs). The largest sales impacts were observed in New Jersey ($1.9 billion), followed by New York ($1.2 billion) and Maryland ($846.6 million). The biggest income impacts were generated in New Jersey ($804.1 million), followed by New York ($496.2 million) and Maryland ($335.3 million). The greatest value-added impacts were in New Jersey ($1.3 billion), followed by New York ($848.9 million) and Maryland ($558.7 million).

Expenditures for fishing trips and durable equipment across the Mid-Atlantic Region in 2017 totaled $4.4 billion. This total included $2.7 billion in durable goods expenditures, with the largest portion coming from boat expenses ($1.6 billion).

Participation

In 2017, there were 1.9 million recreational anglers who fished in the Mid-Atlantic Region. This number represented a 37% decrease from 2008 and a 21% decrease from 2016. The anglers are categorized as either residents from coastal (92%) or non-coastal (8%) counties.

Fishing Trips

In 2017, recreational fishermen took 46 million fishing trips in the Mid-Atlantic Region. This number represented a 9% decrease from 2008 and a 5% decrease from 2016. The largest proportions of trips were taken in the shore mode (57%) and private boat mode (41%). States with the highest number of recorded trips in the Mid-Atlantic Region were New York (16.6 million trips) and New Jersey (12.3 million trips).

Harvest and Release Trends

Of the Mid-Atlantic Region's key species and species groups, black sea bass (32.2 million fish), porgies (scup) (26 million fish), and summer flounder (25.9 million fish), were most frequently caught by recreational fishermen. The text box on the following page shows the species with the largest percentage increases and decreases in the past 10 years and in the past year.

From 2008 to 2017, wrasses (tautog) (77%), drum (spot) (13%), and striped bass (9%) had the largest increases, while winter flounder (-86%), drum (weakfish) (-82%), and drum (Atlantic croaker) (-48%) had the largest decreases. From 2016 to 2017, drum (spot) (148%), drum (Atlantic croaker) (22%), and bluefish (8%) had the largest increases, while winter flounder (-74%), drum (weakfish) (-54%), and striped bass (-31%) had the largest decreases.

Winter flounder recreational harvest limits have been in place since 2013.[9,10] The same recreational fishing regulations for weakfish have been in place since 2009, but the stock is considered depleted. The ASMFC has been managing spot using a traffic light approach since 2014.[11,12]

[9] Atlantic States Marine Fisheries Commission. 2014. Press Release: ASMFC Winter Flounder Board Sets 2014 Recreational Measures for Southern New England/Mid-Atlantic Stock. Arlington, VA. Institution. PR14-02. 1 p. [Available at http://www.asmfc.org/uploads/file/52f39d2fpr02WinterFlounder2014RecSpecs.pdf].
[10] Atlantic States Marine Fisheries Commission. 2015. Press Release: ASMFC Winter Flounder Board Sets 2015 Commercial and Recreational Measures for Inshore Stocks. Arlington, VA. Institution. PR15-04. 1 p. [Available at http://www.asmfc.org/uploads/file/54d2a90fpr04WinterFlounder2015Specs.pdf].
[11] Atlantic States Marine Fisheries Commission. 2016. Addendum XXVIII to the Summer Flounder, Scup, Black Sea Bass. 22 p. [Available at http://www.asmfc.org/uploads/file/56d77016SFlounder_BSB_AddendumXXVII_Feb2016.pdf].
[12] Atlantic States Marine Fisheries Commission. 2017. Press Release: ASMFC & MAFMC Modify Scup Specifications for 2018 and 2019. Arlington, VA. Institution. PR17-36. 2 p. [Available at http://www.asmfc.org/uploads/file/598e05b4pr36RevisedScupSpecs.pdf].

Spot populations are known to fluctuate rapidly which may be reflected in the 148% increase in harvested and released spot from 2016 to 2017.

Harvest and Release: Largest Increases

From 2008:
- Wrasses (tautog) (77%)
- Drum (spot) (13%)
- Striped bass (9%)

From 2016:
- Drum (spot) (148%)
- Drum (Atlantic croaker) (22%)
- Bluefish (8%)

Harvest and Release: Largest Decreases

From 2008:
- Winter flounder (-86%)
- Drum (weakfish) (-82%)
- Drum (Atlantic croaker) (-48%)

From 2016:
- Winter flounder (-74%)
- Drum (weakfish) (-54%)
- Striped bass (-31%)

MARINE ECONOMY — MID-ATLANTIC REGION

For this report, the marine economy refers to the economic activity generated by fishing and marine-related industries in a coastal state. The national marine economy consists of two industry sectors: 1) seafood sales and processing (employer establishments and non-employer firms); and 2) transport, support, and marine operations (employer establishments). These sectors include several different marine-related industries.[13,14]

To measure the size of the commercial fishing sector in a state's economy relative to the size of the commercial fishing sector in the national economy, researchers use an index called the Commercial Fishing Location Quotient (CFLQ).[15,16] The CFLQ is calculated as the ratio of the percentage of regional employment in the commercial fishing sector relative to the percentage of national employment in the commercial fishing sector. The United States CFLQ is 1. If a state CFLQ is less than 1, then less commercial fishing occurs in this state than the national average. If a state CFLQ is greater than 1, then more commercial fishing occurs in this state than the national average.

The Bureau of Labor Statistics suppressed the CFLQ value for Delaware for 2016. Of the remaining states, New Jersey had the highest CFLQ at 0.93. Virginia had a CFLQ value of 0.6.

In 2016, 1.1 million employer establishments operated throughout the entire Mid-Atlantic Region (including marine and non-marine related establishments). These establishments employed 17.8 million workers and had a total annual payroll of $1 trillion. The combined gross state product of Delaware, Maryland, New Jersey, New York, and Virginia was approximately $3.1 trillion in 2016.

Seafood Sales and Processing

Seafood Product Preparation and Packaging: In 2016, the Mid-Atlantic Region had 392 non-employer firms in the seafood product preparation and packaging sector (a 72% increase from 2008). Annual receipts for these firms totaled about $26.7 million (a 75% increase in real terms from 2008). There were 70 employer firms in the seafood product preparation and packaging sector (a 12% decrease from 2008). These establishments employed 1,786 workers and had a total annual payroll of $90.1 million.[17] The greatest number of establishments in this sector was in New York (223), followed by Virginia (130) and Maryland (102).

Seafood Sales, Retail: In 2016, there were 411 non-employer firms engaged in retail sales of seafood in the states that make up the Mid-Atlantic Region (a 20% decrease from 2008). Annual receipts for these firms totaled about $36.9 million (a 38% decrease in real terms from 2008). There were 675 employer firms in the retail sales of seafood sector (a 1% increase from 2008). These establishments employed 3,550 workers and had a total annual payroll of $98.5 million (a 50% increase in real terms from 2008).[18] The greatest number of estab-

[13] Unless otherwise stated, data are from the U.S. Census Bureau. [For more information: https://www.census.gov.]
[14] U.S. Bureau of Economic Analysis, 'Table 1.1.5 Gross Domestic Product' and 'Table SA6N Compensation of Employees by NAICS Industry. [Available at: https://apps.bea.gov/regional/histdata/releases/0518gdpstate/.]
[15] Percentage changes in inflation adjusted (real dollar) terms are calculated using the annual Gross Domestic Product implicit price deflator published by the U.S. Bureau of Economic Analysis and the Federal Reserve Bank of St. Louis. [Available at: https://fred.stlouisfed.org/series/GDPDEF.]
[16] U.S. Bureau of Labor Statistics, 'Location Quotient Calculator.' [For more information: https://www.bls.gov/cew/about-data/location-quotients-explained.htm.]
[17] The Census Bureau suppressed number of employees and payroll data for this sector in one or more states in the this region in either 2016 or 2008, and thus cannot be compared.
[18] The Census Bureau suppressed number of employees data for this sector in one or more states in the this region in either 2016 or 2008, and thus cannot be compared.

lishments in this sector was in New York (973), followed by New Jersey (300) and Maryland (261).

Seafood Sales, Wholesale: There were 485 employer firms in the wholesale sales of seafood sector in the Mid-Atlantic Region in 2016 (a 9% increase from 2008). These establishments employed 4,069 workers, and had a total annual payroll of $193.6 million.[19] The greatest number of establishments in this sector was in New York (286), followed by New Jersey (73) and Maryland (60).

Transport, Support, and Marine Operations

Data for the transport, support, and marine operations sector of Mid-Atlantic Region's economy were largely suppressed for confidentiality reasons. It is clear, however, that these sectors play an important role in the regional economy. For example, in 2016, the ship and boat building sector in the Mid-Atlantic Region accounted for $2 billion in payroll (a 1,272% increase in real terms from 2008). The marine cargo handling sector in Delaware, Maryland, New Jersey and New York totaled $659.5 million in payroll in 2016.

[19] The Census Bureau suppressed number of employees and payroll data for this sector in one or more states in this region in either 2016 or 2008, and thus cannot be compared.

Tables | Mid-Atlantic Region

2017 Economic Impacts of the Mid-Atlantic Seafood Industry (thousands of dollars)

		With Imports				Without Imports			
	Landings Revenue	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Delaware	9,140	1,434	334,784	60,250	107,675	345	44,761	9,480	15,203
Maryland	77,403	13,292	1,689,123	417,035	648,225	6,239	371,659	136,798	186,325
New Jersey	190,549	38,594	7,327,743	1,554,790	2,588,541	7,987	728,249	242,015	347,466
New York	47,767	44,206	6,119,112	1,308,258	2,164,733	3,343	175,702	61,049	85,393
Virginia	183,203	16,735	1,483,551	455,296	658,623	13,858	870,486	330,891	448,721

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	452,636	435,847	523,130	554,433	509,873	440,032	477,195	532,410	554,344	508,063
Finfish & Other	91,280	101,445	113,285	121,775	129,518	122,571	119,137	116,226	110,147	124,113
Shellfish	361,356	334,403	409,845	432,658	380,355	317,461	358,058	416,184	444,196	383,950
Key Species	-	-	-	-	-	-	-	-	-	
American lobster	7,213	5,989	6,281	4,738	5,271	4,063	3,731	3,196	3,125	3,421
Atlantic surf clam	30,019	26,426	19,940	18,737	16,501	13,688	12,792	13,959	10,171	13,716
Blue crab	80,912	80,019	127,735	101,634	101,946	85,577	89,020	98,825	110,983	90,718
Eastern oyster	11,205	9,356	12,038	13,043	20,231	43,700	54,577	60,795	48,516	57,853
Menhaden	24,457	28,581	40,345	39,675	40,043	33,770	33,332	40,332	35,707	45,790
Quahog clam	35,853	23,022	28,880	27,607	29,502	35,902	38,153	52,306	45,239	36,790
Sea scallop	165,916	161,814	184,290	227,448	168,921	100,411	125,680	150,716	180,276	137,018
Squid	7,724	7,158	12,027	20,562	17,819	12,038	8,294	8,528	15,478	15,394
Striped bass	10,671	11,459	11,306	12,669	13,862	17,790	16,553	13,015	14,948	18,359
Summer flounder	9,693	9,980	12,850	15,614	17,193	17,153	13,195	14,400	13,594	11,603

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	687,788	694,960	812,742	798,916	762,858	586,778	595,487	655,986	611,875	620,317
Finfish & Other	481,567	489,221	578,297	576,603	570,060	446,529	455,887	506,005	447,329	457,149
Shellfish	206,221	205,739	234,446	222,312	192,798	140,249	139,600	149,981	164,546	163,168
Key Species	-	-	-	-	-	-	-	-	-	-
American lobster	1,520	1,576	1,553	1,096	1,546	1,229	818	632	601	622
Atlantic surf clam	48,099	41,692	30,946	30,272	26,535	22,788	21,430	23,011	16,790	20,468
Blue crab	67,975	76,097	119,283	104,419	88,974	56,075	54,413	68,051	76,761	63,351
Eastern oyster	1,778	1,438	1,770	2,038	2,749	4,927	5,456	6,614	5,406	4,662
Menhaden	397,537	395,469	499,747	496,876	492,532	366,505	379,997	436,392	384,201	388,008
Quahog clam	5,246	3,255	3,685	3,551	3,730	4,586	5,016	7,123	6,231	4,998
Sea scallop	24,355	25,646	23,999	23,386	17,627	8,855	10,256	12,202	15,569	15,186
Squid	8,241	8,310	26,809	33,150	26,069	14,515	8,142	7,970	15,481	30,102
Striped bass	5,693	5,852	5,582	5,461	5,333	4,673	5,045	3,809	3,776	3,970
Summer flounder	4,260	5,137	6,385	8,673	7,795	8,026	4,901	4,975	3,627	2,729

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
American lobster	4.75	3.80	4.04	4.32	3.41	3.31	4.56	5.06	5.20	5.50
Atlantic surf clam	0.62	0.63	0.64	0.62	0.62	0.60	0.60	0.61	0.61	0.67
Blue crab	1.19	1.05	1.07	0.97	1.15	1.53	1.64	1.45	1.45	1.43
Eastern oyster	6.30	6.51	6.80	6.40	7.36	8.87	10.00	9.19	8.98	12.41
Menhaden	0.06	0.07	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.12
Quahog clam	6.83	7.07	7.84	7.77	7.91	7.83	7.61	7.34	7.26	7.36
Sea scallop	6.81	6.31	7.68	9.73	9.58	11.34	12.25	12.35	11.58	9.02
Squid	0.94	0.86	0.45	0.62	0.68	0.83	1.02	1.07	1.00	0.51
Striped bass	1.87	1.96	2.03	2.32	2.60	3.81	3.28	3.42	3.96	4.62
Summer flounder	2.28	1.94	2.01	1.80	2.21	2.14	2.69	2.89	3.75	4.25

2017 Economic Impacts of the Mid-Atlantic Recreational Fishing Expenditures (thousands of dollars, trips)

	Trips	#Jobs	Sales	Income	Value Added
Delaware	1,991	1,672	182,349	67,767	121,421
Maryland	8,343	8,048	846,572	335,327	558,692
New Jersey	12,288	14,478	1,875,954	804,106	1,255,017
New York	16,634	11,410	1,154,290	496,168	848,945
Virginia	6,749	7,176	764,383	295,511	499,039

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	100,271	Fishing Tackle	699,534
Private Boat	959,316	Other Equipment	246,259
Shore	574,231	Boat Expenses	1,598,062
Total	1,633,818	Vehicle Expenses	173,655
		Second Home Expenses	12,191
		Total Durable Expenditures	2,729,700
Total State Trip and Durable Goods Expenditures			4,363,518

Recreational Anglers by Residential Area (thousands of anglers)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	2,823	2,437	2,598	2,244	2,093	2,080	2,111	1,860	2,238	1,751
Non-Coastal	197	187	178	145	175	139	130	124	169	147
Total Anglers	3,020	2,623	2,776	2,389	2,268	2,219	2,241	1,984	2,407	1,898

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	1,146	1,109	871	1,031	983	1,361	1,209	1,299	688	743
Private	22,536	22,753	24,273	22,649	22,528	21,648	20,821	18,975	19,112	18,863
Shore	27,133	27,660	29,410	29,535	29,617	28,119	29,679	27,409	28,558	26,399
Total Trips	50,815	51,522	54,554	53,214	53,129	51,128	51,710	47,683	48,359	46,005

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Black sea bass	H	1,997	3,054	3,221	1,092	2,171	2,054	2,062	3,146	3,935	4,300
	R	20,420	16,444	18,521	8,802	24,303	15,652	11,901	14,406	23,076	27,912
Bluefish	H	6,803	7,268	7,770	8,379	7,886	5,807	10,557	5,256	6,108	6,719
	R	16,399	15,134	13,328	13,772	15,150	9,207	15,481	10,901	11,933	12,805
Drum (Atlantic croaker)	H	15,625	15,419	16,307	10,726	12,385	18,080	13,390	10,437	7,969	8,129
	R	22,391	20,848	17,969	15,564	26,605	30,906	15,221	8,602	8,250	11,661
Drum (spot)	H	13,040	11,796	11,511	12,741	14,839	16,002	18,694	3,174	6,456	19,235
	R	8,984	6,456	7,705	8,266	11,896	18,447	6,604	2,746	3,591	5,650
Drum (weakfish)	H	659	101	37	28	386	135	59	100	58	120
	R	4,641	420	1,239	1,215	1,972	626	652	1,219	1,978	819
Porgies (scup)	H	2,454	3,114	5,189	2,336	1,912	3,376	2,832	7,101	4,450	8,650
	R	6,317	6,794	5,150	3,760	5,647	7,025	4,907	8,331	13,098	17,387
Striped bass	H	3,479	3,596	4,122	3,529	2,699	3,785	3,103	2,368	3,047	2,328
	R	11,853	11,293	11,705	9,350	13,897	15,757	15,196	16,664	21,183	14,452
Summer flounder	H	2,958	3,144	2,698	3,477	4,969	5,633	4,337	3,249	3,680	2,732
	R	33,122	45,411	53,519	48,568	36,828	35,595	36,106	28,159	24,784	23,160
Winter flounder	H	128	161	167	234	177	21	124	18	93	9
	R	100	271	296	259	125	104	47	105	31	23
Wrasses (tautog)	H	1,434	1,738	2,053	972	577	1,055	1,667	987	1,349	1,048
	R	4,651	5,714	6,669	5,018	5,626	7,082	5,460	7,617	10,302	9,746

[1] Delaware anglers estimates are not available for the non-coastal mode.
[2] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.

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2017 Economic Impacts of the Delaware Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	1,434	334,784	60,250	107,675	345	44,761	9,480	15,203
Commercial Harvesters	169	16,747	3,985	5,396	169	16,747	3,985	5,396
Seafood Processors & Dealers	205	41,627	7,324	14,080	32	6,484	1,141	2,193
Importers	711	224,036	35,906	68,296	0	0	0	0
Seafood Wholesalers & Distributors	128	19,578	7,444	8,875	21	3,276	1,245	1,485
Retail	220	32,796	5,591	11,028	123	18,255	3,109	6,130

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	6,900	7,543	7,845	7,092	8,464	7,307	7,220	6,843	11,494	9,140
Finfish & Other	1,092	1,004	1,047	1,248	1,012	1,378	1,219	1,072	1,091	855
Shellfish	5,808	6,538	6,798	5,844	7,452	5,929	6,001	5,771	10,402	8,285
Key Species	-	-	-	-	-	-	-	-	-	
American eel	190	134	206	274	159	244	156	127	130	40
Black sea bass	156	25	8	2	0	2	NA	304	7	267
Blue crab	4,605	5,435	5,957	4,819	6,664	4,576	4,379	4,498	9,145	6,644
Eastern oyster	410	334	404	347	345	407	420	358	498	682
Quahog clam	127	117	110	143	123	177	133	97	69	101
Sea scallop	256	173	NA	NA	NA	NA	NA	NA	NA	NA
Spot	40	49	50	66	16	66	104	3	28	1
Striped bass	403	327	400	412	470	650	496	462	508	468
Weakfish	18	5	4	2	56	16	7	3	8	2
Whelks	352	389	272	361	83	414	577	436	374	276

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	4,706	5,011	5,214	4,921	5,640	4,048	3,727	3,529	5,684	4,729
Finfish & Other	630	773	718	881	628	774	853	658	547	414
Shellfish	4,076	4,238	4,496	4,040	5,012	3,274	2,874	2,871	5,138	4,315
Key Species	-	-	-	-	-	-	-	-	-	-
American eel	80	60	69	91	54	83	62	45	45	14
Black sea bass	61	6	3	4	0	4	NA	112	2	114
Blue crab	3,508	3,414	4,110	3,502	4,571	2,488	2,000	2,124	4,555	3,452
Eastern oyster	67	67	71	62	60	71	73	61	72	75
Quahog clam	36	31	30	39	32	43	41	30	18	28
Sea scallop	38	25	NA	NA	NA	NA	NA	NA	NA	NA
Spot	32	61	60	82	18	73	107	3	14	1
Striped bass	189	184	185	185	190	187	167	144	137	138
Weakfish	11	3	2	1	29	9	4	1	5	1
Whelks	217	313	138	131	29	156	229	177	139	110

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
American eel	2.38	2.24	3.00	3.03	2.93	2.94	2.50	2.83	2.93	2.94
Black sea bass	2.57	4.31	2.63	0.50	0.85	0.50	NA	2.73	4.50	2.34
Blue crab	1.31	1.59	1.45	1.38	1.46	1.84	2.19	2.12	2.01	1.92
Eastern oyster	6.09	4.97	5.67	5.56	5.76	5.71	5.71	5.85	6.90	9.07
Quahog clam	3.57	3.79	3.69	3.72	3.84	4.07	3.25	3.26	3.75	3.61
Sea scallop	6.81	6.80	NA	NA	NA	NA	NA	NA	NA	NA
Spot	1.24	0.81	0.84	0.81	0.89	0.90	0.97	0.93	2.02	1.06
Striped bass	2.13	1.77	2.16	2.22	2.47	3.47	2.98	3.21	3.72	3.39
Weakfish	1.75	1.93	1.56	2.01	1.95	1.92	1.87	1.92	1.75	1.68
Whelks	1.62	1.24	1.97	2.76	2.89	2.66	2.51	2.46	2.69	2.51

[1] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of Delaware Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	34	2,899	1,086	1,644
	Private Boat	278	36,390	11,181	22,543
	Shore	537	58,059	20,031	39,223
Total Durable Expenditures		823	85,001	35,469	58,011
Total State Economic Impacts		1,672	182,349	67,767	121,421

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	1,895	Fishing Tackle	30,131
Private Boat	34,372	Other Equipment	10,253
Shore	51,233	Boat Expenses	56,735
Total	87,501	Vehicle Expenses	6,288
		Second Home Expenses	0
		Total Durable Expenditures	103,407
Total State Trip and Durable Goods Expenditures			190,908

Recreational Anglers by Residential Area (thousands of anglers)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	134	114	128	129	111	82	93	67	104	80
Non-Coastal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Out-of-State	182	173	165	190	151	97	146	84	168	94
Total Anglers	315	287	293	318	262	179	239	151	272	174

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	70	45	19	18	21	37	39	37	14	14
Private	959	1,034	1,065	1,028	973	950	858	744	637	680
Shore	1,637	1,871	2,012	1,832	1,523	1,448	1,593	1,289	1,480	1,297
Total Trips	2,666	2,950	3,097	2,878	2,516	2,435	2,491	2,071	2,130	1,991

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[2,3,4]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Atlantic mackerel	H	NA	0	NA	NA	0	< 1	NA	< 1	0	< 1
	R	NA	2	NA	NA	< 1	< 1	NA	0	< 1	0
Black sea bass	H	39	103	70	121	108	48	48	57	95	111
	R	1,036	803	708	580	605	512	528	526	780	484
Bluefish	H	160	301	98	124	95	57	333	235	110	261
	R	484	751	210	396	400	161	802	464	359	612
Drum (Atlantic croaker)	H	639	983	208	213	202	530	806	335	25	66
	R	1,163	1,284	1,057	215	1,036	1,812	1,397	309	391	231
Drum (weakfish)	H	10	9	< 1	< 1	11	16	7	2	1	1
	R	153	10	42	14	213	52	55	34	63	38
Striped bass	H	68	65	61	44	51	71	26	42	6	28
	R	633	444	256	338	358	273	530	309	218	254
Summer flounder	H	69	169	144	141	101	120	189	120	173	100
	R	1,137	1,957	1,669	1,330	556	518	651	431	557	596
White perch	H	109	155	638	344	183	331	305	118	10	99
	R	673	455	1,232	876	534	1,139	186	355	46	179
Wrasses (tautog)	H	163	324	182	118	95	97	132	29	46	32
	R	300	1,108	868	312	226	322	200	113	277	389
Yellowfin tuna	H	2	< 1	< 1	1	< 1	2	1	5	< 1	NA
	R	0	< 1	0	< 1	0	< 1	< 1	< 1	0	NA

[1] 'NA' = Non-coastal data are not available because all of the state's residents are considered coastal county residents.
[2] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[3] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[4] 'NA' = not available.

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2016 Delaware State Economy (% of national total)[1]

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[2]
63,121 (0.3%)	25,366 (0.3%)	400,069 (0.3%)	21.2 (0.3%)	30.8 (0.3%)	72.6	ds

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)[1,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	3	NA	ds	ds	ds	ds	ds	0	3
	Receipts	27	NA	ds	ds	ds	ds	ds	0	558
Seafood sales, retail	Firms	9	10	9	9	11	8	13	11	11
	Receipts	418	813	1,107	1,226	1,333	520	452	479	608

Seafood Sales and Processing — Employer Establishments (thousands of dollars)[1]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	1	1	1	1	1	1	2	1	2
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	0
Seafood sales, wholesale	Establishments	6	7	7	7	7	9	8	6	6
	Employees	ds	ds	ds	ds	ds	ds	ds	54	56
	Payroll	ds	ds	ds	ds	ds	3,020	2,381	2,404	2,707
Seafood sales, retail	Establishments	18	16	15	18	16	17	17	14	12
	Employees	ds	50	47	49	ds	60	52	36	45
	Payroll	1,498	1,348	1,414	1,493	1,545	1,396	1,261	1,224	1,037

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[1,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	2	2	2	3	4	4	6	6	5
	Employees	ds	ds	ds	ds	50	61	55	57	53
	Payroll	ds	ds	ds	ds	2,313	2,516	2,174	2,168	2,410
Deep Sea Freight Transportation	Establishments	4	4	5	2	1	1	2	4	2
	Employees	ds	ds	120	ds	ds	ds	ds	98	0
	Payroll	ds	ds	10,768	ds	ds	ds	ds	8,771	0
Deep Sea Passenger Transportation	Establishments	NA	NA	1	NA	NA	2	2	1	1
	Employees	NA	NA	ds	NA	NA	ds	ds	0	0
	Payroll	NA	NA	ds	NA	NA	ds	ds	0	0
Coastal and Great Lakes Freight Transportation	Establishments	2	2	1	NA	NA	NA	NA	1	2
	Employees	ds	ds	ds	NA	NA	NA	NA	0	0
	Payroll	ds	ds	ds	NA	NA	NA	NA	0	0
Port and Harbor Operations	Establishments	2	2	3	3	4	3	2	2	2
	Employees	ds	ds	29	44	ds	ds	ds	0	0
	Payroll	ds	ds	1,182	1,512	ds	ds	ds	0	0
Marine Cargo Handling	Establishments	3	3	3	3	2	3	3	3	3
	Employees	629	ds	434	511	ds	565	541	577	540
	Payroll	19,204	16,952	16,835	19,203	ds	20,698	22,789	23,370	22,994
Navigational Services to Shipping	Establishments	9	8	8	8	8	8	10	10	11
	Employees	79	85	76	78	ds	82	92	81	92
	Payroll	5,360	5,672	5,176	5,096	3,111	5,330	5,350	5,938	6,709
Marinas	Establishments	19	16	19	17	18	19	18	18	18
	Employees	65	ds	65	ds	67	64	95	86	86
	Payroll	1,738	1,877	2,342	3,106	1,963	2,196	2,293	2,527	2,527

[1] ds = Data are suppressed.
[2] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[3] NA = Not available.

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2017 Economic Impacts of the Maryland Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	13,292	1,689,123	417,035	648,225	6,239	371,659	136,798	186,325
Commercial Harvesters	2,490	136,579	38,868	60,712	2,490	136,579	38,868	60,712
Seafood Processors & Dealers	1,559	157,374	61,328	78,312	566	57,123	22,260	28,425
Importers	3,251	1,023,852	164,092	312,115	0	0	0	0
Seafood Wholesalers & Distributors	707	106,195	36,098	47,932	179	26,854	9,128	12,121
Retail	5,285	265,122	116,649	149,155	3,004	151,103	66,541	85,067

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	73,196	75,893	103,821	82,563	84,305	81,137	91,050	88,072	90,361	77,403
Finfish & Other	11,264	11,691	13,011	13,126	14,960	15,640	18,845	15,469	17,725	16,256
Shellfish	61,933	64,202	90,810	69,437	69,345	65,497	72,205	72,604	72,636	61,147
Key Species	-	-	-	-	-	-	-	-	-	
Atlantic croaker	442	415	482	482	663	447	492	342	179	136
Black sea bass	445	451	590	507	421	710	834	792	896	1,171
Blue crab	50,115	52,049	79,055	60,326	60,467	50,167	52,848	52,084	54,534	47,391
Clams or bivalves	5,436	4,403	5,400	4,173	2,259	382	1,253	1,915	3,563	1,468
Eastern oyster	2,277	3,849	4,385	3,691	5,710	13,827	15,687	15,093	12,265	10,301
Menhaden	915	884	729	685	1,669	894	1,380	1,222	1,036	549
Sea scallop	3,758	3,160	1,188	551	202	8	1,328	3,077	1,798	820
Striped bass	5,232	5,180	5,425	5,623	6,172	8,043	8,092	6,194	7,131	6,874
Summer flounder	578	551	541	463	380	541	598	597	668	409
White perch	776	942	1,154	1,493	1,429	1,078	1,360	1,351	1,232	1,265

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	63,534	66,819	101,735	78,162	77,259	47,200	49,922	53,833	59,057	48,281
Finfish & Other	18,732	20,038	27,227	20,490	29,188	19,361	21,201	21,082	18,784	16,433
Shellfish	44,802	46,781	74,507	57,673	48,071	27,839	28,721	32,751	40,273	31,848
Key Species	-	-	-	-	-	-	-	-	-	-
Atlantic croaker	778	550	589	804	1,041	852	504	340	162	93
Black sea bass	159	126	203	182	144	234	252	236	272	389
Blue crab	34,872	38,801	66,262	51,163	43,741	24,797	24,690	28,759	36,734	29,421
Clams or bivalves	8,600	6,292	6,971	5,412	2,962	609	1,955	1,983	2,224	214
Eastern oyster	249	498	432	356	618	1,404	1,196	1,191	887	660
Menhaden	9,615	9,419	15,467	8,016	16,383	7,595	8,363	8,786	6,473	3,520
Sea scallop	569	521	153	58	20	1	110	248	151	87
Striped bass	2,655	2,812	2,510	2,343	2,285	1,981	2,353	1,708	1,718	1,767
Summer flounder	208	214	261	259	165	194	192	188	159	103
White perch	858	1,301	1,700	2,059	1,955	1,271	1,516	1,741	1,868	1,510

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Atlantic croaker	0.57	0.75	0.82	0.60	0.64	0.52	0.98	1.01	1.10	1.46
Black sea bass	2.79	3.59	2.90	2.78	2.92	3.03	3.31	3.35	3.30	3.01
Blue crab	1.44	1.34	1.19	1.18	1.38	2.02	2.14	1.81	1.48	1.61
Clams or bivalves	0.63	0.70	0.77	0.77	0.76	0.63	0.64	0.97	1.60	6.86
Eastern oyster	9.13	7.73	10.15	10.37	9.24	9.85	13.11	12.67	13.83	15.61
Menhaden	0.10	0.09	0.05	0.09	0.10	0.12	0.17	0.14	0.16	0.16
Sea scallop	6.60	6.06	7.77	9.53	10.23	12.77	12.11	12.40	11.94	9.45
Striped bass	1.97	1.84	2.16	2.40	2.70	4.06	3.44	3.63	4.15	3.89
Summer flounder	2.78	2.58	2.07	1.78	2.30	2.80	3.11	3.18	4.20	3.96
White perch	0.90	0.72	0.68	0.73	0.73	0.85	0.90	0.78	0.66	0.84

2017 Economic Impacts of Maryland Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	565	55,948	21,657	34,408
	Private Boat	1,421	140,076	51,658	88,530
	Shore	1,505	127,122	46,641	84,303
Total Durable Expenditures		4,557	523,426	215,371	351,451
Total State Economic Impacts		8,048	846,572	335,327	558,692

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	35,032	Fishing Tackle	117,291
Private Boat	145,337	Other Equipment	55,208
Shore	111,466	Boat Expenses	318,900
Total	291,834	Vehicle Expenses	41,830
		Second Home Expenses	2,519
		Total Durable Expenditures	535,748
Total State Trip and Durable Goods Expenditures			827,582

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	643	514	552	415	374	404	413	364	453	353
Non-Coastal	50	43	54	49	40	36	41	31	23	41
Out-of-State	507	327	462	372	258	329	338	352	352	265
Total Anglers	1,200	884	1,068	836	672	769	792	748	829	659

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	179	189	136	154	156	153	189	177	131	211
Private	4,270	4,345	4,897	4,708	5,150	4,861	4,167	4,366	4,160	3,415
Shore	3,667	4,309	4,829	4,859	4,234	4,695	5,038	4,586	5,073	4,717
Total Trips	8,115	8,843	9,862	9,721	9,539	9,710	9,394	9,129	9,364	8,343

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Black sea bass	H	28	35	42	79	161	27	63	89	207	163
	R	1,275	1,080	2,027	811	1,323	768	956	763	1,054	886
Bluefish	H	1,075	1,517	739	731	349	119	396	287	212	175
	R	2,906	1,813	572	1,037	521	723	491	662	556	196
Drum (Atlantic croaker)	H	1,058	2,587	2,995	1,531	2,566	2,309	2,197	1,739	659	426
	R	3,644	2,425	3,061	937	7,091	7,557	2,807	1,236	727	2,834
Drum (spot)	H	3,838	4,588	2,840	2,125	2,121	2,456	4,396	1,352	1,145	3,287
	R	3,273	1,901	2,773	783	3,292	7,621	2,207	642	713	2,288
Striped bass	H	780	1,105	1,152	1,113	720	1,185	1,640	1,112	1,546	1,092
	R	3,222	4,011	5,390	3,484	9,001	6,676	8,304	8,524	13,781	7,788
Summer flounder	H	131	178	76	47	99	119	118	98	40	57
	R	1,862	2,553	4,082	1,632	852	915	1,358	719	1,712	857
Weakfish drum	H	3	10	13	< 1	39	4	2	13	2	9
	R	86	30	417	51	72	20	27	341	161	42
White perch	H	3,662	1,425	7,239	4,341	5,820	6,827	2,746	3,817	6,028	4,380
	R	8,367	3,857	8,715	7,837	16,250	18,587	7,879	7,200	10,339	7,387
Wrasses (tautog)	H	45	107	290	64	20	23	1	12	4	19
	R	326	383	1,318	340	651	325	5	267	530	761
Yellowfin tuna	H	< 1	7	1	< 1	NA	4	17	12	23	112
	R	0	2	< 1	0	NA	10	4	0	24	10

[1] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[2] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[3] NA = not available.

National Overview | North Pacific | Pacific | Western Pacific | New England | Mid-Atlantic | South Atlantic | Gulf of Mexico

2016 Maryland State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
487,540 (2%)	138,480 (1.8%)	2,282,725 (1.8%)	122 (1.9%)	209 (2.1%)	387	0.59

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	56	42	43	55	67	49	60	53	64
	Receipts	3,310	2,268	2,138	2,374	3,030	3,158	3,230	3,133	3,440
Seafood sales, retail	Firms	84	94	85	86	96	95	87	87	91
	Receipts	9,010	8,819	6,177	7,396	6,454	6,147	8,437	8,104	9,426

Seafood Sales and Processing — Employer Establishments (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	22	19	18	17	16	16	17	17	19
	Employees	1,003	245	273	264	266	309	284	288	260
	Payroll	39,328	13,049	12,652	12,773	13,587	12,455	13,131	13,631	17,775
Seafood sales, wholesale	Establishments	60	61	63	57	60	58	58	53	60
	Employees	851	777	795	775	724	636	630	605	654
	Payroll	42,296	39,055	39,067	38,971	34,194	30,119	31,503	33,739	36,196
Seafood sales, retail	Establishments	94	87	87	88	87	87	83	79	85
	Employees	590	485	526	562	575	574	562	539	561
	Payroll	11,510	11,499	11,810	12,883	13,027	13,623	13,907	15,033	15,910

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	46	38	35	35	34	31	35	36	36
	Employees	677	416	ds	633	378	371	449	456	482
	Payroll	22,363	16,238	ds	36,675	14,619	16,822	18,130	20,599	21,425
Deep Sea Freight Transportation	Establishments	13	15	15	16	14	10	11	11	9
	Employees	250	255	390	329	245	139	135	118	140
	Payroll	19,765	20,722	24,185	25,071	17,938	10,041	11,600	11,097	10,396
Deep Sea Passenger Transportation	Establishments	3	2	1	NA	NA	1	NA	NA	NA
	Employees	ds	ds	ds	NA	NA	ds	NA	NA	NA
	Payroll	ds	ds	ds	NA	NA	ds	NA	NA	NA
Coastal and Great Lakes Freight Transportation	Establishments	6	7	8	6	4	4	8	6	8
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	538	ds	0	0
Port and Harbor Operations	Establishments	3	4	5	5	22	16	17	15	14
	Employees	ds	ds	ds	ds	1,875	962	1,220	1,349	1,080
	Payroll	ds	ds	ds	ds	93,001	44,436	57,543	55,375	52,510
Marine Cargo Handling	Establishments	15	16	17	17	6	12	12	12	13
	Employees	1,572	1,599	2,742	1,924	ds	1,519	1,132	1,140	1,424
	Payroll	48,382	46,727	95,182	86,680	ds	60,500	60,962	81,751	75,022
Navigational Services to Shipping	Establishments	9	11	10	11	10	11	10	11	11
	Employees	92	77	84	84	ds	245	131	125	114
	Payroll	3,968	3,807	4,015	4,259	ds	17,066	6,345	6,411	6,055
Marinas	Establishments	179	176	175	172	159	170	166	172	171
	Employees	1,383	1,289	1,275	1,294	1,276	1,328	1,366	1,380	1,396
	Payroll	45,965	45,483	43,508	43,330	43,531	45,540	47,443	50,633	51,934

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.
[3] NA = not available.

Tables | New Jersey

2017 Economic Impacts of the New Jersey Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	38,594	7,327,743	1,554,790	2,588,541	7,987	728,249	242,015	347,466
Commercial Harvesters	2,844	379,749	99,767	161,817	2,844	379,749	99,767	161,817
Seafood Processors & Dealers	1,469	155,506	58,893	76,868	729	77,231	29,249	38,176
Importers	17,332	5,458,453	874,821	1,663,976	0	0	0	0
Seafood Wholesalers & Distributors	2,931	533,671	171,522	233,236	210	38,207	12,280	16,698
Retail	14,019	800,364	349,787	452,645	4,204	233,062	100,720	130,775

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	168,508	151,539	178,537	220,346	187,675	131,346	149,301	166,171	191,170	190,549
Finfish & Other	19,936	24,074	22,985	26,802	28,606	25,910	24,902	29,089	25,946	39,178
Shellfish	148,572	127,465	155,552	193,544	159,069	105,435	124,400	137,083	165,224	151,371
Key Species	-	-	-	-	-	-	-	-	-	
American lobster	3,215	2,278	2,910	3,087	3,938	2,797	2,380	2,248	1,883	2,244
Atlantic herring	548	1,507	416	414	145	401	615	308	292	771
Atlantic mackerel	1,568	1,539	807	53	577	18	12	535	79	612
Blue crab	7,284	184	12,028	9,426	10,011	6,677	4,157	8,700	5,674	9,142
Eastern oyster	2,547	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goosefish	4,005	3,018	2,752	3,654	3,301	2,453	2,428	2,364	2,470	1,558
Quahog clam	30,838	27,496	23,889	25,301	25,453	22,962	11,455	10,889	9,970	12,251
Sea scallop	91,317	90,150	109,120	142,510	110,560	65,190	87,746	97,855	123,369	99,235
Summer flounder	3,461	3,376	4,553	5,461	5,433	4,899	4,862	5,059	5,443	4,274
Summer flounder										

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	162,308	162,029	161,609	187,153	180,436	119,518	124,989	148,437	132,302	198,602
Finfish & Other	62,821	73,623	74,789	94,656	104,154	61,561	64,901	94,248	71,019	118,728
Shellfish	99,487	88,406	86,820	92,496	76,282	57,957	60,088	54,188	61,283	79,874
Key Species	-	-	-	-	-	-	-	-	-	-
American lobster	633	585	693	698	919	660	526	445	350	409
Atlantic herring	6,539	13,692	4,107	2,380	1,106	2,344	4,087	3,428	2,798	4,285
Atlantic mackerel	9,426	10,255	4,633	106	1,997	46	17	2,188	306	2,811
Blue crab	5,816	257	9,458	9,604	7,395	4,409	3,233	7,247	6,816	6,471
Eastern oyster	550	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goosefish	3,698	2,692	2,024	2,274	2,212	2,231	2,172	1,903	1,885	1,388
Quahog clam	51,597	45,306	38,538	41,281	38,921	35,960	19,447	18,283	16,492	18,301
Sea scallop	13,282	14,045	14,171	14,545	11,379	5,640	7,133	7,847	10,491	10,951
Summer flounder	1,541	1,799	2,166	2,831	2,269	2,004	1,826	1,682	1,297	957
Summer flounder										

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
American lobster	5.08	3.89	4.20	4.42	4.28	4.23	4.52	5.05	5.38	5.49
Atlantic herring	0.08	0.11	0.10	0.17	0.13	0.17	0.15	0.09	0.10	0.18
Atlantic mackerel	0.17	0.15	0.17	0.50	0.29	0.40	0.73	0.24	0.26	0.22
Blue crab	1.25	0.72	1.27	0.98	1.35	1.51	1.29	1.20	0.83	1.41
Eastern oyster	4.63	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goosefish	1.08	1.12	1.36	1.61	1.49	1.10	1.12	1.24	1.31	1.12
Quahog clam	0.60	0.61	0.62	0.61	0.65	0.64	0.59	0.60	0.60	0.67
Sea scallop	6.88	6.42	7.70	9.80	9.72	11.56	12.30	12.47	11.76	9.06
Summer flounder	2.25	1.88	2.10	1.93	2.39	2.44	2.66	3.01	4.20	4.47
Summer flounder										

[1] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of New Jersey Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	346	36,089	13,161	22,678
	Private Boat	2,068	345,574	136,735	219,411
	Shore	1,293	180,635	78,504	121,107
Total Durable Expenditures		10,771	1,313,656	575,706	891,821
Total State Economic Impacts		14,478	1,875,954	804,106	1,255,017

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	22,442	Fishing Tackle	262,616
Private Boat	298,441	Other Equipment	80,353
Shore	143,967	Boat Expenses	630,644
Total	464,850	Vehicle Expenses	70,455
		Second Home Expenses	2,671
		Total Durable Expenditures	1,046,738
Total State Trip and Durable Goods Expenditures			1,511,588

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	765	656	776	687	662	581	607	515	507	447
Non-Coastal	26	35	36	23	27	20	17	24	32	16
Out-of-State	456	454	449	357	431	330	566	448	378	253
Total Anglers	1,246	1,145	1,261	1,067	1,121	931	1,189	987	916	716

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	465	436	331	370	388	532	494	450	234	215
Private	7,474	7,373	8,126	7,129	7,107	6,476	6,260	5,013	4,741	4,848
Shore	9,805	9,850	10,228	10,033	10,659	8,759	10,259	9,021	8,877	7,225
Total Trips	17,745	17,659	18,685	17,532	18,153	15,767	17,012	14,485	13,852	12,288

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Black sea bass	H	1,472	1,489	2,006	285	1,364	934	639	440	517	1,509
	R	11,208	7,938	11,907	4,454	11,111	8,612	4,789	4,984	6,239	7,933
Bluefin tuna	H	5	32	16	13	< 1	30	11	2	5	22
	R	< 1	5	20	31	0	0	2	2	9	22
Bluefish	H	2,048	2,161	3,036	3,934	3,133	2,322	4,557	1,765	3,282	3,044
	R	3,883	6,408	6,367	6,867	6,407	3,540	7,411	4,001	7,084	7,677
Drum (weakfish)	H	537	23	4	8	277	90	16	73	12	79
	R	3,708	205	240	288	1,384	331	194	598	278	146
Red hake	H	183	338	196	220	71	104	218	51	41	60
	R	48	40	71	29	259	157	33	17	13	57
Striped bass	H	791	1,141	1,091	1,039	742	1,324	502	600	660	626
	R	3,668	3,503	2,436	2,447	1,822	4,349	2,840	2,440	1,808	2,316
Summer flounder	H	1,471	1,721	1,318	1,969	3,086	3,450	2,418	1,180	1,456	1,200
	R	17,143	23,087	28,058	24,558	22,080	19,160	22,209	10,821	12,299	7,762
Winter flounder	H	13	55	37	122	< 1	21	52	3	56	8
	R	45	81	60	92	2	89	19	102	21	15
Wrasses (tautog)	H	441	420	717	314	92	443	533	339	190	569
	R	2,352	2,649	2,491	2,518	1,754	1,811	2,040	1,614	1,984	3,051
Yellowfin tuna	H	9	19	84	18	183	148	22	13	29	33
	R	1	46	< 1	< 1	8	6	0	23	20	4

[1] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[2] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.

2016 New Jersey State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
693,239 (2.8%)	231,974 (3%)	3,636,293 (2.9%)	215 (3.3%)	314 (3.2%)	582	0.93

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	22	33	47	29	35	48	45	39	44
	Receipts	1,851	3,670	3,613	3,447	3,565	4,981	5,736	3,603	3,811
Seafood sales, retail	Firms	92	86	66	68	77	74	74	70	68
	Receipts	11,196	11,131	8,265	8,049	8,972	8,257	7,135	7,711	7,042

Seafood Sales and Processing — Employer Establishments (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	14	13	11	12	11	13	13	15	13
	Employees	566	661	482	518	404	671	647	715	452
	Payroll	18,703	22,025	17,427	17,940	13,747	22,764	21,933	25,929	17,030
Seafood sales, wholesale	Establishments	81	83	90	91	82	80	78	78	73
	Employees	856	858	848	935	1,058	765	795	784	753
	Payroll	37,462	37,348	38,065	40,103	44,033	37,405	36,773	39,900	41,239
Seafood sales, retail	Establishments	118	106	108	109	114	114	108	115	116
	Employees	368	332	332	332	382	419	434	446	471
	Payroll	9,372	9,126	9,094	9,264	11,561	11,657	12,520	12,591	13,351

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[3,4]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	30	25	24	23	21	24	24	23	24
	Employees	2,019	1,188	1,056	864	901	917	1,080	1,329	1,417
	Payroll	79,309	42,909	37,920	39,810	36,334	41,886	50,459	59,130	64,354
Deep Sea Freight Transportation	Establishments	27	26	26	26	25	20	21	24	22
	Employees	1,115	1,045	ds	ds	390	225	212	193	187
	Payroll	75,848	66,547	78,898	81,936	27,481	12,263	11,271	11,522	11,988
Deep Sea Passenger Transportation	Establishments	2	3	2	2	2	NA	2	1	1
	Employees	ds	ds	ds	ds	ds	NA	ds	0	0
	Payroll	ds	ds	ds	ds	ds	NA	ds	0	0
Coastal and Great Lakes Freight Transportation	Establishments	18	19	18	20	16	16	13	13	15
	Employees	645	594	600	508	402	367	365	414	404
	Payroll	48,911	41,925	44,246	40,587	32,007	32,431	33,308	37,888	38,330
Port and Harbor Operations	Establishments	6	6	11	7	25	18	18	17	18
	Employees	143	54	124	163	ds	ds	ds	106	105
	Payroll	12,446	5,548	10,463	16,933	139,276	5,995	6,334	6,305	6,202
Marine Cargo Handling	Establishments	21	22	21	22	15	20	21	20	20
	Employees	4,244	3,479	3,292	3,744	2,582	6,912	6,082	5,005	4,692
	Payroll	278,189	230,886	260,894	273,636	203,148	538,991	563,746	521,401	519,594
Navigational Services to Shipping	Establishments	20	19	16	17	18	18	18	20	18
	Employees	191	133	75	110	96	106	92	88	75
	Payroll	7,776	6,638	6,125	5,619	5,983	6,057	5,597	6,914	5,851
Marinas	Establishments	211	214	212	206	210	206	190	196	194
	Employees	916	784	781	773	811	787	737	776	826
	Payroll	39,596	35,811	35,475	34,675	35,760	37,606	36,583	38,469	40,971

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.
[3] NA = not available.

Tables | New York

2017 Economic Impacts of the New York Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	44,206	6,119,112	1,308,258	2,164,733	3,343	175,702	61,049	85,393
Commercial Harvesters	1,564	85,798	24,664	37,931	1,564	85,798	24,664	37,931
Seafood Processors & Dealers	929	152,595	58,019	75,467	117	19,269	7,327	9,530
Importers	14,890	4,689,341	751,556	1,429,517	0	0	0	0
Seafood Wholesalers & Distributors	4,408	363,349	122,835	165,622	115	9,498	3,211	4,329
Retail	22,415	828,029	351,183	456,197	1,546	61,137	25,847	33,603

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	57,429	48,856	49,747	50,455	54,904	57,226	56,733	70,841	52,325	47,767
Finfish & Other	18,534	17,331	20,459	22,239	23,482	23,206	19,690	19,283	19,020	20,392
Shellfish	38,896	31,525	29,288	28,216	31,422	34,020	37,043	51,559	33,305	27,375
Key Species	-	-	-	-	-	-	-	-	-	
American lobster	3,821	3,468	3,165	1,398	999	938	985	711	1,037	764
Atlantic surf clam	5,670	5,858	3,929	545	2,783	2,410	1,338	1,908	201	1,465
Eastern oyster	2,870	1,428	2,047	2,174	2,227	4,149	9,372	9,077	1,916	1,411
Loligo squid	5,290	4,167	4,516	7,250	8,648	5,949	5,448	5,413	7,830	4,907
Quahog clam	13,185	8,397	7,774	6,905	9,218	13,475	11,777	24,173	11,957	11,627
Scups or porgies	1,710	1,887	2,112	2,551	3,536	2,971	2,313	3,138	2,897	2,498
Sea scallop	5,050	5,018	3,778	4,960	4,083	2,602	2,963	978	3,783	2,130
Softshell clam	1,076	700	710	351	332	848	982	2,854	1,137	549
Summer flounder	2,933	3,087	3,550	3,732	3,653	3,197	2,997	3,043	2,527	2,449
Tilefishes	3,343	3,262	4,077	4,525	4,260	4,676	4,255	3,656	2,985	3,330

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	34,175	34,304	33,717	32,054	37,023	34,405	27,638	32,701	30,150	24,741
Finfish & Other	14,686	15,867	18,444	18,488	19,083	18,488	15,645	15,660	15,466	14,839
Shellfish	19,489	18,438	15,273	13,566	17,940	15,917	11,993	17,041	14,684	9,902
Key Species	-	-	-	-	-	-	-	-	-	-
American lobster	850	932	814	344	550	497	223	147	219	150
Atlantic surf clam	8,753	8,799	5,857	809	4,117	3,452	1,983	2,826	297	2,167
Eastern oyster	135	64	81	98	108	204	422	788	363	267
Loligo squid	5,469	4,098	3,900	5,630	7,838	4,985	5,138	4,259	6,303	3,302
Quahog clam	1,476	1,410	1,216	1,131	1,299	1,932	1,781	3,867	2,174	2,018
Scups or porgies	1,214	1,850	2,690	3,729	4,307	4,574	3,175	4,050	3,504	3,472
Sea scallop	782	918	508	522	430	256	262	87	398	251
Softshell clam	131	114	116	57	54	138	160	499	243	117
Summer flounder	856	1,142	1,364	1,517	1,238	1,033	833	830	604	502
Tilefishes	1,199	1,435	1,586	1,521	1,413	1,468	1,383	936	745	1,052

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
American lobster	4.49	3.72	3.89	4.06	1.82	1.89	4.42	4.82	4.74	5.08
Atlantic surf clam	0.65	0.67	0.67	0.67	0.68	0.70	0.67	0.68	0.68	0.68
Eastern oyster	21.21	22.23	25.41	22.23	20.58	20.32	22.23	11.52	5.28	5.29
Loligo squid	0.97	1.02	1.16	1.29	1.10	1.19	1.06	1.27	1.24	1.49
Quahog clam	8.93	5.96	6.39	6.10	7.10	6.97	6.61	6.25	5.50	5.76
Scups or porgies	1.41	1.02	0.79	0.68	0.82	0.65	0.73	0.77	0.83	0.72
Sea scallop	6.46	5.47	7.44	9.50	9.50	10.18	11.33	11.21	9.51	8.50
Softshell clam	8.24	6.13	6.13	6.13	6.12	6.13	6.13	5.73	4.69	4.69
Summer flounder	3.43	2.70	2.60	2.46	2.95	3.09	3.60	3.67	4.19	4.88
Tilefishes	2.79	2.27	2.57	2.97	3.01	3.18	3.08	3.90	4.01	3.17

2017 Economic Impacts of New York Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	397	41,943	15,967	27,087
	Private Boat	3,664	296,374	132,046	230,960
	Shore	1,678	135,005	61,162	105,316
Total Durable Expenditures		5,671	680,968	286,993	485,582
Total State Economic Impacts		11,410	1,154,290	496,168	848,945

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	29,345	Fishing Tackle	163,459
Private Boat	355,142	Other Equipment	56,015
Shore	140,124	Boat Expenses	390,119
Total	524,611	Vehicle Expenses	30,689
		Second Home Expenses	328
		Total Durable Expenditures	640,610
Total State Trip and Durable Goods Expenditures			1,165,221

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	817	638	646	497	533	595	657	555	780	541
Non-Coastal	32	21	24	18	30	8	19	10	29	10
Out-of-State	118	58	69	46	53	93	155	53	113	62
Total Anglers	967	717	740	561	616	695	830	618	922	613

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	375	385	334	457	374	580	434	569	270	259
Private	5,389	5,302	5,374	5,528	5,652	5,961	6,457	6,400	6,915	7,372
Shore	8,027	7,972	8,459	8,221	8,607	8,668	8,511	8,302	8,580	9,003
Total Trips	13,791	13,659	14,167	14,206	14,633	15,209	15,402	15,271	15,765	16,634

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Atlantic herring[4]	H	131	22	704	732	1,391	1,520	1,190	11,460	2,105	1,052
	R	54	0	156	< 1	0	409	41	229	161	104
Black sea-bass	H	387	1,113	1,040	570	526	999	1,234	2,494	3,035	2,421
	R	4,144	3,223	2,393	1,787	9,302	4,255	3,666	7,486	13,134	16,339
Bluefish	H	2,606	2,907	2,878	3,344	3,785	2,830	4,847	2,438	2,078	3,065
	R	7,771	5,218	5,079	5,001	7,100	4,248	6,228	5,090	3,368	3,936
Drum (weakfish)	H	59	0	8	< 1	13	21	2	2	5	17
	R	60	7	7	119	30	19	< 1	14	9	138
Porgies (scup)	H	2,264	2,477	3,277	2,141	1,636	2,907	2,787	7,013	3,645	6,496
	R	5,629	6,141	3,657	3,606	4,633	6,691	4,877	7,728	12,401	15,308
Shortfin mako shark	H	< 1	NA	1	0	< 1	0	35	22	4	41
	R	0	NA	0	24	24	3	52	21	29	5
Striped bass	H	1,170	574	1,449	1,005	928	902	804	407	698	472
	R	2,782	2,262	3,036	2,692	2,428	3,956	2,784	3,682	3,739	2,761
Summer flounder	H	819	498	596	661	1,005	1,385	1,173	1,517	1,800	1,186
	R	8,779	9,877	13,931	16,598	10,682	13,492	9,658	14,470	9,651	12,335
Winter flounder	H	115	106	130	113	177	< 1	72	16	37	< 1
	R	55	188	233	168	120	15	28	3	10	< 1
Wrasses (tautog)	H	578	691	541	323	303	473	913	581	1,069	406
	R	1,554	1,457	1,628	1,738	2,935	4,570	3,017	5,577	7,367	5,470

[1] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[2] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[3] NA = not available.
[4] This species may not be equivalent to species with similar names listed in the commercial tables.

