Climate Change & Commercial Fisheries in New London, CT

Gulf of Maine Research Institute

INTRODUCTION