2016 New York State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
1,708,374 (6.9%)	544,073 (7%)	8,178,455 (6.5%)	522 (8.1%)	794 (8%)	1,516	0.11

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	73	101	115	142	133	150	181	183	187
	Receipts	3,383	4,896	6,784	7,380	8,279	9,946	10,681	12,890	11,541
Seafood sales, retail	Firms	247	196	214	183	205	197	188	172	161
	Receipts	23,983	19,753	18,999	16,286	16,714	15,923	14,369	13,299	12,089

Seafood Sales and Processing — Employer Establishments (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	17	15	15	18	17	17	17	17	18
	Employees	379	ds	272	299	265	280	ds	310	284
	Payroll	18,570	15,227	16,976	21,372	25,666	22,776	22,687	24,100	22,323
Seafood sales, wholesale	Establishments	231	246	263	291	243	264	270	275	286
	Employees	1,627	1,741	1,798	1,876	1,839	1,937	2,051	2,056	2,149
	Payroll	72,233	68,345	72,442	76,970	78,324	84,346	87,511	93,859	97,304
Seafood sales, retail	Establishments	368	386	394	391	385	399	401	409	406
	Employees	1,470	1,509	1,586	1,660	1,674	1,796	2,054	2,163	2,226
	Payroll	30,741	31,640	32,001	35,664	38,721	45,049	51,605	53,952	60,961

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	49	47	41	43	49	45	42	42	38
	Employees	688	585	575	552	560	ds	ds	487	479
	Payroll	30,462	28,880	26,771	25,998	24,599	24,338	28,028	25,591	26,257
Deep Sea Freight Transportation	Establishments	29	32	30	31	23	20	23	22	21
	Employees	732	782	704	752	214	ds	ds	174	212
	Payroll	108,744	89,313	98,499	88,354	31,229	22,691	19,387	26,452	19,416
Deep Sea Passenger Transportation	Establishments	3	4	2	1	2	3	2	2	1
	Employees	ds	8	ds	ds	ds	ds	ds	0	0
	Payroll	316	126	ds	ds	ds	ds	ds	0	0
Coastal and Great Lakes Freight Transportation	Establishments	50	48	65	62	42	59	72	73	73
	Employees	1,759	2,299	1,654	1,708	ds	ds	ds	1,551	1,732
	Payroll	160,735	198,352	136,577	154,087	ds	ds	ds	185,742	196,617
Port and Harbor Operations	Establishments	3	4	8	9	18	15	15	14	14
	Employees	ds	ds	ds	33	1,294	196	168	230	205
	Payroll	ds	ds	568	1,493	105,325	12,358	10,342	13,774	15,087
Marine Cargo Handling	Establishments	10	9	13	12	6	9	12	11	9
	Employees	ds	ds	1,086	1,019	ds	922	835	577	429
	Payroll	ds	ds	68,555	66,439	ds	60,079	52,523	52,731	41,922
Navigational Services to Shipping	Establishments	32	37	37	35	53	33	36	33	36
	Employees	386	312	598	596	712	687	722	695	709
	Payroll	23,294	19,126	50,119	54,406	63,334	68,141	74,395	73,699	76,693
Marinas	Establishments	419	418	429	431	415	424	427	429	422
	Employees	2,263	2,099	2,052	2,033	1,868	1,907	1,986	1,930	1,950
	Payroll	100,910	96,640	94,654	96,408	87,124	93,212	95,900	99,181	102,523

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.

Tables | Virginia

2017 Economic Impacts of the Virginia Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	16,735	1,483,551	455,296	658,623	13,858	870,486	330,891	448,721
Commercial Harvesters	4,220	314,568	99,127	148,362	4,220	314,568	99,127	148,362
Seafood Processors & Dealers	1,840	184,429	71,757	92,609	1,351	135,460	52,704	68,020
Importers	1,585	499,151	79,998	152,163	0	0	0	0
Seafood Wholesalers & Distributors	740	102,472	35,424	47,212	460	63,704	22,022	29,350
Retail	8,350	382,931	168,990	218,278	7,827	356,754	157,038	202,989

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	146,602	152,017	183,179	193,976	174,524	163,016	172,891	200,482	208,993	183,203
Finfish & Other	40,455	47,345	55,782	58,359	61,458	56,436	54,482	51,314	46,365	47,431
Shellfish	106,147	104,672	127,397	135,617	113,067	106,580	118,409	149,167	162,628	135,772
Key Species	-	-	-	-	-	-	-	-	-	
Atlantic croaker	5,269	6,940	6,025	4,571	7,534	6,247	4,186	4,150	3,188	2,716
Black sea bass	759	569	928	1,003	1,401	1,716	1,365	1,607	1,949	2,002
Blue crab	18,013	21,169	29,133	26,274	24,561	23,991	27,047	33,104	41,162	27,268
Goosefish	951	631	594	752	1,218	920	654	516	400	169
Menhaden	21,271	23,578	34,476	32,995	31,107	25,343	26,046	28,209	25,861	22,865
Oysters	3,101	3,745	5,202	6,832	11,949	25,318	29,099	36,267	33,837	45,458
Sea scallop	65,534	63,312	70,204	79,427	54,076	32,610	33,643	48,806	51,325	34,834
Spot	1,171	3,411	975	3,431	770	2,406	5,763	2,471	464	3,685
Striped bass	3,378	4,219	3,635	4,497	5,542	5,702	6,390	4,735	5,088	6,213
Summer flounder	2,719	2,959	4,202	5,956	7,725	8,513	4,733	5,696	4,948	4,467

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	423,066	426,798	510,468	496,626	462,500	381,607	389,211	417,487	384,682	343,964
Finfish & Other	384,698	378,921	457,118	442,088	417,007	346,345	353,287	374,357	341,514	306,735
Shellfish	38,367	47,877	53,350	54,538	45,492	35,262	35,924	43,130	43,168	37,229
Key Species	-	-	-	-	-	-	-	-	-	-
Atlantic croaker	11,214	8,576	7,873	5,569	6,940	6,325	4,814	4,582	4,009	2,905
Black sea bass	215	164	264	275	392	496	388	422	516	714
Blue crab	23,243	32,756	38,490	39,656	33,144	24,258	24,205	29,682	28,407	23,768
Goosefish	972	743	596	604	907	846	587	445	365	213
Menhaden	353,895	351,392	433,241	414,159	390,318	317,950	326,817	353,934	323,196	284,226
Oysters	776	809	1,187	1,522	1,963	3,248	3,765	4,574	4,083	3,660
Sea scallop	9,685	10,137	9,167	8,260	5,798	2,958	2,752	4,020	4,529	3,897
Spot	1,977	3,910	1,024	3,741	613	2,085	3,983	1,576	285	1,745
Striped bass	2,196	2,109	2,139	2,077	2,175	1,680	1,995	1,441	1,360	1,133
Summer flounder	1,654	1,980	2,592	4,065	4,122	4,794	2,049	2,274	1,565	1,166

Average Annual Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Atlantic croaker	0.47	0.81	0.77	0.82	1.09	0.99	0.87	0.91	0.80	0.94
Black sea bass	3.52	3.46	3.52	3.65	3.57	3.46	3.52	3.80	3.78	2.80
Blue crab	0.77	0.65	0.76	0.66	0.74	0.99	1.12	1.12	1.45	1.15
Goosefish	0.98	0.85	1.00	1.25	1.34	1.09	1.11	1.16	1.10	0.79
Menhaden	0.06	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Oysters	4.00	4.63	4.38	4.49	6.09	7.80	7.73	7.93	8.29	12.42
Sea scallop	6.77	6.25	7.66	9.62	9.33	11.02	12.23	12.14	11.33	8.94
Spot	0.59	0.87	0.95	0.92	1.26	1.15	1.45	1.57	1.63	2.11
Striped bass	1.54	2.00	1.70	2.16	2.55	3.39	3.20	3.29	3.74	5.48
Summer flounder	1.64	1.49	1.62	1.47	1.87	1.78	2.31	2.51	3.16	3.83

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.

2017 Economic Impacts of Virginia Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	206	18,977	6,321	11,235
	Private Boat	1,094	119,676	42,121	77,237
	Shore	1,643	173,746	65,630	114,217
Total Durable Expenditures		4,233	451,984	181,439	296,350
Total State Economic Impacts		7,176	764,383	295,511	499,039

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	11,557	Fishing Tackle	126,037
Private Boat	126,024	Other Equipment	44,430
Shore	127,441	Boat Expenses	201,664
Total	265,022	Vehicle Expenses	24,393
		Second Home Expenses	6,673
		Total Durable Expenditures	403,197
Total State Trip and Durable Goods Expenditures			668,219

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	464	515	496	516	412	419	341	359	394	329
Non-Coastal	89	87	63	56	78	74	53	59	86	80
Out-of-State	338	305	279	320	193	267	206	203	244	263
Total Anglers	891	907	838	892	684	760	600	620	724	672

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	56	54	52	31	45	59	53	66	39	44
Private	4,444	4,700	4,811	4,256	3,646	3,399	3,079	2,451	2,660	2,548
Shore	3,997	3,657	3,882	4,590	4,596	4,549	4,277	4,210	4,549	4,157
Total Trips	8,498	8,411	8,745	8,876	8,287	8,007	7,410	6,727	7,247	6,749

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Black sea bass	H	70	313	63	36	13	46	78	66	81	97
	R	2,757	3,401	1,487	1,170	1,961	1,506	1,962	647	1,869	2,271
Cobia	H	9	34	17	13	1	24	22	39	44	15
	R	5	33	21	27	17	36	58	41	81	77
Drum (Atlantic croaker)	H	12,902	10,790	12,962	8,891	8,786	12,517	9,534	8,024	7,277	7,638
	R	12,806	16,733	13,471	14,160	15,140	18,480	10,314	6,815	6,993	8,444
Drum (spot)	H	8,679	6,906	5,631	10,129	10,148	11,734	13,653	1,731	5,279	15,945
	R	3,335	4,014	4,081	7,291	6,371	7,549	4,125	1,897	2,858	3,336
Drum (spotted seatrout)	H	278	68	77	644	392	154	85	23	164	172
	R	911	550	2,530	3,463	1,257	738	1,059	834	3,709	3,155
Drum (weakfish)	H	50	59	13	19	46	4	32	10	38	14
	R	634	168	533	744	274	205	375	232	1,467	454
Red drum	H	61	122	44	0	91	334	252	22	16	347
	R	573	606	88	157	8,323	577	1,109	79	165	1,723
Striped bass	H	671	711	369	328	258	302	131	208	138	110
	R	1,547	1,072	586	389	289	503	738	1,709	1,638	1,333
Summer flounder	H	468	579	564	659	678	560	439	334	212	188
	R	4,202	7,937	5,780	4,449	2,658	1,510	2,230	1,718	567	1,610
Wrasses (tautog)	H	208	196	324	153	66	20	87	24	40	22
	R	119	117	364	110	61	54	197	46	144	76

[1] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[2] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.

2016 Virginia State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
597,409 (2.4%)	199,548 (2.6%)	3,254,172 (2.6%)	170 (2.6%)	285 (2.9%)	497	0.6

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	74	69	56	73	76	84	83	85	94
	Receipts	5,020	4,053	3,698	3,792	4,691	4,276	5,720	5,849	7,389
Seafood sales, retail	Firms	80	82	82	78	87	94	90	80	80
	Receipts	8,273	6,642	6,951	7,819	8,373	7,612	7,084	7,489	7,698

Seafood Sales and Processing — Employer Establishments (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	26	25	23	18	19	18	20	17	18
	Employees	490	941	961	899	919	781	804	790	790
	Payroll	11,366	30,600	30,460	33,285	32,955	30,682	29,763	31,614	32,991
Seafood sales, wholesale	Establishments	69	72	76	62	64	70	65	65	60
	Employees	621	519	518	469	492	483	448	444	457
	Payroll	17,667	15,620	17,901	15,733	14,271	14,719	14,769	16,089	16,115
Seafood sales, retail	Establishments	68	62	59	58	51	55	57	59	56
	Employees	251	271	265	277	280	254	224	279	247
	Payroll	5,170	5,401	5,480	5,453	5,563	5,526	5,537	6,641	7,255

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	59	53	56	51	59	54	56	54	60
	Employees	ds	ds	ds	ds	ds	ds	ds	30,622	30,387
	Payroll	ds	ds	ds	ds	ds	ds	ds	1,955,354	1,922,736
Deep Sea Freight Transportation	Establishments	18	16	17	21	19	12	12	12	14
	Employees	409	ds	421	492	ds	ds	ds	254	301
	Payroll	32,473	19,241	35,917	42,018	ds	ds	ds	33,057	38,674
Deep Sea Passenger Transportation	Establishments	2	2	1	2	1	1	1	1	1
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	0
Coastal and Great Lakes Freight Transportation	Establishments	10	9	7	7	12	11	12	10	12
	Employees	ds	ds	ds	ds	ds	177	152	186	325
	Payroll	ds	ds	ds	ds	ds	10,077	9,264	11,951	18,059
Port and Harbor Operations	Establishments	8	6	7	6	13	14	15	14	13
	Employees	ds	ds	ds	ds	ds	ds	ds	1,922	2,167
	Payroll	ds	ds	ds	ds	ds	ds	ds	132,983	125,111
Marine Cargo Handling	Establishments	12	12	7	11	6	8	8	8	8
	Employees	ds	ds	ds	ds	ds	ds	ds	0	805
	Payroll	ds	ds	41,280	41,262	ds	ds	ds	0	50,903
Navigational Services to Shipping	Establishments	23	25	26	21	20	18	20	20	18
	Employees	375	384	411	419	428	303	322	302	294
	Payroll	21,014	22,177	22,910	22,132	25,732	20,283	21,348	20,746	19,600
Marinas	Establishments	119	118	115	110	105	113	107	108	103
	Employees	964	829	868	818	673	840	814	818	821
	Payroll	24,326	24,631	24,182	23,379	18,874	24,468	24,436	25,146	25,777

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.

South Atlantic Region

- East Florida
- Georgia
- North Carolina
- South Carolina

Dockside in St. Augustine, Florida.
Photo: South Atlantic Fishery Management Council/Cameron Rhodes

MANAGEMENT CONTEXT

The South Atlantic Region includes East Florida, Georgia, North Carolina, and South Carolina. Federal fisheries in this region are managed by the South Atlantic Fishery Management Council and NOAA Fisheries under eight fishery management plans. The coastal migratory pelagic resources and spiny lobster FMPs are managed jointly with the Gulf of Mexico Fishery Management Council. The South Atlantic Council, in cooperation with the Mid-Atlantic and New England Fishery Management Councils, developed a dolphin wahoo Fishery Management Plan for the Atlantic.

South Atlantic Region FMPs

- Coastal migratory pelagic resources (with GMFMC)
- Coral, coral reef and live/hardbottom habitat
- Dolphin/wahoo
- Golden crab
- Pelagic sargassum habitat
- Shrimp
- Snapper grouper
- Spiny lobster (with GMFMC)

Five of the stocks/complexes covered in these FMPs were listed as overfished in 2017: hogfish (Southeast Florida stock), red snapper (South Atlantic stock), red porgy, snowy grouper, and red grouper (South Atlantic stock). Red grouper (Southern Atlantic Coast stock) was added to the overfished list in 2017.

Seven stocks/complexes were subject to overfishing in 2017: hogfish (Southeast Florida stock), red snapper (South Atlantic stock), blueline tilefish,[1] speckled hind, warsaw grouper, tilefish (South Atlantic stock), and red grouper (South Atlantic stock). Red grouper (Southern Atlantic Coast stock) was added to the overfishing list in 2017.

Catch Share Programs

One catch share program has been implemented in the South Atlantic: the South Atlantic Wreckfish ITQ Program. This catch share program and its performance are described below.

South Atlantic Wreckfish ITQ Program: This program was implemented in 1992 and is the only catch share program in the South Atlantic Region. This program was developed to create incentives for the conservation of wreckfish; provide a management regime that promotes stability and facilitates long-range planning and investment by harvesters and dealers; promote management regimes that minimize gear and area conflicts among fishermen; minimize the tendency for over-capitalization in the harvesting and processing/distribution sectors; and provide a reasonable opportunity for fishermen to make adequate returns from commercial fishing by limiting entry into the program. NOAA Fisheries continues to collect data on this program to develop standard performance indicators that measure its basic economic performance.

Policy Updates

In late December 2016, the Amendment 16 Final Rule[2] published, which revised the seasonal closure of the black sea bass pot gear fishery and also specified better gear identifiers for this fishery. This updated Amendment 19, which had specified the seasonal area closures in order to reduce interactions with the Endangered Species Act (ESA) listed North Atlantic right whales (NARW) in the South Atlantic. Amendment 16 changed the boundaries of the closure to reduce the adverse socioeconomic impacts from original closures while still maintaining protections for the right whale.[3]

Under Amendment 36 of the Snapper Grouper FMP, in June 2017, NOAA Fisheries approved the designation of five offshore areas as Spawning Special Management Zones to help protect spawning fish and unique habitat associated with spawning activities in the South Atlantic. Spawning Special Management Zones are expected to protect important spawning habitat and associated species of fish by limiting specific fishing and anchoring activity within the sites. The action includes a sunset provision that would require the areas be reauthorized after a period of 10 years, based on their effectiveness. The five areas, ranging in size from 3 to 5 square miles off North Carolina, South Carolina, and Florida, are the first Spawning Special Management Zones designated in federal waters off the South Atlantic coast.

Another action taken in the Snapper Grouper FMP that

[1] Stock status based on 2015 landings data compared to the overfishing limit. The 2017 blueline tilefish stock assessment is currently under evaluation by NOAA Fisheries.
[2] https://www.federalregister.gov/documents/2016/12/29/2016-31363/fisheries-of-the-caribbean-gulf-of-mexico-and-south-atlantic-snapper-grouper-fishery-off-the
[3] A technical correction to Amendment 16 was issued in February 2017 to correctly note that the commercial trip limit provision was a year-round restriction. See https://www.federalregister.gov/documents/2017/02/21/2017-03291/snapper-grouper-fishery-off-the-southern-atlantic-states-regulatory-amendment-16-technical-amendment

was initiated in response to a request from the South Atlantic Fishery Management Council, was a NMFS-issued temporary rule to allow for the limited harvest and possession of red snapper in or from the South Atlantic exclusive economic zone. The rule, in effect from November 2 to December 21 of 2017, was intended to mitigate adverse impacts on fishermen and fishing communities utilizing the red snapper portion of the snapper-grouper complex. Council and NMFS discussions during 2017 led to the adoption of Amendment 43 to the snapper-grouper fishery management plan, which specifies new ACLs for red snapper beginning in 2018.

Amendment 26 (effective May 2017) to the Coastal Migratory Pelagics FMP for the Gulf of Mexico and Atlantic regions made the GMFMC responsible for management in federal waters off the Florida Keys. In the Gulf, this rule also revises the commercial and recreational fishing ACLs as well as the commercial zone quotas.

Also in June 2017, following a recent stock assessment, the council approved measures that will allow increases in the harvest of spiny lobster in both the South Atlantic and Gulf of Mexico. The action would increase the acceptable biological catch from 7.32 million pounds to 9.6 million pounds. It would also prohibit the use of traps for recreational harvest of spiny lobster.

A 2016 update to the golden tilefish stock assessment, a popular deepwater species primarily targeted by commercial fishermen, indicated the stock in the South Atlantic is undergoing overfishing. To meet mandates to address overfishing, the Council proposed an interim rule in June 2017 to reduce the annual catch limit from 558,036 pounds (gutted weight) to 323,000 pounds (gw). Based on a projection that the ACL would be exceeded in the commercial hook-and-line sector, NMFS required a temporary closure of this sector from November 29, 2017 until the end of the calendar year.

COMMERCIAL FISHERIES — SOUTH ATLANTIC REGION

In this report, commercial fisheries refer to fishing operations that sell their catch for profit. The term does not include subsistence fishermen or saltwater anglers who fish for sport. It also excludes the for-hire sector, which earns its revenue from selling recreational fishing trips to saltwater anglers. The commercial fisheries section reports on economic impacts, landings revenue, landings, and ex-vessel prices of key species/species groups.

Key South Atlantic Commercial Species

- Blue crab
- Clams
- Flounders
- Groupers
- King mackerels
- Oysters
- Shrimp
- Snappers
- Swordfish
- Tunas

Economic Impacts

The premise behind economic impact modeling is that every dollar spent in a regional economy (direct impact) is either saved or re-spent on additional goods or services. If those dollars are re-spent on other goods and services in the regional economy, this spending generates additional economic activity in the region.[4]

Four different measures are commonly used to show how commercial fisheries landings affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as commercial fishing. The category includes both the direct sales of fish landed and sales made between businesses and households resulting from the original sale. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the sales of seafood or purchases of inputs to commercial fishing. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in numbers of jobs. Note that these categories are not additive. The United States seafood industry is defined here as the commercial fishing sector, seafood processors and dealers, seafood wholesalers and distributors, importers, and seafood retailers.[5,6]

[4] Summary data is available online in the FEUS webtool. [Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.]
[5] The NMFS Commercial Fishing Industry Input/Output Model was used to generate the impact estimates. [Available at: http://www.st.nmfs.noaa.gov/documents/commercial_seafood_impacts_2007-2009.pdf.]
[6] Commercial economic impacts data were not available for East Florida; data for the entire state of Florida are reported here.

This report provides estimates of total economic impacts for the nation and for each of the 23 coastal states. Total economic impacts for each state and the nation represent the sum of direct impacts; indirect impacts (in this case, the impact from suppliers to the seafood industry); and induced impacts (spending by employees on personal and household expenditures, where employees of both the seafood industry and its full supply chain are included). That is, the total economic impact estimates reported here measure jobs, sales, value-added, and income impacts from the seafood industry as well as the economic activity generated throughout each region's broader economy from this industry.

In 2017, the commercial fishing and seafood industry in Florida generated the largest employment impacts in the South Atlantic region with 86,141 full- and part-time jobs.[7] Florida also generated the largest sales impacts ($19.7 billion), value-added impacts ($6.6 billion), and income impacts ($3.7 billion).[7]

Landings Trends

South Atlantic landings revenue in 2017 was up $9.6 million, or about 5%, relative to the previous year. The shrimp fishery, largest in the South Atlantic by revenue, continued the strong upward trend of 2016, adding another $2 million (4%) in revenue in 2017. Blue crab revenue, the second highest-grossing fishery in the region, was essentially unchanged from 2016 to 2017, but remained significantly off the previous highs of 2013-2015. Revenue gains from tunas, oysters, and king mackerel revenues more than offset a $1 million decline in clam revenues.

Oyster landings have trended downward since 2010, with 2017 representing the lowest level of landings in the past decade. Higher prices in 2017 (up 77% from 2016 levels), however, enabled revenues to jump 19% year over year. Overall, oystermen earned $8.6 million for their catch in 2017, up $1.4 million from 2016.

Clams harvest surged in 2017, up 32% from 2016 levels, while ex-vessel prices for clams fell 37% to less than $5 per pound. Blue crab, the largest single fishery in the region by volume, saw harvest fall by 15% to 29.8 million pounds, the lowest level observed in the previous decade, along with a 17% increase in ex-vessel price, to $1.25 per pound.

Landings Revenue

In 2017, landings revenue in the South Atlantic region totaled $193.5 million, a 17% increase from 2008 (a 2% increase in real terms after adjusting for inflation) and a 5% increase from 2016. Landings revenue was highest in North Carolina ($97.3 million), followed by East Florida ($53.9 million).

Shellfish landings revenue accounted for 65% of all landings revenue. In 2017, shrimp ($62 million), blue crab ($37.3 million), and flounders ($12.2 million) had the highest landings revenue in this region. Together, these top three species accounted for 58% of total landings revenue.

From 2008 to 2017, oysters (112%, 85% in real terms), tunas (51%, 32% in real terms), and swordfish (36%, 19% in real terms) had the largest increases, while groupers (-48%, -55% in real terms), snappers (-19%, -29% in real terms), and blue crab (-7%, -18% in real terms) had the largest decreases. From 2016 to 2017, tunas (56%), oysters (19%), and king mackerels (18%) had the largest increases, while clams (-17%), groupers (-4%), and flounders (-1%) had the largest decreases.

[7] This information is for the entire state of Florida.

Commercial Revenue: Largest Increases

From 2008:
- Oysters (112%, 85% in real terms)
- Tunas (51%, 32% in real terms)
- Swordfish (36%, 19% in real terms)

From 2016:
- Tunas (56%)
- Oysters (19%)
- King mackerels (18%)

Commercial Revenue: Largest Decreases

From 2007
- Groupers (-48%, -55% in real terms)
- Snappers (-19%, -29% in real terms)
- Blue crab (-7%, -18% in real terms)

From 2015
- Clams (-17%)
- Groupers (-4%)
- Flounders (-1%)

Commercial Landings: Largest Increases

From 2008:
- Clams (65%)
- Tunas (54%)
- Shrimp (8%)

From 2016:
- Clams (32%)
- King mackerels (18%)
- Tunas (16%)

Commercial Landings: Largest Decreases

From 2008:
- Groupers (-65%)
- Flounders (-41%)
- Blue crab (-34%)

From 2016:
- Oysters (-33%)
- Blue crab (-15%)
- Groupers (-8%)

Landings

In 2017, South Atlantic region commercial fishermen landed over 107.7 million pounds of finfish and shellfish. This represents an 8% decrease from 2008 and a 6% increase from 2016. Blue crab contributed the highest landings volume in the region, accounting for 28% of total landing weight.

From 2008 to 2017, clams (65%), tunas (54%), and shrimp (8%) had the largest increases, while groupers (-65%), flounders (-41%), and blue crab (-34%) had the largest decreases. From 2016 to 2017, clams (32%), king mackerels (18%), and tunas (16%) had the largest increases, while oysters (-33%), blue crab (-15%), and groupers (-8%) had the largest decreases.

Prices

In 2017, oysters ($11.96 per pound) received the highest ex-vessel price in the region. Landings of blue crab ($1.25 per pound) had the lowest ex-vessel price. From 2008 to 2017, oysters (154%, 122% in real terms), flounders (84%, 61% in real terms), and groupers (49%, 31% in real terms) had the largest increases, while clams (-24%, -33% in real terms) and tunas (-2%, -14% in real terms) had the largest decreases. From 2016 to 2017, oysters (78%), tunas (35%), and blue crab (17%) had the largest increases, while clams (-37%) and king mackerels (-0.3%) had the largest decreases.

RECREATIONAL FISHERIES — SOUTH ATLANTIC REGION

In this report, recreational fishing refers to fishing for leisure rather than to sell fish (commercial fishing) or for subsistence. This recreational fisheries section reports on economic impacts and expenditures, angler participation, fishing trips, and catch of key species/species groups.[8]

[8] Atlantic and Gulf recreational catch and effort estimates are based upon the MRIP estimates released in 2018.

Key South Atlantic Recreational Species[9]

- Black sea bass
- Bluefish
- Dolphinfish
- Drum (Atlantic croaker and spot)
- Drum (spotted seatrout)
- King mackerel
- Porgies (sheepshead)
- Red drum
- Sharks: Atlantic sharpnose shark, blacktip shark, requiem shark, requiem shark family, requiem shark genus, shark species, unidentified (sharks), and unidentified sharks
- Spanish mackerel

Economic Impacts and Expenditures

The economic contribution of recreational fishing activities in the South Atlantic Region is based on spending by recreational anglers.[10] Total annual trip expenditures are estimated at the state level by multiplying mean trip expenditures by the estimated number of adult trips in each trip mode (for-hire, private boat, and shore) and adjusting by the CPI (consumer price index) to the current year. Total annual durable expenditures are estimated by multiplying mean durable expenditures in each state by the estimated annual number of adult participants for each state and adjusting by the CPI (consumer price index) to the current year.[11]

Four different measures are commonly used to show how angler expenditures affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as recreational fishing. The category includes both the direct sales made to the angler and sales made between businesses and households resulting from that original sale to the angler. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the purchases made by anglers. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in number of jobs. Note that these categories are not additive. NOAA Fisheries uses a regional impact modeling software, called IMPLAN, to estimate these four types of impacts.

The economic contributions for both trip and durable expenditures from recreational fishing in 2017 were estimated using IMPLAN version 3, with base year data from 2017. Models for each state and for the nation were created in IMPLAN using trip expenditures (based on 2016/2017 survey data on average trip expenditures and total 2017 trips) and for durable expenditures (based on 2014 survey data on average durable expenditures and 2017 participants).

The greatest employment impacts from expenditures on saltwater recreational fishing in the South Atlantic Region were generated in East Florida (45,267 jobs), followed by North Carolina (30,170 jobs) and South Carolina (9,803 jobs). The largest sales impacts were observed in East Florida ($5.1 billion), followed by North Carolina ($3.1 billion) and South Carolina ($901.6 million). The biggest income impacts were generated in East Florida ($1.8 billion), followed by North Carolina ($1.1 billion) and South Carolina ($309.6 million). The greatest value-added impacts were in East Florida ($3.2 billion), followed by North Carolina ($1.9 billion) and South Carolina ($557.3 million).

Expenditures for fishing trips and durable equipment across the South Atlantic Region in 2017 totaled $7.8 billion. This total included $4.4 billion in durable goods expenditures, with the largest portion coming from boat expenses ($2.6 billion).

Participation

In 2017, there were 2.2 million recreational anglers who fished in the South Atlantic Region. This number represented a 26% decrease from 2008 and an 8% decrease from 2016. The anglers are categorized as either residents from coastal (81%) or non-coastal (19%) counties.

Fishing Trips

In 2017, recreational fishermen took 76.9 million fishing trips in the South Atlantic Region. This number represented a 1% increase from 2008 and a 5% increase from 2016. The largest proportions of trips were tak-

[9] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[10] Trip expenditure estimates were generated from the 2016/2017 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2020). Durable goods expenditures were generated from the 2014 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2016). (For citations: Publications-U.S. Coastal and Marine Recreation.)
[11] Summary data is available online in the FEUS webtool. [Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.]

en in the shore mode (71%) and private boat (28%). States with the highest number of recorded trips in the South Atlantic Region were East Florida (40.4 million trips) and North Carolina (22.5 million trips).

Harvest and Release Trends

Of the South Atlantic Region's key species and species groups, drum (Atlantic croaker and spot) (21.9 million fish), drum (spotted seatrout) (19.3 million fish), and bluefish (18.6 million fish), were most frequently caught by recreational fishermen. The text box below shows the species with the largest percentage increases and decreases in the past 10 years and in the past year.

Harvest and Release: Largest Increases

From 2008:
- Red drum (95%)
- Black sea bass (70%)
- Dolphinfish (34%)

From 2016:
- Dolphinfish (55%)
- King mackerel (48%)
- Black sea bass (13%)

Harvest and Release: Largest Decreases

From 2008:
- Sharks (-56%)
- Spanish mackerel (-31%)
- King mackerel (-15%)

From 2016:
- Sharks (-36%)
- Spanish mackerel (-34%)
- Porgies (sheepshead) (-18%)

From 2008 to 2017, red drum (95%), black sea bass (70%), and dolphinfish (34%) had the largest increases, while sharks (-56%), Spanish mackerel (-31%), and king mackerel (-15%) had the largest decreases. From 2016 to 2017, dolphinfish (55%), king mackerel (48%), and black sea bass (13%) had the largest increases, while sharks (-36%), Spanish mackerel (-34%), and porgies (sheepshead) (-18%) had the largest decreases.

In October 2016, Hurricane Matthew caused significant damage along the North Carolina and South Carolina coasts that may have temporarily prevented recreational fishing in those states or resulted in reduced access to recreational fishing boats and infrastructure. This possibly affected the recreational fishery in the South Atlantic Region.[12]

MARINE ECONOMY — SOUTH ATLANTIC REGION

For this report, the marine economy refers to the economic activity generated by fishing and marine-related industries in a coastal state. The national marine economy consists of two industry sectors: 1) seafood sales and processing (employer establishments and non-employer firms); and 2) transport, support, and marine operations (employer establishments). These sectors include several different marine-related industries.[13,14]

Note that when discussing the marine economy in the South Atlantic Region, all statistics include the entire state of Florida and not just East Florida.[15]

To measure the size of the commercial fishing sector in a state's economy relative to the size of the commercial fishing sector in the national economy, researchers use an index called the Commercial Fishing Location Quotient (CFLQ).[16,17] The CFLQ is calculated as the ratio of the percentage of regional employment in the commercial fishing sector relative to the percentage of national employment in the commercial fishing sector. The United States CFLQ is 1. If a state CFLQ is less than 1, then less commercial fishing occurs in this state than the national average. If a state CFLQ is greater than 1, then more commercial fishing occurs in this state than the national average.

Florida had the highest CFLQ at 0.99. South Carolina had a CFLQ value of 0.12.

In 2016, 1.7 million employer establishments operated throughout the entire South Atlantic region (including marine and non-marine related establishments). These

[12] National Weather Service. "Hurricane Matthew in the Carolinas: October 8, 2016". [Available at https://www.weather.gov/ilm/Matthew].
[13] Unless otherwise stated, data are from the U.S. Census Bureau. [For more information: www.census.gov.]
[14] U.S. Bureau of Economic Analysis, 'Table 1.1.5 Gross Domestic Product' and 'Table SA6N Compensation of Employees by NAICS Industry. [Available at: https://apps.bea.gov/regional/histdata/releases/0518gdpstate/.]
[15] Marine Economy information was not available for East Florida, information for the entire state of Florida is provided in this report.
[16] Percentage changes in inflation adjusted (real dollar) terms are calculated using the annual Gross Domestic Product implicit price deflator published by the U.S. Bureau of Economic Analysis and the Federal Reserve Bank of St. Louis. [Available at: https://fred.stlouisfed.org/series/GDPDEF.]
[17] U.S. Bureau of Labor Statistics, 'Location Quotient Calculator.' [For more information: https://www.bls.gov/cew/about-data/location-quotients-explained.htm.]

establishments employed 25.7 million workers and had a total annual payroll of $1.1 trillion. The combined gross state product of East Florida, Georgia, North Carolina, and South Carolina was approximately $2.2 trillion in 2016.

Seafood Sales and Processing

Seafood Product Preparation and Packaging: In 2016, the South Atlantic Region had 516 non-employer firms in the seafood product preparation and packaging sector. Annual receipts for these firms totaled about $36.4 million.[18] There were 45 employer firms in the seafood product preparation and packaging sector (a 10% decrease from 2008). These establishments employed 2,580 workers and had a total annual payroll of $108 million.[19] The greatest number of establishments in this sector was in Florida (362), followed by Georgia (114) and North Carolina (97).

Seafood Sales, Retail: In 2016, there were 574 non-employer firms engaged in retail sales of seafood in the states that make up the South Atlantic Region (a 6% decrease from 2008). Annual receipts for these firms totaled about $50.6 million (a 7% decrease in real terms from 2008). There were 412 employer firms in the retail sales of seafood sector (an 11% increase from 2008). These establishments employed 1,898 workers (a 14% increase from 2008) and had a total annual payroll of $43.2 million (a 16% increase in real terms from 2008). The greatest number of establishments in this sector was in Florida (702), followed by North Carolina (308) and Georgia (215).

Seafood Sales, Wholesale: There were 346 employer firms in the wholesale sales of seafood sector in the South Atlantic Region in 2016 (a 1% increase from 2008). These establishments employed 3,998 workers (a 27% increase from 2008), and had a total annual payroll of $161.1 million (a 24% increase in real terms from 2008). The greatest number of establishments in this sector was in Florida (239), followed by North Carolina (57) and Georgia (35).

Transport, Support, and Marine Operations

Data for the transport, support, and marine operations sector of South Atlantic region's economy were largely suppressed for confidentiality reasons. It is clear, however, that these sectors play an important role in the regional economy. For example, in 2016, the ship and boat building sector in the South Atlantic Region accounted for $1.3 billion in payroll (a 2% decrease in real terms from 2008). The deep sea passenger transportation sector in Florida alone accounted for $864.5 million in payroll in 2016.

[18] The Census Bureau suppressed number of firms and receipt data for this sector in one or more states in the this region in either 2016 or 2008, and thus cannot be compared.
[19] The Census Bureau suppressed number of employees and payroll data for this sector in one or more states in the this region in either 2016 or 2008, and thus cannot be compared.

Tables | South Atlantic Region

2017 Economic Impacts of the South Atlantic Seafood Industry (thousands of dollars)

		With Imports				Without Imports			
	Landings Revenue	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Florida[1]	53,850	86,141	19,676,700	3,675,549	6,577,946	9,889	988,504	259,058	399,044
Georgia	16,834	13,868	2,193,422	486,012	800,135	1,932	101,526	39,844	54,292
North Carolina	97,306	9,787	968,751	268,401	402,338	6,199	344,622	140,657	186,990
South Carolina	25,495	1,810	159,373	50,080	72,053	1,454	87,644	36,001	47,882

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	165,660	147,201	166,736	172,978	173,279	165,503	191,322	197,269	183,841	193,484
Finfish & Other	60,797	63,112	66,567	67,870	65,860	65,337	70,467	64,837	63,781	68,363
Shellfish	104,863	84,088	100,170	105,108	107,419	100,167	120,854	132,431	120,061	125,121
Key Species	-	-	-	-	-	-	-	-	-	
Blue crab	39,986	37,703	36,201	33,878	37,593	44,129	46,762	46,162	37,368	37,331
Clams	3,862	3,516	4,517	3,774	3,834	3,872	5,033	8,037	5,868	4,880
Flounders	11,230	10,389	11,180	9,532	8,009	7,536	13,497	13,154	12,420	12,245
Groupers	5,287	4,348	3,874	3,786	3,433	3,376	3,475	3,187	2,848	2,731
King mackerels	7,695	8,088	7,580	6,580	5,559	5,214	5,830	5,623	6,291	7,406
Oysters	4,057	4,599	7,222	6,850	5,467	6,076	7,207	16,535	7,233	8,607
Shrimp	51,064	33,078	46,063	53,674	54,941	38,790	50,965	49,952	59,870	61,984
Snappers	4,554	4,024	3,490	3,762	3,839	3,764	3,999	3,518	3,376	3,696
Swordfish	3,661	4,821	7,864	10,252	10,181	8,914	5,864	4,948	4,406	4,967
Tunas	4,672	4,869	4,070	5,191	7,136	6,176	6,264	5,254	4,525	7,070

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	116,532	113,478	119,645	124,305	109,104	100,652	115,659	113,710	101,236	107,747
Finfish & Other	43,948	51,117	52,715	52,751	42,059	49,707	55,300	45,721	36,703	36,399
Shellfish	72,584	62,361	66,930	71,554	67,045	50,946	60,359	67,990	64,532	71,348
Key Species	-	-	-	-	-	-	-	-	-	-
Blue crab	44,970	38,959	38,839	42,127	40,392	32,764	34,232	40,441	35,078	29,836
Clams	628	611	692	622	667	613	801	905	788	1,037
Flounders	5,151	5,362	5,109	4,356	2,961	2,889	4,735	4,184	3,142	3,050
Groupers	1,580	1,295	1,105	949	856	784	762	674	592	546
King mackerels	4,352	4,858	4,247	3,049	2,456	1,899	2,381	2,267	2,634	3,111
Oysters	862	937	1,447	1,233	897	1,035	1,152	1,052	1,073	719
Shrimp	23,341	20,109	23,174	22,960	22,397	13,851	15,868	22,217	25,086	25,258
Snappers	1,515	1,373	1,196	1,248	1,227	1,171	1,181	1,031	962	1,023
Swordfish	1,307	1,800	2,383	2,783	2,940	2,601	1,754	1,671	1,323	1,390
Tunas	1,658	1,945	1,841	2,249	2,540	2,431	2,671	2,261	2,209	2,561

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Blue crab	0.89	0.97	0.93	0.80	0.93	1.35	1.37	1.14	1.07	1.25
Clams	6.15	5.76	6.53	6.07	5.75	6.31	6.28	8.88	7.44	4.70
Flounders	2.18	1.94	2.19	2.19	2.70	2.61	2.85	3.14	3.95	4.01
Groupers	3.35	3.36	3.51	3.99	4.01	4.31	4.56	4.72	4.81	5.00
King mackerels	1.77	1.66	1.78	2.16	2.26	2.75	2.45	2.48	2.39	2.38
Oysters	4.71	4.91	4.99	5.56	6.09	5.87	6.26	15.71	6.74	11.96
Shrimp	2.19	1.64	1.99	2.34	2.45	2.80	3.21	2.25	2.39	2.45
Snappers	3.01	2.93	2.92	3.02	3.13	3.22	3.38	3.41	3.51	3.61
Swordfish	2.80	2.68	3.30	3.68	3.46	3.43	3.34	2.96	3.33	3.57
Tunas	2.82	2.50	2.21	2.31	2.81	2.54	2.35	2.32	2.05	2.76

[1] Landings revenue is for East Florida. The rest of the information in this row is for the entire state of Florida.

2017 Economic Impacts of the South Atlantic Recreational Fishing Expenditures (thousands of dollars, trips)

	Trips	#Jobs	Sales	Income	Value Added
East Florida	40,404	45,267	5,136,763	1,840,032	3,158,535
Georgia	4,624	3,865	341,166	121,163	218,865
North Carolina	22,452	30,170	3,085,957	1,111,920	1,869,497
South Carolina	9,389	9,803	901,599	309,571	557,259

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	145,187	Fishing Tackle	1,001,304
Private Boat	878,216	Other Equipment	426,511
Shore	2,376,639	Boat Expenses	2,579,475
Total	3,400,041	Vehicle Expenses	311,904
		Second Home Expenses	38,284
		Total Durable Expenditures	4,357,478
Total State Trip and Durable Goods Expenditures			7,757,519

Recreational Anglers by Residential Area (thousands of anglers)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	2,330	1,922	1,933	1,893	2,135	2,092	2,189	1,753	1,873	1,750
Non-Coastal	560	462	536	450	502	396	530	475	472	401
Total Anglers	2,890	2,384	2,470	2,343	2,637	2,488	2,719	2,229	2,345	2,151

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	391	405	350	360	362	342	415	474	500	515
Private	21,568	23,532	25,415	23,391	20,786	20,495	22,194	21,753	21,252	21,506
Shore	54,209	54,669	54,096	52,923	48,186	47,627	52,768	53,562	51,317	54,849
Total Trips	76,167	78,605	79,861	76,674	69,334	68,463	75,377	75,789	73,069	76,869

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Black sea bass	H	887	673	1,330	933	687	629	1,113	727	553	620
	R	6,267	5,670	7,037	10,197	11,658	7,259	15,547	11,307	10,161	11,526
Bluefish	H	5,877	9,159	10,881	10,637	5,949	8,448	8,571	7,176	7,116	5,525
	R	9,854	12,400	22,284	18,670	12,110	19,009	13,887	14,742	13,232	13,106
Dolphinfish	H	1,441	1,438	1,212	1,421	1,436	1,142	1,618	2,255	1,345	1,666
	R	268	209	244	885	246	448	701	889	131	629
Drum (Atlantic croaker and spot)	H	12,937	11,474	9,229	15,301	11,548	14,762	17,704	18,413	12,502	7,209
	R	11,736	16,394	11,600	19,797	15,980	25,015	29,222	24,075	24,625	14,655
Drum (spotted seatrout)	H	3,321	4,230	3,360	2,611	5,115	3,608	2,821	1,805	3,543	3,904
	R	10,948	12,768	20,219	17,352	18,486	13,513	14,324	13,867	15,163	15,380
King mackerel	H	824	833	474	302	254	236	298	323	526	637
	R	311	168	160	104	97	78	199	144	123	323
Porgies (sheepshead)	H	2,091	1,953	2,647	2,357	1,630	2,056	2,658	1,572	2,415	1,885
	R	2,221	1,991	2,281	2,089	2,805	2,288	3,474	3,177	2,944	2,536
Red drum	H	951	990	1,781	1,518	1,422	2,048	1,958	1,585	2,010	2,256
	R	5,432	5,536	11,626	6,767	8,857	9,458	8,787	7,835	9,806	10,164
Sharks	H	123	98	64	59	65	151	137	45	162	34
	R	10,132	8,375	7,485	6,357	6,689	12,893	8,491	10,102	6,926	4,522
Spanish mackerel	H	2,464	3,184	3,638	2,644	2,034	3,764	2,577	1,461	2,866	1,741
	R	2,166	1,538	2,193	1,411	1,164	2,708	1,878	1,060	2,017	1,460

[1] East Florida anglers estimates are not available for the non-coastal mode.
[2] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.

Tables | East Florida

2017 Economic Impacts of the Florida Seafood Industry (thousands of dollars)[1]

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	86,141	19,676,700	3,675,549	6,577,946	9,889	988,504	259,058	399,044
Commercial Harvesters	6,363	474,979	148,088	197,338	6,363	474,979	148,088	197,338
Seafood Processors & Dealers	5,004	918,083	177,676	349,295	520	102,313	19,801	38,926
Importers	45,528	14,338,508	2,298,019	4,371,005	0	0	0	0
Seafood Wholesalers & Distributors	11,001	1,434,637	563,233	700,736	430	56,050	22,005	27,377
Retail	18,245	2,510,493	488,533	959,571	2,576	355,161	69,164	135,402

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[2]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	47,856	40,992	51,151	60,643	57,766	48,669	55,949	51,451	49,168	53,850
Finfish & Other	21,131	23,164	25,756	26,344	26,061	24,139	25,212	23,917	22,622	23,077
Shellfish	26,726	17,828	25,395	34,300	31,705	24,530	30,737	27,534	26,546	30,773
Key Species	-	-	-	-	-	-	-	-	-	
Blue crab	4,333	2,376	3,415	4,155	4,747	3,785	3,118	3,368	3,517	4,400
Clams	510	415	331	220	138	28	61	NA	NA	NA
Groupers	848	662	620	613	893	734	799	879	685	673
King mackerel	6,036	6,563	6,911	5,500	4,685	4,320	4,583	4,805	5,314	6,058
Lobsters	3,312	1,089	2,825	3,207	1,720	3,437	5,150	3,733	3,031	1,964
Sharks	636	949	757	677	458	491	548	642	355	403
Shrimp	17,225	12,455	17,071	24,361	21,903	14,125	18,306	14,802	15,498	16,227
Snappers	1,905	2,383	1,454	1,673	1,604	1,769	2,188	1,654	1,324	1,571
Spanish mackerel	1,827	2,004	2,414	2,686	2,448	2,650	2,652	2,171	2,534	2,760
Swordfish	2,339	2,385	3,677	4,005	4,838	3,287	2,560	2,532	2,228	1,699

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[2]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	26,307	27,501	29,713	31,244	28,579	21,415	24,573	23,151	21,796	24,626
Finfish & Other	14,111	16,105	17,137	16,051	14,241	12,553	13,592	12,459	12,149	12,052
Shellfish	12,196	11,396	12,576	15,193	14,338	8,862	10,981	10,692	9,647	12,573
Key Species	-	-	-	-	-	-	-	-	-	-
Blue crab	3,342	1,640	2,553	3,226	3,440	2,211	1,500	1,639	1,732	2,316
Clams	55	54	42	22	17	5	8	NA	NA	NA
Groupers	239	188	167	154	222	174	179	187	143	137
King mackerel	3,299	4,064	3,905	2,633	2,143	1,547	1,811	1,859	2,162	2,438
Lobsters	506	298	481	514	302	486	543	481	394	256
Sharks	776	1,109	781	716	631	657	662	690	357	432
Shrimp	7,619	8,662	8,743	10,528	8,869	5,044	5,805	6,051	5,842	6,024
Snappers	635	805	510	564	523	572	661	496	393	434
Spanish mackerel	2,263	2,629	3,553	3,433	2,586	2,246	2,585	1,808	2,461	2,673
Swordfish	791	838	1,028	1,067	1,343	831	698	716	592	455

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[2]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Blue crab	1.30	1.45	1.34	1.29	1.38	1.71	2.08	2.06	2.03	1.90
Clams	9.29	7.73	7.90	9.84	8.17	6.00	7.58	NA	NA	NA
Groupers	3.55	3.52	3.72	3.99	4.02	4.21	4.46	4.71	4.80	4.91
King mackerel	1.83	1.61	1.77	2.09	2.19	2.79	2.53	2.58	2.46	2.48
Lobsters	6.55	3.65	5.87	6.23	5.69	7.07	9.48	7.77	7.70	7.69
Sharks	0.82	0.86	0.97	0.95	0.73	0.75	0.83	0.93	1.00	0.93
Shrimp	2.26	1.44	1.95	2.31	2.47	2.80	3.15	2.45	2.65	2.69
Snappers	3.00	2.96	2.85	2.97	3.07	3.09	3.31	3.34	3.37	3.62
Spanish mackerel	0.81	0.76	0.68	0.78	0.95	1.18	1.03	1.20	1.03	1.03
Swordfish	2.96	2.85	3.58	3.75	3.60	3.96	3.67	3.54	3.77	3.74

[1] Information reported in this table is for the entire state of Florida.
[2] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of East Florida Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	928	94,307	33,229	56,195
	Private Boat	4,670	463,590	153,507	310,721
	Shore	8,858	873,806	299,636	591,922
Total Durable Expenditures		30,811	3,705,060	1,353,660	2,199,697
Total State Economic Impacts		45,267	5,136,763	1,840,032	3,158,535

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	53,734	Fishing Tackle	649,609
Private Boat	469,059	Other Equipment	284,567
Shore	693,862	Boat Expenses	1,753,715
Total	1,216,655	Vehicle Expenses	214,273
		Second Home Expenses	15,206
		Total Durable Expenditures	2,917,370
Total State Trip and Durable Goods Expenditures			4,134,025

Recreational Anglers by Residential Area (thousands of anglers)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	1,317	1,099	1,033	1,109	1,181	1,263	1,334	1,001	1,059	975
Non-Coastal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Out-of-State	703	643	629	553	514	540	807	819	674	613
Total Anglers	2,021	1,741	1,662	1,662	1,695	1,803	2,141	1,821	1,733	1,588

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	153	188	132	141	160	161	192	229	256	250
Private	13,485	15,352	17,003	14,771	12,325	12,231	13,759	13,029	12,393	11,756
Shore	32,284	33,470	31,818	30,883	27,193	24,914	30,016	29,138	26,046	28,398
Total Trips	45,921	49,010	48,952	45,795	39,678	37,306	43,968	42,395	38,695	40,404

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bluefish	H	2,717	5,502	6,046	5,575	2,319	2,037	3,262	2,081	1,492	1,591
	R	3,618	5,169	13,455	8,484	8,079	10,002	6,293	5,361	4,751	1,716
Dolphinfish	H	1,068	801	485	771	949	806	1,179	1,505	799	1,285
	R	264	190	234	869	220	440	694	815	127	626
Drum (kingfish)[3]	H	10,802	5,342	8,187	10,137	9,676	6,043	6,745	3,507	4,762	2,079
	R	5,002	7,197	9,425	8,447	10,159	6,505	7,265	9,140	5,872	1,978
Drum (spotted seatrout)	H	617	639	1,187	931	1,683	1,122	1,111	504	963	978
	R	6,352	5,178	9,718	7,839	9,611	5,723	7,280	6,131	4,784	5,846
Gray snapper	H	860	811	447	404	464	2,102	2,556	1,819	3,778	3,355
	R	4,570	7,881	1,732	2,017	6,419	7,167	8,095	6,469	11,947	10,260
Jack (Florida pompano)	H	2,800	513	1,712	507	1,602	630	575	486	380	612
	R	2,277	840	1,093	2,676	2,666	1,261	1,780	984	1,190	827
King mackerel	H	620	596	391	252	181	179	208	219	409	489
	R	241	99	132	89	83	62	146	122	67	171
Porgies (sheepshead)	H	1,012	982	1,893	1,420	1,015	1,076	2,248	1,129	1,942	1,240
	R	1,732	1,559	1,879	1,704	2,315	1,467	2,767	2,520	2,272	1,114
Red drum	H	388	421	721	788	878	1,008	1,028	982	1,310	979
	R	2,441	2,276	6,759	4,192	2,615	5,197	5,075	4,132	4,734	4,727
Spanish mackerel	H	1,330	1,556	2,525	1,304	777	2,666	1,349	230	1,619	651
	R	1,198	699	1,353	522	254	1,892	920	219	1,137	454

[1] NA = Non-coastal data are not available because all of the state's residents are considered coastal county residents.
[2] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[3] Drum (kingfish) include Gulf kingfish and kingfish genus.

2016 Florida State Economy (% of national total)[1]

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[2]
2,053,914 (8.3%)	546,218 (7%)	8,169,642 (6.4%)	363 (5.6%)	514 (5.2%)	946	0.99

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	202	217	280	294	307	300	315	300	316
	Receipts	11,065	12,473	14,635	14,618	17,557	17,214	22,329	21,841	20,834
Seafood sales, retail	Firms	331	316	361	362	383	338	346	355	320
	Receipts	26,087	25,667	27,964	29,037	30,765	25,332	26,433	29,033	24,296

Seafood Sales and Processing — Employer Establishments (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	23	25	27	24	27	25	27	27	23
	Employees	1,637	1,143	1,269	1,095	1,608	1,374	1,419	1,429	1,535
	Payroll	53,455	46,235	45,772	42,612	51,735	50,003	50,556	58,246	63,039
Seafood sales, wholesale	Establishments	229	215	229	250	226	234	233	242	239
	Employees	1,913	1,762	1,747	1,913	1,957	1,878	1,974	2,055	1,849
	Payroll	75,203	72,159	70,889	77,115	75,945	79,266	83,964	90,247	83,818
Seafood sales, retail	Establishments	168	158	145	145	151	165	166	181	191
	Employees	991	885	865	849	945	909	1,037	1,137	1,133
	Payroll	21,604	21,182	20,783	20,158	21,577	23,476	25,844	29,066	26,981

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	297	261	248	246	258	259	263	278	281
	Employees	12,419	8,221	7,363	7,909	8,621	8,813	9,608	10,913	11,170
	Payroll	442,096	296,537	302,909	325,942	374,831	390,853	448,514	488,050	512,454
Deep Sea Freight Transportation	Establishments	57	58	61	65	75	69	77	76	65
	Employees	2,486	2,801	2,279	2,374	3,345	2,485	2,015	2,154	1,639
	Payroll	169,055	180,139	159,025	177,386	231,887	140,564	131,069	137,786	113,897
Deep Sea Passenger Transportation	Establishments	31	33	29	29	39	31	28	32	33
	Employees	ds	ds	ds	ds	ds	ds	ds	10,510	10,161
	Payroll	ds	ds	ds	ds	ds	ds	ds	967,938	864,475
Coastal and Great Lakes Freight Transportation	Establishments	42	42	50	54	60	47	62	57	62
	Employees	1,106	972	709	753	1,381	1,050	1,743	1,815	1,966
	Payroll	50,115	37,774	50,217	53,341	100,402	82,078	175,366	173,004	199,592
Port and Harbor Operations	Establishments	40	32	34	32	66	61	56	55	54
	Employees	712	527	470	377	2,082	555	588	987	1,006
	Payroll	24,668	19,006	20,525	16,879	72,554	25,439	20,647	32,032	32,969
Marine Cargo Handling	Establishments	56	59	55	64	43	58	61	69	63
	Employees	8,052	7,288	7,547	7,484	4,598	6,258	6,992	7,834	7,048
	Payroll	192,473	185,309	191,560	195,458	86,461	188,997	179,024	208,186	191,828
Navigational Services to Shipping	Establishments	147	145	145	150	151	180	190	196	194
	Employees	894	829	980	1,047	853	1,390	878	861	922
	Payroll	56,917	60,641	76,853	75,561	68,366	130,893	74,185	72,483	73,708
Marinas	Establishments	442	428	430	411	432	444	464	466	458
	Employees	5,024	4,665	4,439	4,657	4,918	5,076	5,421	5,472	5,405
	Payroll	151,677	132,955	133,017	142,997	148,573	145,265	168,185	171,354	176,315

[1] All data presented on this page are for the entire state of Florida, not just East Florida.
[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.

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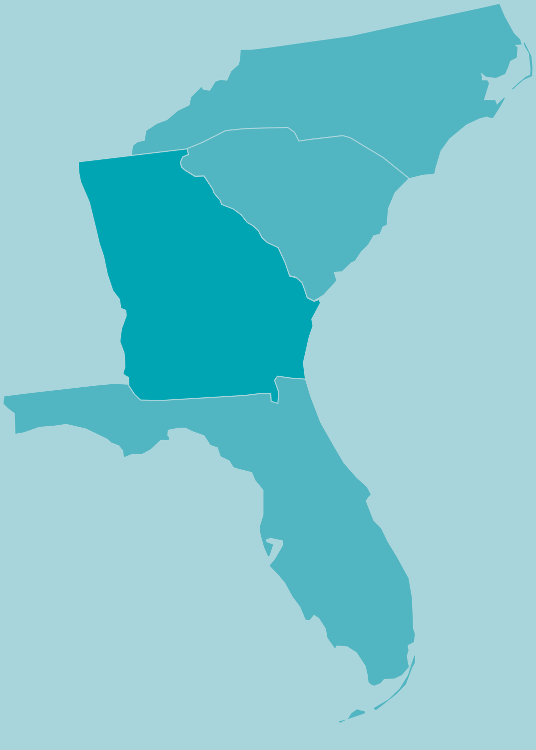

2017 Economic Impacts of the Georgia Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	13,868	2,193,422	486,012	800,135	1,932	101,526	39,844	54,292
Commercial Harvesters	679	29,103	9,994	14,369	679	29,103	9,994	14,369
Seafood Processors & Dealers	1,174	104,955	40,449	53,392	203	18,120	6,983	9,218
Importers	5,159	1,624,727	260,393	495,288	0	0	0	0
Seafood Wholesalers & Distributors	1,098	153,330	52,879	74,310	42	5,809	2,003	2,815
Retail	5,758	281,308	122,297	162,775	1,008	48,494	20,863	27,890

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	13,081	11,761	13,778	16,513	16,740	12,726	17,238	17,400	13,844	16,834
Finfish & Other	623	626	279	639	378	2,014	1,145	897	433	389
Shellfish	12,458	11,135	13,499	15,874	16,362	10,712	16,093	16,503	13,411	16,445
Key Species	-	-	-	-	-	-	-	-	-	
Blue crab	3,910	3,839	2,658	3,346	4,267	3,975	3,772	4,247	4,010	5,022
Clams	383	473	572	831	834	778	1,422	2,284	2,402	2,262
Groupers	0	0	0	0	0	0	0	0	0	0
Shrimp	7,877	6,608	10,137	11,422	11,056	5,782	10,477	9,765	6,849	8,487
Snails (conchs)	6	11	NA	NA	NA	NA	NA	NA	NA	NA
Snappers	0	0	0	0	0	0	0	0	0	0

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	8,930	7,424	7,195	13,000	11,003	18,076	18,781	13,757	7,595	9,416
Finfish & Other	267	306	168	3,319	2,131	12,171	9,640	6,749	1,476	2,088
Shellfish	8,663	7,118	7,027	9,681	8,873	5,905	9,141	7,009	6,119	7,328
Key Species	-	-	-	-	-	-	-	-	-	-
Blue crab	4,227	3,598	2,329	3,427	4,265	3,216	2,667	2,934	3,318	3,889
Clams	54	76	98	147	144	132	260	372	348	319
Groupers	0	0	0	0	0	0	0	0	0	0
Shrimp	3,132	3,324	4,525	4,375	3,951	1,908	2,757	3,669	2,428	2,824
Snails (conchs)	5	11	NA	NA	NA	NA	NA	NA	NA	NA
Snappers	0	0	0	0	0	0	0	0	0	0

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Blue crab	0.92	1.07	1.14	0.98	1.00	1.24	1.41	1.45	1.21	1.29
Clams	7.03	6.24	5.82	5.65	5.79	5.88	5.48	6.14	6.90	7.08
Grouper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shrimp	2.51	1.99	2.24	2.61	2.80	3.03	3.80	2.66	2.82	3.01
Snails (conchs)	1.31	1.00	NA	NA	NA	NA	NA	NA	NA	NA
Snappers	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[1] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of Georgia Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	87	8,466	2,856	5,001
	Private Boat	769	56,706	18,146	37,371
	Shore	1,932	165,350	54,615	102,064
Total Durable Expenditures		1,077	110,644	45,546	74,429
Total State Economic Impacts		3,865	341,166	121,163	218,865

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	4,947	Fishing Tackle	37,155
Private Boat	58,580	Other Equipment	11,823
Shore	120,883	Boat Expenses	42,131
Total	184,410	Vehicle Expenses	19,979
		Second Home Expenses	0
		Total Durable Expenditures	111,088
Total State Trip and Durable Goods Expenditures			295,498

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	190	146	145	146	134	99	125	81	110	110
Non-Coastal	154	91	136	131	96	72	115	80	89	73
Out-of-State	98	45	61	78	74	53	70	70	49	57
Total Anglers	441	282	342	355	303	225	310	231	248	241

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	17	15	7	16	20	21	31	34	26	28
Private	1,201	1,152	1,164	1,236	1,184	1,228	1,262	1,360	1,375	1,569
Shore	1,638	1,525	1,536	1,650	1,786	2,071	2,444	2,715	2,480	3,028
Total Trips	2,855	2,693	2,707	2,902	2,990	3,320	3,737	4,109	3,880	4,624

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Black drum	H	168	42	138	26	43	65	48	48	96	64
	R	133	60	73	20	53	35	22	56	54	85
Black sea bass	H	232	41	38	98	53	234	167	123	19	26
	R	1,545	307	513	526	425	826	1,925	1,087	314	681
Bluefish	H	17	6	27	10	21	17	70	49	12	9
	R	301	163	249	124	148	42	261	427	96	30
Drum (Atlantic croaker)	H	73	185	121	130	105	265	290	790	402	371
	R	528	1,170	652	749	781	1,362	2,058	1,321	1,179	1,060
Drum (South kingfish)	H	1,341	1,545	1,772	1,820	1,346	1,732	2,199	3,437	1,505	1,825
	R	1,794	1,538	1,522	1,689	1,778	1,206	984	1,490	1,742	1,283
Drum (spotted seatrout)	H	1,048	1,363	1,135	762	1,207	937	724	741	1,290	1,060
	R	1,149	2,126	1,676	1,348	2,197	1,321	1,688	1,764	2,113	2,437
Porgies (sheepshead)	H	142	154	240	282	141	129	56	121	187	159
	R	232	72	91	102	58	114	62	128	69	75
Red drum	H	222	164	443	201	96	237	212	201	290	468
	R	494	346	926	370	220	505	751	961	601	1,177
Sharks[2]	H	15	12	8	11	14	26	< 1	8	19	4
	R	969	756	564	759	1,015	907	1,059	902	1,085	569
South flounder	H	76	83	81	55	43	52	58	130	84	101
	R	3	18	6	44	9	22	22	127	34	80

[1] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[2] Sharks include requiem shark family, Atlantic sharpnose shark, requiem shark genus, unidentified (sharks), requiem shark, blacktip shark, unidentified sharks, and shark species.

2016 Georgia State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
877,908 (3.5%)	228,330 (2.9%)	3,804,433 (3%)	183 (2.8%)	288 (2.9%)	543	0.05

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	45	51	52	61	71	60	62	87	100
	Receipts	3,489	3,817	5,458	5,540	4,974	4,378	5,471	6,265	7,582
Seafood sales, retail	Firms	101	98	96	89	97	77	103	84	75
	Receipts	6,922	5,701	6,474	8,646	8,233	6,932	9,338	8,379	8,298

Seafood Sales and Processing — Employer Establishments (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	7	6	6	5	6	5	7	6	7
	Employees	Ds	ds	1,056	1,022	854	945	895	854	917
	Payroll	Ds	ds	37,343	39,433	32,928	35,987	37,122	37,368	38,634
Seafood sales, wholesale	Establishments	30	33	36	28	18	28	24	23	35
	Employees	565	532	514	562	468	469	792	701	731
	Payroll	20,122	18,628	20,075	20,660	15,459	17,326	24,726	26,254	28,745
Seafood sales, retail	Establishments	48	42	48	51	54	60	62	70	70
	Employees	160	162	176	176	214	210	229	248	283
	Payroll	2,433	2,447	2,502	2,566	3,425	3,390	3,745	4,539	4,966

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	20	14	12	15	14	15	16	17	15
	Employees	2,159	ds	ds	ds	ds	ds	ds	3,150	2,272
	Payroll	69,096	ds	ds	ds	ds	ds	ds	110,951	81,978
Deep Sea Freight Transportation	Establishments	14	13	14	12	12	7	9	9	9
	Employees	156	29	ds	51	236	28	63	64	70
	Payroll	11,275	2,192	2,465	4,833	11,238	2,311	3,856	4,421	5,255
Deep Sea Passenger Transportation	Establishments	NA	NA	NA	1	1	1	1	2	1
	Employees	NA	NA	NA	ds	ds	ds	ds	0	0
	Payroll	NA	NA	NA	ds	ds	ds	ds	0	0
Coastal and Great Lakes Freight Transportation	Establishments	6	5	4	4	3	4	7	8	8
	Employees	28	ds	ds	ds	ds	ds	ds	66	84
	Payroll	2,040	1,700	ds	ds	ds	ds	ds	4,356	5,074
Port and Harbor Operations	Establishments	5	5	4	2	13	7	4	4	5
	Employees	ds	ds	ds	ds	ds	ds	ds	68	47
	Payroll	ds	ds	ds	ds	ds	ds	ds	2,961	3,230
Marine Cargo Handling	Establishments	17	18	17	20	10	19	19	18	17
	Employees	2,660	3,707	2,971	4,655	ds	2,986	3,561	4,956	3,966
	Payroll	97,869	87,410	84,675	108,674	ds	120,985	124,394	117,785	98,105
Navigational Services to Shipping	Establishments	11	9	8	8	10	8	7	9	8
	Employees	182	ds	ds	ds	ds	ds	ds	203	149
	Payroll	10,193	12,185	11,237	ds	ds	ds	ds	12,202	9,904
Marinas	Establishments	60	58	62	63	63	59	65	67	63
	Employees	527	541	631	580	636	644	586	639	648
	Payroll	15,571	15,736	17,428	16,986	17,921	17,768	18,604	20,210	22,546

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.
[3] NA = not available.

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2017 Economic Impacts of the North Carolina Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	9,787	968,751	268,401	402,338	6,199	344,622	140,657	186,990
Commercial Harvesters	2,535	165,618	65,115	89,298	2,535	165,618	65,115	89,298
Seafood Processors & Dealers	671	51,049	19,848	25,648	489	37,203	14,465	18,692
Importers	1,625	511,759	82,019	156,007	0	0	0	0
Seafood Wholesalers & Distributors	444	54,528	19,124	25,242	143	17,544	6,153	8,121
Retail	4,512	185,797	82,294	106,144	3,033	124,256	54,924	70,879

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	86,822	77,196	79,824	71,161	72,978	79,128	94,145	104,191	97,193	97,306
Finfish & Other	34,430	33,984	33,349	31,276	31,010	29,836	37,007	32,207	33,572	36,232
Shellfish	52,392	43,212	46,475	39,884	41,968	49,291	57,138	71,984	63,621	61,074
Key Species	-	-	-	-	-	-	-	-	-	
Atlantic croaker	3,142	3,004	3,410	3,160	2,132	1,727	1,865	1,651	2,290	1,135
Black sea bass	1,156	1,401	947	627	688	869	1,408	1,354	1,398	1,859
Blue crab	27,555	27,429	26,537	21,295	22,779	30,001	34,050	33,717	24,303	22,372
Clams	2,435	2,086	2,634	1,899	2,279	2,362	2,957	5,149	2,726	2,183
Flounders	10,886	10,124	10,907	8,893	7,419	7,066	13,060	12,871	12,057	11,962
Groupers	2,274	1,879	1,730	1,463	1,421	1,248	1,264	1,109	1,126	1,012
King mackerel	1,632	1,500	645	1,062	831	878	1,204	786	902	1,265
Shrimp	19,251	8,528	10,689	10,888	13,293	12,947	14,146	16,814	29,752	29,620
Snappers	1,784	1,073	956	1,004	900	917	865	797	955	997
Tunas	3,393	2,922	1,490	2,438	4,400	3,208	3,619	2,817	3,292	5,331

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	71,209	68,955	72,002	67,502	56,694	50,198	61,949	65,917	61,379	62,586
Finfish & Other	27,630	32,323	32,499	29,739	22,738	22,004	29,439	23,284	20,432	19,109
Shellfish	43,580	36,632	39,503	37,763	33,957	28,194	32,509	42,634	40,946	43,477
Key Species	-	-	-	-	-	-	-	-	-	-
Atlantic croaker	5,792	6,135	7,312	5,054	3,107	1,928	2,630	1,819	2,164	1,008
Black sea bass	485	615	401	272	256	330	527	468	439	631
Blue crab	32,917	29,707	30,683	30,035	26,787	22,203	26,231	32,124	25,645	19,273
Clams	400	359	366	302	404	356	438	422	343	299
Flounders	5,009	5,256	5,001	4,102	2,736	2,728	4,585	4,088	3,021	2,958
Groupers	785	638	561	409	382	311	299	259	262	223
King mackerel	1,037	778	329	408	297	345	550	391	437	629
Shrimp	9,427	5,408	5,955	5,140	6,141	4,860	4,691	9,083	13,833	13,892
Snappers	603	374	320	326	279	276	251	231	279	281
Tunas	1,041	1,028	703	1,056	1,482	1,283	1,647	1,320	1,486	1,803

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Atlantic croaker	0.54	0.49	0.47	0.63	0.69	0.90	0.71	0.91	1.06	1.13
Black sea bass	2.39	2.28	2.36	2.30	2.69	2.64	2.67	2.89	3.18	2.94
Blue crab	0.84	0.92	0.86	0.71	0.85	1.35	1.30	1.05	0.95	1.16
Clams	6.09	5.82	7.19	6.28	5.65	6.64	6.75	12.21	7.95	7.31
Flounders	2.17	1.93	2.18	2.17	2.71	2.59	2.85	3.15	3.99	4.04
Groupers	2.89	2.95	3.08	3.58	3.72	4.01	4.22	4.28	4.30	4.54
King mackerel	1.57	1.93	1.96	2.60	2.79	2.54	2.19	2.01	2.07	2.01
Shrimp	2.04	1.58	1.79	2.12	2.16	2.66	3.02	1.85	2.15	2.13
Snappers	2.96	2.87	2.99	3.08	3.22	3.32	3.44	3.45	3.42	3.55
Tunas	3.26	2.84	2.12	2.31	2.97	2.50	2.20	2.13	2.22	2.96

2017 Economic Impacts of North Carolina Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	1,119	104,952	35,545	60,417
	Private Boat	2,492	249,484	87,048	150,896
	Shore	17,515	1,715,605	603,837	1,043,260
Total Durable Expenditures		9,044	1,015,916	385,490	614,924
Total State Economic Impacts		30,170	3,085,957	1,111,920	1,869,497

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	63,578	Fishing Tackle	237,545
Private Boat	235,111	Other Equipment	96,203
Shore	1,215,896	Boat Expenses	619,660
Total	1,514,585	Vehicle Expenses	56,999
		Second Home Expenses	23,078
		Total Durable Expenditures	1,033,485
Total State Trip and Durable Goods Expenditures			2,548,070

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	587	446	544	490	614	564	549	479	541	481
Non-Coastal	303	259	296	254	283	240	301	239	281	235
Out-of-State	1,079	976	1,073	755	764	601	805	830	1,066	795
Total Anglers	1,970	1,681	1,914	1,499	1,661	1,405	1,656	1,548	1,889	1,512

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	170	129	139	129	159	111	96	114	141	149
Private	4,600	4,822	4,983	5,213	5,055	4,848	4,896	4,993	4,860	5,045
Shore	14,558	14,393	15,052	14,127	13,342	13,127	13,934	15,216	16,158	17,258
Total Trips	19,328	19,345	20,173	19,469	18,555	18,086	18,926	20,323	21,159	22,452

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Black sea bass	H	91	153	184	180	134	90	333	320	195	317
	R	1,056	1,681	2,224	2,570	4,650	3,041	5,023	5,036	5,536	6,191
Bluefish	H	2,855	3,190	3,692	3,614	2,684	4,288	4,419	4,123	4,489	3,173
	R	5,147	6,448	7,420	7,150	3,268	7,051	5,863	6,356	6,803	8,256
Dolphinfish	H	362	596	615	639	427	323	403	740	481	280
	R	2	4	6	16	5	5	7	74	3	3
Drum (Atlantic croaker and spot)[3]	H	4,649	5,156	5,111	7,354	3,526	7,422	10,279	4,010	3,038	3,085
	R	7,092	10,470	8,187	11,999	6,875	12,243	14,391	12,617	9,086	6,534
Drum (spotted seatrout)	H	1,373	1,858	631	724	1,603	1,108	725	249	979	1,218
	R	2,227	4,463	7,658	7,421	4,916	4,279	3,949	4,824	6,475	5,148
Flounder (lefteye and summer)[4]	H	145	296	401	291	283	229	443	227	94	227
	R	3,676	4,052	4,435	3,226	4,025	4,012	3,290	2,781	2,877	2,990
King mackerel	H	165	169	58	32	56	48	72	96	108	110
	R	41	24	10	< 1	6	9	35	17	44	95
Spanish mackerel	H	1,014	1,481	927	855	996	995	1,029	835	918	996
	R	806	753	702	480	592	686	814	515	547	688
Striped bass	H	58	32	109	249	24	58	21	41	20	73
	R	402	290	332	808	501	361	374	343	1,089	3,691
Yellowfin tuna	H	22	36	42	33	70	53	44	38	80	119
	R	< 1	1	< 1	< 1	9	1	7	2	29	18

[1] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[2] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[3] Drum (Atlantic croaker and spot) include Atlantic croaker and spot.
[4] Flounder (lefteye and summer) include lefteye flounder genus and summer flounder.

2016 North Carolina State Economy (% of national total)[1]

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
742,858 (3%)	227,347 (2.9%)	3,794,926 (3%)	171 (2.7%)	272 (2.7%)	528	ds

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	ds	34	40	50	46	58	63	72	69
	Receipts	ds	1,297	1,652	2,705	1,630	4,605	4,599	4,715	4,204
Seafood sales, retail	Firms	114	140	126	144	136	127	137	134	122
	Receipts	10,918	12,188	9,057	10,386	11,990	12,175	13,430	12,705	12,215

Seafood Sales and Processing — Employer Establishments (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	18	16	16	14	12	13	14	16	14
	Employees	232	170	171	ds	ds	135	128	128	128
	Payroll	5,373	4,461	4,749	4,830	5,084	4,563	4,720	6,582	6,366
Seafood sales, wholesale	Establishments	65	66	66	64	59	59	56	59	57
	Employees	559	584	590	603	793	849	966	1,187	1,267
	Payroll	16,843	17,383	18,348	19,344	23,949	26,687	30,292	38,462	43,297
Seafood sales, retail	Establishments	90	77	82	84	88	86	93	91	93
	Employees	219	243	247	244	289	254	278	255	282
	Payroll	4,143	4,494	5,017	5,250	5,860	5,872	6,263	6,681	7,207

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	77	64	60	57	60	52	52	62	63
	Employees	4,281	1,983	1,501	1,515	1,760	1,059	1,153	1,422	1,571
	Payroll	138,243	68,004	64,807	66,929	74,843	49,462	50,102	65,388	73,550
Deep Sea Freight Transportation	Establishments	5	6	10	8	7	8	8	6	5
	Employees	ds	9	ds	ds	25	ds	ds	0	0
	Payroll	533	617	ds	ds	1,579	ds	ds	0	0
Deep Sea Passenger Transportation	Establishments	NA	1	NA	1	NA	NA	NA	NA	2
	Employees	NA	ds	NA	ds	NA	NA	NA	NA	0
	Payroll	NA	ds	NA	ds	NA	NA	NA	NA	0
Coastal and Great Lakes Freight Transportation	Establishments	4	6	4	5	6	5	5	6	5
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	2,366	ds	ds	ds	ds	ds	0	0
Port and Harbor Operations	Establishments	3	2	4	3	9	5	2	2	2
	Employees	ds	ds	ds	ds	ds	46	ds	0	0
	Payroll	ds	ds	ds	ds	ds	1,579	ds	0	0
Marine Cargo Handling	Establishments	13	12	11	14	6	9	9	9	9
	Employees	760	914	600	ds	ds	ds	ds	797	594
	Payroll	23,328	20,707	20,755	ds	ds	ds	ds	14,767	14,204
Navigational Services to Shipping	Establishments	10	11	13	11	8	10	13	13	12
	Employees	87	96	94	86	90	77	78	78	71
	Payroll	3,668	4,313	3,968	4,041	3,203	3,583	3,844	4,350	4,369
Marinas	Establishments	107	105	102	104	102	99	100	105	109
	Employees	656	501	536	524	531	501	541	579	624
	Payroll	17,164	15,858	16,238	16,187	15,975	16,369	16,774	18,672	21,964

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.
[3] NA = not available.

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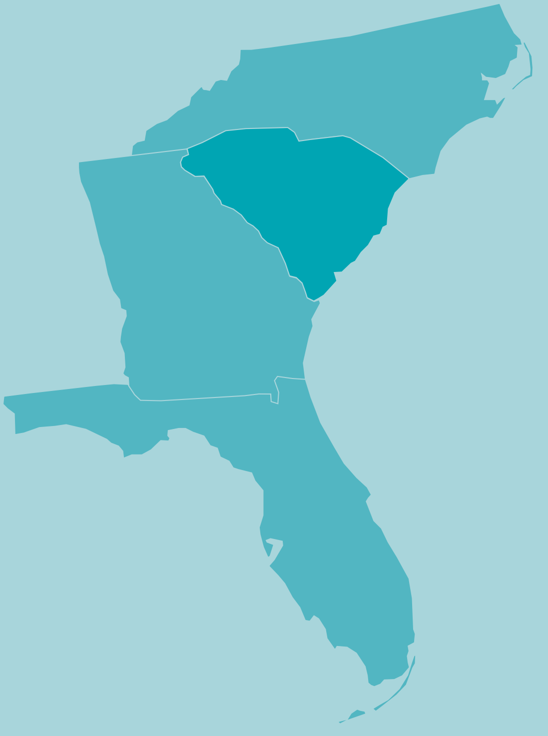


2017 Economic Impacts of the South Carolina Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	1,810	159,373	50,080	72,053	1,454	87,644	36,001	47,882
Commercial Harvesters	534	42,223	16,722	22,978	534	42,223	16,722	22,978
Seafood Processors & Dealers	121	10,494	4,105	5,279	108	9,310	3,642	4,683
Importers	194	61,098	9,792	18,625	0	0	0	0
Seafood Wholesalers & Distributors	78	9,045	3,178	4,174	38	4,400	1,546	2,030
Retail	882	36,513	16,284	20,997	774	31,711	14,092	18,190

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	17,901	17,251	21,983	24,662	25,795	24,981	23,989	24,226	23,637	25,495
Finfish & Other	4,614	5,338	7,182	9,611	8,411	9,347	7,103	7,816	7,154	8,665
Shellfish	13,287	11,913	14,800	15,051	17,384	15,634	16,886	16,410	16,482	16,829
Key Species	-	-	-	-	-	-	-	-	-	
Black sea bass	257	362	213	181	303	471	341	246	159	251
Blue crab	4,187	4,059	3,592	5,083	5,800	6,368	5,822	4,830	5,538	5,537
Clams	535	542	980	823	583	704	592	604	740	434
Groupers	2,165	1,808	1,524	1,709	1,119	1,394	1,412	1,199	1,037	1,046
Oysters	1,768	1,734	1,906	1,975	2,153	2,402	2,243	2,258	2,321	2,612
Sharks	78	56	128	166	139	89	77	63	76	92
Shrimp	6,712	5,487	8,166	7,004	8,689	5,936	8,036	8,571	7,771	7,650
Snappers	864	568	1,079	1,085	1,334	1,078	945	1,067	1,097	1,128
Swordfish	187	1,116	2,289	3,629	2,332	2,691	1,195	1,160	927	1,815
Tilefish	66	9	117	8	148	404	538	537	505	780

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	10,085	9,598	10,735	12,560	12,827	10,963	10,357	10,885	10,466	11,120
Finfish & Other	1,940	2,384	2,912	3,643	2,949	2,978	2,629	3,229	2,646	3,150
Shellfish	8,145	7,214	7,823	8,917	9,878	7,985	7,728	7,655	7,819	7,970
Key Species	-	-	-	-	-	-	-	-	-	-
Black sea bass	132	168	99	100	118	178	131	81	50	81
Blue crab	4,484	4,014	3,274	5,439	5,900	5,134	3,833	3,745	4,382	4,358
Clams	119	123	185	150	102	121	95	112	97	419
Groupers	556	469	377	386	252	298	284	229	188	186
Oysters	329	308	340	337	361	376	339	331	314	327
Sharks	110	63	94	116	109	61	54	41	45	64
Shrimp	3,162	2,716	3,950	2,917	3,435	2,040	2,615	3,414	2,983	2,518
Snappers	277	194	365	358	425	322	269	305	289	309
Swordfish	71	459	725	913	694	712	361	362	267	526
Tilefish	28	5	46	4	51	160	194	171	133	191

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Black sea bass	1.94	2.15	2.16	1.82	2.57	2.64	2.60	3.04	3.19	3.11
Blue crab	0.93	1.01	1.10	0.93	0.98	1.24	1.52	1.29	1.26	1.27
Clams	4.51	4.42	5.30	5.48	5.71	5.82	6.20	5.38	7.63	1.04
Groupers	3.90	3.85	4.04	4.42	4.45	4.68	4.97	5.24	5.52	5.63
Oysters	5.37	5.63	5.61	5.85	5.96	6.39	6.61	6.81	7.39	7.99
Sharks	0.71	0.89	1.35	1.43	1.28	1.46	1.43	1.55	1.70	1.43
Shrimp	2.12	2.02	2.07	2.40	2.53	2.91	3.07	2.51	2.61	3.04
Snappers	3.12	2.92	2.95	3.03	3.14	3.34	3.52	3.50	3.79	3.65
Swordfish	2.64	2.43	3.16	3.98	3.36	3.78	3.31	3.20	3.47	3.45
Tilefish	2.30	2.00	2.54	1.84	2.87	2.53	2.76	3.15	3.81	4.08

2017 Economic Impacts of South Carolina Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	408	35,608	11,825	20,489
	Private Boat	1,420	107,713	33,020	70,151
	Shore	5,047	450,922	151,241	285,456
Total Durable Expenditures		2,928	307,356	113,485	181,163
Total State Economic Impacts		9,803	901,599	309,571	557,259

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	22,928	Fishing Tackle	76,995
Private Boat	115,466	Other Equipment	33,918
Shore	345,998	Boat Expenses	163,969
Total	484,391	Vehicle Expenses	20,653
		Second Home Expenses	0
		Total Durable Expenditures	295,535
Total State Trip and Durable Goods Expenditures			779,926

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	236	231	210	148	207	166	181	192	163	184
Non-Coastal	103	112	104	66	123	84	114	157	102	93
Out-of-State	604	554	494	264	406	602	569	684	510	437
Total Anglers	942	898	809	478	736	852	864	1,033	775	714

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	51	72	72	75	24	48	95	97	78	88
Private	2,281	2,205	2,265	2,170	2,223	2,187	2,276	2,371	2,624	3,136
Shore	5,730	5,280	5,691	6,262	5,865	7,515	6,375	6,494	6,634	6,165
Total Trips	8,063	7,558	8,028	8,507	8,111	9,751	8,746	8,962	9,335	9,389

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Black sea bass	H	156	38	531	104	127	53	249	88	56	197
	R	1,608	913	1,238	2,366	1,212	1,022	4,286	2,079	2,282	3,266
Bluefish	H	288	461	1,115	1,439	924	2,106	820	921	1,123	752
	R	788	621	1,160	2,911	615	1,914	1,470	2,597	1,583	3,105
Drum (Atlantic croaker and spot)[3]	H	6,773	3,560	2,610	4,124	5,135	5,041	1,859	8,094	5,243	2,663
	R	1,360	2,341	1,199	2,477	1,744	9,645	6,651	6,055	8,655	5,125
Drum (South kingfish)	H	2,718	2,952	1,093	1,731	2,774	3,639	2,207	1,368	1,450	1,783
	R	2,395	2,870	0	458	712	0	22	11	45	3
Drum (spotted seatrout)	H	283	370	407	193	622	441	260	311	311	648
	R	1,220	1,002	1,167	744	1,762	2,191	1,407	1,148	1,791	1,950
Porgies (sheepshead)	H	433	454	187	458	128	66	169	141	136	204
	R	85	61	121	203	163	315	421	368	391	436
Red drum	H	229	191	437	373	296	283	393	258	241	456
	R	987	1,676	2,269	1,618	1,083	1,865	1,875	1,433	1,267	2,094
Sharks[4]	H	22	27	11	26	22	57	33	13	19	11
	R	1,759	3,675	2,196	1,714	2,489	4,477	2,571	2,921	1,694	1,429
South flounder	H	262	242	309	323	258	191	140	184	187	221
	R	231	454	25	63	120	0	0	0	< 1	0
Spanish mackerel	H	95	137	171	472	258	101	194	390	306	46
	R	150	84	139	389	313	130	137	322	334	300

[1] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[2] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[3] Drum (Atlantic croaker and spot) include Atlantic croaker and spot.
[4] Sharks include requiem shark family, Atlantic sharpnose shark, requiem shark genus, unidentified (sharks), requiem shark, blacktip shark, unidentified sharks, and shark species.

2016 South Carolina State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
339,739 (1.4%)	105,959 (1.4%)	1,716,496 (1.4%)	69.1 (1.1%)	117 (1.2%)	215	0.12

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	15	21	23	32	35	30	28	26	31
	Receipts	1,155	1,794	1,386	1,326	1,868	1,657	2,690	2,438	3,782
Seafood sales, retail	Firms	64	77	78	87	67	67	73	69	57
	Receipts	4,650	4,709	3,978	5,535	4,818	3,765	4,845	6,007	5,753

Seafood Sales and Processing — Employer Establishments (thousands of dollars)[2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	2	2	2	1	NA	NA	4	2	1
	Employees	ds	ds	ds	ds	NA	NA	ds	0	0
	Payroll	ds	ds	ds	ds	NA	NA	ds	0	0
Seafood sales, wholesale	Establishments	20	15	16	12	15	16	12	16	15
	Employees	108	111	120	101	125	134	148	146	151
	Payroll	3,770	3,676	3,868	3,760	4,506	4,849	5,329	5,327	5,193
Seafood sales, retail	Establishments	64	57	56	61	60	56	56	54	58
	Employees	292	261	260	245	228	222	224	185	200
	Payroll	4,871	4,901	4,580	4,231	3,670	3,713	3,633	3,883	4,006

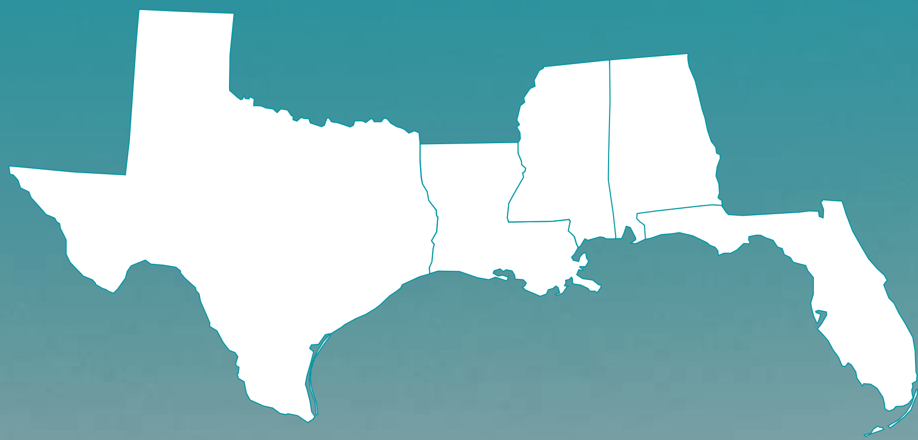
Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	46	41	39	41	39	37	37	34	34
	Employees	3,001	1,929	1,922	1,943	1,980	2,262	2,225	2,690	2,789
	Payroll	97,743	73,988	74,945	85,568	90,942	96,081	98,324	115,262	125,487
Deep Sea Freight Transportation	Establishments	4	8	7	6	6	4	1	1	1
	Employees	ds	ds	20	ds	ds	21	ds	0	0
	Payroll	659	ds	758	722	ds	633	ds	0	0
Deep Sea Passenger Transportation	Establishments	7	6	2	2	1	NA	NA	NA	1
	Employees	ds	ds	ds	ds	ds	NA	NA	NA	0
	Payroll	ds	ds	ds	ds	ds	NA	NA	NA	0
Coastal and Great Lakes Freight Transportation	Establishments	4	4	4	4	5	5	5	4	5
	Employees	ds	ds	ds	ds	40	ds	ds	0	33
	Payroll	ds	ds	ds	ds	2,625	ds	ds	0	1,899
Port and Harbor Operations	Establishments	3	2	2	5	7	2	3	4	4
	Employees	ds	ds	ds	ds	676	ds	ds	0	0
	Payroll	ds	ds	ds	ds	29,332	ds	ds	0	0
Marine Cargo Handling	Establishments	17	14	12	14	10	13	14	15	14
	Employees	1,282	1,953	1,731	1,717	715	ds	1,902	2,467	2,117
	Payroll	56,812	43,170	39,625	49,172	30,381	ds	66,803	59,595	75,187
Navigational Services to Shipping	Establishments	8	8	7	8	10	8	9	9	9
	Employees	227	208	222	217	247	221	219	236	255
	Payroll	11,916	12,522	12,591	11,922	16,625	13,820	14,513	16,311	18,135
Marinas	Establishments	68	69	73	75	70	77	70	70	74
	Employees	588	533	537	543	595	650	661	633	717
	Payroll	13,753	12,642	13,786	15,805	15,408	16,147	17,212	16,996	19,201

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.
[3] NA = Not available.

Gulf of Mexico Region

- Alabama
- West Florida
- Louisiana
- Mississippi
- Texas



Fishing boats in Key West, Florida.
Photo: NOAA Fisheries Office of Science and Technology/Noelle Olsen

MANAGEMENT CONTEXT

The Gulf of Mexico Region includes Alabama, Louisiana, Mississippi, Texas, and West Florida. Federal fisheries in this region are managed by the Gulf of Mexico Fishery Management Council (GMFMC) and NOAA Fisheries under seven fishery management plans (FMPs). The coastal migratory pelagic resources and spiny lobster fisheries are managed jointly with the South Atlantic Fishery Management Council (SAFMC).

FMPs in the Gulf of Mexico Region

- Aquaculture
- Coastal migratory pelagic resources (with SAFMC)
- Corals
- Red drum
- Reef fish
- Shrimp
- Spiny lobster (with SAFMC)

One stock/stock complex covered in these FMPs was listed as overfished in 2017: greater amberjack. In 2017, gray triggerfish (Gulf of Mexico stock) and red snapper (Gulf of Mexico stock) were removed from the overfished list.

Two stocks/complexes were subject to overfishing in 2017: greater amberjack and gray triggerfish (Gulf of Mexico stock), of which both were added in 2017.

Catch Share Programs

Two catch share programs have been implemented in the Gulf of Mexico: the Red Snapper Individual Fishing Quota (IFQ) Program and the Grouper and Tilefish IFQ Program. The landings revenues for these programs totaled more than $55.1 million in 2017. The following are descriptions of these catch share programs and their performance.

Red Snapper IFQ Program: This program was implemented in 2007 to reduce overcapacity and mitigate derby fishing conditions in the red snapper segment of the commercial reef fish fishery. The 2016 key performance indicators of the program show that relative to the baseline period (the 3-year period prior to implementation), the number of active vessels decreased, while quota, landings, inflation-adjusted landings revenue, and inflation-adjusted revenue per active vessel increased.

Grouper and Tilefish IFQ Program: This program was implemented in 2010 to reduce overcapacity, increase harvesting efficiency, and eliminate the race to fish in the grouper–tilefish segment of the commercial reef fish fishery. The 2016 key performance indicators of the program show that relative to the baseline period (the 3-year period prior to implementation), the number of active vessels decreased, while quota, landings, inflation-adjusted landings revenue, and inflation-adjusted revenue per active vessel increased.

Policy Updates[1]

Red snapper allocation has been a key focus of the GMFMC in recent years. For example, Amendment 28 (May 2016) of the Reef Fish FMP revised the commercial and recreational sector allocations of the red snapper ACL by shifting 2.5% of the commercial sector's allocation to the recreational sector. This shift was due to the recalibration of Marine Recreational Information Program catch estimates, which showed higher recreational landings during the time period used to determine the allocation. The resulting sector allocations for red snapper were 48.5% commercial and 51.5% recreational and were applied to the 2016 quotas. However, in March 2017, a court vacated Amendment 28, and the sector quotas for 2017 were adjusted (effective June 2017) to the previous sector allocations of 51% commercial and 49% recreational.

In 2017, the federal red snapper season was initially open only 3 days for private anglers and 49 days for for-hire vessels. The short private angling season in 2017 was due in part to a quota overage in 2016, which required an overage adjustment to the 2017 quota. The short season was also due to landings projected to occur in state waters while federal waters were closed. Shortly after the private angling season ended, it was reopened for an additional 39 days. During this time, the fishing season was open Fridays through Sundays, plus July 3-4 and September 4.

Amendment 26 (effective May 2017) to the Coastal Migratory Pelagics FMP for the Gulf of Mexico and Atlantic regions made the GMFMC responsible for management in federal waters off the Florida Keys. In the Gulf, this rule also revises the commercial and recreational

[1] For additional information on management actions cited herein and other federal fisheries management actions in the Gulf of Mexico Region, see http://gulfcouncil.org/fishery-management/implemented-plans/

fishing ACLs as well as the commercial zone quotas. In addition, under Amendment 26 the recreational bag limit for the Gulf migratory group of king mackerel was increased in May 2017 from two fish per person per trip to three fish per person per trip. The purpose of this increase was to allow more opportunities for recreational anglers to harvest the recreational sector's ACL.

In addition to these management actions, other actions taken in 2017 (but effective January 2018) included establishing a rebuilding plan for gray triggerfish and modifying the greater amberjack rebuilding plan. Both of these stocks were determined to be experiencing overfishing in 2017; greater amberjack has had an overfished status since about 1987. Reef Fish Amendment 46 establishes a 9-year rebuilding timeline for gray triggerfish. The amendment reduces the recreational bag limit to 1-fish per person per day, increases the recreational minimum size limit to 15-inches fork length, and creates a January–February recreational closed season in addition to the current June-July 31 closure during spawning for the commercial and recreational sector. The amendment also increases the commercial trip limit to 16 fish.

Modifications to the greater amberjack rebuilding plan adjust the re-building timeline, reduce the commercial and recreational annual catch limits (ACLs) and annual catch targets (ACTs), and modify the recreational fixed closed season for greater amberjack in the Gulf of Mexico exclusive economic zone (EEZ). Reducing the commercial and recreational fishing ACLs 31% coupled with similar reduction in the ACTs for these fisheries is projected to rebuild the stock by 2027.

COMMERCIAL FISHERIES — GULF OF MEXICO REGION

In this report, commercial fisheries refer to fishing operations that sell their catch for profit. The term does not include subsistence fishermen or saltwater anglers who fish for sport. It also excludes the for-hire sector, which earns its revenue from selling recreational fishing trips to saltwater anglers. The commercial fisheries section reports on economic impacts, landings revenue, landings, and ex-vessel prices of key species/species groups.

Key Gulf of Mexico Region Commercial Species

- Blue crab
- Crawfish
- Groupers
- Menhaden
- Mullets
- Oysters
- Red snapper
- Shrimp
- Spiny lobster
- Tunas

Economic Impacts

The premise behind economic impact modeling is that every dollar spent in a regional economy (direct impact) is either saved or re-spent on additional goods or services. If those dollars are re-spent on other goods and services in the regional economy, this spending generates additional economic activity in the region.[2]

Four different measures are commonly used to show how commercial fisheries landings affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as commercial fishing. The category includes both the direct sales of fish landed and sales made between businesses and households resulting from the original sale. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the sales of seafood or purchases of inputs to commercial fishing. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in numbers of jobs. Note that these categories are not additive. The United States seafood industry is defined here as the commercial fishing sector, seafood processors and dealers, seafood wholesalers and distributors, importers, and seafood retailers.[3,4]

This report provides estimates of total economic impacts for the nation and for each of the 23 coastal states. Total economic impacts for each state and the nation represent the sum of direct impacts; indirect impacts (in this case, the impact from suppliers to the seafood industry); and induced impacts (spending by

[2] Summary data is available online in the FEUS webtool. [Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.]
[3] The NMFS Commercial Fishing Industry Input/Output Model was used to generate the impact estimates. [Available at: http://www.st.nmfs.noaa.gov/documents/commercial_seafood_impacts_2007-2009.pdf.]
[4] Commercial economic impacts data were not available for West Florida; data for the entire state of Florida are reported here.

employees on personal and household expenditures, where employees of both the seafood industry and its full supply chain are included). That is, the total economic impact estimates reported here measure jobs, sales, value-added, and income impacts from the seafood industry as well as the economic activity generated throughout each region's broader economy from this industry.

In 2017, the commercial fishing and seafood industry in Florida generated the largest employment impacts in the Gulf of Mexico region with 86,141 full- and part-time jobs.[5] Florida also generated the largest sales impacts ($19.7 billion), value-added impacts ($6.6 billion), and income impacts ($3.7 billion).[5]

Landings Trends

Overall, landings revenues were fairly flat (down two percent) in the Gulf Region from 2016 to 2017 but there was considerable variation across species and states. Landings revenue gains from shrimp (up 13%, $51.7 million), oysters (up 20%, $18.2 million) and blue crabs (up 6%, $3.9 million) largely offset declines from menhaden (down 50%, -$71.1 million) and spiny lobsters (down 11%, -$9.6 million).

The shrimp fishery is the highest value fishery in the region and in each Gulf state; overall, the region represented 78% of U.S. shrimp harvest in 2017. With shrimp landings revenue up $39 million relative to 2016, Texas accounted for 76% of the region's increase in shrimp landings revenue. Texas shrimp landings were at their highest level since 2006. Region-wide, brown shrimp landings revenue increased 20% (16.6 million pounds) from 2016 to 2017, which was consistent with the NOAA Fisheries forecast; Louisiana (up $2.6 million), Mississippi (up $3.0 million) and Texas (up $18.8 million) all experienced brown shrimp landings and revenue gains.[6] Alabama and West Florida represent over 96% of the pink shrimp fishery; their 2017 landings revenues from this species were up $9.1 million and $13.6 million, respectively. White shrimp 2017 landings revenue increased $20.0 million (37%) in Texas from the previous year, offsetting declines in all other Gulf states. Overall, shrimp prices ticked up 2% despite record high imports of shrimp products in 2017.

Oyster landings revenue increased from 2016 to 2017 due to higher landings in Louisiana and Texas (up 11% and 12%, respectively) and higher prices. Oyster production in Texas exceeded expectations, which had been lowered due to the heavy rains from Hurricane Harvey that caused fresh water run-off in east Galveston Bay, devastating oyster beds in that area. Oyster production elsewhere in Texas, however, offset the east Galveston Bay losses. In terms of prices, average annual prices increased in each of the Gulf states from 2016 to 2017. Gulf-wide oyster prices increased 11% during this period; in contrast, oyster prices declined 8% on average elsewhere in the United States from 2016 to 2017.

Menhaden landings revenue declined from 2016 to 2017 on a combination of lower harvest levels (down 25%), which had been predicted by NOAA Fisheries,[7] and lower prices (down 36%). Global production of fish meal and fish oil, the primary market for menhaden, was up in 2017 due to the recovery of the Peru and Chile fisheries, which depressed prices. Taking a more long-term perspective, 2016 was a banner year for the Gulf menhaden fishery, with real (inflation-adjusted) landings revenue achieving its highest level since 1984. Relative to 2008, menhaden real landings revenue was only down 2%. Louisiana, home to two of the three menhaden processing facilities, accounted for 100% of the 2016-2017 decline in landings revenue.

Spiny lobster landings, which only West Florida harvests in the Gulf Region, declined 28% in 2017 relative to 2016 landings; landings revenue fell 23% ($9.6 million). The spiny lobster season, which runs from August to March, was disrupted by Hurricane Irma, which struck south Florida in early September 2017, displacing and destroying over 150,000 lobster traps.[8] The Florida Keys Commercial Fishermen's Association, in cooperation with Florida Sea Grant and the Florida Fish and Wildlife Conservation Commission, deployed spotter planes to identify and recover lost gear, saving the industry an estimated $4 million.

Landings Revenue

In 2017, landings revenue in Gulf of Mexico totaled $890.3 million, a 34% increase from 2008 (a 17% increase in

[5] This information is for the entire state of Florida.
[6] https://www.fisheries.noaa.gov/media-release/noaa-predicts-season-commercial-harvest-brown-shrimp-western-gulf-mexico
[7] https://www.st.nmfs.noaa.gov/Assets/commercial/market-news/Forecast2017.pdf
[8] https://www.flseagrant.org/news/2018/04/florida-sea-grant-helped-save-keys-lobster-industry-nearly-4-million-after-hurricane-irma/

real terms after adjusting for inflation) and a 2% decrease from 2016. Landings revenue was highest in Louisiana ($370.2 million), followed by Texas ($237 million).

Shellfish landings revenue accounted for 79% of all landings revenue. In 2017, shrimp ($451.2 million), oysters ($109.6 million), and menhaden ($72.2 million) had the highest landings revenue in this region. Together, these top three species accounted for 71% of total landings revenue.

From 2008 to 2017, red snapper (251%, 206% in real terms), oysters (81%, 58% in real terms), and blue crab (73%, 51% in real terms) had the largest increases, while tunas (-16%, -27% in real terms) and groupers (-8%, -19% in real terms) had the largest decreases. From 2016 to 2017, oysters (20%), shrimp (13%), and blue crab (6%) had the largest increases, while menhaden (-50%), spiny lobster (-23%), and groupers (-22%) had the largest decreases.

Commercial Revenue: Largest Increases

From 2008:
- Red snapper (251%, 206% in real terms)
- Oysters (81%, 58% in real terms)
- Blue crab (73%, 51% in real terms)

From 2016:
- Oysters (20%)
- Shrimp (13%)
- Blue crab (6%)

Commercial Revenue: Largest Decreases

From 2008:
- Tunas (-16%, -27% in real terms)
- Groupers (-8%, -19% in real terms)

From 2016:
- Menhaden (-50%)
- Spiny lobster (-23%)
- Groupers (-22%)

Landings

In 2017, Gulf of Mexico Region commercial fishermen landed over 1.4 billion pounds of finfish and shellfish. This represents a 10% increase from 2008 and a 19% decrease from 2016. Menhaden contributed the highest landings volume in the region, accounting for 73% of total landing weight.

From 2008 to 2017, red snapper (183%), shrimp (21%), and spiny lobster (21%) had the largest increases, while groupers (-34%), oysters (-15%), and tunas (-14%) had the largest decreases. From 2016 to 2017, shrimp (11%), oysters (8%), and blue crab (5%) had the largest increases, while spiny lobster (-28%), groupers (-26%), and menhaden (-25%) had the largest decreases.

Commercial Landings: Largest Increases

From 2008:
- Red snapper (183%)
- Shrimp (21%)
- Spiny lobster (21%)

From 2016:
- Shrimp (11%)
- Oysters (8%)
- Blue crab (5%)

Commercial Landings: Largest Decreases

From 2008:
- Groupers (-34%)
- Oysters (-15%)
- Tunas (-14%)

From 2016:
- Spiny lobster (-28%)
- Groupers (-26%)
- Menhaden (-25%)

Prices

In 2017, spiny lobster ($8.83 per pound) received the highest ex-vessel price in the region. Landings of menhaden ($0.07 per pound) had the lowest ex-vessel price. From 2008 to 2017, oysters (112%, 85% in real terms), blue crab (57%, 37% in real terms), and groupers (41%, 23% in real terms) had the largest increases, while tunas (-2%, -15% in real terms) had the largest decrease. From 2016 to 2017, oysters (11%), spiny lobster (7%), and groupers (5%) had the largest increases, while menhaden (-32%), mullets (-4%), and tunas (-0.7%) had the largest decreases.

RECREATIONAL FISHERIES — GULF OF MEXICO REGION

In this report, recreational fishing refers to fishing for leisure rather than to sell fish (commercial fishing) or for subsistence. This recreational fisheries section reports on economic impacts and expenditures, angler participation, fishing trips, and catch of key species/species groups. [Louisiana harvest and release totals for 2014-2017 are estimated using data from a state creel survey.][9]

Key Gulf of Mexico Region Recreational Species[10]

- Drum (Atlantic croaker)
- Drum (Gulf and Southern kingfish)
- Drum (sand and silver seatrouts)
- Drum (spotted seatrout)
- Porgies (sheepshead)
- Red drum
- Red snapper
- Southern flounder
- Spanish mackerel
- Striped mullet

Economic Impacts and Expenditures

The economic contribution of recreational fishing activities in the Gulf of Mexico Region is based on spending by recreational anglers.[11] Total annual trip expenditures are estimated at the state level by multiplying mean trip expenditures by the estimated number of adult trips in each trip mode (for-hire, private boat, and shore) and adjusting by the CPI (consumer price index) to the current year. Total annual durable expenditures are estimated by multiplying mean durable expenditures in each state by the estimated annual number of adult participants for each state and adjusting by the CPI (consumer price index) to the current year.[12]

Four different measures are commonly used to show how angler expenditures affect the economy in a region (state or nationwide): sales, income, value-added, and employment. The term sales refers to the gross value of all sales by regional businesses affected by an activity, such as recreational fishing. The category includes both the direct sales made to the angler and sales made between businesses and households resulting from that original sale to the angler. Income includes personal income (wages and salaries) and proprietors' income (income from self-employment). Value-added is the contribution made to the gross domestic product in a region. Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the purchases made by anglers. The first three measures are calculated in terms of dollars, whereas employment impacts are measured in number of jobs. Note that these categories are not additive. NOAA Fisheries uses a regional impact modeling software, called IMPLAN, to estimate these four types of impacts.

The economic contributions for both trip and durable expenditures from recreational fishing in 2017 were estimated using IMPLAN version 3, with base year data from 2017. Models for each state and for the nation were created in IMPLAN using trip expenditures (based on 2016/2017 survey data on average trip expenditures and total 2017 trips) and for durable expenditures (based on 2014 survey data on average durable expenditures and 2017 participants).

The greatest employment impacts from expenditures on saltwater recreational fishing in the Gulf of Mexico Region were generated in West Florida (79,498 jobs), followed by Alabama (23,721 jobs) and Louisiana (16,853 jobs).The largest sales impacts were observed in West Florida ($9.1 billion), followed by Alabama ($2.2 billion) and Louisiana ($1.9 billion). The biggest income impacts were generated in West Florida ($3.3 billion), followed by Alabama ($802.3 million) and Texas ($642.7 million). The greatest value-added impacts were in West Florida ($5.5 billion), followed by Alabama ($1.4 billion) and Louisiana ($1.1 billion).

Expenditures for fishing trips and durable equipment across the Gulf of Mexico Region in 2017 totaled $13.5 billion. This total included $10 billion in durable goods expenditures, with the largest portion coming from boat expenses ($5.8 billion).

Participation

In 2017, there were 2.6 million recreational anglers who fished in the Gulf of Mexico Region. This number repre-

[9] Atlantic and Gulf recreational catch and effort estimates are based upon the MRIP estimates released in 2018.
[10] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[11] Trip expenditure estimates were generated from the 2016/2017 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2020). Durable goods expenditures were generated from the 2014 National Marine Recreational Fishing Expenditure Survey (Lovell et al., 2016). (For citations: Publications-U.S. Coastal and Marine Recreation.)
[12] Summary data is available online in the FEUS webtool. [Available at: https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states-interactive-tool.]

sented an 18% decrease from 2008 and a 3% decrease from 2016. The anglers are categorized as either residents from coastal (89%) or non-coastal (11%) counties.

Fishing Trips

In 2017, recreational fishermen took 58.6 million fishing trips in the Gulf of Mexico Region. [Texas trip estimates are not available for the shore mode. Shore mode in Louisiana has been included in the private mode since 2014.] This number represented a 4% decrease from 2008 and an 8% increase from 2016. The largest proportions of trips were taken in the shore mode (55%) and private boat mode (43%). States with the highest number of recorded trips in the Gulf of Mexico Region were West Florida (41.8 million trips) and Alabama (8.5 million trips).

Harvest and Release Trends

Of the Gulf of Mexico Region's key species and species groups, drum (spotted seatrout) (42.7 million fish), drum (sand and silver seatrouts) (15.7 million fish), and drum (Atlantic croaker) (14.6 million fish), were most frequently caught by recreational fishermen. The text box below shows the species with the largest percentage increases and decreases in the past 10 years and in the past year.

Harvest and Release: Largest Increases

From 2008:
- Red snapper (87%)
- Spanish mackerel (48%)
- Striped mullet (39%)

From 2016:
- Porgies (sheepshead) (94%)
- Spanish mackerel (71%)
- Red snapper (48%)

Harvest and Release: Largest Decreases

From 2008:
- South flounder (-73%)
- Red drum (-45%)

From 2016:
- South flounder (-51%)
- Striped mullet (-31%)
- Drum (Gulf and south kingfish) (-2%)

From 2008 to 2017, red snapper (87%), Spanish mackerel (48%), and striped mullet (39%) had the largest increases, while south flounder (-73%) and red drum (-45%) had the largest decreases. From 2016 to 2017, porgies (sheepshead) (94%), Spanish mackerel (71%), and red snapper (48%) had the largest increases, while south flounder (-51%), striped mullet (-31%), and drum (Gulf and south kingfish) (-2%) had the largest decreases.

The Gulf of Mexico Region experienced unusually high water temperatures in 2016. These high water temperatures may have caused changes to the spawning of certain fish stocks such as Atlantic croaker. In Louisiana, the catch of Atlantic croaker increased over 200% compared to 2016. The high water temperatures were also thought to directly influence hurricane activity in the Gulf, including Hurricane Harvey which hit Texas and Hurricane Irma which hit Florida and Alabama.[13] The damage to recreational fishing infrastructure and personal property had negative effects on recreational fishing effort in some locations.

MARINE ECONOMY — GULF OF MEXICO REGION

For this report, the marine economy refers to the economic activity generated by fishing and marine-related industries in a coastal state. The national marine economy consists of two industry sectors: 1) seafood sales and processing (employer establishments and non-employer firms); and 2) transport, support, and marine operations (employer establishments). These sectors include several different marine-related industries.[14,15]

Note that when discussing the marine economy in the Gulf of Mexico Region, all statistics include the entire state of Florida and not just West Florida.[16]

To measure the size of the commercial fishing sector in a state's economy relative to the size of the commercial fishing sector in the national economy, researchers use an index called the Commercial Fishing Location Quotient (CFLQ).[17,18] The CFLQ is calculated as the ratio of the percentage of regional employment in the

[13] NOAA/NWS/National Data Buoy Center. 2019. "National Data Buoy Center". Stennis Space Center, MS. [Available at https://www.ndbc.noaa.gov/. (Accessed June 4, 2019)].
[14] Unless otherwise stated, data are from the U.S. Census Bureau. [For more information: https://www.census.gov.]
[15] U.S. Bureau of Economic Analysis, 'Table 1.1.5 Gross Domestic Product' and 'Table SA6N Compensation of Employees by NAICS Industry. [Available at: https://apps.bea.gov/regional/histdata/releases/0518gdpstate/.]
[16] Marine Economy information was not available for West Florida; information for the entire state of Florida is provided in this report.
[17] Percentage changes in inflation adjusted (real dollar) terms are calculated using the annual Gross Domestic Product implicit price deflator published by the U.S. Bureau of Economic Analysis and the Federal Reserve Bank of St. Louis. [Available at: https://fred.stlouisfed.org/series/GDPDEF.]
[18] U.S. Bureau of Labor Statistics, 'Location Quotient Calculator.' [For more information: https://www.bls.gov/cew/about-data/location-quotients-explained.htm.]

commercial fishing sector relative to the percentage of national employment in the commercial fishing sector. The United States CFLQ is 1. If a state CFLQ is less than 1, then less commercial fishing occurs in this state than the national average. If a state CFLQ is greater than 1, then more commercial fishing occurs in this state than the national average.

Louisiana had the highest CFLQ at 3.68. Mississippi had a CFLQ value of 1.02.

In 2016, 1.9 million employer establishments operated throughout the entire Gulf of Mexico Region (including marine and non-marine related establishments). These establishments employed 31.1 million workers and had a total annual payroll of $1.4 trillion. The combined gross state product of Alabama, West Florida, Louisiana, Mississippi, and Texas was approximately $3.1 trillion in 2016.

Seafood Sales and Processing

Seafood Product Preparation and Packaging: In 2016, the Gulf of Mexico Region had 652 non-employer firms in the seafood product preparation and packaging sector (a 57% increase from 2008). Annual receipts for these firms totaled about $49.1 million (a 76% increase in real terms from 2008). There were 129 employer firms in the seafood product preparation and packaging sector (remains unchanged from 2008). These establishments employed 7,068 workers (a 15% decrease from 2008) and had a total annual payroll of $221.2 million (a 3% decrease in real terms from 2008). The greatest number of establishments in this sector was in Florida (362), followed by Texas (233) and Louisiana (181).

Seafood Sales, Retail: In 2016, there were 768 non-employer firms engaged in retail sales of seafood in the states that make up the Gulf of Mexico Region (a 5% decrease from 2008). Annual receipts for these firms totaled about $64.1 million (a 28% decrease in real terms from 2008). There were 379 employer firms in the retail sales of seafood sector (a 2% decrease from 2008). These establishments employed 2,765 workers and had a total annual payroll of $56.3 million (a 30% increase in real terms from 2008).[19] The greatest number of establishments in this sector was in Florida (702), followed by Louisiana (360) and Texas (281).

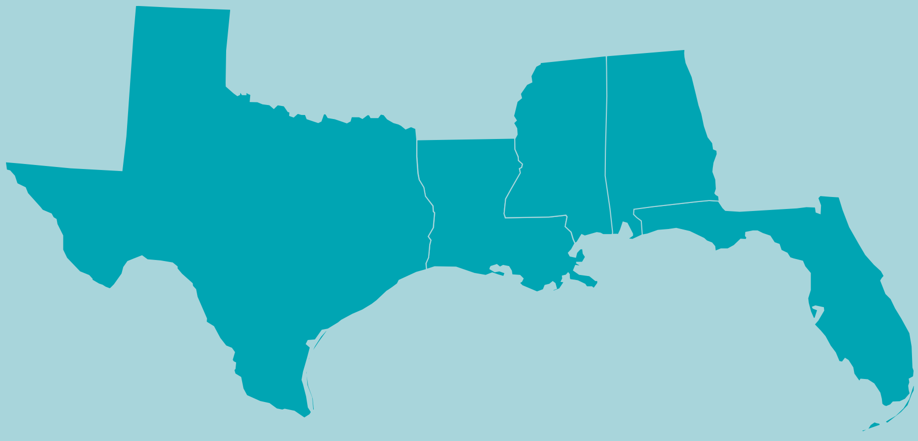
Seafood Sales, Wholesale: There were 473 employer firms in the wholesale sales of seafood sector in the Gulf of Mexico Region in 2016 (a 7% increase from 2008). These establishments employed 4,040 workers (a 3% increase from 2008), and had a total annual payroll of $161.9 million (a 13% increase in real terms from 2008). The greatest number of establishments in this sector was in Florida (239), followed by Louisiana (116) and Texas (86).

Transport, Support, and Marine Operations

Data for the transport, support, and marine operations sector of Gulf of Mexico Region's economy were largely suppressed for confidentiality reasons. It is clear, however, that these sectors play an important role in the regional economy. For example, in 2016, the ship and boat building sector in the Gulf of Mexico Region accounted for $2.9 billion in payroll (a 32% increase in real terms from 2008).

[19] The Census Bureau suppressed number of employees data for this sector in one or more states in the this region in either 2016 or 2008, and thus cannot be compared.

Tables | Gulf of Mexico Region



2017 Economic Impacts of the Gulf of Mexico Seafood Industry (thousands of dollars)

		With Imports				Without Imports			
	Landings Revenue	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Alabama	69,682	12,748	591,424	235,475	308,048	12,665	580,185	232,696	303,803
Florida[1]	183,015	86,141	19,676,700	3,675,549	6,577,946	9,889	988,504	259,058	399,044
Louisiana	370,231	31,061	1,813,468	664,891	908,972	30,090	1,611,905	624,121	840,430
Mississippi	30,348	4,802	233,702	93,193	120,534	4,774	229,354	92,120	118,902
Texas	236,994	30,274	3,254,182	886,755	1,352,431	19,462	1,310,704	478,048	669,610

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[2]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	663,848	636,427	624,629	811,905	784,869	941,557	1,059,780	877,767	905,203	890,269
Finfish & Other	147,115	142,425	117,831	184,721	188,283	200,892	200,092	250,085	261,318	183,068
Shellfish	516,732	494,003	506,797	627,184	596,586	740,665	859,688	627,682	643,885	707,201
Key Species	-	-	-	-	-	-	-	-	-	-
Blue crab	39,813	45,484	41,264	48,794	53,708	61,804	79,458	74,525	65,153	69,037
Crawfish	9,507	15,547	13,971	9,914	8,325	16,490	16,088	6,851	11,877	NA
Groupers	24,108	18,435	14,270	20,326	24,657	24,628	30,435	27,670	28,737	22,285
Menhaden	64,376	60,606	51,750	92,855	85,890	90,643	80,402	138,438	143,243	72,153
Mullets	6,099	6,105	5,221	10,368	7,557	13,222	11,626	7,621	8,563	6,666
Oysters	60,464	73,464	55,085	65,273	76,042	76,450	93,007	99,253	91,395	109,604
Red snapper	7,972	7,984	10,202	11,413	13,681	20,621	23,158	27,437	26,552	27,955
Shrimp	366,808	327,608	339,228	441,384	412,209	513,055	587,267	362,504	399,485	451,165
Spiny lobster	19,141	12,203	32,747	35,610	21,128	46,744	53,415	44,049	41,251	31,654
Tunas	6,170	8,180	2,688	5,516	10,657	7,308	6,334	4,502	5,790	5,161

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	1,278,879	1,435,665	1,072,068	1,792,550	1,489,595	1,346,244	1,245,301	1,553,245	1,735,765	1,402,221
Finfish & Other	994,813	1,071,919	810,889	1,472,911	1,177,685	1,043,696	931,158	1,258,002	1,437,717	1,085,240
Shellfish	284,066	363,746	261,179	319,640	311,910	302,548	314,143	295,244	298,048	316,981
Key Species	-	-	-	-	-	-	-	-	-	-
Blue crab	49,258	61,277	41,240	55,606	55,444	46,941	51,664	52,609	51,702	54,394
Crawfish	15,735	19,312	14,557	9,599	6,853	19,676	13,055	5,461	13,573	NA
Groupers	8,941	7,008	5,075	7,175	8,325	7,613	8,991	7,815	7,948	5,871
Menhaden	927,517	1,002,579	753,442	1,398,654	1,102,539	971,308	848,599	1,188,716	1,363,683	1,016,738
Mullets	10,609	11,303	8,963	14,233	10,772	13,482	15,101	10,806	11,433	9,313
Oysters	20,723	22,829	15,824	18,742	21,192	19,257	17,957	17,127	16,315	17,702
Red snapper	2,370	2,503	3,259	3,567	4,042	5,306	5,739	6,741	6,480	6,700
Shrimp	188,806	250,572	178,902	221,469	219,216	206,839	215,903	210,322	207,146	228,960
Spiny lobster	2,975	3,960	5,286	5,302	3,634	5,600	5,038	5,450	5,015	3,586
Tunas	1,786	2,836	1,322	1,588	3,070	2,094	1,760	1,343	1,706	1,531

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Blue crab	0.81	0.74	1.00	0.88	0.97	1.32	1.54	1.42	1.26	1.27
Crawfish	0.60	0.81	0.96	1.03	1.21	0.84	1.23	1.25	0.88	NA
Groupers	2.70	2.63	2.81	2.83	2.96	3.24	3.39	3.54	3.62	3.80
Menhaden	0.07	0.06	0.07	0.07	0.08	0.09	0.09	0.12	0.11	0.07
Mullets	0.57	0.54	0.58	0.73	0.70	0.98	0.77	0.71	0.75	0.72
Oysters	2.92	3.22	3.48	3.48	3.59	3.97	5.18	5.80	5.60	6.19
Red snapper	3.36	3.19	3.13	3.20	3.39	3.89	4.03	4.07	4.10	4.17
Shrimp	1.94	1.31	1.90	1.99	1.88	2.48	2.72	1.72	1.93	1.97
Spiny lobster	6.43	3.08	6.20	6.72	5.81	8.35	10.60	8.08	8.23	8.83
Tunas	3.45	2.88	2.03	3.47	3.47	3.49	3.60	3.35	3.39	3.37

[1] Landings revenue is for West Florida. The rest of the information in this row is for the entire state of Florida.
[2] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of the Gulf of Mexico Recreational Fishing Expenditures (thousands of dollars, trips)

	Trips	#Jobs	Sales	Income	Value Added
Alabama	8,493	23,721	2,209,359	802,282	1,441,757
Louisiana	2,308	16,853	1,898,816	625,091	1,136,104
Mississippi	4,852	5,162	504,776	170,900	314,391
Texas	1,144	13,583	1,720,172	642,663	1,079,694
West Florida	41,840	79,498	9,141,558	3,271,476	5,535,059

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	463,915	Fishing Tackle	2,173,055
Private Boat	1,515,082	Other Equipment	943,366
Shore	1,494,808	Boat Expenses	5,762,513
Total	3,473,805	Vehicle Expenses	1,000,810
		Second Home Expenses	140,248
		Total Durable Expenditures	10,019,992
Total State Trip and Durable Goods Expenditures			13,493,797

Recreational Anglers by Residential Area (thousands of anglers)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	2,926	2,550	2,480	2,737	2,803	2,973	2,683	2,445	2,453	2,324
Non-Coastal	262	296	235	311	268	400	185	199	259	296
Total Anglers	3,188	2,846	2,715	3,048	3,071	3,373	2,868	2,643	2,712	2,620

Recreational Fishing Effort by Mode (thousands of angler trips)[2]

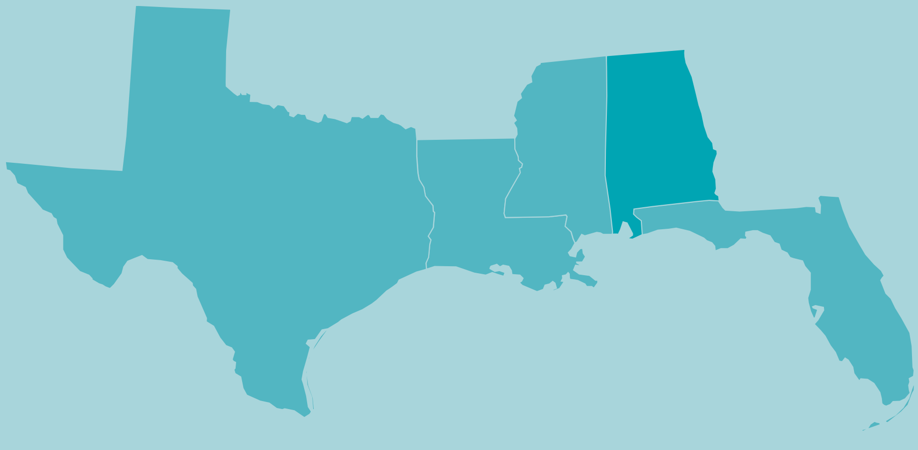
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	970	932	730	907	1,121	1,054	1,065	1,214	1,274	1,256
Private	32,302	30,390	31,433	31,484	33,726	31,787	25,410	23,585	24,714	25,254
Shore	27,815	26,457	29,336	30,492	32,843	36,483	26,239	25,823	28,414	32,128
Total Trips	61,087	57,779	61,499	62,884	67,690	69,324	52,715	50,622	54,403	58,638

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[3,4]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Drum (Atlantic croaker)	H	4,675	3,870	3,819	4,765	3,096	4,646	6,229	3,533	2,362	3,552
	R	7,261	10,115	10,456	13,084	8,842	7,303	5,307	5,857	5,372	11,054
Drum (Gulf and South kingfish)	H	3,328	2,566	4,893	2,250	3,378	4,071	1,655	2,556	4,254	3,927
	R	2,040	1,851	1,921	1,300	1,492	1,208	1,120	703	1,936	2,134
Drum (sand and silver seatrouts)	H	7,454	9,730	11,400	11,141	11,061	6,414	5,187	6,145	6,146	9,595
	R	4,202	5,688	4,551	5,594	5,597	3,614	1,466	2,567	2,767	6,074
Drum (spotted seatrout)	H	24,382	24,870	21,831	27,012	27,503	24,005	8,291	10,913	14,523	12,090
	R	39,662	36,579	32,908	43,436	47,941	43,650	18,523	19,787	29,400	30,571
Porgies (sheepshead)	H	4,088	3,910	3,966	6,109	4,834	3,259	2,717	2,688	2,266	4,754
	R	3,595	3,234	5,718	4,029	3,921	5,081	3,683	3,848	2,320	4,159
Red drum	H	5,524	5,040	7,211	7,326	5,907	7,621	2,857	3,226	2,892	3,383
	R	13,326	12,038	15,447	14,072	14,547	17,579	7,256	8,064	7,128	7,075
Red snapper	H	1,323	1,466	1,155	1,512	1,516	2,422	1,106	1,460	1,714	3,069
	R	5,282	4,759	4,815	5,818	4,463	5,630	4,205	3,455	6,650	9,270
South flounder	H	1,306	1,831	1,842	1,878	1,509	2,339	677	586	714	395
	R	376	575	617	541	659	639	214	337	203	56
Spanish mackerel	H	4,764	3,595	4,472	4,882	5,482	9,000	4,491	5,501	5,601	6,381
	R	4,881	3,738	6,456	6,370	4,616	11,855	6,157	4,236	2,762	7,935
Striped mullet	H	3,051	1,943	4,128	4,397	6,239	7,848	6,216	7,001	5,630	4,575
	R	353	543	300	666	536	557	1,416	382	1,195	147

[1] Texas anglers estimates are not available by mode. West Florida anglers estimates are not available for the non-coastal mode.
[2] Texas trip estimates are not available for the shore mode.
[3] Data collected by the Texas Parks and Wildlife Department (TPWD) TPWD is reported in this table. The data collected by the TPWD Texas Parks and Wildlife Department (TPWD) differs from the data collected and reported in the MRIP. Data on the number of fish released are not reported by TPWD. (For more information: www.tpwd.state.tx.us.)
[4] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.

Tables | Alabama



2017 Economic Impacts of the Alabama Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	12,748	591,424	235,475	308,048	12,665	580,185	232,696	303,803
Commercial Harvesters	2,091	115,139	34,088	50,810	2,091	115,139	34,088	50,810
Seafood Processors & Dealers	2,101	151,277	59,256	75,301	2,046	147,321	57,706	73,332
Importers	22	7,051	1,130	2,149	0	0	0	0
Seafood Wholesalers & Distributors	188	10,114	3,545	4,567	188	10,067	3,529	4,546
Retail	8,346	307,843	137,455	175,221	8,341	307,657	137,372	175,115

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	44,503	39,624	26,335	50,910	46,527	56,832	70,497	55,660	65,599	69,682
Finfish & Other	4,358	3,662	2,748	4,072	5,183	4,680	4,572	5,013	4,927	4,596
Shellfish	40,145	35,962	23,587	46,838	41,344	52,153	65,925	50,647	60,672	65,086
Key Species	-	-	-	-	-	-	-	-	-	-
Blue crab	1,533	961	732	1,128	1,044	1,036	1,319	1,225	1,784	1,520
Flounders	214	197	97	222	185	58	53	66	56	30
Menhaden	59	42	15	58	84	104	147	154	164	158
Mullets	1,030	765	594	687	1,206	1,178	1,046	761	522	535
Oysters	243	77	390	1,322	1,253	786	441	341	601	557
Red snapper	239	263	329	314	316	401	697	1,443	1,423	1,852
Sharks	403	275	111	381	330	247	219	251	256	247
Shrimp	38,355	34,894	22,463	44,361	39,040	50,321	64,149	49,078	58,273	63,002
Spanish mackerel	664	301	499	582	1,149	940	472	705	833	439
Vermilion snapper	507	841	384	622	393	88	387	27	78	88

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	24,612	29,199	14,063	26,119	26,335	23,421	25,790	28,259	29,692	31,557
Finfish & Other	5,577	4,478	3,441	4,966	6,596	5,831	5,276	5,090	5,110	4,504
Shellfish	19,035	24,721	10,622	21,153	19,739	17,590	20,514	23,169	24,581	27,053
Key Species	-	-	-	-	-	-	-	-	-	-
Blue crab	1,799	1,458	927	1,617	1,325	1,025	1,184	1,300	1,918	1,425
Flounders	107	97	48	111	83	25	23	26	19	9
Menhaden	268	190	81	364	521	496	700	695	804	1,052
Mullets	2,017	1,814	1,202	1,262	1,946	1,793	1,829	1,385	952	988
Oysters	71	23	68	296	265	133	58	26	37	26
Red snapper	61	65	83	78	78	108	180	356	320	410
Sharks	424	328	140	450	495	343	272	386	396	339
Shrimp	17,154	23,215	9,625	19,224	18,137	16,418	19,257	21,839	22,614	25,594
Spanish mackerel	921	418	733	839	1,377	972	431	617	859	440
Vermilion snapper	199	346	148	224	132	28	124	8	24	24

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Blue crab	0.85	0.66	0.79	0.70	0.79	1.01	1.11	0.94	0.93	1.07
Flounders	2.01	2.04	2.05	2.00	2.21	2.35	2.24	2.51	2.87	3.18
Menhaden	0.22	0.22	0.18	0.16	0.16	0.21	0.21	0.22	0.20	0.15
Mullets	0.51	0.42	0.49	0.54	0.62	0.66	0.57	0.55	0.55	0.54
Oysters	3.41	3.33	5.75	4.47	4.72	5.91	7.60	12.96	16.36	21.21
Red snapper	3.93	4.04	3.97	4.04	4.05	3.70	3.86	4.05	4.45	4.52
Sharks	0.95	0.84	0.79	0.85	0.67	0.72	0.81	0.65	0.65	0.73
Shrimp	2.24	1.50	2.33	2.31	2.15	3.06	3.33	2.25	2.58	2.46
Spanish mackerel	0.72	0.72	0.68	0.69	0.83	0.97	1.09	1.14	0.97	1.00
Vermilion snapper	2.55	2.43	2.59	2.78	2.97	3.12	3.11	3.58	3.26	3.57

2017 Economic Impacts of Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	770	67,011	21,017	36,848
	Private Boat	1,641	168,481	42,379	108,884
	Shore	7,265	675,278	201,765	392,089
Total Durable Expenditures		14,045	1,298,589	537,121	903,936
Total State Economic Impacts		23,721	2,209,359	802,282	1,441,757

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	44,136	Fishing Tackle	339,260
Private Boat	169,746	Other Equipment	110,146
Shore	510,768	Boat Expenses	1,111,694
Total	724,651	Vehicle Expenses	48,364
		Second Home Expenses	28,101
		Total Durable Expenditures	1,637,565
Total State Trip and Durable Goods Expenditures			2,362,216

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	192	205	195	295	254	279	220	225	274	186
Non-Coastal	116	151	140	177	131	224	123	151	176	246
Out-of-State	237	209	220	435	339	549	510	455	465	480
Total Anglers	545	566	554	907	723	1,052	853	831	915	911

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	56	56	33	77	59	90	87	96	104	93
Private	2,261	2,282	2,316	2,288	2,114	2,155	2,037	2,080	2,010	2,540
Shore	2,661	3,103	2,980	3,373	3,978	4,524	4,357	4,653	5,206	5,860
Total Trips	4,978	5,442	5,329	5,738	6,151	6,769	6,482	6,830	7,320	8,493

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bluefish	H	58	30	108	398	210	362	173	109	690	105
	R	178	191	270	688	581	1,554	722	408	3,705	651
Drum (Atlantic croaker)	H	2,301	663	2,073	1,844	544	860	2,844	2,003	559	1,522
	R	3,168	4,017	4,412	4,659	2,011	2,016	3,605	3,468	1,393	6,101
Drum (kingfish)[3]	H	1,561	1,366	2,069	1,408	646	2,545	850	1,082	916	1,756
	R	595	1,009	932	659	240	691	389	371	734	1,327
Drum (sand seatrout)	H	2,647	3,095	5,519	3,379	2,277	1,078	1,431	2,315	1,894	2,639
	R	931	1,662	2,114	1,384	828	601	740	715	1,043	3,300
Drum (spotted seatrout)	H	751	814	1,576	1,455	1,396	1,299	574	1,228	1,464	891
	R	2,445	1,997	1,152	2,572	2,030	2,009	581	2,354	2,711	1,567
Porgies (sheepshead)	H	548	511	779	1,113	1,065	493	335	845	283	569
	R	412	120	171	372	117	104	41	660	71	43
Red drum	H	157	175	307	343	323	451	290	413	386	387
	R	468	347	377	244	808	1,130	861	493	604	989
Red snapper	H	273	277	241	604	403	757	364	630	646	1,249
	R	1,147	1,200	1,269	1,434	549	1,477	2,018	1,366	2,834	2,396
South flounder	H	246	278	579	318	242	194	123	104	139	101
	R	131	70	161	101	121	102	74	110	85	12
Spanish mackerel	H	243	204	631	1,309	1,478	2,921	477	2,240	1,772	2,529
	R	82	127	297	447	477	2,496	162	1,054	355	1,233

[1] Data collected by the Texas Parks and Wildlife Department (TPWD) TPWD is reported in this table. The data collected by the TPWD Texas Parks and Wildlife Department (TPWD) differs from the data collected and reported in the MRIP. Data on the number of fish released are not reported by TPWD. (For more information: www.tpwd.state.tx.us.)
[2] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[3] Drum (kingfish) include south kingfish and Gulf kingfish.

2016 Alabama State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
324,994 (1.3%)	99,584 (1.3%)	1,673,249 (1.3%)	69.0 (1.1%)	113 (1.1%)	206	0.42

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	33	41	68	67	47	58	57	49	38
	Receipts	1,894	1,809	3,314	4,354	1,965	3,069	3,446	2,901	3,365
Seafood sales, retail	Firms	57	67	71	58	68	66	55	46	43
	Receipts	5,632	5,484	5,197	4,759	7,073	5,520	4,351	3,274	2,971

Seafood Sales and Processing — Employer Establishments (thousands of dollars)

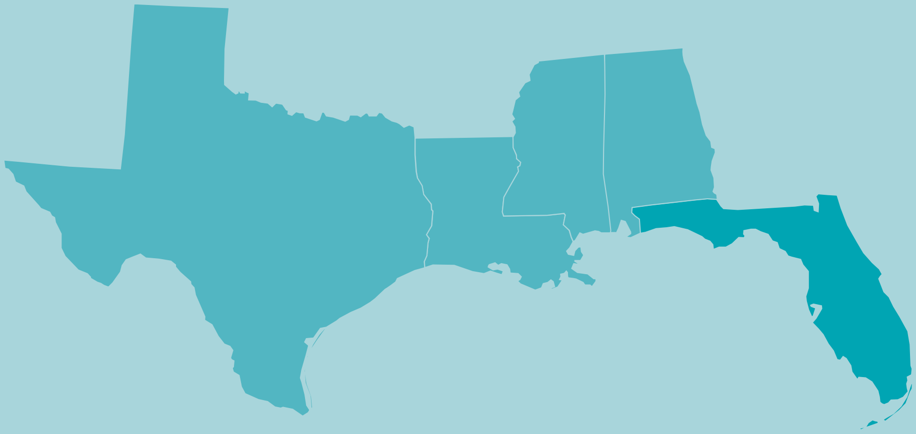
		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	23	22	21	16	17	22	23	20	20
	Employees	1,450	1,086	1,128	882	778	989	963	961	900
	Payroll	29,277	24,900	22,824	21,922	19,730	22,641	23,973	25,951	27,924
Seafood sales, wholesale	Establishments	29	28	23	25	16	18	18	21	17
	Employees	494	339	332	321	306	281	388	378	412
	Payroll	8,751	5,893	5,119	6,547	6,221	6,861	9,321	10,034	10,487
Seafood sales, retail	Establishments	33	31	34	32	32	28	31	32	32
	Employees	ds	130	132	120	189	219	200	234	255
	Payroll	1,710	2,044	2,016	1,888	2,990	3,267	3,330	3,706	4,013

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	42	40	32	35	37	38	37	41	43
	Employees	4,435	3,913	2,598	3,176	4,936	5,948	5,904	6,049	6,025
	Payroll	188,543	159,065	151,813	166,116	251,063	303,016	311,296	342,082	342,073
Deep Sea Freight Transportation	Establishments	7	7	5	6	5	5	2	2	1
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	0
Deep Sea Passenger Transportation	Establishments	2	3	2	2	1	NA	NA	NA	NA
	Employees	ds	ds	ds	ds	ds	NA	NA	NA	NA
	Payroll	ds	ds	ds	ds	ds	NA	NA	NA	NA
Coastal and Great Lakes Freight Transportation	Establishments	4	4	5	5	4	5	5	4	4
	Employees	ds	ds	ds	215	ds	ds	45	0	0
	Payroll	ds	ds	ds	13,117	ds	ds	2,617	0	0
Port and Harbor Operations	Establishments	4	5	5	3	6	3	2	2	2
	Employees	ds	ds	ds	ds	101	4	ds	0	0
	Payroll	ds	ds	ds	ds	5,788	160	ds	0	0
Marine Cargo Handling	Establishments	20	19	19	19	10	13	13	14	15
	Employees	756	658	548	536	ds	554	778	666	709
	Payroll	33,244	27,272	32,143	34,998	ds	34,481	37,273	37,154	47,407
Navigational Services to Shipping	Establishments	17	16	16	16	14	12	16	14	14
	Employees	287	294	276	283	241	208	124	121	113
	Payroll	16,712	15,383	14,737	14,981	8,808	14,761	6,902	6,922	5,911
Marinas	Establishments	56	55	54	53	57	54	54	57	57
	Employees	316	278	609	ds	329	332	343	387	372
	Payroll	9,170	8,418	12,149	12,196	10,253	9,659	9,804	11,182	12,086

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.
[3] NA = not available.

Tables | West Florida



2017 Economic Impacts of the Florida Seafood Industry (thousands of dollars)[1]

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	86,141	19,676,700	3,675,549	6,577,946	9,889	988,504	259,058	399,044
Commercial Harvesters	6,363	474,979	148,088	197,338	6,363	474,979	148,088	197,338
Seafood Processors & Dealers	5,004	918,083	177,676	349,295	520	102,313	19,801	38,926
Importers	45,528	14,338,508	2,298,019	4,371,005	0	0	0	0
Seafood Wholesalers & Distributors	11,001	1,434,637	563,233	700,736	430	56,050	22,005	27,377
Retail	18,245	2,510,493	488,533	959,571	2,576	355,161	69,164	135,402

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[2]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	123,850	117,324	139,046	166,015	143,886	182,172	212,961	196,790	185,828	183,015
Finfish & Other	51,698	49,976	41,321	59,580	60,710	67,994	74,935	65,469	68,394	64,699
Shellfish	72,152	67,349	97,725	106,434	83,176	114,178	138,026	131,321	117,435	118,315
Key Species	-	-	-	-	-	-	-	-	-	-
Blue crab	3,289	4,195	6,706	7,719	5,142	6,454	7,385	8,488	6,588	7,078
Gag	4,913	2,759	2,079	1,439	2,437	2,799	2,889	2,781	4,663	2,556
Lobsters	19,175	12,206	32,752	35,616	21,136	46,749	53,418	44,049	41,251	31,654
Mullet	4,172	5,069	4,188	8,630	5,050	11,081	9,387	6,148	6,991	5,009
Oyster	5,519	6,968	6,298	8,582	9,706	5,783	4,178	4,599	4,036	3,921
Quahog clam	1,825	1,524	1,002	921	753	921	NA	NA	NA	NA
Red grouper	13,591	10,488	8,992	15,087	16,737	16,219	21,217	18,931	17,872	14,155
Red snapper	2,951	2,980	4,552	5,417	6,141	8,073	8,111	9,997	8,609	9,506
Shrimp	23,265	24,446	27,554	28,456	22,161	29,164	42,690	38,027	35,371	46,305
Stone crab	19,019	17,806	23,335	24,430	23,934	24,710	27,911	35,776	29,917	29,066

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[2]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	60,380	66,387	63,678	78,459	63,648	63,231	81,775	62,717	64,774	62,444
Finfish & Other	35,740	39,000	32,251	42,392	39,077	38,003	49,090	35,325	40,162	37,011
Shellfish	24,640	27,386	31,428	36,067	24,570	25,227	32,685	27,391	24,612	25,433
Key Species	-	-	-	-	-	-	-	-	-	-
Blue crab	2,660	3,371	5,759	6,833	4,157	4,463	4,456	4,871	3,868	4,295
Gag	1,478	825	572	369	612	676	689	642	1,073	575
Lobsters	2,981	3,961	5,287	5,303	3,635	5,601	5,040	5,450	5,015	3,586
Mullet	6,980	9,167	7,262	11,410	7,249	10,879	11,943	8,595	9,325	7,040
Oyster	2,526	2,877	2,165	3,100	3,316	1,298	757	844	853	786
Quahog clam	279	255	156	137	128	183	NA	NA	NA	NA
Red grouper	5,628	4,387	3,488	5,635	6,141	5,412	6,629	5,664	5,300	3,921
Red snapper	849	863	1,317	1,538	1,698	2,181	2,104	2,642	2,327	2,520
Shrimp	9,942	11,451	12,892	11,975	7,958	9,676	11,946	13,080	11,739	14,056
Stone crab	6,163	5,382	5,100	5,460	5,202	3,767	1,944	2,759	3,005	2,511

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[2]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Blue crab	1.24	1.24	1.16	1.13	1.24	1.45	1.66	1.74	1.70	1.65
Gag	3.32	3.34	3.63	3.90	3.98	4.14	4.19	4.33	4.34	4.45
Lobsters	6.43	3.08	6.19	6.72	5.81	8.35	10.60	8.08	8.23	8.83
Mullet	0.60	0.55	0.58	0.76	0.70	1.02	0.79	0.72	0.75	0.71
Oyster	2.19	2.42	2.91	2.77	2.93	4.46	5.52	5.45	4.73	4.99
Quahog clam	6.53	5.97	6.43	6.74	5.86	5.03	NA	NA	NA	NA
Red grouper	2.41	2.39	2.58	2.68	2.73	3.00	3.20	3.34	3.37	3.61
Red snapper	3.47	3.45	3.46	3.52	3.62	3.70	3.86	3.78	3.70	3.77
Shrimp	2.34	2.13	2.14	2.38	2.78	3.01	3.57	2.91	3.01	3.29
Stone crab	3.09	3.31	4.58	4.47	4.60	6.56	14.36	12.96	9.96	11.57

[1] Information reported in this table is for the entire state of Florida.
[2] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	4,175	430,144	149,684	256,148
	Private Boat	9,218	954,882	323,281	616,073
	Shore	12,087	1,250,684	421,571	800,311
Total Durable Expenditures		54,018	6,505,848	2,376,940	3,862,527
Total State Economic Impacts		79,498	9,141,558	3,271,476	5,535,059

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	242,652	Fishing Tackle	1,263,852
Private Boat	832,301	Other Equipment	526,879
Shore	875,464	Boat Expenses	2,970,268
Total	1,950,417	Vehicle Expenses	304,829
		Second Home Expenses	56,889
		Total Durable Expenditures	5,122,715
Total State Trip and Durable Goods Expenditures			7,073,132

Recreational Anglers by Residential Area (thousands of anglers)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	1,820	1,551	1,538	1,592	1,718	1,813	1,649	1,414	1,393	1,400
Non-Coastal[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Out-of-State	2,029	1,671	1,470	1,624	2,141	2,538	2,716	2,399	2,306	2,383
Total Anglers	3,849	3,222	3,008	3,216	3,859	4,351	4,365	3,813	3,699	3,783

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	599	575	494	560	715	686	693	769	805	772
Private	22,324	19,828	20,585	20,688	23,306	21,551	18,859	16,775	17,883	18,025
Shore	17,971	15,804	18,368	18,815	20,977	24,056	19,073	18,186	20,249	23,043
Total Trips	40,894	36,207	39,446	40,063	44,998	46,293	38,625	35,730	38,936	41,840

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[2,3,4]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Common snook	H	41	31	0	1	1	39	33	36	48	66
	R	2,845	3,489	1,244	1,687	2,561	3,801	3,622	5,195	7,208	5,824
Drum (sand and silver seatrouts)[5]	H	1,980	2,202	1,097	2,424	4,387	2,139	1,279	959	521	1,463
	R	1,270	1,160	600	856	2,309	675	420	1,434	665	1,052
Drum (spotted seatrout)	H	3,093	3,071	2,519	3,821	4,493	3,657	2,714	2,730	3,299	3,680
	R	19,717	17,234	19,924	28,685	29,785	20,134	16,124	15,691	22,996	24,949
Gag grouper	H	951	428	590	313	282	466	327	278	214	279
	R	9,355	6,128	5,084	3,597	2,680	2,663	2,057	1,289	2,122	3,354
Gray snapper	H	3,011	2,749	1,396	1,528	3,877	3,561	4,609	3,474	3,787	3,098
	R	14,547	6,698	5,094	7,116	10,027	15,084	17,621	15,712	12,922	13,954
King mackerel	H	370	947	389	350	470	399	563	485	575	476
	R	398	345	201	159	202	182	254	157	405	204
Mullets[6]	H	2,721	1,315	2,383	2,308	4,424	4,394	4,022	3,146	3,931	3,699
	R	336	382	160	266	245	597	1,519	519	1,585	606
Porgies (sheepshead)	H	1,395	1,698	1,696	1,634	2,113	1,500	1,883	1,349	1,546	2,757
	R	2,206	1,941	4,232	3,054	3,108	3,468	3,590	2,130	2,201	4,039
Red drum	H	875	460	570	702	1,110	902	836	1,124	844	805
	R	5,210	3,097	5,505	6,632	6,061	5,576	5,510	6,996	5,755	4,423
Spanish mackerel	H	4,481	3,338	3,767	3,510	3,796	5,960	3,974	3,184	3,677	3,810
	R	4,772	3,565	6,130	5,865	4,014	9,343	5,986	3,171	2,354	6,589

[1] NA = Non-coastal data are not available because all of the state's residents are considered coastal county residents.
[2] Data collected by the Texas Parks and Wildlife Department (TPWD) TPWD is reported in this table. The data collected by the TPWD Texas Parks and Wildlife Department (TPWD) differs from the data collected and reported in the MRIP. Data on the number of fish released are not reported by TPWD. (For more information: www.tpwd.state.tx.us.)
[3] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[4] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[5] Drum (sand and silver seatrouts) include silver seatrout and sand seatrout.
[6] Mullets include mullet genus and striped mullet.

2016 Florida State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[2]
2,053,914 (8.3%)	546,218 (7%)	8,169,642 (6.4%)	363 (5.6%)	514 (5.2%)	946	0.99

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	202	217	280	294	307	300	315	300	316
	Receipts	11,065	12,473	14,635	14,618	17,557	17,214	22,329	21,841	20,834
Seafood sales, retail	Firms	331	316	361	362	383	338	346	355	320
	Receipts	26,087	25,667	27,964	29,037	30,765	25,332	26,433	29,033	24,296

Seafood Sales and Processing — Employer Establishments (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	23	25	27	24	27	25	27	27	23
	Employees	1,637	1,143	1,269	1,095	1,608	1,374	1,419	1,429	1,535
	Payroll	53,455	46,235	45,772	42,612	51,735	50,003	50,556	58,246	63,039
Seafood sales, wholesale	Establishments	229	215	229	250	226	234	233	242	239
	Employees	1,913	1,762	1,747	1,913	1,957	1,878	1,974	2,055	1,849
	Payroll	75,203	72,159	70,889	77,115	75,945	79,266	83,964	90,247	83,818
Seafood sales, retail	Establishments	168	158	145	145	151	165	166	181	191
	Employees	991	885	865	849	945	909	1,037	1,137	1,133
	Payroll	21,604	21,182	20,783	20,158	21,577	23,476	25,844	29,066	26,981

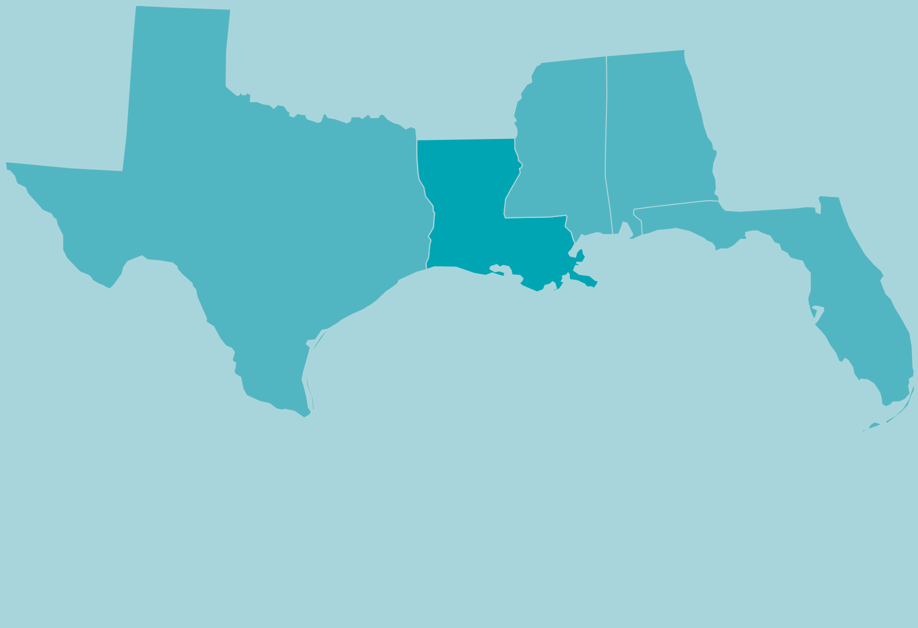
Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	297	261	248	246	258	259	263	278	281
	Employees	12,419	8,221	7,363	7,909	8,621	8,813	9,608	10,913	11,170
	Payroll	442,096	296,537	302,909	325,942	374,831	390,853	448,514	488,050	512,454
Deep Sea Freight Transportation	Establishments	57	58	61	65	75	69	77	76	65
	Employees	2,486	2,801	2,279	2,374	3,345	2,485	2,015	2,154	1,639
	Payroll	169,055	180,139	159,025	177,386	231,887	140,564	131,069	137,786	113,897
Deep Sea Passenger Transportation	Establishments	31	33	29	29	39	31	28	32	33
	Employees	ds	ds	ds	ds	ds	ds	ds	10,510	10,161
	Payroll	ds	ds	ds	ds	ds	ds	ds	967,938	864,475
Coastal and Great Lakes Freight Transportation	Establishments	42	42	50	54	60	47	62	57	62
	Employees	1,106	972	709	753	1,381	1,050	1,743	1,815	1,966
	Payroll	50,115	37,774	50,217	53,341	100,402	82,078	175,366	173,004	199,592
Port and Harbor Operations	Establishments	40	32	34	32	66	61	56	55	54
	Employees	712	527	470	377	2,082	555	588	987	1,006
	Payroll	24,668	19,006	20,525	16,879	72,554	25,439	20,647	32,032	32,969
Marine Cargo Handling	Establishments	56	59	55	64	43	58	61	69	63
	Employees	8,052	7,288	7,547	7,484	4,598	6,258	6,992	7,834	7,048
	Payroll	192,473	185,309	191,560	195,458	86,461	188,997	179,024	208,186	191,828
Navigational Services to Shipping	Establishments	147	145	145	150	151	180	190	196	194
	Employees	894	829	980	1,047	853	1,390	878	861	922
	Payroll	56,917	60,641	76,853	75,561	68,366	130,893	74,185	72,483	73,708
Marinas	Establishments	442	428	430	411	432	444	464	466	458
	Employees	5,024	4,665	4,439	4,657	4,918	5,076	5,421	5,472	5,405
	Payroll	151,677	132,955	133,017	142,997	148,573	145,265	168,185	171,354	176,315

National Overview | North Pacific | Pacific | Western Pacific | New England | Mid-Atlantic | South Atlantic | Gulf of Mexico

[1] All data presented on this page are for the entire state of Florida, not just West Florida.
[2] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[3] ds = Data are suppressed.

Tables | Louisiana



2017 Economic Impacts of the Louisiana Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	31,061	1,813,468	664,891	908,972	30,090	1,611,905	624,121	840,430
Commercial Harvesters	12,395	692,108	234,564	344,083	12,395	692,108	234,564	344,083
Seafood Processors & Dealers	1,939	186,228	72,234	92,137	1,770	170,069	65,966	84,142
Importers	523	164,560	26,374	50,165	0	0	0	0
Seafood Wholesalers & Distributors	931	115,646	39,397	50,997	831	103,145	35,138	45,485
Retail	15,273	654,926	292,323	371,590	15,094	646,584	288,453	366,721

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	275,701	286,993	233,559	324,123	329,754	399,064	487,718	376,764	427,522	370,231
Finfish & Other	64,118	62,632	56,912	102,097	88,989	103,919	98,773	109,672	158,548	85,472
Shellfish	211,582	224,361	176,647	222,026	240,766	295,145	388,945	267,092	268,974	284,759
Key Species	-	-	-	-	-	-	-	-	-	
Blue crab	32,203	37,301	30,325	36,784	43,921	51,568	66,706	58,069	49,408	54,231
Crawfish	9,507	15,547	13,971	9,914	8,325	16,490	16,088	6,851	11,877	NA
King mackerel	1,307	1,184	1,149	1,594	1,475	1,517	2,414	2,006	2,152	2,073
Menhaden	45,768	42,555	43,331	82,881	63,374	80,262	72,844	85,322	132,105	60,909
Mullets	749	73	185	775	976	626	893	418	720	757
Oysters	39,009	50,950	24,986	41,652	42,186	44,872	67,482	85,090	68,540	84,379
Red snapper	2,038	2,185	2,311	2,261	2,551	4,824	6,427	6,610	5,948	6,716
Shrimp	130,854	120,555	107,362	133,670	146,318	182,210	238,665	117,071	139,141	134,032
Tunas	4,409	6,338	1,649	3,369	7,893	4,595	4,276	2,743	4,414	2,589
Vermilion snapper	819	806	399	517	670	474	700	633	925	284

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	919,017	1,007,474	793,377	1,311,040	1,044,376	993,879	872,507	1,072,187	1,256,134	898,529
Finfish & Other	759,440	806,845	665,677	1,153,921	878,405	823,989	687,557	917,426	1,092,079	738,342
Shellfish	159,577	200,629	127,700	157,119	165,971	169,890	184,950	154,761	164,055	160,187
Key Species	-	-	-	-	-	-	-	-	-	-
Blue crab	41,714	53,057	30,752	43,893	46,327	39,193	43,219	41,308	40,100	43,922
Crawfish	15,735	19,312	14,557	9,599	6,853	19,676	13,055	5,461	13,573	NA
King mackerel	789	927	691	1,002	969	788	1,167	1,047	996	1,052
Menhaden	738,092	785,575	648,561	1,131,287	853,012	800,101	663,693	893,789	1,068,690	716,056
Mullets	1,503	189	362	1,385	1,385	609	1,186	692	1,005	1,093
Oysters	12,840	15,006	6,874	11,156	11,368	11,364	12,692	14,488	12,053	13,327
Red snapper	589	667	828	918	1,028	1,216	1,489	1,591	1,444	1,557
Shrimp	89,285	113,250	75,515	92,469	101,406	99,655	115,982	93,499	98,324	94,354
Tunas	1,248	2,009	490	932	2,152	1,241	1,142	661	1,211	684
Vermilion snapper	409	412	186	234	291	174	242	213	335	114

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Blue crab	0.77	0.70	0.99	0.84	0.95	1.32	1.54	1.41	1.23	1.23
Crawfish	0.60	0.81	0.96	1.03	1.21	0.84	1.23	1.25	0.88	NA
King mackerel	1.66	1.28	1.66	1.59	1.52	1.93	2.07	1.92	2.16	1.97
Menhaden	0.06	0.05	0.07	0.07	0.07	0.10	0.11	0.10	0.12	0.09
Mullets	0.50	0.39	0.51	0.56	0.70	1.03	0.75	0.60	0.72	0.69
Oysters	3.04	3.40	3.63	3.73	3.71	3.95	5.32	5.87	5.69	6.33
Red snapper	3.46	3.28	2.79	2.46	2.48	3.97	4.32	4.15	4.12	4.31
Shrimp	1.47	1.06	1.42	1.45	1.44	1.83	2.06	1.25	1.42	1.42
Tunas	3.53	3.16	3.37	3.62	3.67	3.70	3.74	4.15	3.65	3.79
Vermilion snapper	2.00	1.95	2.15	2.21	2.30	2.73	2.89	2.97	2.76	2.48

[1] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	1,851	150,975	47,377	80,374
	Private Boat	3,282	397,091	125,323	231,958
	Shore	669	74,292	24,544	44,580
Total Durable Expenditures		11,051	1,276,458	427,847	779,192
Total State Economic Impacts		16,853	1,898,816	625,091	1,136,104

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	94,112	Fishing Tackle	223,961
Private Boat	302,428	Other Equipment	111,190
Shore	56,545	Boat Expenses	897,752
Total	453,085	Vehicle Expenses	169,171
		Second Home Expenses	14,639
		Total Durable Expenditures	1,416,713
Total State Trip and Durable Goods Expenditures			1,869,798

Recreational Anglers by Residential Area (thousands of anglers)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	795	669	609	690	651	709	NA	NA	NA	NA
Non-Coastal	120	108	67	86	77	109	NA	NA	NA	NA
Out-of-State	170	139	120	183	165	262	NA	NA	NA	NA
Total Anglers	1,084	916	796	959	893	1,080	NA	NA	NA	NA

Recreational Fishing Effort by Mode (thousands of angler trips)[2]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	152	168	76	97	108	122	131	160	179	179
Private	5,237	5,731	6,098	5,944	5,730	5,477	2,096	2,266	2,062	2,130
Shore	4,417	4,617	5,048	5,413	5,051	5,172	NA	NA	NA	NA
Total Trips	9,806	10,516	11,223	11,454	10,889	10,770	2,227	2,425	2,242	2,308

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[3,4,5,6,7]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Black drum	H	944	1,040	897	1,091	995	1,020	218	220	138	143
	R	2,254	2,268	2,424	2,854	2,421	4,064	NA	NA	NA	NA
Drum (Atlantic croaker)	H	632	1,223	581	1,123	1,288	2,328	235	209	150	150
	R	2,293	2,866	3,861	5,472	4,122	3,973	NA	NA	NA	NA
Drum (sand seatrout)	H	1,614	1,748	2,178	2,513	2,070	1,458	532	370	354	359
	R	1,469	1,910	1,150	2,475	1,397	1,845	NA	NA	NA	NA
Drum (South kingfish)	H	177	243	206	34	316	41	4	20	6	18
	R	438	273	91	72	113	118	NA	NA	NA	NA
Drum (spotted seatrout)	H	17,833	17,959	15,582	19,035	19,410	16,267	3,231	4,292	5,326	5,142
	R	14,859	15,203	10,186	10,961	14,055	19,153	NA	NA	NA	NA
Porgies (sheepshead)	H	2,048	1,588	1,323	2,748	1,277	975	262	258	225	553
	R	888	1,146	1,306	514	605	1,386	NA	NA	NA	NA
Red drum	H	3,992	3,918	5,850	5,780	3,941	5,679	1,283	1,244	1,045	1,644
	R	7,185	7,989	8,994	6,809	6,505	10,046	NA	NA	NA	NA
Red snapper	H	100	130	12	63	153	113	128	171	145	119
	R	364	312	12	210	216	333	NA	NA	NA	NA
South flounder	H	517	888	674	988	689	1,531	209	217	222	94
	R	64	177	187	189	207	251	NA	NA	NA	NA
Yellowfin tuna	H	17	6	2	21	47	13	14	23	28	23
	R	5	0	0	8	6	2	NA	NA	NA	NA

[1] Louisiana resident participation is estimated from historical Marine Recreational Information Program (MRIP) data (2008-2013) and a state creel survey (2014-2017).
[2] Effort for 2014-2017 is estimated using data from a state creel survey and does not capture shore-based effort separately from private boat effort.
[3] Data collected by the Texas Parks and Wildlife Department (TPWD) TPWD is reported in this table. The data collected by the TPWD Texas Parks and Wildlife Department (TPWD) differs from the data collected and reported in the MRIP. Data on the number of fish released are not reported by TPWD. (For more information: www.tpwd.state.tx.us.)
[4] Louisiana harvest and release totals for 2014-2017 are estimated using data from a state creel survey.
[5] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[6] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[7] NA = not available.

2016 Louisiana State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
368,735 (1.5%)	105,732 (1.4%)	1,709,226 (1.3%)	75.1 (1.2%)	119 (1.2%)	239	3.68

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	77	68	120	94	78	99	111	115	113
	Receipts	7,365	5,308	10,358	9,308	8,492	9,136	8,632	10,086	11,917
Seafood sales, retail	Firms	182	173	197	192	184	173	177	169	180
	Receipts	25,900	17,622	16,001	18,758	16,804	17,538	17,383	17,870	18,880

Seafood Sales and Processing — Employer Establishments (thousands of dollars)

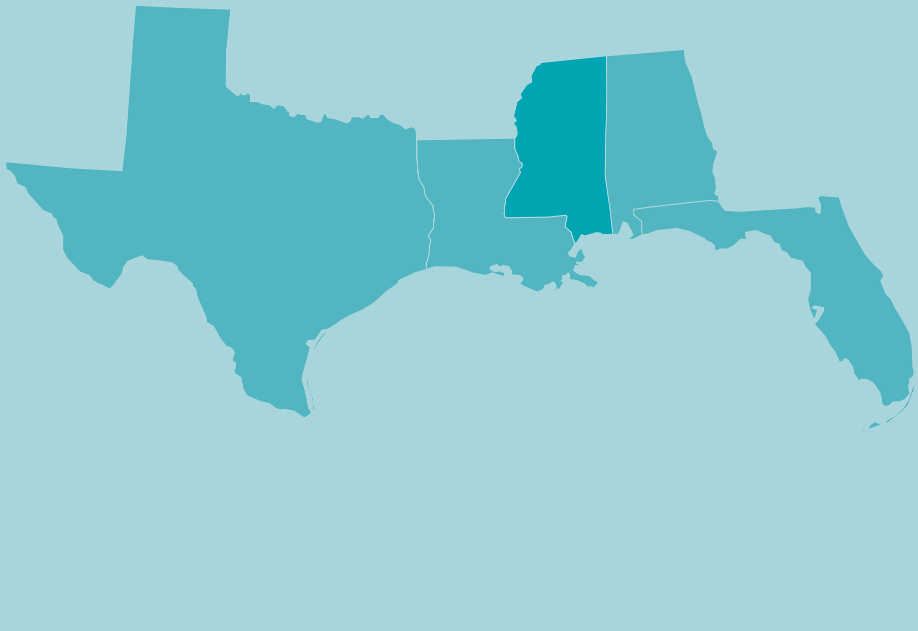
		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	36	38	34	33	35	36	37	38	34
	Employees	991	1,301	1,209	1,006	1,117	964	943	1,015	1,069
	Payroll	32,382	37,657	35,770	46,440	51,237	49,339	50,881	63,909	37,506
Seafood sales, wholesale	Establishments	98	98	97	94	103	106	109	111	116
	Employees	739	702	683	767	862	846	672	865	805
	Payroll	15,858	17,261	15,554	18,427	22,296	23,235	24,107	25,837	28,013
Seafood sales, retail	Establishments	107	106	101	100	97	94	90	90	90
	Employees	681	703	527	590	704	643	562	612	710
	Payroll	11,141	11,564	11,214	11,090	13,042	11,213	10,421	11,802	13,095

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	117	109	109	109	116	110	117	109	105
	Employees	12,815	12,521	11,737	11,722	10,933	7,413	8,512	8,470	5,629
	Payroll	619,606	613,188	600,259	639,047	631,098	416,319	479,243	401,977	316,927
Deep Sea Freight Transportation	Establishments	18	21	16	17	18	11	19	21	16
	Employees	1,095	1,192	93	93	ds	95	ds	451	300
	Payroll	87,479	91,760	6,147	5,608	ds	5,435	ds	21,706	25,246
Deep Sea Passenger Transportation	Establishments	2	2	1	3	2	4	4	3	3
	Employees	ds	ds	ds	ds	ds	3	ds	0	0
	Payroll	ds	ds	ds	ds	ds	363	ds	0	0
Coastal and Great Lakes Freight Transportation	Establishments	123	117	125	125	105	102	124	116	104
	Employees	6,506	6,077	5,610	5,834	6,422	5,317	6,275	5,212	3,919
	Payroll	549,388	391,914	405,796	417,362	497,165	458,589	556,693	396,625	273,575
Port and Harbor Operations	Establishments	22	17	21	20	46	18	14	15	15
	Employees	517	440	431	461	1,205	443	ds	399	421
	Payroll	37,181	33,907	38,776	38,745	80,780	37,122	ds	37,866	39,772
Marine Cargo Handling	Establishments	39	44	41	42	37	44	49	45	43
	Employees	2,010	2,193	2,511	2,526	2,016	2,834	3,106	3,418	2,955
	Payroll	85,484	92,883	105,063	108,491	93,896	174,054	212,786	175,092	156,891
Navigational Services to Shipping	Establishments	145	137	138	138	136	133	137	142	144
	Employees	2,884	2,893	3,176	3,396	2,545	2,533	2,816	2,862	2,780
	Payroll	183,381	175,271	224,533	208,306	162,094	169,795	206,318	218,379	203,905
Marinas	Establishments	43	43	43	45	44	41	39	36	38
	Employees	274	244	314	329	257	250	229	194	204
	Payroll	9,581	8,989	14,716	10,771	9,209	8,693	7,276	4,683	4,521

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.

Tables | Mississippi



2017 Economic Impacts of the Mississipi Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	4,802	233,702	93,193	120,534	4,774	229,354	92,120	118,902
Commercial Harvesters	863	49,268	14,867	21,823	863	49,268	14,867	21,823
Seafood Processors & Dealers	744	63,532	25,135	31,495	727	62,034	24,542	30,752
Importers	9	2,762	443	842	0	0	0	0
Seafood Wholesalers & Distributors	59	6,208	2,191	2,760	59	6,191	2,184	2,752
Retail	3,128	111,932	50,558	63,615	3,126	111,861	50,526	63,575

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	43,696	37,956	21,895	30,291	49,337	34,970	26,014	68,926	29,389	30,348
Finfish & Other	19,233	18,667	8,963	10,527	23,172	10,938	8,102	53,743	11,831	11,918
Shellfish	24,464	19,289	12,932	19,764	26,165	24,032	17,912	15,183	17,559	18,430
Key Species	-	-	-	-	-	-	-	-	-	
Blue crab	447	573	366	318	724	416	997	1,209	895	793
Flounders	40	58	64	118	101	45	55	76	75	27
Menhaden	18,534	17,987	8,378	9,871	22,394	10,230	7,358	52,962	10,973	11,086
Mullets	32	30	31	56	63	61	25	12	22	39
Oysters	6,858	6,094	4,268	928	1,596	1,544	1,685	969	1,088	344
Red snapper	NA	158	NA	168	226	NA	307	NA	NA	NA
Shrimp	17,146	12,612	8,293	18,514	23,846	22,072	15,229	13,004	15,576	17,293

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	201,822	230,255	111,229	278,075	263,640	180,600	190,555	307,507	307,984	316,330
Finfish & Other	190,191	217,461	105,274	267,407	249,382	171,000	184,393	294,723	294,641	300,105
Shellfish	11,631	12,794	5,955	10,668	14,259	9,599	6,162	12,785	13,343	16,226
Key Species	-	-	-	-	-	-	-	-	-	-
Blue crab	450	545	366	370	782	359	570	798	773	626
Flounders	17	25	28	55	43	19	21	29	27	8
Menhaden	189,118	216,709	104,729	266,774	248,824	170,500	183,950	294,233	294,189	299,630
Mullets	57	62	59	93	99	95	39	21	40	68
Oysters	2,606	2,189	1,453	247	425	336	321	182	245	60
Red snapper	NA	57	NA	86	115	NA	170	NA	NA	NA
Shrimp	8,570	10,054	4,135	10,048	13,051	8,903	5,270	11,804	12,324	15,540

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Blue crab	0.99	1.05	1.00	0.86	0.93	1.16	1.75	1.51	1.16	1.27
Flounders	2.36	2.34	2.33	2.14	2.33	2.38	2.66	2.61	2.83	3.28
Menhaden	0.10	0.08	0.08	0.04	0.09	0.06	0.04	0.18	0.04	0.04
Mullets	0.57	0.48	0.52	0.61	0.64	0.64	0.64	0.56	0.55	0.58
Oysters	2.63	2.78	2.94	3.75	3.75	4.59	5.25	5.32	4.44	5.78
Red snapper	NA	2.75	NA	1.96	1.97	NA	1.81	NA	NA	NA
Shrimp	2.00	1.25	2.01	1.84	1.83	2.48	2.89	1.10	1.26	1.11

[1] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of Recreational Fishing Expenditures (thousands of dollars)

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	204	16,559	5,045	8,769
	Private Boat	586	55,163	17,481	33,230
	Shore	794	60,560	21,318	39,200
Total Durable Expenditures		3,578	372,494	127,056	233,192
Total State Economic Impacts		5,162	504,776	170,900	314,391

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	10,854	Fishing Tackle	90,196
Private Boat	51,816	Other Equipment	45,702
Shore	52,031	Boat Expenses	288,723
Total	114,700	Vehicle Expenses	85,337
		Second Home Expenses	307
		Total Durable Expenditures	510,266
Total State Trip and Durable Goods Expenditures			624,966

Recreational Anglers by Residential Area (thousands of anglers)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coastal	119	125	137	160	179	171	171	195	156	153
Non-Coastal	26	36	29	48	60	67	62	48	83	50
Out-of-State	48	50	50	60	91	101	94	114	106	97
Total Anglers	194	212	216	268	331	339	328	357	345	300

Recreational Fishing Effort by Mode (thousands of angler trips)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	13	11	4	11	11	11	17	42	25	21
Private	1,575	1,629	1,566	1,600	1,643	1,599	1,486	1,568	1,733	1,606
Shore	2,765	2,933	2,940	2,892	2,838	2,731	2,808	2,984	2,960	3,225
Total Trips	4,354	4,573	4,509	4,503	4,493	4,342	4,312	4,594	4,718	4,852

Harvest (H) and Release (R) of Key Species/Species Groups (thousands of fish)[1,2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Drum (Atlantic croaker)	H	1,370	1,648	692	1,358	752	819	2,120	957	1,241	1,262
	R	1,384	2,679	1,585	1,842	1,673	630	704	1,690	3,292	4,240
Drum (kingfish)[4]	H	550	351	413	395	546	976	437	1,066	1,713	802
	R	154	153	162	90	326	195	298	122	409	391
Drum (sand and silver seatrouts)[5]	H	1,042	2,574	2,338	2,599	2,145	1,589	1,797	2,391	3,242	4,936
	R	503	957	680	879	1,063	494	305	418	1,059	1,513
Drum (spotted seatrout)	H	1,789	2,215	1,421	1,563	1,395	1,985	1,183	1,838	3,410	1,396
	R	2,641	2,145	1,645	1,218	2,071	2,354	1,818	1,741	3,693	4,055
Porgies (sheepshead)	H	51	79	119	557	235	207	198	185	107	816
	R	89	26	10	89	91	122	52	1,059	48	77
Red drum	H	234	202	219	153	210	320	201	203	329	247
	R	462	605	571	387	1,173	828	885	575	769	1,664
Red snapper	H	32	52	< 1	40	109	48	13	20	91	122
	R	391	335	120	< 1	10	134	127	472	333	752
Sharks[6]	H	3	34	232	56	19	109	12	11	6	12
	R	103	81	333	82	207	147	65	27	134	28
South flounder	H	426	597	546	421	401	448	255	172	225	96
	R	179	326	256	246	319	279	138	225	110	39
Striped mullet	H	246	376	521	1,291	660	1,883	869	2,664	1,254	615
	R	13	18	65	165	204	57	17	323	18	5

[1] Data collected by the Texas Parks and Wildlife Department (TPWD) TPWD is reported in this table. The data collected by the TPWD Texas Parks and Wildlife Department (TPWD) differs from the data collected and reported in the MRIP. Data on the number of fish released are not reported by TPWD. (For more information: www.tpwd.state.tx.us.)
[2] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.
[3] In this table, '<1' = 0-999 fish, and '1' = 1,000-1,499 fish.
[4] Drum (kingfish) include south kingfish and Gulf kingfish.
[5] Drum (sand and silver seatrouts) include silver seatrout and sand seatrout.
[6] Sharks include requiem shark family, Atlantic sharpnose shark, requiem shark genus, unidentified (sharks), requiem shark, blacktip shark, unidentified sharks, and shark species.

2016 Mississippi State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
214,804 (0.9%)	58,850 (0.8%)	939,322 (0.7%)	34.4 (0.5%)	58.8 (0.6%)	110	1.02

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	17	16	30	25	27	ds	21	12	20
	Receipts	1,055	753	1,937	2,108	930	ds	1,932	1,539	2,879
Seafood sales, retail	Firms	48	56	69	51	50	54	42	53	58
	Receipts	3,437	4,206	3,421	3,505	3,957	3,855	3,129	4,053	4,836

Seafood Sales and Processing — Employer Establishments (thousands of dollars)[2]

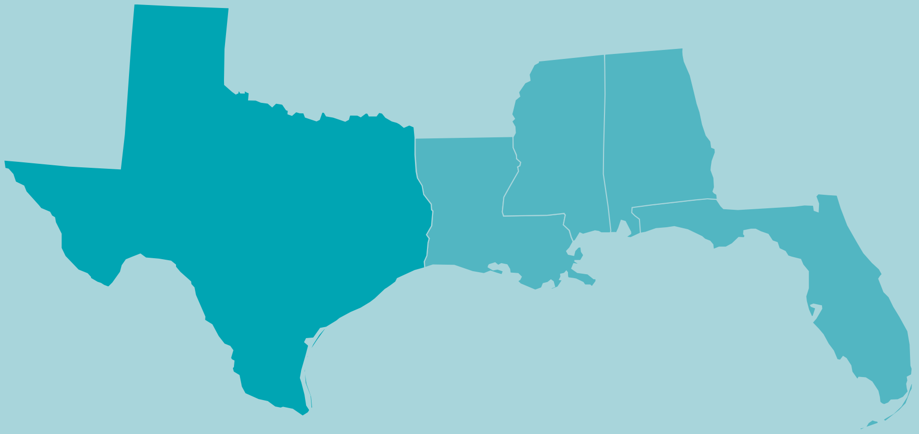
		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	20	20	20	18	18	19	19	18	18
	Employees	3,062	2,796	2,849	2,464	2,368	2,284	2,289	2,370	2,589
	Payroll	61,723	61,926	61,731	52,502	55,407	59,212	57,324	60,906	65,003
Seafood sales, wholesale	Establishments	18	16	18	18	17	14	14	14	15
	Employees	61	113	ds	64	102	ds	ds	39	46
	Payroll	3,088	2,836	2,542	2,532	4,412	1,546	1,587	1,800	2,038
Seafood sales, retail	Establishments	18	14	15	17	13	13	10	8	9
	Employees	50	46	50	58	ds	ds	ds	96	228
	Payroll	699	841	810	838	1,902	ds	ds	2,672	3,092

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	24	20	20	20	18	19	18	18	16
	Employees	ds	ds	ds	ds	ds	ds	ds	14,722	14,066
	Payroll	ds	ds	ds	ds	ds	ds	ds	892,317	899,814
Deep Sea Freight Transportation	Establishments	NA	1	1	1	2	1	1	1	1
	Employees	NA	ds	ds	ds	ds	ds	ds	0	0
	Payroll	NA	ds	ds	ds	ds	ds	ds	0	0
Coastal and Great Lakes Freight Transportation	Establishments	5	5	4	4	4	6	4	4	4
	Employees	119	114	ds	127	ds	230	277	259	0
	Payroll	8,351	7,730	8,058	7,233	ds	17,080	16,365	17,353	0
Port and Harbor Operations	Establishments	1	1	1	1	3	2	1	1	1
	Employees	ds	ds	ds	ds	ds	ds	ds	0	0
	Payroll	ds	ds	ds	ds	ds	ds	ds	0	0
Marine Cargo Handling	Establishments	7	8	7	7	2	4	5	5	6
	Employees	ds	ds	ds	ds	ds	ds	ds	241	173
	Payroll	ds	ds	ds	ds	ds	ds	ds	10,390	7,562
Navigational Services to Shipping	Establishments	8	7	8	6	7	6	7	7	7
	Employees	ds	ds	141	ds	ds	ds	ds	57	42
	Payroll	ds	ds	6,982	ds	ds	ds	ds	2,698	2,748
Marinas	Establishments	17	13	18	19	16	16	18	17	18
	Employees	111	172	183	189	204	154	193	197	199
	Payroll	2,794	3,479	4,163	5,137	5,361	3,972	4,960	5,047	5,517

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.
[3] NA = Not available.

Tables | Texas



2017 Economic Impacts of the Texas Seafood Industry (thousands of dollars)

	With Imports				Without Imports			
	#Jobs	Sales	Income	Value Added	#Jobs	Sales	Income	Value Added
Total Impacts	30,274	3,254,182	886,755	1,352,431	19,462	1,310,704	478,048	669,610
Commercial Harvesters	5,267	498,484	147,520	234,133	5,267	498,484	147,520	234,133
Seafood Processors & Dealers	2,476	232,007	87,279	114,949	1,593	149,226	56,138	73,935
Importers	4,832	1,521,937	243,919	463,953	0	0	0	0
Seafood Wholesalers & Distributors	1,426	215,697	71,969	99,664	583	88,124	29,403	40,718
Retail	16,272	786,057	336,067	439,732	12,020	574,870	244,987	320,825

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Revenue	176,098	154,530	203,795	240,566	215,365	268,519	262,589	179,627	196,864	236,994
Finfish & Other	7,709	7,488	7,888	8,445	10,231	13,361	13,709	16,188	17,619	16,382
Shellfish	168,389	147,043	195,907	232,121	205,134	255,158	248,880	163,439	179,245	220,612
Key Species	-	-	-	-	-	-	-	-	-	
Atlantic croaker	446	484	531	622	743	819	681	747	850	767
Black drum	1,363	1,377	1,573	1,448	1,491	1,699	1,981	2,074	2,283	2,458
Blue crab	2,342	2,454	3,134	2,845	2,878	2,331	3,050	5,534	6,478	5,416
Flounders	144	91	62	205	175	73	97	187	239	164
Groupers	606	695	389	572	774	1,168	1,156	1,483	1,601	1,153
Oysters	8,835	9,376	19,144	12,789	21,302	23,465	19,221	8,254	17,129	20,404
Red snapper	2,744	2,398	3,009	3,254	4,448	7,324	7,617	9,387	10,573	9,881
Shrimp	157,187	135,100	173,556	216,382	180,844	229,289	226,535	145,323	151,124	190,533
Tunas	94	139	4	2	5	7	14	3	NA	NA
Vermilion snapper	1,430	1,233	1,337	1,274	1,434	659	604	920	584	443

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Landings	73,048	102,351	89,721	98,857	91,596	85,113	74,674	82,576	77,182	93,361
Finfish & Other	3,866	4,134	4,247	4,224	4,225	4,872	4,842	5,438	5,725	5,278
Shellfish	69,182	98,216	85,475	94,633	87,371	80,241	69,832	77,138	71,457	88,083
Key Species	-	-	-	-	-	-	-	-	-	-
Atlantic croaker	59	63	67	79	89	96	78	90	100	88
Black drum	1,468	1,610	1,729	1,795	1,623	1,689	1,747	1,879	1,995	1,926
Blue crab	2,635	2,844	3,436	2,893	2,853	1,902	2,234	4,331	5,044	4,126
Flounders	58	32	26	75	60	20	25	51	64	40
Groupers	188	227	156	199	227	306	281	355	375	271
Oysters	2,679	2,733	5,265	3,943	5,817	6,126	4,129	1,587	3,127	3,504
Red snapper	870	851	1,031	948	1,123	1,800	1,797	2,152	2,390	2,213
Shrimp	63,855	92,602	76,734	87,753	78,665	72,186	63,448	70,100	62,145	79,415
Tunas	22	45	1	1	3	3	6	1	NA	NA
Vermilion snapper	592	561	539	465	511	234	203	307	192	149

Average Annual Ex-Vessel Price of Key Species/Species Groups (dollars per pound)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Atlantic croaker	7.58	7.64	7.98	7.84	8.31	8.55	8.77	8.26	8.47	8.73
Black drum	0.93	0.86	0.91	0.81	0.92	1.01	1.13	1.10	1.14	1.28
Blue crab	0.89	0.86	0.91	0.98	1.01	1.23	1.37	1.28	1.28	1.31
Flounders	2.48	2.84	2.37	2.75	2.94	3.55	3.89	3.65	3.72	4.11
Groupers	3.22	3.06	2.49	2.87	3.41	3.81	4.12	4.18	4.27	4.25
Oysters	3.30	3.43	3.64	3.24	3.66	3.83	4.66	5.20	5.48	5.82
Red snapper	3.15	2.82	2.92	3.43	3.96	4.07	4.24	4.36	4.42	4.47
Shrimp	2.46	1.46	2.26	2.47	2.30	3.18	3.57	2.07	2.43	2.40
Tunas	4.26	3.08	3.19	1.82	1.83	2.10	2.29	2.43	NA	NA
Vermilion snapper	2.42	2.20	2.48	2.74	2.81	2.81	2.98	3.00	3.04	2.97

[1] NA = these data are confidential and therefore not disclosable.

2017 Economic Impacts of Recreational Fishing Expenditures (thousands of dollars)[1]

		#Jobs	Sales	Income	Value Added
Trip Impacts by Fishing Mode	For-Hire	1,097	121,965	41,158	73,447
	Private Boat	1,876	254,812	79,074	154,631
	Shore	NA	NA	NA	NA
Total Durable Expenditures		10,610	1,343,395	522,431	851,616
Total State Economic Impacts		13,583	1,720,172	642,663	1,079,694

2017 Angler Trip and Durable Goods Expenditures (thousands of dollars)[1,2]

Fishing Mode	Trip Expenditures	Equipment	Durable Goods Expenditures
For-Hire	72,161	Fishing Tackle	255,786
Private Boat	158,791	Other Equipment	149,449
Shore	NA	Boat Expenses	494,076
Total	230,952	Vehicle Expenses	393,109
		Second Home Expenses	40,312
		Total Durable Expenditures	1,332,733
Total State Trip and Durable Goods Expenditures			1,563,685

Recreational Fishing Effort by Mode (thousands of angler trips)[1]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
For-Hire	150	122	123	162	227	145	137	147	162	191
Private	906	919	868	963	932	1,005	932	896	1,025	953
Shore	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Trips	1,056	1,041	991	1,125	1,159	1,150	1,069	1,043	1,187	1,144

Harvest (H) of Key Species/Species Groups (thousands of fish)[3,4]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Black drum	82	98	165	129	257	150	139	128	138	165
Drum (Atlantic croaker)	64	117	125	157	157	152	117	214	126	67
Drum (sand seatrout)	152	111	127	227	177	151	147	110	135	96
Drum (spotted seatrout)	917	810	732	1,137	810	796	590	825	1,025	982
King mackerel	8	16	6	9	9	10	13	9	12	15
Porgies (sheepshead)	46	34	49	57	143	84	39	51	106	60
Red drum	266	285	264	347	323	269	247	241	288	300
Red snapper	41	31	33	36	34	48	40	50	31	45
South flounder	64	47	30	92	96	92	71	85	104	77
Spanish mackerel	3	5	11	8	5	2	3	2	4	7

[1] NA = not available.
[2] The Marine Recreational Information Program (MRIP) does not collect participation (number of anglers) or effort (number of trips) data for Texas. To calculate trip expenditure estimates, effort by fishing mode was estimated based on 2018 data provided by the Texas Parks and Wildlife Department (TPWD). (For more information: www.tpwd.state.tx.us.)
[3] Data collected by the Texas Parks and Wildlife Department (TPWD) TPWD is reported in this table. The data collected by the TPWD Texas Parks and Wildlife Department (TPWD) differs from the data collected and reported in the MRIP. Data on the number of fish released are not reported by TPWD. (For more information: www.tpwd.state.tx.us.)
[4] Key species/species groups were chosen to represent those most frequently caught or highly prized by recreational anglers, or important for management. It is not a comprehensive list nor ranked by the total number of fish caught/released.

2016 Texas State Economy (% of national total)

#Non-Employer Firms	#Establishments	#Employees	Annual Payroll ($ billions)	Employee Compensation ($ billions)	Gross State Product ($ billions)	Commercial Fishing Location Quotient[1]
2,251,787 (9.1%)	579,168 (7.5%)	10,429,924 (8.2%)	527 (8.2%)	813 (8.2%)	1,623	0.31

Seafood Sales and Processing — Non-Employer Firms (thousands of dollars)

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Firms	85	82	99	119	123	123	128	178	165
	Receipts	3,466	3,858	3,224	5,734	6,675	7,484	6,706	11,051	10,057
Seafood sales, retail	Firms	188	196	184	171	194	173	199	178	167
	Receipts	18,204	13,177	12,124	13,433	14,891	15,094	15,160	15,660	13,072

Seafood Sales and Processing — Employer Establishments (thousands of dollars)[2]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Seafood product prep. & packaging	Establishments	27	24	22	24	22	30	32	29	34
	Employees	1,169	1,026	1,184	1,273	1,248	1,026	1,062	1,006	975
	Payroll	27,045	29,006	24,961	26,425	27,737	27,638	28,643	29,729	27,765
Seafood sales, wholesale	Establishments	69	75	77	82	71	75	89	90	86
	Employees	734	683	715	723	603	729	816	874	928
	Payroll	24,498	23,650	23,879	26,356	25,309	30,370	35,553	37,315	37,519
Seafood sales, retail	Establishments	60	51	52	50	60	60	59	62	57
	Employees	206	189	199	ds	ds	331	395	415	439
	Payroll	3,403	3,393	3,742	4,090	6,102	6,891	8,201	9,319	9,097

Transport, Support and Marine Operations — Employer Establishments (thousands of dollars)[2,3]

		2008	2009	2010	2011	2012	2013	2014	2015	2016
Ship and Boat Building	Establishments	102	99	97	91	89	87	88	84	81
	Employees	5,368	3,891	3,386	2,773	5,601	5,686	5,178	4,956	5,098
	Payroll	235,190	158,261	147,492	153,077	310,230	297,248	306,571	283,838	270,717
Deep Sea Freight Transportation	Establishments	35	36	30	39	40	33	33	35	36
	Employees	514	802	764	860	742	ds	790	639	607
	Payroll	40,764	61,309	63,408	71,515	65,818	44,902	55,106	47,119	47,952
Deep Sea Passenger Transportation	Establishments	3	2	1	1	NA	2	2	2	2
	Employees	ds	ds	ds	ds	NA	ds	ds	0	0
	Payroll	ds	ds	ds	ds	NA	ds	ds	0	0
Coastal and Great Lakes Freight Transportation	Establishments	42	43	48	48	39	42	48	48	49
	Employees	2,815	2,729	1,909	1,764	1,814	2,253	2,227	2,058	2,115
	Payroll	251,997	200,219	161,080	177,549	174,686	207,831	215,950	208,286	199,415
Port and Harbor Operations	Establishments	24	30	29	26	37	27	25	25	26
	Employees	ds	421	ds	439	1,381	630	387	395	572
	Payroll	10,538	13,778	18,627	18,842	55,470	25,229	13,544	16,436	17,603
Marine Cargo Handling	Establishments	55	57	54	55	42	48	53	56	57
	Employees	6,313	6,276	5,262	5,259	4,373	6,390	7,451	8,179	6,687
	Payroll	196,006	167,562	166,877	153,360	130,817	272,286	327,690	324,552	280,303
Navigational Services to Shipping	Establishments	99	95	87	91	91	89	93	91	80
	Employees	1,884	1,849	1,606	1,448	1,676	1,485	1,588	1,415	1,430
	Payroll	137,962	137,289	132,283	113,444	124,500	130,572	139,259	144,090	135,341
Marinas	Establishments	143	131	148	144	132	124	128	138	137
	Employees	1,486	1,423	1,198	1,233	1,169	1,258	1,222	1,209	1,226
	Payroll	34,039	33,803	33,968	34,928	34,711	36,461	36,776	37,054	39,658

[1] The U.S. Commercial Fishing Location Quotient (CFLQ) is 1. A CFLQ greater than 1 indicates that more commercial fishing occurs in this state than the national average. A CFLQ less than 1 indicates that less commercial fishing occurs in this state than the national average.
[2] ds = Data are suppressed.
[3] NA = not available.

Data Sources

A dog on a commercial fishing boat in Newport, Oregon.
Photo: NOAA Fisheries Office of Science and Technology/Noelle Olsen

MANAGEMENT CONTEXT

- Excess Harvesting Capacity in U.S. Fisheries, A Report to Congress. April 28, 2008. National Marine Fisheries Service, National Oceanic & Atmospheric Administration (NOAA Fisheries). https://www.st.nmfs.noaa.gov/spo/SPO/tm/spo93.pdf
- "Status of U.S. Fisheries." Office of Sustainable Fisheries, National Marine Fisheries Service, National Oceanic & Atmospheric Administration (NOAA Fisheries). https://www.fisheries.noaa.gov/national/population-assessments/status-us-fisheries
- "Endangered Species Act (ESA)." Office of Protected Resources, National Marine Fisheries Service, National Oceanic & Atmospheric Administration (NOAA Fisheries). https://www.fisheries.noaa.gov/national/endangered-species-conservation/endangered-species-act
- "Certified Fisheries." Marine Stewardship Council. www.msc.org/
- "Catch Shares." Office of Sustainable Fisheries, National Marine Fisheries Service, National Oceanic & Atmospheric Administration (NOAA Fisheries). https://www.fisheries.noaa.gov/national/laws-and-policies/catch-shares

Fishery Management Councils & Fishery Plans:

- Caribbean Fishery Management Council. www.caribbeanfmc.com
- Gulf of Mexico Fishery Management Council. www.gulfcouncil.org
- Mid-Atlantic Fishery Management Council. www.mafmc.org/
- New England Fishery Management Council. www.nefmc.org/
- North Pacific Fishery Management Council. www.npfmc.org/
- Pacific Fishery Management Council. www.pcouncil.org
- South Atlantic Fishery Management Council. www.safmc.net
- Western Pacific Fishery Management Council. www.wpcouncil.org

COMMERCIAL FISHERIES

Data for New England, Mid-Atlantic, South Atlantic, Gulf of Mexico, North Pacific, Pacific and Western Pacific Regions:

- Commercial Landings Database. Obtained December 5, 2017. Office of Science & Technology, National Marine Fisheries Service, National Oceanic & Atmospheric Administration (NOAA Fisheries). https://www.fisheries.noaa.gov/topic/commercial-fishing#overview

Pacific cod, flatfish, Atka mackerel, walleye pollock, rockfish and sablefish data, North Pacific Region:

- Alaska Fisheries Science Center, National Marine Fisheries Service, National Oceanic & Atmospheric Administration (NOAA Fisheries). Obtained December 5, 2017. https://www.fisheries.noaa.gov/region/alaska

Economic Impacts of the U.S. Commercial Seafood Industry:

- A User's Guide to the National and Coastal State I/O Model. http://www.st.nmfs.noaa.gov/documents/commercial_seafood_impacts_2007-2009.pdf

Additional information:

- "NOAA Fisheries Economics & Social Sciences Program." Office of Science & Technology, National Marine Fisheries Service, National Oceanic & Atmospheric Administration (NOAA Fisheries). https://www.fisheries.noaa.gov/topic/socioeconomics
- "Data Caveats." Office of Science & Technology, National Marine Fisheries Service, National Oceanic & Atmospheric Administration (NOAA Fisheries). https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/data-caveats/index

RECREATIONAL FISHERIES

Consumer Price Index (CPI) Inflation Calculator:

- CPI Inflation Calculator. Obtained September 24, 2019. Bureau of Labor Statistics. ttps://data.bls.gov/cgi-bin/cpicalc.pl

Data for New England, Mid-Atlantic, South Atlantic, Gulf of Mexico and Western Pacific Regions:

- Recreational Fishery Statistics Queries." Obtained August 15, 2017. Office of Science & Technology, National Marine Fisheries Service, National Oceanic & Atmospheric Administration (NOAA Fisheries). https://www.fisheries.noaa.gov/recreational-fishing-data/recreational-fishing-data-and-statistics-queries#run-a-data-query

Data for Texas (Gulf of Mexico Region):

- Texas Parks & Wildlife Department. Obtained August 14, 2018. https://tpwd.texas.gov/
- Louisiana Department of Wildlife and Fisheries. Obtained May 29, 2018. http://www.wlf.louisiana.gov/

Data for Pacific Region:

- Pacific States Marine Fisheries Commission, Recreational Fisheries Information Network (RecFIN) for Oregon and Washington. Obtained August 21, 2018. http://www.recfin.org
- California Department of Fish and Wildlife. Obtained September 24, 2018. https://www.wildlife.ca.gov/
- Pacific Fishery Management Council, Salmon Stock Assessment and Fishery Evaluation (SAFE) documents. Obtained May 15, 2019. https://www.pcouncil.org/stock-assessments-and-fishery-evaluation-safe-documents/

Data for North Pacific Region:

- Pacific States Marine Fisheries Commission, Recreational Fisheries Information Network (RecFIN). Obtained November 1, 2018.

Recreational Fishing Expenditures and Impacts:

- Lovell, Sabrina, James Hilger, Emily Rollins, Noelle A. Olsen, and Scott Steinback. 2020. The Economic Contribution of Marine Angler Expenditures on Fishing Trips in the United States, 2017. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-201, 80 p. https://spo.nmfs.noaa.gov/sites/default/files/TM201.pdf
- Lovell, J. Sabrina, James Hilger, Scott Steinback, and Clifford Hutt. 2016. The Economic Contribution of Marine Angler Expenditures on Durable Goods in the United States, 2014. U.S. Dept. of Commerce. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-165, 72 p. https://spo.nmfs.noaa.gov/content/tech-memo/economic-contribution-marine-angler-expenditures-durable-goods-united-states-2014
- Lovell, Sabrina, Scott Steinback, and James Hilger. 2013. The Economic Contribution of Marine Angler Expenditures in the United States, 2011. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-134, 188 p. https://spo.nmfs.noaa.gov/content/tech-memo/economic-contribution-marine-angler-expenditures-united-states-2011

THE MARINE ECONOMY

- "County Business Patterns Data Series." Obtained January 22, 2019. U.S. Census Bureau. https://www.census.gov/programs-surveys/cbp.html
- "Gross Domestic Product by State." Obtained February 21, 2019. Bureau of Economic Analysis. http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=2#reqid=70&step=1&isuri=1
- "Location Quotient Calculator." Obtained February 20, 2019. Bureau of Labor Statistics. https://data.bls.gov/cew/doc/info/location_quotients.htm
- "Nonemployer Statistics." Obtained January 22, 2019. U.S. Census Bureau. https://www.census.gov/programs-surveys/nonemployer-statistics.html

Publications

Fishermen brailing cod in Kodiak, Alaska
Photo: North Pacific Fishery Management Council/Theresa Peterson

Selected publications by NOAA Fisheries Economics and Social Sciences Program staff are grouped by geographic region of focus and then organized under the following categories:

- Climate Change Research
- Coastal and Marine Recreation Research
- Commercial Fisheries Economics Research
- Spatial Analysis and Marine Protected Areas Research
- Ocean Governance, Policy and Management Research
- Marine Protected Areas Research
- Other Marine Environmental Research
- Ecosystem-Based Management Research
- Recreational Fisheries Economics Research
- Habitat Economics Research
- Seafood Marketing and Trade Research
- Sociocultural Fisheries Research
- U.S. Territories and International Fisheries Research
- Protected Resources Economics Research

UNITED STATES

Climate Change Research

Foster, T., N. Brozovic, and *C. Speir.* 2017. The buffer value of groundwater when well yield is limited. J. Hydrol., 547:638-649. https://doi.org/10.1016/j.jhydrol.2017.02.034.

Busch, D., R. Griffis, J. Link, K. Abrams, J. Baker, R. Brainard, M. Ford, J. Hare, A. Himes-Cornell, A. Hollowed, N. Mantua, S. McClatchie, M. McClure, M. Nelson, K. Osgood, J. Peterson, M. Rust, V. Saba, M. Sigler, S. Sykora-Bodie, C. Toole, E. Thunberg, R. Waples, and *R. Merrick.* 2016. Climate science strategy of the US National Marine Fisheries Service. Mar. Policy, 74:58-67. https://doi.org/10.1016/j.marpol.2016.09.001.

Griffis, R., L. Mcgilvray, D. Cahoon, *T. Clay,* E. Curchitser, K. Curtis, J. Devivo, B. Duncan, *S. Gill,* J. Grear, B. Halpern, *J. Hare, A. Himes-Cornell, J. Howard,* R. Johnston, M. Kenney, *D. Legler,* E. Lindstrom, *T. O'Brien,* S. Rumrill, *E. Thunberg,* T. Webler, J. West, *R. Wood, S. Zador, S. Busch,* and *E. Fly.* 2013. Research priorities to advance the oceans and coasts climate indicators system. In Report to the National Climate Assessment Indicator System Working Group. Project information available at https://www.globalchange.gov/what-we-do/assessment/indicators-system.

Himes-Cornell, A., S. Allen, G. Auad, M. Boatman, *P. Clay, M. Dalton, S. Herrick,* D. Kotowicz, *P. Little,* C. Lopez, P. Loring, *P. Niemeier, K. Norman, L. Pfeiffer, M. Plummer, M. Rust,* M. Singer, and *C. Speirs.* 2013. Impacts of climate change on human uses of the ocean and ocean services. In Oceans and marine resources in a changing climate: A technical input to the 2013 National Climate Assessment (R. Griffis and J. Howard, eds.), p. 73-137. U.S. Global Change Research Program, Washington, DC.

Howard, J., E. Babij, *R. Griffis,* B. Helmuth, *A. Himes-Cornell, P. Niemier,* M. Orbach, *L. Petes, S. Allen,* G. Auad, *R. Beard,* M. Boatman, N. Bond, *T. Boyer, D. Brown, P. Clay, K. Crane, S. Cross, M. Dalton,* J. Diamond, R. Diaz, *Q. Dortch, E. Duffy,* D. Fauquier, W. Fisher, M. Graham, B. Halpern, L. Hansen, B. Hayum, *S. Herrick, A. Hollowed,* D. Hutchins, *E. Jewett,* D. Jin, N. Knowlton, D. Kotowicz, *T. Kristiansen, P. Little,* C. Lopez, P. Loring, *R. Lumpkin,* A. Mace, K. Mengerink, J. Morrison, J. Murray, *K. Norman,* J. O'Donnell, *J. Overland, R. Parsons, N. Pettigrew, L. Pfeiffer,* E. Pidgeon, *M. Plummer, J. Polovina,* J. Quintrell, *T. Rowles,* J. Runge, *M. Rust,* E. Sanford, U. Send, M. Singer, *C. Speir, D. Stanitski,* C. Thornber, *C. Wilson,* and *Y. Xue.* 2013. Oceans and marine resources in a changing climate. In Oceanography and marine biology: An annual review, vol. 51, vol. 51 (R. N. Hughes, D. J. Hughes, and I. P. Smith, eds.), p. 71-192. Crc Press-Taylor & Francis Group, Boca Raton.

Babij, E., *P. Niemeier,* B. Hayum, *A. Himes-Cornell, A. Hollowed,* P. Little, M. Orbach, and E. Pidgeon. 2012. International implications of climate change. In Oceans and marine resources in a changing climate: A technical input to the 2013 National Climate Assessment (R. Griffis and H. Howard, eds.), p. 138-162. U.S. Global Change Research Program, Washington, DC.

Haynie, A., and *L. Pfeiffer.* 2012. Why economics matters for understanding the effects of climate change on fisheries. ICES J. Mar. Sci., 69(7):1160-1167. https://doi.org/10.1093/icesjms/fss021.

Coastal and Marine Recreation Research

Marvasti, A. 2013. Estimating outdoor recreation demand with aggregate data: A revealed preference approach. Ocean Coast. Manage., 71(1):170-175. https://doi.org/10.1016/j.ocecoaman.2012.09.006.

Commercial Fisheries Economics Research

Holland, D., C. Speir, J. Agar, S. Crosson, G. DePiper, S. Kasperski, A. Kitts, and *L. Perruso.* 2017. Impact of catch shares on diversification of fishers' income and risk. Proc. Natl. Acad. Sci., 114(35):9302-9307. https://doi.org/10.1073/pnas.1702382114.

Brinson, A., and *E. Thunberg.* 2016. Performance of federally managed catch share fisheries in the United States. Fish. Res., 179:213-223. https://doi.org/10.1016/j.fishres.2016.03.008.

Knapp, G., and *M. Rubino.* 2016. The political economics of marine aquaculture in the United States. Rev. Fish. Sci. Aquac., 24(3):213-229. https://doi.org/10.1080/23308249.2015.1121202.

Pfeiffer, L., and T. Gratz. 2016. The effect of rights-based fisheries management on risk taking and fishing safety. Proc. Natl. Acad. Sci., 113(10):2615-2620. https://doi.org/10.1073/pnas.1509456113.

Squires, D. 2016. Firm behavior under quantity controls: The theory of virtual quantities. J. Environ. Econ. Manage., 79:70-86. https://doi.org/10.1016/j.jeem.2015.04.005.

Anderson, J., C. Anderson, J. Chu, J. Meredith, F. Asche, G. Sylvia, M. Smith, D. Anggraeni, R. Arthur, A. Guttormsen, J. McCluney, T. Ward, W. Akpalu, H. Eggert, J. Flores, M. Freeman, *D. Holland,* G. Knapp, M. Kobayashi, S. Larkin, K. MacLauchlin, K. Schnier, M. Soboil, S. Tveteras, H. Uchida, and D. Valderrama. 2015. The fishery performance indicators: A management tool for triple bottom line outcomes. PLOS One, 10(5):1-20. https://doi.org/10.1371/journal.pone.0122809.

Holland, D., E. Thunberg, J. Agar, S. Crosson, C. Demarest, S. Kasperski, L. Perruso, E. Steiner, J. Stephen, A. Strelcheck, and *M. Travis.* 2015. U.S. catch share markets: A review of data availability and impediments to transparent markets. Mar. Policy, 57:103-110. https://doi.org/10.1016/j.marpol.2015.03.027.

Kasperski, S. 2015. Optimal multi-species harvesting in ecologically and economically interdependent fisheries. Environ. Resource Econ., 61(4):517-557. https://doi.org/10.1007/s10640-014-9805-9.

Kroetz, K., J. Sanchirico, and *D. Lew.* 2015. Efficiency costs of social objectives in tradable permit programs. J. Assoc. Environ. Resour. Economists, 2(3):339-366. https://doi.org/10.1086/681646.

Lambert, D., E. Thunberg, R. Felthoven, J. Lincoln, and *W. Patrick.* 2015. Guidance on fishing vessel risk assessments and accounting for safety at sea in fishery management design. NOAA Tech. Memo. NMFS-OSF-2, 56 p. https://doi.org/10.7289/V58P5XJQ.

Squires, D., and N. Vestergaard. 2015. Productivity growth, catchability, stock assessments, and optimum renewable resource use. Mar. Policy, 62:309-317. https://doi.org/10.1016/j.marpol.2015.07.006.

Thunberg, E., J. Walden, J. Agar, R. Felthoven, A. Harley, S. Kasperski, J. Lee, T. Lee, A. Mamula, J. Stephen, and *A. Strelcheck.* 2015. Measuring changes in multi-factor productivity in U.S. catch share fisheries. Mar. Policy, 62:294-301. https://doi.org/10.1016/j.marpol.2015.05.008.

Walden, J., B. Fissel, D. Squires, and N. Vestergaard. 2015. Productivity change in commercial fisheries: An introduction to the special issue. Mar. Policy, 62:289-293. https://doi.org/10.1016/j.marpol.2015.06.019.

Collier, T., *A. Mamula,* and J. Ruggiero. 2014. Estimation of multi-output production functions in commercial fisheries. Omega Int. J. Manage. Sci., 42(1):157-165. https://doi.org/10.1016/j.omega.2013.05.001.

Holland, D., E. Thunberg, J. Agar, S. Crosson, C. Demarest, S. Kasperski, L. Perruso, E. Steiner, J. Stephen, A. Strelcheck, and *M. Travis.* 2014. U.S. catch share markets: A review of characteristics and data availability. NOAA Tech. Memo. NMFS-F/SPO-145, 67 p.

Seung, C. 2014. Estimating effects of exogenous output changes: An application of multi-regional social accounting matrix (MRSAM) method to natural resource management. Reg. Sci. Policy Pract., 6(2):177-193. https://doi.org/10.1111/rsp3.12037.

Walden, J., J. Agar, R. Felthoven, A. Harley, *S. Kasperski, J. Lee, A. Mamula, J. Stephen, A. Strelcheck,* and *E. Thunberg.* 2014. Productivity change in U.S. catch share fisheries. NOAA Tech. Memo. NMFS-F/SPO-146, 149 p.

Fell, H., and *A. Haynie.* 2013. Spatial competition with changing market institutions. J. Appl. Econometrics, 28(4):702-719. https://doi.org/10.1002/jae.2272.

Fissel, B., B. Gilbert, and J. LaRiviere. 2013. Technology adoption and diffusion with uncertainty in a commons. Econ. Letters, 120(2):297-301. https://doi.org/10.1016/j.econlet.2013.04.048.

Grafton, R., and *D. Squires.* 2013. Theory and practice of fisheries and water economics. In Encyclopedia of energy, natural resource, and environmental economics, vol. 2 (J. F. Shogren, ed.), p. 31-38. Elsevier, Waltham.

Kite-Powell, H., *M. Rubino,* and *B. Morehead.* 2013. The future of US seafood supply. Aquacult. Econ. Manage., 17(3):228-250. https://doi.org/10.1080/13657305.2013.812691.

Schnier, K., and *R. Felthoven.* 2013. Production efficiency and exit in rights-based fisheries. Land Econ., 89(3):538-557. https://doi.org/10.3368/le.89.3.538.

Abbott, J., and *A. Haynie.* 2012. What are we protecting? Fisher behavior and the unintended consequences of spatial closures as a fishery management tool. Ecol. Appl., 22(3):762-777. https://doi.org/10.1890/11-1319.1.

Ocean Governance, Policy and Management Research

Szymkowiak, M., and *A. Himes-Cornell.* 2017. Do active participation measures help fishermen retain fishing privileges? Coast. Manage., 45(1):56-72. https://doi.org/10.1080/08920753.2017.1237243.

Squires, D., and N. Vestergaard. 2016. Putting economics into maximum economic yield. Mar. Resour. Econ., 31(1):101-116. https://doi.org/10.1086/683670.

Bibb, S., S. Bloom, A. Brinson, M. Chandler, G. Davenport, K. Denit, G. Dinardo, J. Gange, S. Giordano, A. Gutierrez, J. Hoey, S. Ignell, R. Kosaka, C. Park, T. Rankin, H. Sagar, and *R. Silva.* 2015. Cooperative research and cooperative management: A review with recommendations. NOAA Tech. Memo. NMFS-F/SPO-156, 78 p.

Himes-Cornell, A., and M. Orbach. 2013. Impacts of climate change on human uses of the ocean. In Oceans and marine resources in a changing climate: A technical input to the 2013 National Climate Assessment, vol. 51 (R. Griffis and J. Howard, eds.), p. 111-131.

Crosson, S. 2012. The impact of empowering scientific advisory committees to constrain catch limits in U.S. fisheries. Sci. Public Policy, 40(2):261-273. https://doi.org/10.1093/scipol/scs104.

Tallis, H., S. Lester, *M. Ruckelshaus, M. Plummer,* K. McLeod, A. Guerry, S. Andelman, M. Caldwell, M. Conte, *S. Copps,* D. Fox, R. Fujita, S. Gaines, G. Gelfenbaum, B. Gold, P. Kareiva, C. Kim, K. Lee, M. Papenfus, S. Redman, B. Silliman, L. Wainger, and C. White. 2012. New metrics for managing and sustaining the ocean's bounty. Mar. Policy, 36(1):303-306. https://doi.org/10.1016/j.marpol.2011.03.013.

Other Marine Environmental Research

Lipton, D., D. Lew, K. Wallmo, P. Wiley, and A. Dvarskas. 2014. The evolution of non-market valuation of U.S. coastal and marine resources. J. Ocean Coast. Econ., 2014(1):6. https://doi.org/10.15351/2373-8456.1011.

Marvasti, A. 2013. The role of price expectations and legal uncertainties in ocean mineral, exploration activities. Resources Pol., 38(1):68-74. https://doi.org/10.1016/j.resourpol.2012.09.002.

Ruckelshaus, M., S. Doney, H. Galindo, J. Barry, F. Chan, J. Duffy, C. English, S. Gaines, J. Grebmeier, *A. Hollowed,* N. Knowlton, *J. Polovina,* N. Rabalais, W. Sydeman, and L. Talley. 2013. Securing ocean benefits for society in the face of climate change. Mar. Policy, 40:154-159. https://doi.org/10.1016/j.marpol.2013.01.009.

Ecosystem-Based Management Research

Holsman, K., J. Samhouri, G. Cook, *E. Hazen, E. Olsen, M. Dillard, S. Kasperski, S. Gaichas,* C. Kelble, *M. Fogarty,* and *K. Andrews.* 2017. An ecosystem-based approach to marine risk assessment. Ecosyst. Health Sustainability, 3(1):e01256. https://doi.org/10.1002/ehs2.1256.

Slater, W., *G. DePiper, J. Gove, C. Harvey, E. Hazen, S. Lucey, M. Karnauskas, S. Regan, E. Siddon, E. Yasumiishi, S. Zador, M. Brady, M. Ford, R. Griffis, R. Shuford, H. Townsend, T. O'Brien, J. Peterson, K. Osgood,* and *J. Link.* 2017. Challenges, opportunities, and future directions to advance NOAA Fisheries ecosystem status reports (ESRs): Report of the National ESR Workshop. NOAA Tech. Memo. NMFS-F/SPO-174, 66 p.

Samhouri, J., A. Haupt, P. Levin, J. Link, and *R. Shuford.* 2014. Lessons learned from developing integrated ecosystem assessments to inform marine ecosystem-based management in the USA. ICES J. Mar. Sci., 71(5):1205-1215. https://doi.org/10.1093/icesjms/fst141.

Recreational Fisheries Economics Research

Lovell, S., J. Hilger, S. Steinback, and *C. Hutt.* 2016. The economic contribution of marine angler expenditures on durable goods in the United States, 2014. NOAA Tech. Memo. NMFS-F/SPO-165, 72 p.

Hutt, C., S. Lovell, and *S. Steinback.* 2015. The economics of independent marine recreational fishing bait and tackle retail stores in the United States, 2013. NOAA Tech. Memo. NMFS-F/SPO-151, 110 p.

Hutt, C., and *G. Silva.* 2015. The economics of Atlantic highly migratory species for-hire fishing trips, July-November 2013. NOAA Tech. Memo. NMFS-OSF-4, 34 p. https://doi.org/10.7289/V5154F2X.

Lovell, S., and *D. Carter.* 2014. The use of sampling weights in regression models of recreational fishing-site choices. Fish. Bull., 112(4):243–252. https://doi.org/10.7755/FB.112.4.1.

Larson, D., and *D. Lew.* 2013. The opportunity cost of travel time as a noisy wage fraction. Am. J. Agric. Econ., 96(2):420-437. https://doi.org/10.1093/ajae/aat093.

Lovell, S., S. Steinback, and *J. Hilger.* 2013. The economic contribution of marine angler expenditures in the United States, 2011. NOAA Tech. Memo. NMFS-F/SPO-134, 188 p.

Habitat Economics Research

Samonte, G., P. Edwards, *J. Royster,* V. Ramenzoni, and S. Morlock. 2017. Socioeconomic benefits of habitat restoration. NOAA Tech. Memo. NMFS-OHC-1, 66 p.

Speir, C., J. Han, and N. Brozovic. 2016. Spatial dynamic optimization of groundwater use with ecological standards for instream flow. Water Econ. Policy, 2(3):1650013. https://doi.org/10.1142/s2382624x16500132.

Speir, C., S. Pittman, and *D. Tomberlin.* 2015. Uncertainty, irreversibility and the optimal timing of large-scale investments in protected species habitat restoration. Front. Mar. Sci., 2:101. https://doi.org/10.3389/fmars.2015.00101.

Meiyappan, P., *M. Dalton,* B. O'Neill, and A. Jain. 2014. Spatial modeling of agricultural land use change at global scale. Ecol. Model., 291:152-174. https://doi.org/10.1016/j.ecolmodel.2014.07.027.

Edwards, P., A. Sutton-Grier, and G. Coyle. 2013. Investing in nature: Restoring coastal habitat blue infrastructure and green job creation. Mar. Policy, 38:65-71. https://doi.org/10.1016/j.marpol.2012.05.020.

Seafood Marketing and Trade Research

Helvey, M., C. Pomeroy, N. Pradhan, *D. Squires,* and *S. Stohs.* 2017. Can the United States have its fish and eat it too? Mar. Policy, 75:62-67. https://doi.org/10.1016/j.marpol.2016.10.013.

Jenny Sun, C.-H., F.-S. Chiang, M. Owens, and *D. Squires.* 2017. Will American consumers pay more for eco-friendly labeled canned tuna? Estimating US consumer demand for canned tuna varieties using scanner data. Mar. Policy, 79:62-69. https://doi.org/10.1016/j.marpol.2017.02.006.

Sociocultural Fisheries Research

Colburn, L., M. Jepson, A. Himes-Cornell, S. Kasperski, K. Norman, C. Weng, and *P. Clay.* 2017. Community participation in U.S. catch share programs. NOAA Tech. Memo. NMFS-F/SPO-179, 136 p.

Cutler, M., *T. Murphy,* and M. Vasta. 2017. An overview of the survey on the socioeconomic aspects of commercial fishing vessel owners in the Northeast and Mid-Atlantic. NOAA Tech. Memo. NMFS-NE-240, 29 p. https://doi.org/10.13140/RG.2.2.28727.83360.

Love, D., *P. Pinto da Silva, J. Olson,* J. Fry, and *P. Clay.* 2017. Fisheries, food, and health in the USA: The importance of aligning fisheries and health policies. Agric. Food Security, 6(1). https://doi.org/10.1186/s40066-017-0093-9.

Pollnac, R., *T. Seara, L. Colburn,* and *M. Jepson.* 2015. Taxonomy of USA east coast fishing communities in terms of social vulnerability and resilience. Environ. Impact Assess. Rev., 55:136-143. https://doi.org/10.1016/j.eiar.2015.08.006.

Clay, P., and *A. Himes-Cornell.* 2014. Bringing social science into U.S. national climate policy. Anthropol. News, 55(4):e18-e51. https://doi.org/10.1111/j.1556-3502.2014.55402.x.

Poe, M., K. Norman, and *P. Levin.* 2014. Cultural dimensions of socioecological systems: Key connections and guiding principles for conservation in coastal environments. Conserv. Lett., 7(3):166-175. https://doi.org/10.1111/conl.12068.

Felthoven, R., and *S. Kasperski.* 2013. Socioeconomic indicators for United States fisheries and fishing communities. PICES Press, 21(2):20-23.

Colburn, L., and *M. Jepson.* 2012. Social indicators of gentrification pressure in fishing communities: A context for social impact assessment. Coast. Manage., 40(3):289-300. https://doi.org/10.1080/08920753.2012.677635.

Protected Resources Economics Research

Lew, D., and *K. Wallmo.* 2017. Temporal stability of stated preferences for endangered species protection from choice experiments. Ecolog. Econ., 131:87-97. https://doi.org/10.1016/j.ecolecon.2016.08.009.

Pienaar, E., *D. Lew,* and *K. Wallmo.* 2017. Intention to pay for the protection of threatened and endangered marine species: Implications for conservation program design. Ocean Coast. Manage., 138:170-180. https://doi.org/10.1016/j.ocecoaman.2017.01.019.

Bisack, K., and G. Magnusson. 2016. Measuring management success for protected species: Looking beyond biological outcomes. Front. Mar. Sci., 3(61):1-7. https://doi.org/10.3389/fmars.2016.00061.

Wallmo, K., K. Bisack, D. Lew, and *D. Squires.* 2016. Editorial: The economics of protected marine species: Concepts in research and management. Front. Mar. Sci., 3:183. https://doi.org/10.3389/fmars.2016.00183.

Wallmo, K., and *D. Lew.* 2016. A comparison of regional and national values for recovering threatened and endangered marine species in the United States. J. Environ. Manage., 179:38-46. https://doi.org/10.1016/j.jenvman.2016.04.053.

Bisack, K., D. Squires, D. Lipton, J. Hilger, D. Holland, D. Johnson, M.-Y. Lee, R. Lent, D. Lew, G. Magnusson, *M. Pan, L. Queirolo, S. Stohs, C. Speir,* and *K. Wallmo.* 2015. Proceedings of the 2014 NOAA economics of protected resources workshop, September 9-11, 2014, La Jolla, California. NOAA Tech. Memo. NMFS NE-233, 179 p. https://doi.org/10.7289/V5QR4V3D.

Johnston, R., *D. Jarvis, K. Wallmo,* and *D. Lew.* 2015. Multiscale spatial pattern in nonuse willingness to pay: Applications to threatened and endangered marine species. Land Econ., 91(4):739-761. https://doi.org/10.3368/le.91.4.739.

Pienaar, E., *D. Lew,* and *K. Wallmo.* 2015. The importance of survey content: Testing for the context dependency of the New Ecological Paradigm Scale. Soc. Sci. Res., 51:338-349. https://doi.org/10.1016/j.ssresearch.2014.09.005.

Pienaar, E., *D. Lew,* and *K. Wallmo.* 2013. Are environmental attitudes influenced by survey context? An investigation of the context dependency of the New Ecological Paradigm (NEP) Scale. Soc. Sci. Res., 42(6):1542-1554. https://doi.org/10.1016/j.ssresearch.2013.07.001.

Wallmo, K., and *D. Lew.* 2012. Public willingness to pay for recovering and downlisting threatened and endangered marine species. Conserv. Biol., 26(5):830-839. https://doi.org/10.1111/j.1523-1739.2012.01899.x.

NORTH PACIFIC

Climate Change Research

Haynie, A., and H. Huntington. 2016. Strong connections, loose coupling: The influence of the Bering Sea ecosystem on commercial fisheries and subsistence harvests in Alaska. Ecol. Soc., 21(4):6. https://doi.org/10.5751/ES-08729-210406.

Seung, C., and *J. Ianelli.* 2016. Regional economic impacts of climate change: A computable general equilibrium analysis for an Alaska fishery. Nat. Resour. Model., 29(2):289-333. https://doi.org/10.1111/nrm.12092.

Punt, A., D. Poljak, *M. Dalton,* and R. Foy. 2014. Evaluating the impact of ocean acidification on fishery yields and profits: The example of red king crab in Bristol Bay. Ecol. Model., 285:39-53. https://doi.org/10.1016/j.ecolmodel.2014.04.017.

Haynie, A., and *L. Pfeiffer.* 2013. Climatic and economic drivers of the Bering Sea walleye pollock (Theragra chalcogramma) fishery: Implications for the future. Can. J. Fish. Aquat. Sci., 70(6):841-853. https://doi.org/10.1139/cjfas-2012-0265.

Carothers, C., K. Criddle, *C. Chambers,* P. Cullenberg, J. Fall, *A. Himes-Cornell,* J. Johnsen, N. Kimball, C. Menzies, and E. Springer, eds. 2012. Fishing people of the north: Cultures, economies, and management responding to change. 312 p. Alaska Sea Grant, University of Alaska—Fairbanks.

Commercial Fisheries Economics Research

Anderson, S., *E. Ward, A. Shelton,* M. Adkison, A. Beaudreau, R. Brenner, *A. Haynie,* J. Shriver, *J. Watson,* and B. Williams. 2017. Benefits and risks of diversification for individual fishers. Proc. Natl. Acad. Sci., 114(40):10797-10802. https://doi.org/10.1073/pnas.1702506114.

Ono, K., *A. Haynie, A. B. Hollowed, J. Ianelli, C. McGilliard,* and A. Punt. 2017. Management strategy analysis for multispecies fisheries, including technical interactions and human behavior in modelling management decisions and fishing. Can. J. Fish. Aquat. Sci., 75(8):1185-1202. https://doi.org/10.1139/cjfas-2017-0135.

Reimer, M., J. Abbott, and *A. Haynie.* 2017. Empirical models of fisheries production: Conflating technology with incentives? Mar. Resour. Econ., 32(2):169-190. https://doi.org/10.1086/690677.

Seung, C. 2017. A multi-regional economic impact analysis of Alaska salmon fishery failures. Ecolog. Econ., 138:22-30. https://doi.org/10.1016/j.ecolecon.2017.03.020.

Kasperski, S. 2016. Optimal multispecies harvesting in the presence of a nuisance species. Mar. Policy, 64:55-63. https://doi.org/10.1016/j.marpol.2015.11.009.

Seung, C. 2016. Identifying channels of economic impacts: An inter-regional structural path analysis for Alaska fisheries. Mar. Policy, 66:39-49. https://doi.org/10.1016/j.marpol.2016.01.015.

Seung, C., B. Muse, and E. Waters. 2016. Net economic impacts of recent Alaska salmon fishery failures and federal relief. North Am. J. Fish. Manage., 36(2):351-362. https://doi.org/10.1080/02755947.2015.1120831.

Szymkowiak, M., and *R. Felthoven.* 2016. Understanding the determinants of hired skipper use in the Alaska halibut individual fishing quota fishery. North Am. J. Fish. Manage., 36(5):1139-1148. https://doi.org/10.1080/02755947.2016.1184201.

Abbott, J., *A. Haynie,* and M. Reimer. 2015. Hidden flexibility: Institutions, incentives, and the margins of selectivity in fishing. Land Econ., 91(1):169-195. https://doi.org/10.3368/le.91.1.169.

Call, I., and *D. Lew.* 2015. Tradable permit programs: What are the lessons for the new Alaska halibut catch sharing plan? Mar. Policy, 52:125-137. https://doi.org/10.1016/j.marpol.2014.10.014.

Fissel, B. 2015. Methods for the Alaska groundfish first-wholesale price projections: Section 6 of the economic status of the groundfish fisheries off Alaska. NOAA Tech. Memo. NMFS-AFSC-305, 39 p. https://doi.org/10.7289/V58K772W.

Fissel, B., R. Felthoven, S. Kasperski, and C. O'Donnell. 2015. Decomposing productivity and efficiency changes in the Alaska head and gut factory trawl fleet. Mar. Policy, 62:337-346. https://doi.org/10.1016/j.marpol.2015.06.018.

Glass, J., G. Kruse, and *S. Miller.* 2015. Socioeconomic considerations of the commercial weathervane scallop fishery off Alaska using SWOT analysis. Ocean Coast. Manage., 105:154-165. https://doi.org/10.1016/j.ocecoaman.2015.01.005.

Lew, D., A. Himes-Cornell, and *J. Lee.* 2015. Weighting and imputation for missing data in a cost and earnings fishery survey. Mar. Resour. Econ., 30(2):219-230. https://doi.org/10.1086/679975.

Seung, C. 2015. Untangling economic impacts for Alaska fisheries: A structural path analysis. Mar. Resour. Econ., 30(3):331-347. https://doi.org/10.1086/680444.

Felthoven, R., J. Lee, and K. Schnier. 2014. Cooperative formation and peer effects in fisheries. Mar. Resour. Econ., 29(2):133-156. https://doi.org/10.1086/676827.

Fissel, B. 2014. Economic indices for the North Pacific groundfish fisheries: Calculation and visualization. NOAA Tech. Memo. NMFS-AFSC-279, 59 p.

Haynie, A. 2014. Changing usage and value in the Western Alaska Community Development Quota (CDQ) program. Fish. Sci., 80(2):181-191. https://doi.org/10.1007/s12562-014-0723-0.

Peterson, M., F. Mueter, K. Criddle, and *A. Haynie.* 2014. Killer whale depredation and associated costs to Alaskan sablefish, Pacific halibut and Greenland turbot longliners. PLOS One, 9(2):e88906. https://doi.org/10.1371/journal.pone.0088906.

Seung, C. 2014. Measuring spillover effects of shocks to the Alaska economy: An inter-regional social accounting matrix (IRSAM) model approach. Econ. Systems Res., 26(2):224-238. https://doi.org/10.1080/09535314.2013.803039.

Seung, C., E. Waters, and *J. Leonard.* 2014. Assessing multiregional economic impacts of Alaskan fisheries: A computable general equilibrium analysis. Rev. Urban Reg. Devel. Stud., 26(3):155-173. https://doi.org/10.1111/rurd.12026.

Torres, M., and *R. Felthoven.* 2014. Productivity growth and product choice in catch share fisheries: The case of Alaska pollock. Mar. Policy, 50:280-289. https://doi.org/10.1016/j.marpol.2014.07.008.

Waters, E., *C. Seung,* M. Hartley, and *M. Dalton.* 2014. Measuring the multiregional economic contribution of an Alaska fishing fleet with linkages to international markets. Mar. Policy, 50:238-248. https://doi.org/10.1016/j.marpol.2014.07.003.

Kasperski, S., and *D. Holland.* 2013. Income diversification and risk for fishermen. Proc. Natl. Acad. Sci., 110(6):2076-2081. https://doi.org/10.1073/pnas.1212278110.

Seung, C., and E. Waters. 2013. Calculating impacts of exogenous output changes: Application of a social accounting matrix (SAM) model to Alaska fisheries. Ann. Reg. Sci., 51(2):553-573. https://doi.org/10.1007/s00168-012-0546-9.

Pfeiffer, L., and *A. Haynie.* 2012. The effect of decreasing seasonal sea-ice cover on the winter Bering Sea pollock fishery. ICES J. Mar. Sci., 69(7):1148-1159. https://doi.org/10.1093/icesjms/fss097.

Punt, A., M. Siddeek, *B. Garber-Yonts, M. Dalton, L. Rugolo,* D. Stram, *B. Turnock,* and J. Zheng. 2012. Evaluating the impact of buffers to account for scientific uncertainty when setting TACs: Application to red king crab in Bristol Bay, Alaska. ICES J. Mar. Sci., 69(4):624-634. https://doi.org/10.1093/icesjms/fss047.

Sethi, S., *M. Dalton,* and R. Hilborn. 2012. Managing harvest risk with catch-pooling cooperatives. ICES J. Mar. Sci., 69(6):1038-1044. https://doi.org/10.1093/icesjms/fss064.

Sethi, S., *M. Dalton,* and R. Hilborn. 2012. Quantitative risk measures applied to Alaskan commercial fisheries. Can. J. Fish. Aquat. Sci., 69(3):487-498. https://doi.org/10.1139/f2011-170.

Ecosystem-Based Management Research

Zador, S., S. Gaichas, S. Kasperski, C. Ward, R. Blake, N. Ban, A. Himes-Cornell, and J. Koehn. 2017. Linking ecosystem processes to communities of practice through commercially fished species in the Gulf of Alaska. ICES J. Mar. Sci., 74(7):2024-2033. https://doi.org/10.1093/icesjms/fsx054.

Sanchirico, J., *D. Lew, A. Haynie,* D. Kling, and D. Layton. 2013. Conservation values in marine ecosystem-based management. Mar. Policy, 38:523-530. https://doi.org/10.1016/j.marpol.2012.08.008.

Recreational Fisheries Economics Research

Lew, D., and D. Larson. 2017. Stated preferences of Alaska resident saltwater anglers for contemporary regulatory policies. Mar. Fish. Rev., 79(3-4):12-25. https://doi.org/10.7755/MFR.79.3-4.2.

Seung, C., and *D. Lew.* 2017. A multiregional approach for estimating the economic impact of harvest restrictions on saltwater sportfishing. North Am. J. Fish. Manage., 37(5):1112-1129. https://doi.org/10.1080/02755947.2017.1345808.

Lew, D., D. Putman, and D. Larson. 2016. Attitudes and preferences toward Pacific halibut management alternatives in the saltwater sport fishing charter sector in Alaska: Results from a survey. NOAA Tech. Memo. NMFS-AFSC-326, 58 p. https://doi.org/10.7289/V5/TM-AFSC-326.

Lew, D., and D. Larson. 2015. Stated preferences for size and bag limits of Alaska charter boat anglers. Mar. Policy, 61:66-76. https://doi.org/10.1016/j.marpol.2015.07.007.

Lew, D., G. Sampson, *A. Himes-Cornell, J. Lee,* and *B. Garber-Yonts.* 2015. Costs, earnings, and employment in the Alaska saltwater sport fishing charter sector, 2011-2013. NOAA Tech. Memo. NMFS-AFSC-299, 134 p. https://doi.org/10.7289/V5KP803N.

Lew, D., and D. Larson. 2014. Is a fish in hand worth two in the sea? Evidence from a stated preference study. Fish. Res., 157:124-135. https://doi.org/10.1016/j.fishres.2014.04.005.

Lew, D., and *C. Seung.* 2014. On the statistical significance of regional economic impacts from recreational fishing harvest limits in southern Alaska. Mar. Resour. Econ., 29(3):241-257. https://doi.org/10.1086/677759.

Larson, D., and *D. Lew.* 2013. How do harvest rates affect angler trip patterns? Mar. Resour. Econ., 28(2):155-173. https://doi.org/10.5950/0738-1360-28.2.155.

Seung, C., and *D. Lew.* 2013. Accounting for variation in exogenous shocks in economic impact modeling. Ann. Reg. Sci., 51(3):711-730. https://doi.org/10.1007/s00168-012-0550-0.

Lew, D., and D. Larson. 2012. Economic values for saltwater sport fishing in Alaska: A stated preference analysis. North Am. J. Fish. Manage., 32(4):745-759. https://doi.org/10.1080/02755947.2012.681012.

Sociocultural Fisheries Research

Himes-Cornell, A., and *A. Santos.* 2017. Involving fishing communities in data collection: A summary and description of the Alaska community survey, 2013. NOAA Tech. Memo. NMFS-AFSC-340, 195 p. https://doi.org/10.7289/V5/TM-AFSC-340.

Himes-Cornell, A., and *S. Kasperski.* 2016. Using socioeconomic and fisheries involvement indices to understand Alaska fishing community well-being. Coast. Manage., 44(1):36-70. https://doi.org/10.1080/08920753.2016.1116671.

Himes-Cornell, A., C. Maguire, S. Kasperski, K. Hoelting, and R. Pollnac. 2016. Understanding vulnerability in Alaska fishing communities: A validation methodology for rapid assessment of indices related to well-being. Ocean Coast. Manage., 124:53-65. https://doi.org/10.1016/j.ocecoaman.2016.02.004.

Kent, K., and *A. Himes-Cornell.* 2016. Making landfall: Linkages between fishing communities and support services. Coast. Manage., 44(4):279-294. https://doi.org/10.1080/08920753.2016.1135276.

Himes-Cornell, A., and K. Hoelting. 2015. Resilience strategies in the face of short and long-term change: Out-migration and fisheries regulation in Alaskan fishing communities. Ecol. Soc., 20(2):9. https://doi.org/10.5751/ES-07074-200209.

Himes-Cornell, A., and *S. Kasperski.* 2015. Assessing climate change vulnerability in Alaska's fishing communities. Fish. Res., 162:1-11. https://doi.org/10.1016/j.fishres.2014.09.010.

Himes-Cornell, A., and *K. Kent.* 2014. Involving fishing communities in data collection: A summary and description of the Alaska community survey, 2010. NOAA Tech. Memo. NMFS-AFSC-280, 170 p.

Himes-Cornell, A., and *K. Kent.* 2014. Involving fishing communities in data collection: A summary and description of the Alaska community survey, 2011. NOAA Tech. Memo. NMFS-AFSC-284, 171 p.

Kasperski, S., and *A. Himes-Cornell.* 2014. Indicators of fishing engagement and reliance of Alaskan fishing communities. Alaska Fisheries Science Center. In Alaska Fisheries Science Center Quarterly Report. Quarterly Research Reports & Activities, January-February-March 2014, 7 p.

Package-Ward, C., and *A. Himes-Cornell.* 2014. Utilizing oral histories to understand the social networks of Oregon fishermen in Alaska. Hum. Org., 73(3):277-288. https://doi.org/10.17730/humo.73.3.x01174800236738l.

Himes-Cornell, A., K. Hoelting, C. Maguire, L. Munger-Little, *J. Lee,* J. Fisk, *R. Felthoven,* C. Geller, and *P. Little.* 2013. Community profiles for North Pacific fisheries - Alaska. NOAA Tech. Memo. NMFS-AFSC-259, Vol. 1, 70 p.

PACIFIC

Commercial Fisheries Economics Research

Holland, D., E. Steiner, and *A. Warlick.* 2017. Can vessel buybacks pay off: An evaluation of an industry funded fishing vessel buyback. Mar. Policy, 82:8-15. https://doi.org/10.1016/j.marpol.2017.05.002.

Leonard, J., and *E. Steiner.* 2017. Initial economic impacts of the U.S. Pacific Coast groundfish fishery individual fishing quota program. North Am. J. Fish. Manage., 37(4):862-881. https://doi.org/10.1080/02755947.2017.1330784.

Thorson, J., R. Fonner, *M. Haltuch,* K. Ono, and H. Winker. 2017. Accounting for spatiotemporal variation and fisher targeting when estimating abundance from multispecies fishery data. Can. J. Fish. Aquat. Sci., 74(11):1794-1807. https://doi.org/10.1139/cjfas-2015-0598.

Holland, D. 2016. Development of the Pacific groundfish trawl IFQ market. Mar. Resour. Econ., 31(4):453-464. https://doi.org/10.1086/687829.

Holland, D., and *S. Kasperski.* 2016. The impact of access restrictions on fishery income diversification of US West Coast fishermen. Coast. Manage., 44(5):452-463. https://doi.org/10.1080/08920753.2016.1208883.

Pfeiffer, L. 2016. Safety incidents in the West Coast catch shares fisheries. NOAA Tech. Memo. NMFS-F/SPO-160, 33 p.

Mamula, A., and T. Collier. 2015. Multifactor productivity, environmental change, and regulatory impacts in the US West Coast groundfish trawl fishery, 1994-2013. Mar. Policy, 62:326-336. https://doi.org/10.1016/j.marpol.2015.06.002.

Rose, K., J. Fiechter, E. Curchitser, K. Hedstrom, M. Bernal, S. Creekmore, *A. Haynie,* S. Ito, S. Lluch-Cota, *B. Megrey,* C. Edwards, D. Checkley, T. Koslow, *S. McClatchie, F. Werner, A. MacCall,* and V. Agostini. 2015. Demonstration of a fully-coupled end-to-end model for small pelagic fish using sardine and anchovy in the California current. Prog. Oceanogr., 138:348-380. https://doi.org/10.1016/j.pocean.2015.01.012.

Chan, V., R. Clarke, and *D. Squires.* 2014. Full retention in tuna fisheries: Benefits, costs and unintended consequences. Mar. Policy, 45:213-221. https://doi.org/10.1016/j.marpol.2013.10.016.

Kaplan, I., D. Holland, and E. Fulton. 2014. Finding the accelerator and brake in an individual quota fishery: Linking ecology, economics, and fleet dynamics of US West Coast trawl fisheries. ICES J. Mar. Sci., 71(2):308-319. https://doi.org/10.1093/icesjms/fst114.

Kvamsdal, S., and *S. Stohs.* 2014. Estimating endangered species interaction risk with the Kalman filter. Am. J. Agric. Econ., 96(2):458-468. https://doi.org/10.1093/ajae/aat092.

Speir, C., C. Pomeroy, and J. Sutinen. 2014. Port level fishing dynamics: Assessing changes in the distribution of fishing activity over time. Mar. Policy, 46:171-191. https://doi.org/10.1016/j.marpol.2014.01.014.

Ishimura, G., *S. Herrick,* and U. Sumaila. 2013. Stability of cooperative management of the Pacific sardine fishery under climate variability. Mar. Policy, 39:333-340. https://doi.org/10.1016/j.marpol.2012.12.008.

Mamula, A., and *J. Walden.* 2013. Proceedings of the National Marine Fisheries Service productivity workshop (Santa Cruz, CA June 11-12, 2012). NOAA Tech. Memo. NMFS-SWFSC-503, 267 p.

Holland, D., and *J. Jannot.* 2012. Bycatch risk pools for the US West Coast groundfish fishery. Ecolog. Econ., 78:132-147. https://doi.org/10.1016/j.ecolecon.2012.04.010.

Kaplan, I., and *J. Leonard.* 2012. From krill to convenience stores: Forecasting the economic and ecological effects of fisheries management on the US West Coast. Mar. Policy, 36(5):947-954. https://doi.org/10.1016/j.marpol.2012.02.005.

Lian, C. 2012. West Coast open access groundfish and salmon troller survey: Protocol and results for 2005 and 2006. NOAA Tech. Memo. NMFS-NWFSC-116, 52 p.

Thomson, C. 2012. Commercial fishing economics technical report for the secretarial determination on whether to remove four dams on the Klamath River in California and Oregon. Appendix MS7, Appendix to: Management testing and scenarios in the California Current, In California Current Integrated Ecosystem Assessment: Phase II Report (P.S. Levin, B. K. Wells, and M.B. Sheer, eds.). Available at https://swfsc-publications.fisheries.noaa.gov/publications/CR/2013/2013Thomson.pdf.

Ocean Governance, Policy & Management Research

Breslow, S., B. Sojka, R. Barnea, X. Basurto, C. Carothers, S. Charnley, S. Coulthard, N. Dolsak, J. Donatuto, C. Garcia-Quijano, C. Hicks, A. Levine, M. Mascia, *K. Norman, M. Poe,* T. Satterfield, K. St. Martin, and *P. Levin.* 2016. Conceptualizing and operationalizing human wellbeing for ecosystem assessment and management. Environ. Sci. Policy, 66:250-259. https://doi.org/10.1016/j.envsci.2016.06.023.

Levin, P., G. Williams, A. Rehr, K. Norman, and *C. Harvey.* 2015. Developing conservation targets in social-ecological systems. Ecol. Soc., 20(4):6. https://doi.org/10.5751/es-07866-200406.

Wells, B., T. Wainwright, C. Thomson, T. Williams, N. Mantua, L. Crozier, S. Breslow, and *K. Fresh.* 2014. CCIEA Phase III Report 2013: Ecosystem components, protected species – Pacific salmon. 102 p.

Khanna, M., and *C. Speir.* 2013. Motivations for proactive environmental management. Sustainability, 5(6):2664-2692. https://doi.org/10.3390/su5062664.

Morzaria-Luna, H., C. Ainsworth, *I. Kaplan, P. Levin,* and E. Fulton. 2013. Indirect effects of conservation policies on the coupled human-natural ecosystem of the upper Gulf of California. PLOS One, 8(5):e64085. https://doi.org/10.1371/journal.pone.0064085.

Ainsworth, C., H. Morzaria-Luna, *I. Kaplan,* P. Levin, E. Fulton, R. Cudney-Bueno, P. Turk-Boyer, J. Torre, G. Danemann, and T. Pfister. 2012. Effective ecosystem-based management must encourage regulatory compliance: A Gulf of California case study. Mar. Policy, 36(6):1275-1283. https://doi.org/10.1016/j.marpol.2012.03.016.

Norman, K., D. Holland, and *S. Kasperski.* 2012. Resilient and economically viable coastal communities. In California Current Integrated Ecosystem Assessment: Phase II Report. (P.S. Levin, B. K. Wells, and M.B. Sheer, eds.). Available at https://www.integratedecosystemassessment.noaa.gov/sites/default/files/2018-12/11.Human%20Dimensions%20July%202013%20RevFinal.pdf.

Marine Protected Areas Research

Wallmo, K., and *R. Kosaka.* 2017. Using choice models to inform large marine protected area design. Mar. Policy, 83:111-117. https://doi.org/10.1016/j.marpol.2017.05.034.

Wallmo, K., and *R. Kosaka.* 2014. Public preferences for marine protected areas off the U.S. West Coast: The significance of restrictions and size on economic value. NOAA Tech. Memo. NMFS-F/SPO-144, 96 p.

Mason, J., R. Kosaka, A. Mamula, and *C. Speir.* 2012. Effort changes around a marine reserve: The case of the California Rockfish Conservation Area. Mar. Policy, 36(5):1054-1063. https://doi.org/10.1016/j.marpol.2012.03.002.

Other Marine Environmental Research

Fuller, E., *J. Samhouri,* J. Stoll, S. Levin, and J. Watson. 2017. Characterizing fisheries connectivity in marine social-ecological systems. ICES J. Mar. Sci., 74(8):2087-2096. https://doi.org/10.1093/icesjms/fsx128.

Otto, S., S. Simons, J. Stoll, and *P. Lawson.* 2016. Making progress on bycatch avoidance in the ocean salmon fishery using a transdisciplinary approach. ICES J. Mar. Sci., 73(9):2380-2394. https://doi.org/10.1093/icesjms/fsw061.

Griffiths, J., D. Schindler, J. Armstrong, *M. Scheuerell,* D. Whited, R. Clark, R. Hilborn, C. Holt, *S. Lindley,* J. Stanford, and E. Volk. 2014. Performance of salmon fishery portfolios across western North America. J. Appl. Ecol., 51(6):1554-1563. https://doi.org/10.1111/1365-2664.12341.

Levin, P., J. Azose, and S. Anderson. 2014. Biblical influences on conservation: An examination of the apparent sustainability of Kosher seafood. Ecol. Soc., 19(2):55. https://doi.org/10.5751/es-06524-190255.

Halpern, B., C. Longo, K. McLeod, R. Cooke, B. Fischhoff, *J. Samhouri,* and C. Scarborough. 2013. Elicited preferences for components of ocean health in the California current. Mar. Policy, 42:68-73. https://doi.org/10.1016/j.marpol.2013.01.019.

Ecosystem-Based Management Research

Harvey, C., N. Garfield, G. Williams, K. Andrews, C. Barceló, *K. Barnas, S. Bograd, R. Brodeur, B. Burke, J. Cope, L. deWitt, J. Field, J. Fisher, C. Greene, T. Good, E. Hazen, D. Holland, M. Jacox, S. Kasperski, S. Kim, A. Leising, S. Melin, C. Morgan, S. Munsch, K. Norman,* W. Peterson, *M. Poe, J. Samhouri, I. Schroeder,* W. Sydeman, J. Thayer, *A. Thompson, N. Tolimieri, A. Varney, B. Wells, T. Williams,* and J. Zamon. 2017. Ecosystem status report of the California Current for 2017: A summary of ecosystem indicators compiled by the California Current Integrated Ecosystem Assessment Team (CCIEA). NOAA Tech. Memo. NMFS-NWFSC-139, 61 p. https://doi.org/10.7289/V5/TM-NWFSC-139.

Miller, R., J. Field, J. Santora, *M. Monk, R. Kosaka,* and *C. Thomson.* 2017. Spatial valuation of California marine fisheries as an ecosystem service. Can. J. Fish. Aquat. Sci., 74(11):1732-1748. https://doi.org/10.1139/cjfas-2016-0228.

Recreational Fisheries Economics Research

Anderson, L., and *M. Plummer.* 2017. Recreational demand for shellfish harvesting under environmental closures. Mar. Resour. Econ., 32(1):43-57. https://doi.org/10.1086/688975.

Bellquist, L., B. Semmens, *S. Stohs,* and A. Siddall. 2017. Impacts of recently implemented recreational fisheries regulations on the Commercial Passenger Fishing Vessel fishery for Paralabrax sp. in California. Mar. Policy, 86:134-143. https://doi.org/10.1016/j.marpol.2017.09.017.

Hilger, J., and *S. Lovell.* 2017. An economic profile of the charter fishing fleet in California. Mar. Fish. Rev., 79(3-4):26-33. https://doi.org/10.7755/MFR.79.3-4.3.

Anderson, L., and *S. Lee.* 2013. Untangling the recreational value of wild and hatchery salmon. Mar. Resour. Econ., 28(2):175-197. https://doi.org/10.5950/0738-1360-28.2.175.

Anderson, L., S. Lee, and P. Levin. 2013. Costs of delaying conservation: Regulations and the recreational values of exploited and co-occurring species. Land Econ., 89(2):371-385. https://doi.org/10.3368/le.89.2.371.

Kuriyama, K., *J. Hilger,* and M. Hanemann. 2013. A random parameter model with onsite sampling for recreation site choice: An application to Southern California shoreline sportfishing. Environ. Resource Econ., 56(4):481-497. https://doi.org/10.1007/s10640-013-9640-4.

Thomson, C. and *C. Speir*. 2011. In-river sport fishing economics technical report for the secretarial determination on whether to remove four dams on the Klamath River in California and Oregon. Available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153242.

Habitat Economics Research

Elbakidze, L., B. Fa'anunu, *A. Mamula,* and R. Taylor. 2017. Evaluating economic efficiency of a water buyback program: The Klamath irrigation project. Resource Energy Econ., 48:68-82. https://doi.org/10.1016/j.reseneeco.2017.02.001.

Speir, C., A. Mamula, and D. Ladd. 2015. Effects of water supply on labor demand and agricultural production in California's San Joaquin Valley. Water Econ. Policy, 1(2):1550003. https://doi.org/10.1142/s2382624x15500034.

Thomson, C. 2012. Klamath Tribes fishery socioeconomics technical report for the secretarial determination on whether to remove four dams on the Klamath River in California and Oregon. Available at https://kbifrm.psmfc.org/wp-content/uploads/2017/07/Thomson_2012_0381_Klamath-tribes-fishery-socioeconomics.pdf.

Sociocultural Fisheries Research

Calhoun, S., F. Conway, and *S. Russell.* 2016. Acknowledging the voice of women: Implications for fisheries management and policy. Mar. Policy, 74:292-299. https://doi.org/10.1016/j.marpol.2016.04.033.

Norman, K., T. Safford, *B. Feist,* and M. Henly. 2016. At the confluence of data streams: Mapping paired social and biophysical landscapes on the Puget Sound's edge. Coast. Manage., 44(5):427-440. https://doi.org/10.1080/08920753.2016.1208038.

Poe, M., J. Donatuto, and T. Satterfield. 2016. "Sense of place": Human wellbeing considerations for ecological restoration in Puget Sound. Coast. Manage., 44(5):409-426. https://doi.org/10.1080/08920753.2016.1208037.

Russell, S., A. Arias-Arthur, K. Sparks, and *A. Varney.* 2016. West Coast communities and catch shares: The early years of social change. Coast. Manage., 44(5):441-451. https://doi.org/10.1080/08920753.2016.1208864.

Poe, M., P. Levin, N. Tolimieri, and *K. Norman.* 2015. Subsistence fishing in a 21st century capitalist society: From commodity to gift. Ecolog. Econ., 116:241-250. https://doi.org/10.1016/j.ecolecon.2015.05.003.

Sawchuk, J., A. Beaudreau, *D. Tonnes,* and D. Fluharty. 2015. Using stakeholder engagement to inform endangered species management and improve conservation. Mar. Policy, 54:98-107. https://doi.org/10.1016/j.marpol.2014.12.014.

Breslow, S., D. Holland, P. Levin, K. Norman, M. Poe, C. Thomson, R. Barnea, P. Dalton, N. Dolsak, *C. Greene,* K. Hoelting, *S. Kasperski, R. Kosaka,* D. Ladd, *A. Mamula, S. Miller,* B. Sojka, *C. Speir, S. Steinback,* and *N. Tolimieri.* 2014. Human dimensions of the CCIEA. In California Current Integrated Ecosystem Assessment: Phase III Report. (P. Levin, B. Wells, and M. Sheer, eds.), 37 p.

Holland, D., and *S. Kasperski.* 2014. Fishery income diversification and risk for fishermen and fishing communities of the US West Coast and Alaska. In California Current Integrated Ecosystem Assessment: Phase III Report. (P. Levin, B. Wells, and M. Sheer, eds.).

Safford, T., *K. Norman,* M. Henly, K. Mills, and *P. Levin.* 2014. Environmental awareness and public support for protecting and restoring Puget Sound. Environ. Manage., 53(4):757-768. https://doi.org/10.1007/s00267-014-0236-8.

Protected Resources Economics Research

Richerson, K., and *D. Holland.* 2017. Quantifying and predicting responses to a US West Coast salmon fishery closure. ICES J. Mar. Sci., 74(9):2364-2378. https://doi.org/10.1093/icesjms/fsx093.

Gjertsen, H., D. Squires, P. Dutton, and T. Eguchi. 2014. Cost-effectiveness of alternative conservation strategies with application to the Pacific leatherback turtle. Conserv. Biol., 28(1):140-149. https://doi.org/10.1111/cobi.12239.

WESTERN PACIFIC

Commercial Fisheries Economics Research

Chan, H., and *M. Pan.* 2017. Economic and social characteristics of the Hawaii small boat fishery 2014. NOAA Tech. Memo. NMFS-PIFSC-63, 107 p. https://doi.org/10.7289/V5/TM-PIFSC-63.

Pan, M., S. Arita, and *K. Bigelow.* 2017. Cost-earnings study of the American Samoa longline fishery based on vessel operations in 2009 and recent trend of economic performance. National Marine Fisheries Services, Pacific Islands Fisheries Science Center. Administration Report H-17-01, 32 p. https://doi.org/10.7289/V5/AR-PIFSC-H-17-01.

Sweeney, J., R. Howitt, H. Chan, *M. Pan,* and *P. Leung.* 2017. How do fishery policies affect Hawaii's longline fishing industry? Calibrating a positive mathematical programming model. Nat. Resour. Model., 30(2):e12127. https://doi.org/10.1111/nrm.12127.

Kalberg, K., and *M. Pan.* 2016. 2012 economic cost earnings of pelagic longline fishing in Hawaii. NOAA Tech. Memo. NMFS-PIFSC-56, 60 p. https://doi.org/10.7289/V5/TM-PIFSC-56.

Richmond, L., *D. Kotowicz,* and *J. Hospital.* 2015. Monitoring socioeconomic impacts of Hawai'i's 2010 bigeye tuna closure: Complexities of local management in a global fishery. Ocean Coast. Manage., 106:87-96. https://doi.org/10.1016/j.ocecoaman.2015.01.015.

Hospital, J., and C. Beavers. 2014. Catch shares and the main Hawaiian Islands bottomfish fishery: Linking fishery conditions and fisher perceptions. Mar. Policy, 44:9-17. https://doi.org/10.1016/j.marpol.2013.08.006.

Arita, S., M. Pan, J. Hospital, and *P. Leung.* 2013. The distributive economic impacts of Hawaii's commercial fishery: A SAM analysis. Fish. Res., 145:82-89. https://doi.org/10.1016/j.fishres.2013.02.005.

Davidson, K., M.-Y. Pan, W. Hu, and D. Poerwanto. 2012. Consumers' willingness to pay for aquaculture fish products vs. wild-caught seafood – a case study in Hawaii. Aquacult. Econ. Manage., 16(2):136-154. https://doi.org/10.1080/13657305.2012.678554.

Hospital, J., and *C. Beavers.* 2012. Economic and social characteristics of bottomfish fishing in the main Hawaiian Islands. National Marine Fisheries Service, Pacific Islands Fisheries Science Center. Administrative Report H-12-01, 44 p.

Pan, M., and *P. Leung.* 2012. Guest editors' introduction: Economic relations between marine aquaculture and wild capture fisheries. Aquacult. Econ. Manage., 16(2):98-101. https://doi.org/10.1080/13657305.2012.678556.

Ecosystem-Based Management Research

Weijerman, M., C. Grace-McCaskey, S. Grafeld, D. Kotowicz, K. Oleson, and I. van Putten. 2016. Towards an ecosystem-based approach of Guam's coral reefs: The human dimension. Mar. Policy, 63:8-17. https://doi.org/10.1016/j.marpol.2015.09.028.

Recreational Fisheries Economics Research

Grafeld, S., K. Oleson, M. Barnes, M. Peng, C. Chan, and *M. Weijerman.* 2016. Divers' willingness to pay for improved coral reef conditions in Guam: An untapped source of funding for management and conservation? Ecolog. Econ., 128:202-213. https://doi.org/10.1016/j.ecolecon.2016.05.005.

Madge, L., *J. Hospital,* and E. Williams. 2016. Attitudes and preferences of Hawaii non-commercial fishermen. Volume 1: Report from the 2015 Hawaii saltwater recreational fishing survey. NOAA Tech. Memo. NMFS-PIFSC-58, 85 p. https://doi.org/10.7289/V5/TM-PIFSC-58.

Duffield, J., C. Neher, *S. Allen,* D. Patterson, and B. Gentner. 2012. Modeling the behavior of marlin anglers in the Western Pacific. Mar. Resour. Econ., 27(4):343-357. https://doi.org/10.5950/0738-1360-27.4.343.

Sociocultural Fisheries Research

Kotowicz, D., L. Richmond, and *J. Hospital.* 2017. Exploring public knowledge, attitudes, and perceptions of the Marianas Trench Marine National Monument. Coast. Manage., 45(6):452-469. https://doi.org/10.1080/08920753.2017.1373451.

Barnes, M., K. Kalberg, *M. Pan,* and *P. Leung.* 2016. When is brokerage negatively associated with economic benefits? Ethnic diversity, competition, and common-pool resources. Social Netwks., 45:55-65. https://doi.org/10.1016/j.socnet.2015.11.004.

Barnes-Mauthe, M., *S. Arita, S. Allen,* S. Gray, and *P. Leung.* 2013. The influence of ethnic diversity on social network structure in a common-pool resource system: Implications for collaborative management. Ecol. Soc., 18(1):23. https://doi.org/10.5751/es-05295-180123.

Protected Resources Economics Research

Chan, H., and *M. Pan.* 2016. Spillover effects of environmental regulation for sea turtle protection in the Hawaii longline swordfish fishery. Mar. Resour. Econ., 31(3):259-279. https://doi.org/10.1086/686672.

NEW ENGLAND

Climate Change Research

Clay, P., L. Colburn, and T. Seara. 2016. Social bonds and recovery: An analysis of Hurricane Sandy in the first year after landfall. Mar. Policy, 74:334-340. https://doi.org/10.1016/j.marpol.2016.04.049.

Colburn, L., M. Jepson, C. Weng, T. Seara, J. Weiss, and *J. Hare.* 2016. Indicators of climate change and social vulnerability in fishing dependent communities along the Eastern and Gulf Coasts of the United States. Mar. Policy, 74:323-333. https://doi.org/10.1016/j.marpol.2016.04.030.

Seara, T., P. Clay, and *L. Colburn.* 2016. Perceived adaptive capacity and natural disasters: A fisheries case study. Global Environ. Change (A Hum. Policy Dimens.), 38:49-57. https://doi.org/10.1016/j.gloenvcha.2016.01.006.

Commercial Fisheries Economics Research

Färe, R., S. Grosskopf, and *J. Walden.* 2017. Measuring capital value in a commercial fishery: A distance function approach. Mar. Policy, 81:109-115. https://doi.org/10.1016/j.marpol.2017.02.014.

Georgianna, D., *M.-Y. Lee,* and *J. Walden.* 2017. Contrasting trends in the Northeast United States groundfish and scallop processing industries. Mar. Policy, 85:100-106. https://doi.org/10.1016/j.marpol.2017.08.025.

Muench, A., G. DePiper, and *C. Demarest.* 2017. On the precision of predicting fishing location using data from the vessel monitoring system (VMS). Can. J. Fish. Aquat. Sci., 75(7):1036-1047. https://doi.org/10.1139/cjfas-2016-0446.

Oliveira, M., A. Camanho, *J. Walden,* V. Miguéis, N. Ferreira, and M. Gaspar. 2017. Forecasting bivalve landings with multiple regression and data mining techniques: The case of the Portuguese artisanal dredge fleet. Mar. Policy, 84:110-118. https://doi.org/10.1016/j.marpol.2017.07.013.

Walden, J., R. Färe, and S. Grosskopf. 2017. Measuring change in productivity of a fishery with the Bennet–Bowley indicator. Fish. Bull., 115(3):273-283. https://doi.org/10.7755/FB.115.3.1.

Das, C. 2016. Fisheries annual fixed cost data collection and estimation methodology: An application in the North-east, US. Mar. Policy, 71:184-193. https://doi.org/10.1016/j.marpol.2016.05.030.

Palmer, M., J. Deroba, C. Legault, and *E. Brooks.* 2016. Comment on "Slow adaptation in the face of rapid warming leads to collapse of the Gulf of Maine cod fishery'. Science, 352(6284):423. https://doi.org/10.1126/science.aad9674.

Holland, D., P. Pinto da Silva, and *A. Kitts.* 2015. Evolution of social capital and economic performance in New England harvest cooperatives. Mar. Resour. Econ., 30(4):371-392. https://doi.org/10.1086/682153.

Murphy, T., A. Kitts, C. Demarest, and *J. Walden.* 2015. 2013 Final report on the performance of the northeast multispecies (groundfish) fishery (May 2013 -April 2014). National Marine Fisheries Science, Northeast Fisheries Science Center. Reference Document 15-02, 106 p. https://doi.org/10.7289/V5XS5SB9.

Thunberg, E., and S. Correia. 2015. Measures of fishing fleet diversity in the New England groundfish fishery. Mar. Policy, 58:6-14. https://doi.org/10.1016/j.marpol.2015.04.005.

Thunberg, E., and *M.-Y. Lee.* 2015. The effort control program in the Northeast United States groundfish fishery. In Effort rights in fisheries management: General principles and case studies from around the world. 17–20 September 2012, Bilbao, Spain (D. Squires, M. Maunder, N. Vestergaard, V. Restrepo, R. Metzner, S. Herrick, R. Hannesson, I. del Valle, and P. Anderson, eds.), p. 215-234. Food and Agriculture Organization of the United Nations, Rome.

Clay, P., A. Kitts, and *P. Pinto da Silva.* 2014. Measuring the social and economic performance of catch share programs: Definition of metrics and application to the US Northeast Region groundfish fishery. Mar. Policy, 44:27-36. https://doi.org/10.1016/j.marpol.2013.08.009.

Lee, M.-Y. 2014. Hedonic pricing of Atlantic cod: Effects of size, freshness, and gear. Mar. Resour. Econ., 29(3):259-277. https://doi.org/10.1086/677769.

Murphy, T., A. Kitts, D. Records, C. Demarest, D. Caless, J. Walden, and *S. Benjamin.* 2014. 2012 final report on the performance of the northeast multispecies (groundfish) fishery (May 2012-April 2013). National Marine Fisheries Service, Northeast Fisheries Science Center. Reference Document 14-01, 111 p. https://doi.org/10.7289/V5SF2T63.

Walden, J., and *N. Kitts.* 2014. Measuring fishery profitability: An index number approach. Mar. Policy, 43:321-326. https://doi.org/10.1016/j.marpol.2013.07.002.

Holland, D., A. Kitts, P. Pinto da Silva, and J. Wiersma. 2013. Social capital and the success of harvest cooperatives in the New England groundfish fishery. Mar. Resour. Econ., 28(2):133-153. https://doi.org/10.5950/0738-1360-28.2.133.

Lee, M.-Y., and *E. Thunberg.* 2013. An inverse demand system for New England groundfish: Welfare analysis of the transition to catch share management. Am. J. Agric. Econ., 95(5):1178-1195. https://doi.org/10.1093/ajae/aat061.

Walden, J. 2013. Economic health of the northeast (U.S.) multispecies trawl fleet 1996–2010. Fish. Res., 139:98-104. https://doi.org/10.1016/j.fishres.2012.10.002.

Lee, M.-Y. 2012. Examining bargaining power in the northeast multispecies days-at-sea market. North Am. J. Fish. Manage., 32(5):1017-1031. https://doi.org/10.1080/02755947.2012.707633.

Murphy, T., A. Kitts, D. Records, C. Demarest, M. McPherson, J. Walden, D. Caless, E. Sawyer, S. Steinback, and *J. Olson.* 2012. 2011 final report on the performance of the Northeast multispecies (groundfish) fishery (May 2011-April 2012). National Marine Fisheries Service, Northeast Fisheries Science Center. Reference Document 12-30, 111 p.

Ocean Governance, Policy and Management Research

Nutters, H., and *P. Pinto da Silva.* 2012. Fishery stakeholder engagement and marine spatial planning: Lessons from the Rhode Island Ocean SAMP and the Massachusetts Ocean Management Plan. Ocean Coast. Manage., 67:9-18. https://doi.org/10.1016/j.ocecoaman.2012.05.020.

Other Marine Environmental Research

DePiper, G. 2014. Statistically assessing the precision of self-reported VTR fishing locations. NOAA Tech. Memo. NMFS-NE-229, 22 p. https://doi.org/10.7289/V53F4MJN.

Ecosystem-Based Management Research

DePiper, G., S. Gaichas, S. Lucey, P. Pinto da Silva, M. Anderson, H. Breeze, A. Bundy, *P. Clay,* G. Fay, *R. Gamble,* R. Gregory, *P. Fratantoni,* C. Johnson, M. Koen-Alonso, K. Kleisner, *J. Olson, C. Perretti,* P. Pepin, F. Phelan, *V. Saba, L. Smith, J. Tam,* N. Templeman, and R. Wildermuth. 2017. Operationalizing integrated ecosystem assessments within a multidisciplinary team: Lessons learned from a worked example. ICES J. Mar. Sci., 74(8):2076-2086. https://doi.org/10.1093/icesjms/fsx038.

Jin, D., *G. DePiper,* and P. Hoagland. 2016. Applying portfolio management to implement ecosystem-based fishery management (EBFM). North Am. J. Fish. Manage., 36(3):652-669. https://doi.org/10.1080/02755947.2016.1146180.

Wiedenmann, J., J. Wilen, *P. Levin, M. Plummer,* and M. Mangel. 2016. A framework for exploring the role of bioeconomics on observed fishing patterns and ecosystem dynamics. Coast. Manage., 44(5):529-546. https://doi.org/10.1080/08920753.2016.1208886.

Jin, D., P. Hoagland, T. Dalton, and *E. Thunberg.* 2012. Development of an integrated economic and ecological framework for ecosystem-based fisheries management in New England. Prog. Oceanogr., 102:93-101. https://doi.org/10.1016/j.pocean.2012.03.007.

Pinsky, M., and *M. Fogarty.* 2012. Lagged social-ecological responses to climate and range shifts in fisheries. Clim. Chang., 115(3-4):883-891. https://doi.org/10.1007/s10584-012-0599-x.

Recreational Fisheries Economics Research

Lee, M.-Y., S. Steinback, and *K. Wallmo.* 2017. Applying a bioeconomic model to recreational fisheries management: Groundfish in the northeast United States. Mar. Resour. Econ., 32(2):191-216. https://doi.org/10.1086/690676.

Sociocultural Fisheries Research

Stoll, J., *P. Pinto da Silva, J. Olson,* and S. Benjamin. 2015. Expanding the ‘geography’ of resilience in fisheries by bringing focus to seafood distribution systems. Ocean Coast. Manage., 116:185-192. https://doi.org/10.1016/j.ocecoaman.2015.07.019.

Johnson, T., *A. Henry,* and C. Thompson. 2014. Qualitative indicators of social resilience in small-scale fishing communities: An emphasis on perceptions and practice. Hum. Ecol. Rev., 20(2):97-115.

Jepson, M., and *L. Colburn.* 2013. Development of social indicators of fishing community vulnerability and resilience in the U.S. Southeast and Northeast regions. NOAA Tech. Memo. NMFS-F/SPO-129, 64 p.

Protected Resources Economics Research

Bisack, K., and C. Das. 2015. Understanding non-compliance with protected species regulations in the Northeast USA gillnet fishery. Front. Mar. Sci., 2(91):1-11. https://doi.org/10.3389/fmars.2015.00091.

Bisack, K., and G. Magnusson. 2014. Measuring the economic value of increased precision in scientific estimates of marine mammal abundance and bycatch: Harbor porpoise *Phocoena phocoena* in the Northeast U.S. gill-net fishery. North Am. J. Fish. Manage., 34(2):311-321. https://doi.org/10.1080/02755947.2013.869281.

Magnusson, G., *K. Bisack,* and *H. Milliken.* 2012. The cost-effectiveness of gear research relative to a closure: Pound nets and sea turtles as an example. National Marine Fisheries Service, Northeast Fisheries Science Center. Reference Document 12-01, 25 p.

MID-ATLANTIC

Commercial Fisheries Economics Research

Holzer, J., *G. DePiper,* and *D. Lipton.* 2017. Buybacks with costly participation. J. Environ. Econ. Manage., 85:130-145. https://doi.org/10.1016/j.jeem.2017.05.001.

DePiper, G. 2015. To bid or not to bid: The role of participation rates in conservation auction outcomes. Am. J. Agric. Econ., 97(4):1157-1174. https://doi.org/10.1093/ajae/aav017.

Färe, R., S. Grosskopf, and *J. Walden.* 2015. Productivity change and fleet restructuring after transition to individual transferable quota management. Mar. Policy, 62:318-325. https://doi.org/10.1016/j.marpol.2015.05.015.

Huang, P., R. Woodward, M. Wilberg, and *D. Tomberlin.* 2015. Management evaluation for the Chesapeake Bay blue crab fishery: An integrated bioeconomic approach. North Am. J. Fish. Manage., 35(2):216-228. https://doi.org/10.1080/02755947.2014.986342.

DePiper, G., N. Higgins, D. Lipton, and A. Stocking. 2013. Auction design, incentives, and buying back Maryland and Virginia crab licenses. Can. J. Agr. Econ., 61(2):353-370. https://doi.org/10.1111/cjag.12005.

Walden, J., J. Kirkley, R. Färe, and *P. Logan.* 2012. Productivity change under an individual transferable quota management system. Am. J. Agric. Econ., 94(4):913-928. https://doi.org/10.1093/ajae/aas025.

Ecosystem-Based Management Research

DePiper, G., D. Lipton, and R. Lipcius. 2017. Valuing ecosystem services: Oysters, denitrification, and nutrient trading programs. Mar. Resour. Econ., 32(1):1-20. https://doi.org/10.1086/688976.

Gaichas, S., R. Seagraves, J. Coakley, *G. DePiper, V. Guida, J. Hare, P. Rago,* and M. Wilberg. 2016. A framework for incorporating species, fleet, habitat, and climate interactions into fishery management. Front. Mar. Sci., 3:105. https://doi.org/10.3389/fmars.2016.00105.

Recreational Fisheries Economics Research

Hutt, C., S. Lovell, and *G. Silva.* 2014. The economic contribution of Atlantic highly migratory species angling permit holders in New England and the Mid-Atlantic, 2011. NOAA Tech. Memo. NMFS-F/SPO-147, 34 p.

Habitat Economics Research

Nicosia, K., S. Daaram, B. Edelman, L. Gedrich, E. He, S. McNeilly, V. Shenoy, A. Velagapudi, W. Wu, L. Zhang, A. Barvalia, V. Bokka, B. Chan, J. Chiu, S. Dhulipalla, V. Hernandez, J. Jeon, P. Kanukollu, P. Kravets, A. Mantha, C. Miranda, V. Nigam, M. Patel, S. Praveen, T. Sang, S. Upadhyay, T. Varma, C. Xu, B. Yalamanchi, M. Zharova, A. Zheng, R. Verma, J. Vasslides, *J. Manderson,* R. Jordan, and S. Gray. 2014. Determining the willingness to pay for ecosystem service restoration in a degraded coastal watershed: A ninth grade investigation. Ecolog. Econ., 104:145-151. https://doi.org/10.1016/j.ecolecon.2014.02.010.

SOUTH ATLANTIC

Commercial Fisheries Economics Research

Crosson, S. 2016. The Affordable Care Act and opportunities for change in North Carolina's commercial fisheries. Mar. Resour. Econ., 31(2):121-129. https://doi.org/10.1086/685099.

Crosson, S. 2015. Anticipating exit from North Carolina's commercial fisheries. Soc. Nat. Resour., 28(7):797-806. https://doi.org/10.1080/08941920.2014.970737.

Yandle, T., and *S. Crosson.* 2015. Whatever happened to the wreckfish fishery? An evaluation of the oldest finfish ITQ program in the United States. Mar. Resour. Econ., 30(2):193-217. https://doi.org/10.1086/679974.

Crosson, S., T. Yandle, and *B. Stoffle.* 2013. Renegotiating property rights in the Florida golden crab fishery. Int. J. Commons, 7(2):521–548. https://doi.org/10.18352/ijc.385.

Huang, L., L. Nichols, *J. Craig,* and M. Smith. 2012. Measuring welfare losses from hypoxia: The case of North Carolina brown shrimp. Mar. Resour. Econ., 27(1):3-23. https://doi.org/10.5950/0738-1360-27.1.3.

Walter, J., E. Orbesen, C. Liese, and *J. Serafy.* 2012. Can circle hooks improve western Atlantic sailfish, istiophorus platypterus, populations? Bull. Mar. Sci., 88(3):755-770. https://doi.org/10.5343/bms.2011.1072.

Ocean Governance, Policy and Management Research

Rehr, A., M. Small, P. Bradley, W. Fisher, A. Vega, K. Black, and T. Stockton. 2012. A decision support framework for science-based, multi-stakeholder deliberation: A coral reef example. Environ. Manage., 50(6):1204-1218. https://doi.org/10.1007/s00267-012-9941-3.

Recreational Fisheries Economics Research

Carter, D., A. Marvasti, C. Liese, and *S. Crosson.* 2016. Valuing sportfishing harvest with the demand for boat fuel. Mar. Resour. Econ., 31(3):323-338. https://doi.org/10.1086/686580.

Shideler, G., *D. Carter, C. Liese,* and *J. Serafy.* 2015. Lifting the goliath grouper harvest ban: Angler perspectives and willingness to pay. Fish. Res., 161:156-165. https://doi.org/10.1016/j.fishres.2014.07.009.

Carter, D., and *C. Liese.* 2012. The economic value of catching and keeping or releasing saltwater sport fish in the southeast USA. North Am. J. Fish. Manage., 32(4):613-625. https://doi.org/10.1080/02755947.2012.675943.

GULF OF MEXICO

Commercial Fisheries Economics Research

Marvasti, A. 2017. Determinants of the risk of accidents in the Gulf of Mexico commercial fisheries. Ocean Coast. Manage., 148:282-287. https://doi.org/10.1016/j.ocecoaman.2017.08.018.

Marvasti, A., and S. Dakhlia. 2017. Occupational safety and the shift from common to individual fishing quotas in the Gulf of Mexico. Southern Econ. J., 83(3):705-720. https://doi.org/10.1002/soej.12154.

O'Farrell, S., J. Sanchirico, I. Chollett, *M. Cockrell, S. Murawski, J. Watson, A. Haynie, A. Strelcheck,* and *L. Perruso.* 2017. Improving detection of short-duration fishing behaviour in vessel tracks by feature engineering of training data. ICES J. Mar. Sci., 74(5):1428-1436. https://doi.org/10.1093/icesjms/fsw244.

Purcell, K., J. Craig, J. Nance, M. Smith, and L. Bennear. 2017. Fleet behavior is responsive to a large-scale environmental disturbance: Hypoxia effects on the spatial dynamics of the northern Gulf of Mexico shrimp fishery. PLOS One, 12(8):e0183032. https://doi.org/10.1371/journal.pone.0183032.

Marvasti, A., and A. Lamberte. 2016. Commodity price volatility under regulatory changes and disaster. J. Empirical Finance, 38:355-361. https://doi.org/10.1016/j.jempfin.2016.07.008.

Karnauskas, M., M. Schirripa, J. Craig, G. Cook, C. Kelble, *J. Agar,* B. Black, D. Enfield, D. Lindo-Atichati, *B. Muhling, K. Purcell, P. Richards,* and C. Wang. 2015. Evidence of climate-driven ecosystem reorganization in the Gulf of Mexico. Glob. Change. Biol., 21(7):2554-2568. https://doi.org/10.1111/gcb.12894.

Solis, D., *J. Agar,* and J. del Corral. 2015. IFQs and total factor productivity changes: The case of the Gulf of Mexico red snapper fishery. Mar. Policy, 62:347-357. https://doi.org/10.1016/j.marpol.2015.06.001.

Solís, D., J. del Corral, *L. Perruso,* and *J. Agar.* 2015. Individual fishing quotas and fishing capacity in the US Gulf of Mexico red snapper fishery. Australian J. Agr. Resource Econ., 59(2):288-307. https://doi.org/10.1111/1467-8489.12061.

Agar, J., and *D. Carter.* 2014. Are the 2012 allocations of gag, red, and black grouper in the Gulf of Mexico economically efficient? NOAA Tech. Memo. NMFS-SEFSC-660, 40 p. https://doi.org/10.7289/V5ZW1HVJ.

Agar, J., and *D. Carter.* 2014. Is the 2012 allocation of red snapper in the Gulf of Mexico economically efficient? NOAA Tech. Memo. NMFS-SEFSC-659, 32 p. https://doi.org/10.7289/V53N21B7.

Agar, J., J. Stephen, A. Strelcheck, and A. Diagne. 2014. The Gulf of Mexico red snapper IFQ program: The first five years. Mar. Resour. Econ., 29(2):177-198. https://doi.org/10.1086/676825.

Marvasti, A. 2014. Crew injuries and fatalities, employment estimates, and casualty rates in the Gulf of Mexico commercial fisheries. NOAA Tech. Memo. NMFS-SEFSC-656, 17 p. https://doi.org/10.7289/V56T0JKG.

Solís, D., J. del Corral, *L. Perruso,* and *J. Agar.* 2014. Evaluating the impact of individual fishing quotas (IFQs) on the technical efficiency and composition of the US Gulf of Mexico red snapper commercial fishing fleet. Food Pol., 46:74-83. https://doi.org/10.1016/j.foodpol.2014.02.005.

Solís, D., *L. Perruso,* J. del Corral, *B. Stoffle,* and D. Letson. 2013. Measuring the initial economic effects of hurricanes on commercial fish production: The US Gulf of Mexico grouper (Serranidae) fishery. Nat. Hazards, 66(2):271-289. https://doi.org/10.1007/s11069-012-0476-y.

Tokotch, B., C. Meindl, A. Hoare, and *M. Jepson.* 2012. Stakeholder perceptions of the northern Gulf of Mexico grouper and tilefish individual fishing quota program. Mar. Policy, 36(1):34-41. https://doi.org/10.1016/j.marpol.2011.03.006.

Other Marine Environmental Research

Farrow, K., A. Brinson, K. Wallmo, and *D. Lew.* 2016. Environmental attitudes in the aftermath of the Gulf Oil Spill. Ocean Coast. Manage., 119:128-134. https://doi.org/10.1016/j.ocecoaman.2015.10.001.

Ecosystem-Based Management Research

Gruss, A., K. Rose, J. Simons, C. Ainsworth, E. Babcock, D. Chagaris, K. De Mutsert, J. Froeschke, P. Himchak, *I. Kaplan,* H. O'Farrell, and M. Rejon. 2017. Recommendations on the use of ecosystem modeling for informing ecosystem-based fisheries management and restoration outcomes in the Gulf of Mexico. Mar. Coast. Fish., 9(1):281-295. https://doi.org/10.1080/19425120.2017.1330786.

Karnauskas, M., C. Kelble, S. Regan, C. Quenée, R. Allee, *M. Jepson,* A. Freitag, *J. Craig,* C. Carollo, L. Barbero, N. Trifonova, *D. Hanisko,* and *G. Zapfe.* 2017. 2017 Ecosystem status report update for the Gulf of Mexico. NOAA Tech. Memo. NMFS-SEFSC-706, 51 p.

Recreational Fisheries Economics Research

Carter, D., S. Crosson, and *C. Liese.* 2015. Nowcasting intraseasonal recreational fishing harvest with internet search volume. PLOS One, 10(9):e0137752. https://doi.org/10.1371/journal.pone.0137752.

Habitat Economics Research

Minello, T., L. Rozas, P. Caldwell, and *C. Liese.* 2012. A comparison of salt marsh construction costs with the value of exported shrimp production. Wetlands, 32(5):791-799. https://doi.org/10.1007/s13157-011-0237-9.

Sociocultural Fisheries Research

Blount, B., S. Jacob, P. Weeks, and *M. Jepson.* 2015. Testing cognitive ethnography: Mixed-methods in developing indicators of well-being in fishing communities. Hum. Org., 74(1):1-15. https://doi.org/10.17730/humo.74.1.665ww120082h561l.

Jacob, S., P. Weeks, B. Blount, and *M. Jepson.* 2013. Development and evaluation of social indicators of vulnerability and resiliency for fishing communities in the Gulf of Mexico. Mar. Policy, 37:86-95. https://doi.org/10.1016/j.marpol.2012.04.014.

CARIBBEAN

Commercial Fisheries Economics Research

Agar, J., M. Shivlani, and D. Solis. 2017. The commercial trap fishery in the Commonwealth of Puerto Rico: An economic, social, and technological profile. North Am. J. Fish. Manage., 37(4):778-788. https://doi.org/10.1080/02755947.2017.1317678.

Fleming, C., F. Tonioli, and *J. Agar.* 2014. A review of principal coastal economic sectors within the southeast United States and the U.S. Caribbean. NOAA Tech. Memo. NMFS-SEFSC-669, 44 p. https://doi.org/10.7289/V5J10135.

Habitat Economics Research

Fitzpatrick, L., C. Parmeter, and *J. Agar.* 2017. Threshold effects in meta-analyses with application to benefit transfer for coral reef valuation. Ecolog. Econ., 133:74-85. https://doi.org/10.1016/j.ecolecon.2016.11.015.

INTERNATIONAL

Climate Change Research

Melnikov, N., B. O'Neill, *M. Dalton,* and B. van Ruijven. 2017. Downscaling heterogeneous household outcomes in dynamic CGE models for energy-economic analysis. Energy Econ., 65:87-97. https://doi.org/10.1016/j.eneco.2017.04.023.

McLeod, E., B. Szuster, J. Hinkel, E. Tompkins, N. Marshall, T. Downing, *S. Wongbusarakum,* A. Patwardhan, M. Hamza, C. Anderson, S. Bharwani, L. Hansen, and P. Rubinoff. 2016. Conservation organizations need to consider adaptive capacity: Why local input matters. Conserv. Lett., 9(5):351-360. https://doi.org/10.1111/conl.12210.

McLeod, E., B. Szuster, E. Tompkins, N. Marshall, T. Downing, *S. Wongbusarakum,* A. Patwardhan, M. Hamza, C. Anderson, S. Bharwani, L. Hansen, and P. Rubinoff. 2015. Using expert knowledge to develop a vulnerability and adaptation framework and methodology for application in tropical island communities. Coast. Manage., 43(4):365-382. https://doi.org/10.1080/08920753.2015.1046803.

Wongbusarakum, S., M. Gombos, *B. Parker,* C. Courtney, S. Atkinson, and W. Kostka. 2015. The Local Early Action Planning (LEAP) tool: Enhancing community-based planning for a changing climate. Coast. Manage., 43(4):383-393. https://doi.org/10.1080/08920753.2015.1046805.

Commercial Fisheries Economics Research

Guillotreau, P., *D. Squires,* J. Sun, and G. Compeán. 2017. Local, regional and global markets: What drives the tuna fisheries? Rev. Fish Biol. Fish., 27(4):909-929. https://doi.org/10.1007/s11160-016-9456-8.

Gutierrez, A., and S. Morgan. 2017. Impediments to fisheries sustainability - coordination between public and private fisheries governance systems. Ocean Coast. Manage., 135:79-92. https://doi.org/10.1016/j.ocecoaman.2016.10.016.

Pons, M., T. Branch, M. Melnychuk, O. Jensen, *J. Brodziak,* J. Fromentin, S. Harley, *A. Haynie,* L. Kell, M. Maunder, A. Parma, V. Restrepo, R. Sharma, R. Ahrens, and R. Hilborn. 2017. Effects of biological, economic and management factors on tuna and billfish stock status. Fish Fish., 18(1):1-21. https://doi.org/10.1111/faf.12163.

Smith, M., A. Oglend, A. Kirkpatrick, F. Asche, L. Bennear, *J. Craig,* and *J. Nance.* 2017. Seafood prices reveal impacts of a major ecological disturbance. Proc. Natl. Acad. Sci. U. S. A, 114(7):1512-1517. https://doi.org/10.1073/pnas.1617948114.

Sun, C., F. Chiang, P. Guillotreau, *D. Squires,* D. Webster, and M. Owens. 2017. Fewer fish for higher profits? Price response and economic incentives in global tuna fisheries management. Environ. Resour. Econ., 66(4):749-764. https://doi.org/10.1007/s10640-015-9971-4.

Kuriyama, P., T. Branch, *M. Bellman,* and K. Rutherford. 2016. Catch shares have not led to catch-quota balancing in two North American multispecies trawl fisheries. Mar. Policy, 71:60-70. https://doi.org/10.1016/j.marpol.2016.05.010.

Melnychuk, M., T. Essington, T. Branch, S. Heppell, O. Jensen, *J. Link,* S. Martell, A. Parma, and A. Smith. 2016. Which design elements of individual quota fisheries help to achieve management objectives? Fish Fish., 17(1):126-142. https://doi.org/10.1111/faf.12094.

Oliveira, M., A. Camanho, *J. Walden,* and M. Gaspar. 2016. Evaluating the influence of skipper skills in the performance of Portuguese artisanal dredge vessels. ICES J. Mar. Sci., 73(10):2721-2728. https://doi.org/10.1093/icesjms/fsw103.

Squires, D., and *N. Vestergaard.* 2016. Economics of Fisheries. In Oxford bibliographies in environmental science (E. Wohl, ed.). Oxford University Press.

Stemle, A., H. Uchida, and C. Roheim. 2016. Have dockside prices improved after MSC certification? Analysis of multiple fisheries. Fish. Res., 182:116-123. https://doi.org/10.1016/j.fishres.2015.07.022.

Woods, P., *D. Holland,* and A. Punt. 2016. Evaluating the benefits and risks of species-transformation provisions in multispecies IFQ fisheries with joint production. ICES J. Mar. Sci., 73(7):1764-1773. https://doi.org/10.1093/icesjms/fsw031.

Grafton, R., K. Segerson, and *D. Squires.* 2015. Promoting green growth in fisheries. In Protecting the environment privately (J. Bennett, ed.), p. 63-87. World Scientific Publishing Company, Singapore.

Squires, D., and M. Maunder. 2015. Synthesis of workshop results: Pros and cons of effort based management. In Effort rights in fisheries management: General principles and case studies from around the World. 17–20 September 2012, Bilbao, Spain (D. Squires, M. Maunder, N. Vestergaard, V. Restrepo, R. Metzner, S. Herrick, R. Hannesson, I. del Valle, and P. Anderson, eds.), p. 11-28. Food and Agriculture Organization of the United Nations, Rome.

Woods, P., C. Bouchard, *D. Holland,* A. Punt, and G. Marteinsdóttir. 2015. Catch-quota balancing mechanisms in the Icelandic multi-species demersal fishery: Are all species equal? Mar. Policy, 55:1-10. https://doi.org/10.1016/j.marpol.2015.01.004.

Woods, P., *D. Holland,* G. Marteinsdóttir, and A. Punt. 2015. How a catch–quota balancing system can go wrong: An evaluation of the species quota transformation provisions in the Icelandic multispecies demersal fishery. ICES J. Mar. Sci., 72(5):1257-1277. https://doi.org/10.1093/icesjms/fsv001.

Holland, D. 2013. Making cents out of barter data from the British Columbia groundfish ITQ market. Mar. Resour. Econ., 28(4):311-330. https://doi.org/10.5950/0738-1360-28.4.311.

Squires, D., R. Allen, and V. Restreppo. 2013. Rights-based management in international tuna fisheries. FAO Fisheries and Aquaculture Technical Paper. No. 571, 79 p.

Wolff, F.-C., *D. Squires,* and P. Guillotreau. 2013. The firm's management in production: Management, firm, and time effects in an Indian Ocean tuna fishery. Am. J. Agric. Econ., 95(3):547-567. https://doi.org/10.1093/ajae/aas140.

Essington, T., M. Melnychuk, T. Branch, S. Heppell, O. Jensen, *J. Link,* S. Martell, A. Parma, J. Pope, and A. Smith. 2012. Catch shares, fisheries, and ecological stewardship: A comparative analysis of resource responses to a rights-based policy instrument. Conserv. Lett., 5(3):186-195. https://doi.org/10.1111/j.1755-263X.2012.00226.x.

Park, S., *K. Davidson,* and *M. Pan.* 2012. Economic relationships between aquaculture and capture fisheries in the republic of Korea. Aquacult. Econ. Manage., 16(2):102-116. https://doi.org/10.1080/13657305.2012.678558.

Ocean Governance, Policy and Management Research

Do Yun, S., *B. Hutniczak,* J. Abbott, and E. Fenichel. 2017. Ecosystem-based management and the wealth of ecosystems. Proc. Natl. Acad. Sci. U. S. A, 114(25):6539-6544. https://doi.org/10.1073/pnas.1617666114.

Lodge, M., K. Segerson, and *D. Squires.* 2017. Sharing and preserving the resources in the deep sea: Challenges for the international seabed authority. Int. J. Mar. Coast. Law, 32(3):427 to 457. https://doi.org/10.1163/15718085-12323047.

Mumby, P., J. Sanchirico, K. Broad, M. Beck, P. Tyedmers, M. Morikawa, T. Okey, L. Crowder, E. Fulton, D. Kelso, J. Kleypas, *S. Munch,* P. Glynn, K. Matthews, and J. Lubchenco. 2017. Avoiding a crisis of motivation for ocean management under global environmental change. Glob. Change. Biol., 23(11):4483-4496. https://doi.org/10.1111/gcb.13698.

Rindorf, A., C. Dichmont, *J. Thorson,* A. Charles, L. Clausen, P. Degnbol, D. Garcia, N. Hintzen, A. Kempf, *P. Levin,* P. Mace, C. Maravelias, C. Minto, J. Mumford, S. Pascoe, R. Prellezo, A. Punt, D. Reid, C. Rockmann, R. Stephenson, O. Thebaud, G. Tserpes, and R. Voss. 2017. Inclusion of ecological, economic, social, and institutional considerations when setting targets and limits for multispecies fisheries. ICES J. Mar. Sci., 74(2):453-463. https://doi.org/10.1093/icesjms/fsw226.

Squires, D., M. Maunder, R. Allen, P. Andersen, K. Astorkiza, D. Butterworth, G. Caballero, *R. Clarke,* H. Ellefsen, P. Guillotreau, J. Hampton, R. Hannesson, E. Havice, *M. Helvey, S. Herrick Jr.,* K. Hoydal, V. Maharaj, R. Metzner, I. Mosqueira, A. Parma, I. Prieto-Bowen, V. Restrepo, S. F. Sidique, S. Steinsham, *E. Thunberg,* I. del Valle, and N. Vestergaard. 2017. Effort rights-based management. Fish Fish., 18(3):440-465. https://doi.org/10.1111/faf.12185.

Hicks, C., A. Levine, A. Agrawal, X. Basurto, *S. Breslow,* C. Carothers, S. Charnley, S. Coulthard, N. Dolsak, J. Donatuto, C. Garcia-Quijano, M. Mascia, *K. Norman, M. Poe,* T. Satterfield, K. Martin, and *P. Levin.* 2016. Engage key social concepts for sustainability. Science, 352(6281):38-40. https://doi.org/10.1126/science.aad4977.

Moore, S., and *D. Squires.* 2016. Governing the depths: Conceptualizing the politics of deep sea resources. Global Environ. Politics, 16(2):101-109. https://doi.org/10.1162/GLEP_a_00347.

Squires, D., M. Maunder, *S. Herrick, M. Helvey,* and *R. Clarke.* 2016. Effort rights-based management. In Effort rights in fisheries management: General principles and case studies from around the world. 17–20 September 2012, Bilbao, Spain (D. Squires, M. Maunder, N. Vestergaard, V. Restrepo, R. Metzner, S. Herrick, R. Hannesson, I. del Valle, and P. Anderson, eds.), p. 37-78. Food and Agriculture Organization of the United Nations, Rome.

Squires, D., M. Maunder, N. Vestergaard, V. Restrepo, R. Metzner, *S. Herrick,* R. Hannesson, I. del Valle, and P. Anderson. 2016. Effort rights in fisheries management: General principles and case studies from around the world. In Effort rights in fisheries management: General principles and case studies from around the world. 17–20 September 2012, Bilbao, Spain (D. Squires, M. Maunder, N. Vestergaard, V. Restrepo, R. Metzner, S. Herrick, R. Hannesson, I. del Valle, and P. Anderson, eds.), p. 1-10. Food and Agriculture Organization of the United Nations, Rome.

Squires, D., M. Maunder, N. Vestergaard, V. Restrepo, R. Metzner, *S. Herrick,* R. Hannesson, I. del Valle, and P. Anderson, eds. 2016. Effort rights in fisheries management: General principles and case studies from around the world. 17–20 September 2012, Bilbao, Spain. 260 p. Food and Agriculture Organization of the United Nations, Rome.

Grafton, R., and *D. Squires.* 2015. The economic sustainability paradigm and freshwater and marine fisheries governance. In Handbook of water economics (A. Dinar, and K. Schwabe, eds.), p. 199–218. Edward Elgar, Cheltenham, UK.

Squires, D., L. Ballance, R. Deriso, *J. Ianelli,* M. Maunder, and K. Schaefer. 2015. Comment on 'Scope and compatibility of measures in international fisheries agreements' by Finus and Schneider. Oxford Econ. Pap., 67(4):889-894. https://doi.org/10.1093/oep/gpv041.

Mengerink, K., C. Van Dover, J. Ardron, M. Baker, E. Escobar-Briones, K. Gjerde, J. Koslow, E. Ramirez-Llodra, A. Lara-Lopez, *D. Squires,* T. Sutton, A. Sweetman, and L. Levin. 2014. A call for deep-ocean stewardship. Science, 344(6185):696-698. https://doi.org/10.1126/science.1251458.

Richerson, K., *P. Levin,* and M. Mangel. 2012. Accounting for indirect effects and non-commensurate values in ecosystem based fishery management (EBFM). Mar. Policy, 36(2):565. https://doi.org/10.1016/j.marpol.2011.08.009.

Marine Protected Areas Research

McDermott, S., L. Buhl-Mortensen, G. Dahle, *D. Hart, A. Haynie,* T. Johannessen, E. Moksness, E. Olsen, E. Olsen, *J. Olson, P. Spencer,* and *W. Stockhausen.* 2017. Lessons on marine protected area management in northern boreal regions from the United States and Norway. Mar. Fish. Rev., 79(1):28 to 51. https://doi.org/10.7755/MFR.79.1.2.

Rice, J., E. Moksness, C. Attwood, *S. Brown,* G. Dahle, K. Gjerde, E. Grefsrud, R. Kenchington, A. Kleiven, P. McConney, M. Ngoile, T. Naesje, E. Olsen, E. Olsen, J. Sanders, C. Sharma, O. Vestergaard, and L. Westlund. 2012. The role of MPAs in reconciling fisheries management with conservation of biological diversity. Ocean Coast. Manage., 69:217-230. https://doi.org/10.1016/j.ocecoaman.2012.08.001.

Other Marine Environmental Research

Higham, J., L. Bejder, S. Allen, *P. Corkeron,* and D. Lusseau. 2016. Managing whale-watching as a non-lethal consumptive activity. J. Sustainable Tourism, 24(1):73-90. https://doi.org/10.1080/09669582.2015.1062020.

Ecosystem-Based Management Research

Link, J., O. Thebaud, D. Smith, A. Smith, J. Schmidt, J. Rice, J. Poos, C. Pita, *D. Lipton,* M. Kraan, S. Frusher, L. Doyen, A. Cudennec, K. Criddle, and D. Bailly. 2017. Keeping humans in the ecosystem. ICES J. Mar. Sci., 74(7):1947-1956. https://doi.org/10.1093/icesjms/fsx130.

Maury, O., L. Campling, H. Arrizabalaga, O. Aumont, L. Bopp, G. Merino, *D. Squires,* W. Cheung, M. Goujon, C. Guivarch, S. Lefort, F. Marsac, P. Monteagudo, R. Murtugudde, H. Österblom, J. Pulvenis, Y. Ye, and B. van Ruijven. 2017. From shared socio-economic pathways (SSPs) to oceanic system pathways (OSPs): Building policy-relevant scenarios for global oceanic ecosystems and fisheries. Global Environ. Change, 45:203-216. https://doi.org/10.1016/j.gloenvcha.2017.06.007.

Payne, M., A. Hobday, B. MacKenzie, D. Tommasi, D. Dempsey, S. Fässler, *A. Haynie,* R. Ji, G. Liu, *P. Lynch,* D. Matei, A. Miesner, K. Mills, K. Strand, and E. Villarino. 2017. Lessons from the first generation of marine ecological forecast products. Front. Mar. Sci., 4:289. https://doi.org/10.3389/fmars.2017.00289.

Rindorf, A., C. Dichmont, *P. Levin,* P. Mace, S. Pascoe, R. Prellezo, A. Punt, D. Reid, R. Stephenson, C. Ulrich, M. Vinther, and L. Clausen. 2017. Food for thought: Pretty good multispecies yield. ICES J. Mar. Sci., 74(2):475-486. https://doi.org/10.1093/icesjms/fsw071.

Recreational Fisheries Economics Research

Kim, D.-H., *C. Seung,* and Y.-I. Seo. 2017. Multi-regional economic impacts of recreational fisheries: Analysis of Small Sea Ranch in Gyeong-Nam Province, Korea. Mar. Policy, 84:90-98. https://doi.org/10.1016/j.marpol.2017.07.011.

Seafood Marketing and Trade Research

Béné, C., R. Arthur, H. Norbury, E. Allison, M. Beveridge, S. Bush, L. Campling, W. Leschen, D. Little, *D. Squires,* S. Thilsted, M. Troell, and M. Williams. 2016. Contribution of fisheries and aquaculture to food security and poverty reduction: Assessing the current evidence. World Devel., 79:177-196. https://doi.org/10.1016/j.worlddev.2015.11.007.

Crona, B., X. Basurto, *D. Squires,* S. Gelcich, T. Daw, A. Khan, E. Havice, V. Chomo, M. Troell, E. Buchary, and E. Allison. 2016. Towards a typology of interactions between small-scale fisheries and global seafood trade. Mar. Policy, 65:1-10. https://doi.org/10.1016/j.marpol.2015.11.016.

Sociocultural Fisheries Research

Froehlich, H., R. Gentry, *M. Rust,* D. Grimm, and B. Halpern. 2017. Public perceptions of aquaculture: Evaluating spatio-temporal patterns of sentiment around the world. PLOS One, 12(1):e0169281. https://doi.org/10.1371/journal.pone.0169281.

Protected Resources Economics Research

Lent, R., and *D. Squires.* 2017. Reducing marine mammal bycatch in global fisheries: An economics approach. Deep Sea Res. (II Top. Stud. Oceanogr.), 140:268-277. https://doi.org/10.1016/j.dsr2.2017.03.005.

Cárdenas, S., and *D. Lew.* 2016. Factors influencing willingness to donate to marine endangered species recovery in the Galapagos National Park, Ecuador. Front. Mar. Sci., 3:60. https://doi.org/10.3389/fmars.2016.00060.

Smith, M., F. Asche, L. Bennear, E. Havice, A. Read, and *D. Squires.* 2014. Will a catch share for whales improve social welfare? Ecol. Appl., 24(1):15-23. https://doi.org/10.1890/13-0085.1.

Squires, D. 2014. Biodiversity conservation in Asia. Asia Pac. Policy Stud., 1(1):144-159. https://doi.org/10.1002/app5.13.

THEORETICAL

Commercial Fisheries Economics Research

Kronbak, L., *D. Squires,* and N. Vestergaard. 2014. Recent developments in fisheries economics research. Int. Rev. Environ. Resour. Econ., 7(1):67-108.

Squires, D., R. Clarke, and *V. Chan.* 2014. Subsidies, public goods, and external benefits in fisheries. Mar. Policy, 45:222-227. https://doi.org/10.1016/j.marpol.2013.11.002.

Woodward, R., and *D. Tomberlin.* 2014. Practical precautionary resource management using robust optimization. Environ. Manage., 54(4):828-839. https://doi.org/10.1007/s00267-014-0348-1.

Ono, K., *D. Holland,* and R. Hilborn. 2013. How does species association affect mixed stock fisheries management? A comparative analysis of the effect of marine protected areas, discard bans, and individual fishing quotas. Can. J. Fish. Aquat. Sci., 70(12):1792-1804. https://doi.org/10.1139/cjfas-2013-0046.

Squires, D., and N. Vestergaard. 2013. Technical change and the commons. Rev. Econ. Statist., 95(5):1769-1787. https://doi.org/10.1162/REST_a_00346.

Squires, D., and N. Vestergaard. 2013. Technical change in fisheries. Mar. Policy, 42:286-292. https://doi.org/10.1016/j.marpol.2013.03.019.

Holland, D., and G. Herrera. 2012. The impact of age structure, uncertainty, and asymmetric spatial dynamics on regulatory performance in a fishery metapopulation. Ecolog. Econ., 77:207-218. https://doi.org/10.1016/j.ecolecon.2012.03.003.

Ecosystem-Based Management Research

Ryan, R., *D. Holland,* and G. Herrera. 2014. Ecosystem externalities in fisheries. Mar. Resour. Econ., 29(1):39-53. https://doi.org/10.1086/676288.

Protected Resources Economics Research

Wallmo, K., K. Bisack, D. Lew, and *D. Squires,* eds. 2016. Protected species economics: Concepts in research and management. Vol. 2, 133 p. Frontiers in Marine Science, Lausanne, Switzerland.

Resources

Signs for the *Chelsea Rose*, a historic fishing boat, used to sell locally caught seafood at the dock in Newport, Oregon.
Photo: Pacific Fishery Management Council

UNITED STATES

Federal Agencies

- Office of Science and Technology, NOAA Fisheries | www.fisheries.noaa.gov/about/office-science-and-technology
- Marine Recreational Information Program | www.fisheries.noaa.gov/topic/recreational-fishing-data
- Office of Marine Conservation, Bureau of Oceans and International Environmental and Scientific Affairs, U.S. Department of State | www.state.gov/bureaus-offices/under-secretary-for-economic-growth-energy-and-the-environment/bureau-of-oceans-and-international-environmental-and-scientific-affairs/office-of-marine-conservation/

NORTH PACIFIC

Federal Agencies

- Alaska Fisheries Science Center, NOAA Fisheries | www.fisheries.noaa.gov/about/alaska-fisheries-science-center
- Alaska Regional Office, NOAA Fisheries | www.fisheries.noaa.gov/about/alaska-regional-office
- Alaska Region, U.S. Fish and Wildlife Service | www.fws.gov/alaska/
- District 17, U.S. Coast Guard | www.pacificarea.uscg.mil/Our-Organization/District-17/

State Agencies

- Alaska Department of Fish and Game | www.adfg.state.ak.us

Councils and Commissions

- North Pacific Fishery Management Council | www.npfmc.org
- Pacific States Marine Fisheries Commission | www.psmfc.org
- Fisheries Economics Data Program Pacific States Marine Fisheries Commission | www.psmfc.org/efin
- International Pacific Halibut Commission | www.iphc.int

PACIFIC

Federal Agencies

- Northwest Fisheries Science Center, NOAA Fisheries | www.fisheries.noaa.gov/about/northwest-fisheries-science-center
- West Coast Regional Office, NOAA Fisheries | www.fisheries.noaa.gov/about/west-coast-regional-office
- Southwest Fisheries Science Center | www.fisheries.noaa.gov/about/southwest-fisheries-science-center
- Pacific Region, U.S. Fish and Wildlife Service | www.fws.gov/pacific
- California and Nevada, U.S. Fish and Wildlife Service | www.fws.gov/cno
- District 13, U.S. Coast Guard | www.pacificarea.uscg.mil/Our-Organization/District-13/

State Agencies

- California Department of Fish and Game | www.wildlife.ca.gov
- Oregon Department of Fish and Wildlife | www.dfw.state.or.us
- Washington Department of Fish and Wildlife | http://wdfw.wa.gov/

Councils and Commissions

- Pacific Fishery Management Council | www.pcouncil.org
- Pacific States Marine Fisheries Commission | www.psmfc.org
- Fisheries Economics Data Program - Pacific States Marine Fisheries Commission | www.psmfc.org/efin
- International Pacific Halibut Commission | www.iphc.int

WESTERN PACIFIC

Federal Agencies

- Pacific Islands Fisheries Science Center, NOAA Fisheries | www.fisheries.noaa.gov/about/pacific-islands-fisheries-science-center
- Pacific Islands Regional Office, NOAA Fisheries | www.fisheries.noaa.gov/about/pacific-islands-regional-office
- Pacific Region, U.S. Fish and Wildlife Service | www.fws.gov/pacific
- District 14, U.S. Coast Guard | www.pacificarea.uscg.mil/Our-Organization/District-14/

State Agencies

- Hawai‘i Department of Land and Natural Resources | www.dlnr.hawaii.gov/
- Guam Office of the Governor | http://governor.guam.gov/
- Division of Fish and Wildlife, Commonwealth of the Northern Mariana Islands | http://www.dfw.gov.mp/Monument_Page.html

Councils and Commissions

- Western Pacific Fishery Management Council | www.wpcouncil.org

NEW ENGLAND

Federal Agencies

- Northeast Fisheries Science Center, NOAA Fisheries | www.fisheries.noaa.gov/about/northeast-fisheries-science-center
- Greater Atlantic Regional Fisheries Office, NOAA Fisheries | www.fisheries.noaa.gov/about/greater-atlantic-regional-fisheries-office
- Northeast Region, U.S. Fish and Wildlife Service | www.fws.gov/northeast
- District 1, U.S. Coast Guard | www.atlanticarea.uscg.mil/Our-Organization/District-1/

State Agencies

- Maine Department of Marine Resources | www.maine.gov/dmr/
- Rhode Island Department of Environmental Management | www.dem.ri.gov
- Massachusetts Division of Marine Fisheries | www.mass.gov/orgs/division-of-marine-fisheries
- Connecticut Department of Environmental Protection | www.ct.gov/deep/
- New Hampshire Fish and Game Department | www.wildlife.state.nh.us

Councils and Commissions

- New England Fishery Management Council | www.nefmc.org
- Atlantic States Marine Fisheries Commission | www.asmfc.org

MID-ATLANTIC

Federal Agencies

- Northeast Fisheries Science Center, NOAA Fisheries | www.fisheries.noaa.gov/about/northeast-fisheries-science-center
- Greater Atlantic Regional Fisheries Office, NOAA Fisheries | www.fisheries.noaa.gov/about/greater-atlantic-regional-fisheries-office
- Northeast Region, U.S. Fish and Wildlife Service | www.fws.gov/northeast
- District 5, U.S. Coast Guard | www.atlanticarea.uscg.mil/Our-Organization/District-5/

State Agencies

- Delaware Division of Fish and Wildlife | https://dnrec.alpha.delaware.gov/fish-wildlife/
- Pennsylvania Fish and Boat Commission | www.fishandboat.com/
- Fisheries and Boating Service, Maryland Department of Natural Resources | www.dnr.state.md.us/fisheries
- New Jersey Division of Fish and Wildlife | www.state.nj.us/dep/fgw
- Marine Resources Councils and Boards Bureau of Marine Resources, New York Department of Environmental Conservation | www.dec.ny.gov/about/568.html
- Virginia Marine Resources Commission | www.dnr.maryland.gov/fisheries

Councils and Commissions

- Mid-Atlantic Fishery Management Council | www.mafmc.org
- Atlantic States Marine Fisheries Commission | www.asmfc.org

SOUTH ATLANTIC

Federal Agencies

- Southeast Fisheries Science Center, NOAA Fisheries | www.fisheries.noaa.gov/about/southeast-fisheries-science-center
- Southeast Regional Office, NOAA Fisheries | www.fisheries.noaa.gov/about/southeast-regional-office
- Southeast Region, U.S. Fish and Wildlife Service | www.fws.gov/southeast
- Southwest Region, U.S. Fish and Wildlife Service | www.fws.gov/southwest
- District 7, U.S. Coast Guard | www.atlanticarea.uscg.mil/Our-Organization/District-7/

State Agencies

- Florida Fish and Wildlife Conservation Commission | www.myfwc.com/
- Coastal Resources Division, Georgia Department of Natural Resources | www.coastalgadnr.org/
- Division of Marine Fisheries, North Carolina Department of Environment and Natural Resources | http://portal.ncdenr.org/web/mf/
- Marine Resources Division, South Carolina Department of Natural Resources | www.dnr.sc.gov

Councils and Commissions

- South Atlantic Fishery Management Council | www.safmc.net
- Atlantic States Marine Fisheries Commission | www.asmfc.org

GULF OF MEXICO

Federal Agencies

- Southeast Fisheries Science Center, NOAA Fisheries | www.fisheries.noaa.gov/about/southeast-fisheries-science-center
- Southeast Regional Office, NOAA Fisheries | www.fisheries.noaa.gov/about/southeast-regional-office
- Southeast Region, U.S. Fish and Wildlife Service | www.fws.gov/southeast
- Southwest Region, U.S. Fish and Wildlife Service | www.fws.gov/southwest
- District 8, U.S. Coast Guard | www.atlanticarea.uscg.mil/Our-Organization/District-8/

State Agencies

- Florida Fish and Wildlife Conservation Commission | www.myfwc.com/
- Marine Resources Division, Alabama Department of Conservation and Natural Resources | www.outdooralabama.com
- Mississippi Department of Marine Resources | www.dmr.ms.gov/
- Louisiana Department of Wildlife and Fisheries | www.wlf.louisiana.gov/
- Texas Parks and Wildlife Department | www.tpwd.texas.gov/

Councils and Commissions

- Gulf of Mexico Fishery Management Council | www.gulfcouncil.org
- Gulf States Marine Fisheries Commission | www.gsmfc.org

PROFESSIONAL ORGANIZATIONS

- North American Association of Fisheries Economists | https://naafe.oregonstate.edu/
- International Institute of Fisheries Economics and Trade | https://iifet.oregonstate.edu/

OTHER ORGANIZATIONS AND INFORMATION

- Organisation for Economic Co-operation and Development | www.oecd.org/
- Fisheries and Aquaculture Department, Food and Agriculture Organization of the United Nations | www.fao.org/fishery/capture/en
- Marine Stewardship Council | www.msc.org

Glossary

Surf fishing in Chincoteague Island, Virginia.
Photo: Mid-Atlantic Fishery Management Council/Jose Montanez

Angler[1] — A person catching fish with no intent to sell, including people releasing the catch. Also known as a recreational fisherman.

Annual Payroll[2] — Includes all forms of compensation such as salaries, wages, reported tips, commissions, bonuses, vacation allowances, sick-leave pay, employee contributions to qualified pension plans, and the value of taxable fringe benefits. For corporations, it includes amounts paid to officers and executives; for unincorporated businesses, it does not include profit or other compensation of proprietors or partners. Payroll is reported before deductions for Social Security, income tax, insurance, union dues, etc.

Annual Receipts[3] — Includes gross receipts, sales, commissions, and income from trades and businesses, as reported on annual business income tax returns. Business income consists of all payments received for services rendered by non-employer businesses, such as payments received as independent agents and contractors. The composition of non-employer receipts may differ from receipts data published for employer establishments. For example, for wholesale agents and brokers without payroll (non-employers), the receipts item contains commissions or earnings. In contrast, for wholesale agents and brokers with payroll (employers), the sales and receipts item published in the Economic Census represents the value of the goods involved in the transactions.

Buyback Program — A management tool available to fishery managers intended to ease fishing-related pressure on marine resources. Fishing vessels are purchased by the government or by the fishing industry itself. Then they are removed from a specific fishery where fish stocks or stock complexes are considered overfished or subject to overfishing.

Bycatch[1] — Species other than the primary target species that are caught incidental to the harvest of the primary species. Bycatch may be retained or discarded; discards may occur for regulatory or economic reasons.

Catch[1] — 1. To undertake any activity that results in taking fish out of its environment dead or alive, or to bring fish on board a vessel dead or alive; 2. The total number (or weight) of fish caught by fishing operations. Catch should include all fish killed by the act of fishing, not just those landed; For this report, recreational catch refers to the total number of individual fish released (thrown back into the sea) and harvested (not thrown back into the sea) by recreational fishermen (anglers).

Catch Share Program[4] — This is a generic term used to describe a fishery management program that allocates a specific portion of the total fishery catch to individuals, cooperatives, communities, or other entities, including sectors. The term encompasses more specific programs defined in legislation such as Limited Access Privilege Programs (LAPPs) and Individual Fishing Quotas (IFQs). Note that a catch share allocated to a sector is different from a general sectoral allocation or distribution to an entire segment of a fishery (such as a recreational sector allocation or a longline gear sector allocation). The two differ because the recipient of the catch share is responsible for terminating fishing activity when their specific share is reached.

Coastal County[5] — Counties with borders that are within 25 miles of the coast are considered coastal. All counties in Rhode Island, Connecticut, Delaware, and Florida are considered coastal.

Coastal County Angler — For this report, a coastal county angler refers to a recreational fisherman who lives within a given state and within a coastal county of that state.

Commercial Fisheries — In this report, commercial fisheries refer to fishing operations that sell their catch for profit. The term does not include subsistence fishermen or saltwater anglers who fish for sport. It also excludes the for-hire sector, which earns its revenue from selling recreational fishing trips to saltwater anglers. The commercial fisheries section reports on economic impacts, landings revenue, landings, and ex-vessel prices of key species/species groups.

Commercial Fishing Location Quotient (CFLQ)[6] — For this report, the CFLQ is calculated as the ratio of a state's distribution of employment in commercial fishing industries compared with the distribution of commercial fishing industries in the U.S. The CFLQ is calculated using the "Location Quotient Calculator" provided by the Bureau of Labor Statistics, U.S. Department of Labor.

Community Development Quota Program (CDQ)[1] — A program in western Alaska under which a percentage of the total allowable catch (TAC) of Bering Sea commercial fisheries is allocated to specific communities. Communities eligible for this program must be located within 50 miles of the Bering Sea coast or on an island within the Bering Sea; meet criteria established by the State of Alaska; be a village certified by the Secretary of the Interior pursuant to the Alaska Native Claims Settlement Act; and consist of residents who conduct more than half of their current commercial or subsistence fishing in the Bering Sea or waters surrounding the Aleutian Islands. Currently 7.5 percent of the TAC in the pollock, halibut, sablefish, crab and groundfish fisheries is allocated to the CDQ Program.

Dedicated Access Privileges (DAPs)[7] — As defined by the U.S. Commission on Ocean Policy, a DAP program assigns an individual or other entity access to a predetermined portion of the annual catch in a particular fishery. In some cases, the privilege is transferable and may be bought and sold, creating a market. The term encompasses a range of tools, including access privileges assigned to individuals (that is, individual transferable quotas), and to groups or communities (for example, community development quotas, cooperatives, and area-based quotas). DAP is often synonymous with Limited Access Privilege Programs (see "Limited Access Privilege Program") and are sometimes referred to as rights-based management. However, "rights-based management" implies granting an individual the "right" to fish. Apart from certain tribes, U.S. fishermen do not have inalienable rights to fish because the fishery resources of the U.S. belong to all people of the U.S. Under current law, fishermen are granted a "privilege" to fish, subject to certain conditions.

Discards[1] — To release or return a fish or other species to the sea, dead or alive, whether or not such fish or other species are brought fully on board a fishing vessel. Estimates of discards can be made in a variety of ways, including samples from observers and logbook records. Fish (or parts of fish) can be discarded for a variety of reasons such as having physical damage, being a non-target species for the trip, and compliance with management regulations like minimum size limits or quotas.

Durable Equipment Expenditures or Durable Goods Expenditures[8] — For this report, this term refers to expenses related to equipment used for recreational fishing activities. These expenses include the purchase of semi-durable goods (e.g., tackle, rods, reels, line); durable goods (e.g., motor boats and accessories, non-motorized boats, boating electronics, mooring, boat storage, boat insurance, vehicles, second homes); and angling accessories and multi-purpose items (e.g., magazines, club dues, saltwater angling-specific clothing, camping gear).

Ecolabel[9] — In fisheries, ecolabelling schemes entitle a fishery product to bear a distinctive logo or statement that certifies that the fish has been harvested in compliance with specified conservation and sustainability standards. The logo or statement is intended to facilitate informed decisions by purchasers whose choices may promote and stimulate the sustainable use of fishery resources.

Economic Impact Model[8,10,11] — Economic impact models capture how sales in a sector generate economic impacts directly in the sector in which the sale was made. The sales then ripple throughout the state and national economies as each dollar spent generates additional sales by other firms and consumers. The NOAA Fisheries Commercial Fishing & Seafood Industry Input/Output Model uses an IMPLAN platform to estimate the economic impacts associated with the harvesting of fish by U.S. commercial fishermen and other major components of the U.S. seafood industry. As used here, the term fish refers to the entire range of finfish, shellfish, and other life (that is, sea urchins, seaweed, kelp and worms) from marine and freshwaters that are included in the landings data maintained by the National Marine Fisheries Service. The NOAA Fisheries Recreational Economic Impact Model, which also uses an IMPLAN platform, estimates the economic impacts generated by expenditures made by marine (saltwater) anglers.

Economic Impacts[8,10,11] — For this report, the economic impacts of the commercial fishing sector and seafood industry refer to the employment (full-time and part-time jobs), personal income, and output (sales by U.S. businesses) generated by the commercial harvest sector and other major components of the U.S. seafood industry. These components include processors and dealers, wholesalers and distributors, grocers, and restaurants. Economic impacts of recreational fishing activities refer to the amount of sales generated, the number of jobs supported, labor income, and the contribution to gross domestic product (GDP) by state (also known as value-added impacts) from expenditures related to recreational fishing.

Effort — For this report, effort refers to the number of angler trips taken by recreational fishermen (anglers). An angler trip is defined as any part of a single day (24 hours) of marine recreational fishing.

Employee Compensation[12] — This is related to gross domestic product (GDP) by state and is an estimate of the sum of employee wages and salaries and supplements to wages and salaries. Wages and salaries are measured on an accrual, or "when earned" basis, which may be different from the measure of wages and salaries measured on a disbursement, or "when paid" basis. Wages and salaries and supplements of federal military and civilian government employees stationed abroad are excluded from the measure of GDP by state.

Employer Establishments[13] — Businesses with payroll and paid employees with a single physical location at which business is conducted or services or industrial operations are performed. An employee establishment is not necessarily identical to a company or enterprise, which may consist of one or more establishments. When two or more activities are carried on at a single location under a single ownership, all activities generally are grouped together as a single establishment. The entire establishment is classified on the basis of its major activity, and all data are included in that classification.

Employment Impacts — Employment is specified on the basis of full-time and part-time jobs supported directly or indirectly by the purchases made by anglers or by the commercial harvest and seafood sector economic activity. This impact is measured in the number of full and part-time jobs.

Endangered Species[14] — As defined by the Endangered Species Act (ESA), an endangered species is any species which is in danger of extinction throughout all or a significant portion of its range. See also "Threatened Species."

Endangered Species Act (ESA)[14] — The ESA was signed on December 28, 1973 and provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. The ESA replaced the Endangered Species Conservation Act of 1969. Congress has amended the ESA several times.

Exclusive Economic Zone (EEZ)[1] — The EEZ is the area that extends 200 nautical miles from the seaward boundary of the coastal states. The seaward boundary for most states is 3 nautical miles with the exceptions of Texas, Puerto Rico, and the Gulf Coast of Florida, which is 9 nautical miles. The U.S. claims and exercises sovereign rights and exclusive fishery management authority over all fish and continental shelf resources through this 200-nautical-mile boundary.

Expenditures[8,11] — For this report, expenditures are related to recreational fishing activities and described as being one of two types: 1) expenditures related to a specific fishing trip; or 2) durable equipment expenditures.

Fish Stock[1] — A fish stock refers to the living resources in the community or population from which catches are taken in a fishery. The term "fish stock" usually implies that the particular population is more or less isolated from other stocks of the same species and hence self-sustaining. In a particular fishery, the fish stock may be one or several species of fish. Here, it also includes commercial invertebrates and plants.

Fishery Management Council (FMC) or Regional Fishery Management Council[15] — A regional fisheries management body established by the Magnuson-Stevens Act to manage fishery resources in eight designated regions of the United States.

Fishery Management Plan (FMP)[15] — 1. A document prepared under supervision of the appropriate fishery management council (FMC) for the management of stocks of fish judged to require management. The plan generally must be formally approved. An FMP includes data, analyses, and management measures; 2. A plan containing conservation and management measures for fishery resources, and other provisions required by the Magnuson-Stevens Act, developed by fishery management councils or the Secretary of Commerce.

Fishing Cooperatives[15] — A market-based fisheries management tool where access to fisheries resources is limited to a specific group of fishermen. See also "Catch Share Program."

Fishing Day — For this report, a fishing day refers to a partial or full day spent in recreational fishing. This term is used in the Alaska recreational fishing tables.

Fishing Effort[1] — The amount of fishing gear of a specific type used on the fishing grounds over a given unit of time. For example, hours trawled per day, number of hooks set per day, or number of hauls of a beach seine per day. When two or more kinds of gear are used, the respective efforts must be adjusted to some standard type before being added. For recreational fishing activities, fishing effort refers to the number of fishing trips made by recreational anglers.

Fishing Mode — For this report, fishing mode refers to the type of recreational fishing a recreational fisherman (angler) engages in, such as fishing from shore, a private or rental boat, or a for-hire boat.

Fishing Trip — For this report, a fishing trip is defined as an angler trip. An angler trip is defined as any part of a single day (24 hours) of marine recreational fishing. Fishing trips are classified as occurring in one of three fishing modes: 1) a shore-based fishing trip; 2) by a private or rental boat; or 3) on a for-hire fishing boat.

For-Hire Mode — For this report, this fishing mode refers to trips taken by recreational fishermen (anglers) on a party (also referred to as a head boat) or charter boat. In the Gulf and South Atlantic, for-hire mode does not include head boats.

Gross Domestic Product (GDP) by State or Gross State Product (GSP)[12] — Previously known as the Gross State Product, the GDP by state is the value added in production by the labor and capital located in a state. GDP for a state is derived as the sum of the GDP originating in all industries in the state.

Harvest[1] — The total number or weight of fish caught and kept from an area over a period of time. Note that landings, catch, and harvest are different. However, in Hawai`i and the Gulf states, recreational harvest includes fish thrown back dead. See also "Catch" and "Release."

Income Impacts[8,10,11] — Income impacts include personal income (wages and salaries) and proprietors' income (income from self-employment).

Individual Fishing Quota (IFQ)[1] — A type of limited entry; an allocation to an individual (a person or a legal entity, for example, a vessel owner or company) of a right (privilege) to harvest a certain amount of fish in a certain period of time. It is also often expressed as an individual share of an aggregate quota, or total allowable catch (TAC). See also "Individual Transferable Quota" and "Catch Share Program."

Individual Transferable Quota (ITQ)[1] — A type of individual fishing quota (IFQ) allocated to individual fishermen or vessel owners that can be transferred (sold or leased) to others. See also "Individual Fishing Quota."

Industry Sector — For this report, fishing- and marine-related industries were combined into industry sectors. Two industry sectors were included in this report: 1) seafood sales and processing; and 2) transport, support, and marine operations. Fishing and marine-related industries were chosen from the County Business Patterns Data Series based on data availability and perceived relevance to fishing or marine activities. These industries were then combined into one of these two industry sectors.

Key Species or Species Groups — For this report, up to 10 species or species groups were chosen as "key" species or species groups due to their regional importance to commercial and recreational fisheries. The regional importance of these key species or species groups was chosen based on their economic and/or historical or cultural significance to a state or region.

Landing Revenues — The dollar value of commercial fisheries landings.

Landings[1] — 1. The number or poundage of fish unloaded by commercial fishermen or brought to shore by recreational fishermen for personal use. Landings are reported at the locations at which fish are brought to shore; 2. The part of the catch that is selected and kept during the sorting procedures on board vessels and successively discharged at dockside.

License Limitation Program or Limited Entry Program[1] — A management tool available to fishery managers where the number of commercial fishermen or vessels licensed to participate in a fishery is legally restricted. A management agency often uses this management tool to limit entry into a fishery.

Limited Access Privilege Program (LAPP) or Limited Access Privilege System[15] — As defined in the Magnuson-Stevens Act, LAPPs limit participation in a fishery to those satisfying certain eligibility criteria or requirements contained in a fishery management plan (FMP) or associated regulation. A limited access privilege is a federal permit, issued as part of a limited access system, to harvest a quantity of fish expressed by a unit or units representing a portion of the total allowable catch (TAC) of the fishery that may be received or held for exclusive use by a person. A LAPP includes an individual fishing quota (IFQ) or individual tradable quota (ITQ) but does not include community development quotas (CDQs). LAPPs are sometimes known as Dedicated Access Privileges (DAPs). However, unlike LAPPs, DAPs generally encompass CDQs as well as IFQs (see "Dedicated Access Privileges"). LAPPs are a type of catch share program. See also "Catch Share Program."

Limited Entry Program — Also known as a license limitation program; see "License Limitation Program."

Location Quotient[6] — Location Quotients (LQs) are ratios that allow an area's distribution of employment by industry to be compared to a reference or base area's distribution. The reference area is usually the U.S., but it can also be a state or metropolitan area. The reference or base industry is usually the all-industry total. LQs also allow areas to be easily compared with each other. If an LQ is equal to 1, then the industry has the same share of its area employment as it does in the reference area. An LQ greater than 1 indicates an industry with a greater share of the local area employment than in the reference area.

For example (assuming the U.S. as the reference area), Las Vegas will have an LQ greater than 1 in the Leisure and Hospitality industry, because this industry makes up a larger share of the Las Vegas employment total than it does for the country as a whole. LQs are calculated by first dividing local industry employment by the all-industry total of local employment. Next, reference area industry employment is divided by the all-industry total for the reference area. Finally, the local ratio is divided by the reference area ratio.

Magnuson-Stevens Fishery Conservation and Management Act or Magnuson-Stevens Act (MSA)[1] — Federal legislation responsible for establishing the Regional Fishery Management Councils (FMCs) and the mandatory and discretionary guidelines for federal fishery management plans (FMPs). This legislation was originally enacted in 1976 as the Fishery Management and Conservation Act. Its name was changed to the Magnuson Fishery Conservation and Management Act in 1980, and in 1996 it was renamed the Magnuson-Stevens Fishery Conservation and Management Act.

Market-based Management[15] — Market-based management is an umbrella term that encompasses approaches that provide economic incentives to protect fisheries from overharvest. These approaches contrast with conventional fisheries management approaches, such as buyback programs and license limitation programs (see "Buyback Program" and "License Limitation Program"). One example of a market-based management approach for fisheries is a limited access privilege program (LAPP; see "Limited Access Privilege Program") that includes an individual fishing quota. A LAPP provides individual fishermen an exclusive, market-based share of a harvest quota or total allowable catch (TAC) of a fishery.

Marine Coastal County — For this report, a marine coastal county is a coastal county that is adjacent to an ocean coastline. See also "Coastal County."

Marine Economy — For this report, the marine economy refers to the economic activity generated by fishing- and marine-related industries located in a coastal state. Fishing- and marine-related industries were chosen from industries defined in the County Business Patterns Data Series provided by the U.S. Census Bureau. Industries listed in this report were chosen based on that industry's direct contribution to fishing and marine activities, and whether data were available for that industry. Information such as the number of establishments, number of employees, and annual payroll for these fishing and marine-related industries was used to determine their relative levels of economic activity in a state. These industries were categorized into one of two industry sectors: 1) seafood sales and processing; and 2) transport, support, and marine operations. See also "Industry Sector."

Non-Coastal County Angler — For this report, a non-coastal county angler refers to a recreational fisherman who lives within a given state but not in a coastal county of that state.

Non-Employer Firms[3] — A non-employer business is one that has no paid employees, has annual business receipts of $1,000 or more ($1 or more in the construction industries), and is subject to federal income taxes. Most non-employers are self-employed individuals operating very small unincorporated businesses that may or may not be the owner's principal source of income.

Non-Resident Angler — For this report, a non-resident in the U.S. table refers to a recreational fisherman (angler) who resides outside the U.S.; a non-resident in the regional and state tables refers to an angler who did not reside in the state where they fished.

Out-of-State Angler — For this report, an out-of-state angler is a recreational fisherman (angler) who does not reside within a given coastal state.

Overcapacity[16] — When the harvesting capability within a given fishery exceeds the level of harvest allowed for that fishery.

Overcapitalization[9] — When the amount of harvesting capacity in a fishery exceeds the amount needed to harvest the desired amount of fish at least cost.

Overfished[1] — 1. An overfished stock or stock complex "whose size is sufficiently small that a change in management practices is required to achieve an appropriate level and rate of rebuilding." A stock or stock complex is considered overfished when its population size falls below the minimum stock size threshold (MSST). A rebuilding plan is required for stocks that are deemed overfished; 2. A stock is considered overfished when exploited beyond an explicit limit past which its abundance is considered "too low" to ensure safe reproduction. In many fisheries, the term is used when biomass has been estimated to be below a biological reference point that is used as the signpost defining an "overfished condition."

Overfishing[1] — 1. According to the National Standard Guidelines, "overfishing occurs whenever a stock or stock complex is subjected to a rate or level of fishing mortality that jeopardizes the capacity of a stock or stock complex to produce maximum sustainable yield (MSY) on a continuing basis." Overfishing is occurring if the maximum fishing mortality threshold (MFMT) is exceeded for 1 year or more; 2. In general, the action of exerting fishing pressure (fishing intensity) beyond the agreed optimum level. A reduction of fishing pressure would, in the medium term, lead to an increase in the total catch.

Protected Species[17] — Refers to any species that is protected by either the Endangered Species Act (ESA) or the Marine Mammal Protection Act (MMPA), and that is under the jurisdiction of NOAA Fisheries. This total includes all threatened, endangered, and candidate species, as well as all cetaceans and pinnipeds, excluding walruses.

Recreational Fisheries — Recreational fishing refers to fishing for leisure rather than to sell fish (commercial fishing) or for subsistence. The economic contributions or impacts of recreational fishing activities in the United States is based on spending by recreational anglers.

Regional Fishery Management Council or Fishery Management Council (FMC)[15] — The Magnuson-Stevens Act established eight Regional FMCs around the United States. Each council consists of voting and non-voting members who represent various federal, state, and tribal governments; fishing industry groups (commercial and/or recreational); and non-fishing groups (such as environmental organizations and academic institutions). Each council is tasked with creating fishery management plans for important fisheries within their regions.

Release — For this report, release refers to the number of individual fish caught by a recreational fisherman (angler) that are then returned to the sea (dead or alive). In Hawai`i and the Atlantic and Gulf states, release does not include fish returned to the sea that are dead. See also "Catch" and "Harvest."

Resident — For this report, a resident in the U.S. table refers to a recreational fisherman (angler) who resides inside the U.S.; a resident in the regional and state tables refers to an angler who resides in the state where they fished.

Sales Impacts[8,10,11] — Sales impacts refer to the gross value of all sales by regional businesses affected by an activity, such as recreational or commercial fishing. For example, it includes both the direct sales made by the angler (commercial fisherman) and sales made between businesses and households resulting from that original sale by the angler (commercial fisherman).

Sector Allocation Program[17] — A fisheries management tool where a group of fishermen are allocated a quota or share of a total allowable catch (TAC), in accordance with an approved plan. This program is considered a type of catch share program. See also "Catch Share Program."

Species[1] — A group of animals or plants having common characteristics that are able to breed together to produce fertile (capable of reproducing) offspring and maintain their "separateness" from other groups.

Species Group[1] — Group of species considered together because they are difficult to differentiate without detailed examination (very similar species), or because data for the separate species are not available (for example, in fishery statistics or commercial categories).

Threatened Species[14] — As defined by the Endangered Species Act (ESA), a threatened species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. See also "Endangered Species."

Total Annual Durable Expenditures — Total annual durable expenditures were estimated by multiplying mean durable expenditures by the estimated annual number of adult participants at the state level or the national level and adjusted by the Consumer Price Index to the current year.

Total Annual Trip Expenditures – Total annual trip expenditures are estimated at the state level by multiplying mean trip expenditures by the estimated number of adult trips in each trip mode (for-hire, private boat, and shore) and adjusted by the Consumer Price Index to the current year. The trip expenditures at the national level is the sum of state trip expenditures in each mode.

Trip Expenditures — For this report, trip expenditures refer to expenses incurred by recreational fishermen (anglers) on a fishing trip. Trip expenditures include expenditures made by residents (individuals who reside in a coastal or non-coastal county within a given state; a U.S. resident) and non-residents (individuals who do not reside within the United States).

Value-Added Impacts[8,10,11] — Value-Added impacts refer to the contribution made to the gross domestic product in a region from commercial fishing landings and recreational fishing expenditures.

GLOSSARY NOTES

[1] Blackhart, K., D. G. Stanton, and M. Shimada (eds.). 2005. NOAA Fisheries Glossary, Revised edition, June 2006. NOAA Tech. Memo. NMFS-F/SPO-69, 61 p. Available at: https://spo.nmfs.noaa.gov/content/tech-memo/noaa-fisheries-glossary [accessed March 26, 2020].

[2] U.S. Census Bureau. County Business Patterns (CBP). Available at: https://www.census.gov/programs-surveys/cbp.html [accessed April 1, 2020].

[3] U.S. Census Bureau. Nonemployer Statistics. Available at: https://www.census.gov/programs-surveys/nonemployer-statistics.html [accessed April 1, 2020].

[4] NOAA Fisheries Policy Office. NOAA Catch Share Policy. Available at: https://www.fisheries.noaa.gov/national/laws-and-policies/catch-shares [accessed March 31, 2020].

[5] NOAA Fisheries. Recreational Fishing Data Glossary. Available at: https://www.fisheries.noaa.gov/recreational-fishing-data/recreational-fishing-data-glossary [accessed March 31, 2020].

[6] Bureau of Labor Statistics. QCEW Location Quotient Details. Available at: https://www.bls.gov/cew/about-data/location-quotients-explained.htm [accessed April 1, 2020].

[7] U.S. Commission on Ocean Policy. An Ocean Blueprint for the 21st Century, Final Report. 2004. Available at: https://govinfo.library.unt.edu/oceancommission/documents/full_color_rpt/000_ocean_full_report.pdf [accessed April 1, 2020].

[8] Lovell, S. J., J. Hilger, S. Steinback, and C. Hutt. 2016. The Economic Contribution of Marine Angler Expenditures on Durable Goods in the United States, 2014. . NOAA Tech. Memo. NMFS-F/SPO-165, 72 p. Available at: https://spo.nmfs.noaa.gov/content/tech-memo/economic-contribution-marine-angler-expenditures-durable-goods-united-states-2014 [accessed March 12, 2020].

[9] FAO Fisheries Department. Fisheries Term Portal. Available at: http://www.fao.org/faoterm/collection/fisheries/en/ [accessed April 1, 2020].

[10] Kirkley, J. The NMFS Commercial Fishing & Seafood Industry Input/Output Model (CFSI I/O Model). Available at: https://pdfs.semanticscholar.org/8600/3a0004135375f1f13a888aca5e2eaf4fffd8.pdf?_ga=2.158730802.982576641.1585688544-2034208116.1585688544 [accessed April 6, 2020].

[11] Lovell, S. J., J. Hilger, N. A. Olsen, and S. Steinback. 2020. The Economic Contribution of Marine Angler Expenditures on Fishing Trips in the United States, 2017. NOAA Tech. Memo. NMFS-F/SPO-201, 80p. Available at: https://spo.nmfs.noaa.gov/content/tech-memo/economic-contribution-marine-angler-expenditures-fishing-trips-united-states-2017 [accessed March 27, 2020].

[12] Bureau of Economic Analysis. Regional Economic Accounts: About Regional. Available at: https://www.bea.gov/resources/learning-center/about-regional [accessed April 1, 2020].

[13] U.S. Census Bureau. About the Economic Census. Available at: https://www.census.gov/programs-surveys/economic-census/about.html [accessed April 1, 2020].

[14] NOAA Fisheries. Endangered Species Act. Available at: https://www.fisheries.noaa.gov/national/endangered-species-conservation/endangered-species-act [accessed March 31, 2020].

[15] NOAA Fisheries. Magnuson-Stevens Fishery Conservation and Management Act. Available at: https://www.fisheries.noaa.gov/resource/document/magnuson-stevens-fishery-conservation-and-management-act [accessed April 1, 2020].

[16] NOAA Fisheries. Status of U.S. Fisheries. Available at: https://www.fisheries.noaa.gov/national/population-assessments/status-us-fisheries [accessed March 31, 2020.]

[17] Terry, J., J. Walden, and J. Kirkley. 2008. National Assessment of Excess Harvesting Capacity in Federally Managed Commercial Fisheries NOAA Tech. Memo. NMFS-F/SPO-93, 366 p. Available at: https://spo.nmfs.noaa.gov/content/tech-memo/national-assessment-excess-harvesting-capacity-federally-managed-commercial [accessed March 31, 2020].

Commercial fishing vessel.
Photo: South Atlantic Fishery Management Council/Cameron Rhodes

From: Fastmail [mailto:bill_321@fastmail.com]
Sent: Monday, March 20, 2023 3:55 PM
To: Rex Richardson <Rex.Richardson@longbeach.gov>; Mary Zendejas <Mary.Zendejas@longbeach.gov>; Cindy Allen <Cindy.Allen@longbeach.gov>; Suely Saro <Suely.Saro@longbeach.gov>; Al Austin <Al.Austin@longbeach.gov>; Daryl Supernaw <Daryl.Supernaw@longbeach.gov>; Megan@megankerr.com
Cc: CityClerk <CityClerk@longbeach.gov>; Paul Monge <Paul.Monge@longbeach.gov>; Forrestosburn@gmail.com; Connor Lock <Connor.Lock@longbeach.gov>
Subject: Pull item #8 and Phase out Drilling in 5 Years

-EXTERNAL-

Dear Long Beach Decision-Makers,

As a resident of Long Beach for more than 35 years, I am writing to express my serious concern regarding item #8 on tomorrow's agenda.

Instead of passing this feeble, kick-the-can-down-the-road report, the City Council should direct Energy Resources to rewrite a plan i**n line with a 5-year phase out of oil drilling** and 3200 feet health and safety setbacks immediately.

This is not the time to pussyfoot around the issue of phasing out oil drilling. This is a time for real leadership on sustainable action and keeping fossil fuels and their resulting greenhouse gases in the ground. The people of the future will pay dearly for a cavalier, don't-rock-the-boat attitude toward fossil fuel development. Right now, you are those people's representatives!

Please have the courage to take bold action. Stand up for our children and grandchildren. Let's leave them a planet worth inhabiting, not one marked by massive population displacement, global meltdown, and epic die-offs of all species, most especially ours.

Please refuse to kowtow any longer to the interests of a few oil barons the way Long Beach politicians have for the city's entire history. Phase out oil drilling now. Show greater Los Angeles that Long Beach can lead on this critical existential issue by standing up to a status quo that is literally killing us!

Sincerely

William Light

From: varenka lorenzi [mailto:varenka.lorenzi@gmail.com]
Sent: Tuesday, March 21, 2023 12:19 AM
To: Rex Richardson <Rex.Richardson@longbeach.gov>; +mary.zendejas@longbeach.gov; +cindy.allen@longbeach.gov; +suely.saro@longbeach.gov; +al.austin@longbeach.gov; +daryl.supernaw@longbeach.gov; +Megan@megankerr.com
Cc: CityClerk <CityClerk@longbeach.gov>; +Paul.Monge@longbeach.gov; +Forrestosburn@gmail.com; +connor.lock@longbeach.gov
Subject: Pull item #8 and Phase out Drilling in 5 Years

-EXTERNAL-

Long Beach Decision-makers,

I am writing with serious concerns in regards to item number 8 on tomorrows agenda.

Instead of passing this report, City Council should direct Energy Resources to rewrite a plan in line with a 5-year phase out of oil drilling and 3200 feet health and safety setbacks immediately.

California is the only major oil producing state without health and safety buffers between oil drilling sites and homes, schools, parks, hospitals.
As a resident of Long Beach, I expect you to put our health before the revenues from oil drilling in sensitive areas.
The science is clear on the short and long term effects of living near oil wells due to the toxic chemicals leaching out. You can choose to keep ruining the life of people or you can do the right thing and protect the health of your citizens.

Please ensure a buffer zone, and work towards a faster phase-out of oil drilling to reduce methane emissions, instead of contributing to global warming at a rate that is going to destroy our beautiful State.

Sincerely,
Varenka Lorenzi

From: Pete Marsh [mailto:petemarsh.re@gmail.com]
Sent: Tuesday, March 21, 2023 2:57 PM
To: CityClerk <CityClerk@longbeach.gov>
Subject: Agenda Item 23-0238: Request a Full Economic Analysis of Oil Production Costs

-EXTERNAL-

Honorable Mayor and Honorable CouncilMembers:

Thank you for all that you do for our community and for a vibrant Long Beach economy. We are fortunate to be part of the Southern California economic engine that generates GDP of about $1.6T, which would place SoCal as the world's 13th largest economy if it were its own country.

This morning, I forwarded an opinion piece by the LA Times Editorial Board, and that inspired the following rudimentary economic analysis of Long Beach's oil and gas economy.

The **City Manager's Dec 9, 2022 memo** to City Council, titled "Revenue Implications of SB 1137 - Health and Safety Setbacks Around New and Reworked Existing Oil Wells," presents an incomplete financial picture to City Council, severely restricting your ability to make fully informed and sound decisions for the best economic outcomes for the City.

- It describes projected losses in revenue to the Tideland Operating Fund, Uplands Fund, and General Fund, averaging roughly $13M of the $236M **FY23 Tidelands Fund** (~6%) over six years and roughly $6M of the General Fund (<1%).
- The memo also describes future costs of oil well abandonment cost (roughly $1.2B, of which the city's share is $154M, of which we've so far saved $70M).
- But this depiction fails to consider the real price society, including the residents and economy of Long Beach, pays for powering much of our economy with fossil fuel combustion. We've come to accept many of these costs as "normal," yet they are costs we know how to avoid.
- A decade ago, decarbonizing the global economy looked difficult and expensive. But a decade of incredible technical advances and price decreases in renewable energy and electric end use machines means that a zero carbon economy is both technically feasible and less expensive than the fossil fueled status quo. I summarize 18 peer-reviewed studies from the last six years, all reaching this conclusion, in this **set of three slides from my climate economics presentations**.

Below is a rudimentary economic analysis that presents peer-reviewed assessments of global costs imposed on society by fossil fuel combustion, and somewhat crudely calculates Long Beach's share of those costs. I'm sure these approximations are not exactly accurate. But I feel confident they represent the magnitude of the under-appreciated costs of our oil economy, and should make every government leader wonder what their share of this cost burden is.

Our outstanding Health and Human Services Department may have some estimates for these costs, and I recommend City Council request them. If they don't, please as a Council direct Staff to develop such a report. It should include expenditures by the City and other levels of government on chronic and acute illnesses that result from oil production, environmental cleanup costs, etc. In the meantime, here are rough calculations based on globally accepted peer-reviewed studies.

What's the true cost of fossil fuels?

- According to the World Bank, 2021 Global GDP was ~$96 trillion.
  - Meanwhile, the International Monetary Fund calculates that 2020 fossil fuel subsidies were $5.9T or 6.8% of global GDP.
  - 92% of the subsidies, or **6.3% of GDP, are indirect, primarily undercharging for the health and environmental costs that society pay**s to clean up the physical mess to the ecosystems on which our lives depend, and the chronic health impairments that reduce quality of life for all of us.
- How does that translate to Long Beach?
  - According to the U.S. Bureau of Economic Analysis and the Federal Reserve Bank of St. Louis, 2021 Gross Domestic Product for Los Angeles-Long Beach-Anaheim MSA (Metro Statistical Area) is **$1.12 trillion, and the population of the MSA is 13 million**.
  - Long Beach's 470,000 residents are 3.6% of the MSA population; if we assume that our GDP share is roughly proportionate, **then Long Beach 2021 GDP is ~~$40 billion**.
  - If our share if health and environmental costs matches the 6.3% of GDP that the IMF calculates globally, then **fossil air pollution is dragging down Long Beach's economy and wellness by $2.5 billion per year**.

What about mortality?

- According to multiple peer-reviewed studies, air pollution from fossil fuels caused 8~9 million premature deaths globally in 2019 (typical of other years), or ~0.1% of the global ~8 billion population.
- If Long Beach residents die prematurely in the same proportion as the rest of the world, that means **fossil air pollution is prematurely killing about 470 of our neighbors**, 0.1% of our 470,000 fellow citizens, every year.

Long Beach's climate community includes many business leaders who would be happy to help the city assess these costs. One of my colleagues is a graduate of the UCLA Anderson School of business, and has experience as both an investment banker and municipal bond manager. And I spent about a decade as a regional leader for two private sector businesses: the respected management consultancy Booz Allen Hamilton, and a startup that grew in five years from 3 employees and zero revenue to 700 employees and $110M revenue, profitable from year one. When we thinik about climate solutions, we wear our green eye shades, not Birkenstocks.

At tonight's Council meeting, please remove item #8 from the consent agenda, and engage in a lively discussion of the full economic impact of oil production and combustion. A fully informed economic analysis will clearly show that accelerated phaseout of oil production is much better ecconomically for the City than dragging our feet.

Grateful for your service, and striving for rapid decarbonization,

Pete Marsh
Council District 2 resident
[redacted] | PeteMarsh.RE@gmail.com
Citizens' Climate Lobby, the Best Lobbyists Money CAN'T Buy!

Group Leader, Long Beach CA
Co-Leader, National Electrification Team - our decarbonization superpower!
Rewiring America: Electrifying our Communities
Climate Reality Project LA Chapter, Green Building Committee

From: Constance May [mailto:constm1@uci.edu]
Sent: Monday, March 20, 2023 12:55 PM
To: Rex Richardson <Rex.Richardson@longbeach.gov>; +mary.zendejas@longbeach.gov; +cindy.allen@longbeach.gov; +suely.saro@longbeach.gov; +al.austin@longbeach.gov; +daryl.supernaw@longbeach.gov; +Megan@megankerr.com
Cc: CityClerk <CityClerk@longbeach.gov>; Paul Monge <Paul.Monge@longbeach.gov>; Forrestosburn@gmail.com; Connor Lock <Connor.Lock@longbeach.gov>
Subject: Pull item #8 and Phase out Drilling in 5 Years

-EXTERNAL-

Long Beach Decision-makers,

I am writing with serious concerns in regards to item number 8 on tomorrow's agenda.

Instead of passing this report, the City Council should direct Energy Resources to rewrite a plan in line with a 5-year phase out of oil drilling and 3200 feet health and safety setbacks immediately.

According to the IPCC AR6 "Current emissions reduction policies put us on track for warming of around 5.8°F (3.2°C) by the end of the century, leading to an unrecognizable world.

This 5 Year program outlines a ramping up of oil production to 26.2 million barrels of oil over the 5 year period, compared to 25.5 million barrels of oil in the previous 5 year plan. Gas production is also expected to increase significantly. The city cannot pass this plan and also say that it is moving away from fossil fuel extraction when it is literally doing the opposite.

The Proposed Program allows for over 12 million metric tons of CO_2. And the proposed operations threaten to release methane from ongoing gas production, which leaks routinely and is a super pollutant 87 times more potent than CO_2 in terms of climate warming over a 20 year period.

The oil industry is in decline, and is desperate to get every last drop of oil to profit at the expense of our climate and health.

Don't be on the wrong side of history.
Thanks,
Constance May
Research Program Coordinator
Center for Ecosystem Climate Solutions (CECS)
Climate Energy and Water Solutions group (CLEWS)
University of California, Irvine

From: Tina Nguyen [mailto:ngtina88@gmail.com]
Sent: Monday, March 20, 2023 8:23 PM
To: Rex Richardson <Rex.Richardson@longbeach.gov>; +mary.zendejas@longbeach.gov; +cindy.allen@longbeach.gov; +suely.saro@longbeach.gov; +al.austin@longbeach.gov; +daryl.supernaw@longbeach.gov; +Megan@megankerr.com
Cc: CityClerk <CityClerk@longbeach.gov>; Paul Monge <Paul.Monge@longbeach.gov>; Forrestosburn@gmail.com; Connor Lock <Connor.Lock@longbeach.gov>
Subject: Pull item #8 and Phase out Drilling in 5 Years

-EXTERNAL-

Long Beach Decision-makers,

I am writing with serious concerns in regards to item number 8 on tomorrow's agenda.

Instead of passing this report, City Council should direct Energy Resources to rewrite a plan in line with a 5-year phase out of oil drilling and 3200 feet health and safety setbacks immediately.

Thank you,
Tina Nguyen

From: Paulo Panaligan [mailto:panaliga@gmail.com]
Sent: Tuesday, March 21, 2023 11:41 AM
To: Rex Richardson <Rex.Richardson@longbeach.gov>; +mary.zendejas@longbeach.gov; +cindy.allen@longbeach.gov; +suely.saro@longbeach.gov; +al.austin@longbeach.gov; +daryl.supernaw@longbeach.gov; +Megan@megankerr.com
Cc: CityClerk <CityClerk@longbeach.gov>; Paul Monge <Paul.Monge@longbeach.gov>; Forrestosburn@gmail.com; Connor Lock <Connor.Lock@longbeach.gov>
Subject: Pull item #8 and Phase out Drilling in 5 Years

-EXTERNAL-

Long Beach Decision-makers,

I am writing with serious concerns in regards to item number 8 on tomorrow's agenda.

Instead of passing this report, the City Council should direct Energy Resources to rewrite a plan in line with a 5-year phase out of oil drilling and 3200 feet health and safety setbacks immediately. The trend of declining production levels will continue exponentially and at the cost of the healthy living of your constituents. It is best to take action now and direct efforts to identify alternative means of revenue via renewable energy.

Respectfully,

J. Paulo C. Panaligan

From: Jonathan Parfrey [mailto:jparfrey@climateresolve.org]
Sent: Tuesday, March 21, 2023 2:02 PM
To: Rex Richardson <Rex.Richardson@longbeach.gov>
Cc: CityClerk <CityClerk@longbeach.gov>; Mary Zendejas <Mary.Zendejas@longbeach.gov>; Cindy Allen <Cindy.Allen@longbeach.gov>; Suely Saro <Suely.Saro@longbeach.gov>; Al Austin <Al.Austin@longbeach.gov>; Daryl Supernaw <Daryl.Supernaw@longbeach.gov>; Megan@megankerr.com; Paul Monge <Paul.Monge@longbeach.gov>; Forrestosburn@gmail.com; Connor Lock <Connor.Lock@longbeach.gov>; nhernandez <nhernandez@climateresolve.org>; Gina Palino <gpalino@climateresolve.org>; Enrique Huerta <ehuerta@climateresolve.org>; Erick Huerta <erick@climateresolve.org>
Subject: Item 8 – drilling permits

-EXTERNAL-

Dear Mayor Richardson and Council-Members,

Climate Resolve, headquartered in downtown Los Angeles, comprised of 28 employees, helps Californians prepare for the impacts of climate change. The science is clear, with the level of greenhouse gases in our atmosphere, we are living with and can anticipate hotter temperatures, deeper droughts, worse coastal and riverine flooding, and higher sea levels. All of these effects will impact the people of Long Beach.

We know what we're talking about. Climate Resolve served as a contractor assisting the City of Long Beach with its Climate Action and Adaptation Plan. Our organization also served as a co-author of California's Fourth Climate Change Assessment, and organized the last three California Climate Science Symposia.

To be clear, the #1 best way to protect Californians from climate change is to stop making the problem worse. As the saying goes, when you find yourself in a hole, stop digging.

Long Beach is digging itself a deeper hole for its residents, its businesses and its Port by ignoring the dictates of Senate Bill 1137 by permitting new drilling sites.

Long Beach is also an outlier among Southern California cities: the cities of Los Angeles, Culver City, and LA County have recently voted to expedite the phase out of oil drilling.

We must ask: why is the City of Long Beach, normally a climate leader, now certifying a plan to maintain and expand oil drilling?

Tonight's vote before City Council on the City's "5 Year Program" for oil and gas development, clearly relies on continued drilling. The plan does virtually nothing to phase out oil and gas extraction and continues to project maximum extraction at drill sites.

Climate Resolve asks the City to not approve the current plan, and send back the "5 Year Program" to check it for compliance with Senate Bill 1137. We respectfully ask that the council only approve plans that are in compliance with state climate goals.

If you wish to discuss this matter with me, please do not hesitate to reach out.

Sincerely,

Jonathan Parfrey
Executive Director
Climate Resolve
[redacted]

-----Original Message-----
From: Bryan Quigley [mailto:gquigs@gmail.com]
Sent: Sunday, March 19, 2023 10:50 PM
To: CityClerk <CityClerk@longbeach.gov>
Subject: Council Meeting 2023-03-21, Take items off of consent calendar

-EXTERNAL-

Dear City Clerk,

Please confirm receipt if you can. Thank you!

I would like to ask that Agenda items 8 (and related 9/10),11, 12, 13, and 16 be removed from the consent calendar as they represent millions of investment in fossil fuels that cannot continue to be considered routine.

I include my comments on those items here, but also plan to attend in person:

#8, 23-0238 ER - Long Beach Unit Annual Plan (July 1, 2023 - June 30, 2024)

This invests 60 million in 35 more wells when we need from a climate and finance perspective to be removing wells. Long Beach needs to wean itself off of oil and not invest more in it.

#11, 23-0241 Ray Gaskin - Contract for Ford F-550 truck for Clean Team

By adding another fossil fuel vehicle to our fleet we are cleaning up trash while spewing pollution. One of the goals of this is to fit in smaller areas and a F-150 Lightning is available on the market. Please put this 159k into BEV, not fossil fuels.

#12, 23-0242 Purchase of two Volvo L120H Wheel Loader tractors

Volvo has converted L120H wheel loaders to electric in Europe and it's mentioned that they will respond to demand for more. Long Beach should ask for them to bring the L120H BEV to the USA. Also, the smaller L25 Electric is available today via SourceWell, but I'm not sure it's fit for the same work.

We should not get more vehicles to keep the sand in place, while helping raise sea levels. If we can't get an electric version this year - let's wait on the purchase until we can.

#13, On 23-0243 Arizona Machinery - Purchase of two John Deere tractors

I couldn't determine what kind of John Deere tractors we are purchasing as I found some price values ranging from 30k to 500k each and I didn't find any in the middle. Again we should evaluate electric options and wait for the electric options that all companies are working towards. Solectrac and Monarch, among others, are making BEV tractors today.

#16, On 23-0246 Purchase of a mobile command center

Custom vehicles like this are harder to source but there are still greener options. LDV does offer a Mobile Command Center with solar and battery storage although mainly powered by fossil fuels still. Farber Specialty mentions options to customize the all-electric Ford eTransit van or the MT50e walk-in van from Freightliner Custom Chassis.

I fully support item #15, 23-0245 Velocity Truck Center - Contract for two BEV Crane Carrier LNT-26 trucks and that should be approved without delay.

Lastly I'd like to disclose that I own some Ford stock - but would encourage Long Beach not buying a Ford if it means buying a fossil fueled vehicle.

Thank you!
Bryan Quigley
Belmont Shore, Long Beach, CA

From: anngadfly@aol.com [mailto:anngadfly@aol.com]
Sent: Tuesday, March 21, 2023 11:11 AM
To: Council District 1 <District1@longbeach.gov>; Council District 2 <District2@longbeach.gov>; Council District 3 <District3@longbeach.gov>; Council District 5 <District5@longbeach.gov>; Council District 6 <District6@longbeach.gov>; Council District 7 <District7@longbeach.gov>; Council District 8 <District8@longbeach.gov>; Council District 9 <District9@longbeach.gov>; Mayor <Mayor@longbeach.gov>; CityClerk <CityClerk@longbeach.gov>; CityAttorney <CityAttorney@longbeach.gov>; City Manager <CityManager@longbeach.gov>
Cc: alyssabishopyoga@gmail.com; annachristensen259@gmail.com; cmoore@algalita.org; ksharper01@cs.com; oururbanparadise@gmail.com; rebrobles1@gmail.com; taheshakc259@gmail.com; vbickf123@aol.com; nicole.levin@sierraclub.org; morgan.goodwin@sierraclub.org; mgoldenkrasner@biologicaldiversity.org; dpc@cbcearthlaw.com; sss@cbcearthlaw.com; bbradshaw@biologicaldiversity.org
Subject: Comments on Item 8 3/21/23 Agenda

-EXTERNAL-

Los Cerritos Wetlands Task Force
Angeles Chapter, Sierra Club

To: Long Beach Mayor and Councilmembers
From: Sierra Club Los Cerritos Wetlands Task Force
Re: March 21, 2023 Agenda Item 8. 23-0238
Recommendation to approve and adopt the Long Beach Unit Annual Plan (July 1, 2023 to June 30, 2024) and Program Plan (July 1, 2023 to June 30, 2028). (Citywide)
Office or Department: ENERGY RESOURCES

Dear Decision Makers:

We ask that Item 8 be removed from tonight's agenda and brought back on the agenda with an adequate description of the subject matter.

If the Mayor and Council are unwilling follow Brown Act section 54954.2. (a) "(1) *At least 72 hours before a regular meeting, the legislative body of the local agency, or its designee, shall post an agenda containing a brief general description of each item of business to be transacted or discussed at the meeting* . . ." , **we respectfully ask that this item be pulled from the Consent Calendar for discussion tonight.**

The Long Beach Unit Annual Plan states that 33 wells will be drilled at the THUMS offshore location from July, 2023 to June, 2024. Expected oil and gas revenues are $357 million; however, operating expenses are $323 million! This leave a profit of only $34 million, an **amount not worth the health and environmental risks these operations present.**

Earlier this month, this council voted to study ways Long Beach could wean themselves from oil production. I urge you to take the first step by denying this plan. No new drilling should be taking place until voters have an opportunity to decide on SB1137 in November.

Respectfully,

Anna Christensen and Ann Cantrell, Co-chairs

California State Senate

STANDING COMMITTEES
ENERGY, UTILITIES
& COMMUNICATIONS
ENVIRONMENTAL QUALITY
HEALTH

JOINT COMMITTEES
LEGISLATIVE AUDIT
RULES

SENATOR LENA A. GONZALEZ
THIRTY-THIRD SENATE DISTRICT

SENATE MAJORITY WHIP
CHAIR, SENATE COMMITTEE ON TRANSPORTATION

March 17, 2023

Mayor Rex Richardson and City Council
Long Beach City Hall
411 West Ocean Blvd.
Long Beach, California 90802

RE: Council Agenda Item 8 - Long Beach Unit Annual Plan

Honorable Mayor and Members of the Long Beach City Council:

I write to express my serious concerns with agenda item 8, which seeks the adoption of the Long Beach Unit (LBU) Annual Plan (July 1, 2023, to June 30, 2024) and Program Plan (July 1, 2023, to June 30, 2028).

I strongly urge you to reconsider and reduce the rate and locations of oil and gas production as proposed in the LBU Annual plan. As Long Beach positions itself as a global leader in the fight against climate change and increased carbon emissions, its plans must reflect these values and part ways with its overreliance on oil production at the expense of our community's health.

The effects of environmental pollution on public health are linked and exacerbated in areas like Long Beach, where community members face a multitude of toxic emission sources from oil production, transportation corridors, and ports. Recognizing the disastrous health impacts on residents living near oil production wells, I championed Senate Bill (SB) 1137 (Chapter 1, Statutes of 2022), and on September 16, 2022, Governor Gavin Newsom signed my bill into law. SB 1137 protects the public health of California's frontline communities by creating a minimum health protection zone of 3,200 feet between sensitive receptors, such as a residences, schools, childcare facilities, playgrounds, hospitals, or nursing homes, and a new or reworked oil and gas production well. In addition, the bill establishes strict engineering controls to be implemented by existing operations within the health protection zone, including leak notification and safety protocols.

CAPITOL OFFICE
1021 O STREET, SUITE 7720
SACRAMENTO, CA 95814
TEL (916) 651-4033
FAX (916) 651-4933

LONG BEACH DISTRICT OFFICE
3939 ATLANTIC AVE., SUITE 107
LONG BEACH, CA 90807
TEL (562) 256-7921
FAX (562) 256-9991

HUNTINGTON PARK DISTRICT OFFICE
3355 E. GAGE AVENUE
HUNTINGTON PARK,CA 90255
TEL (323) 277-4560
FAX (323) 277-4528

SENATOR.GONZALEZ@SENATE.CA.GOV • WWW.SEN.CA.GOV/GONZALEZ

To protect residents and workers in homes, schools, childcare centers, and medical facilities from environmental health hazards of oil operations, the LBU Annual Plan should not include any development of wells within the 3200-foot health protection zone as defined in SB 1137. Currently, the LBU Annual Plan (Part III - page 11) states - "This plan is based upon 33 replacement wells planned from existing cellars." Questions that the Mayor and council should take into consideration:

- Will this proposed new drilling occur in health protection zones?
- How is the city contemplating health protection zones in their planning?
- How has the city engaged with the greater Long Beach community (affected residents, stakeholders and environmental partners)?

Furthermore, it runs afoul for the city to continue permitting or reworking oil wells, both for the poor health outcomes it poses for our community, but also for the greater unfunded liability responsibilities it poses for both the City and the State of California.

At its March 7th, 2023 meeting, the City council approved an agenda item requesting that the city manager find alternative revenue opportunities to offset projected reductions in oil revenues. This item relayed that “now is the time for the City of Long Beach to take its place as a global leader in curbing the effects of climate change and carbon-emissions by creating a sustainable climate economy. The City will need to part ways with the Long Beach of the past that rely heavily on the production of oil and fossil fuels at the expense of our community’s health.”

For these reasons, I strongly urge the City of Long Beach to continue its commitment to reducing its reliance on oil production and to work diligently with the greater environmental community on a 5-year plan that truly reflects the values and fiscal priorities of the City. Should you have any questions regarding my concerns on this matter, please do not hesitate to contact my office at (562) 256-7921.

Sincerely,

Lena A. Gonzalez
State Senator, District 33

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SENATOR.GONZALEZ@SENATE.CA.GOV • WWW.SEN.CA.GOV/GONZALEZ

From: Danielle Soykin [mailto:dsoykin1@outlook.com]
Sent: Monday, March 20, 2023 2:10 PM
To: CityClerk <CityClerk@longbeach.gov>
Subject: Public Comment Regarding Item Number #8

-EXTERNAL-

Hi, I'm a voter from Los Angeles who would like to submit a public comment imploring the Long Beach City Council not to approve their "5 Year Program" regarding oil drilling, which they will be voting on tomorrow. The City Council should instead direct Energy Resources to rewrite a plan in line with a 5-year phase out of oil drilling and 3200 feet health and safety setbacks immediately. Oil drilling should be phased out, as the city of Long Beach promised, not trying to expand it. This is an egregious offense against both people's safety (who wants their house to be near an oil drilling site?) and the environment. Please do the right thing.
Respectfully,
Danielle Soykin

From: lindajwilson@att.net [mailto:lindajwilson@att.net]
Sent: Tuesday, March 21, 2023 2:59 PM
To: CityClerk <CityClerk@longbeach.gov>
Cc: Joni Ricks-Oddie <Joni.Ricks-Oddie@longbeach.gov>; Anjelica Vargas <Anjelica.Vargas@longbeach.gov>; Forrest Osburn <Forrest.Osburn@longbeach.gov>
Subject: Stop The Warehouse Project at 5910 Cherry Ave 90805 / City Council Agenda Item # 29

-EXTERNAL-

Dear Mayor and City Councilmembers,

REF: Appeal Hearing Proposed Warehouse Project at 5910 Cherry Ave, Long Beach, CA 90805
March 21st at 5:00pm at City Hall.

The project consists of the construction of a single 303,972-square-foot concrete, tilt-up industrial building that is approximately 51 feet in height. Surrounding the building are surface parking areas including 338 at-grade parking stalls and 79 truck parking stalls. The building incorporates 44 trucks, high-dock doors along the south elevation facing the abutting commercial site. The building includes 9,000 square feet of office space in the southwest corner of the building along Cherry Avenue.

According to CalEnviroScreen | OEHHA, North Long Beach has high levels of air pollution that endanger human health by causing respiratory conditions such as asthma, wheezing, decreased lung function, increased likelihood of hospital visits, heart disease, and even early death.

Research shows these kinds of projects bring traffic, noise, and pollution to nearby neighborhoods, putting the health of the community in danger and diminishing the quality-of-life.

The city should ask for a **plan EIR** of the area and adopt a set of regulations to reduce/control pollution before approving these kinds of developments.

Having a **plan EIR** in place before the approval of new developments will identify the proper mitigation and conditions to protect the health of the community and facilitate the project's approval while encouraging responsible developments.

Establishing regulations to reduce pollution will deliver much-needed health and air quality benefits to North Long Beach residents, and if done right, policymakers can help ensure that low-income communities of color are realizing these benefits as soon as possible without adverse impacts on their health.

Adopting policies to guide warehouse development in the city's general plan will also help jurisdictions comply with their obligations under SB 1000. This requires local government general plans to identify objectives and policies to reduce health risks in disadvantaged communities, promote civil engagement in the public decision-making process, and prioritize improvements and programs that address the needs of disadvantaged communities.

This is not about just limiting the harmful PM emissions from trucks, but about mitigating long standing pollution in the air, land, and water, and improving the quality of life, as promised, in the communities most burdened by overall pollution.

I urge the city council to protect our health by approving the appeal and requesting a full EIR.

Sincerely,

Linda Wilson
College Square Neighborhood
251 Fuego Street
Long Beach, CA 90805-1116

"This is to oppose the warehouse development at 5910 Cherry Ave and request a full EIR for this project"

My name is Linda Wilson. I am a long-time resident of District 9 in North Long Beach since 1989.

This is in support of the **appeal** to request a **full EIR** for this project because we believe that should this development be approved **as planned now** it will have negative effects on the local climate and community health. Traffic flow, congestion is also a concern for the 91 Freeway as well as Cherry Ave.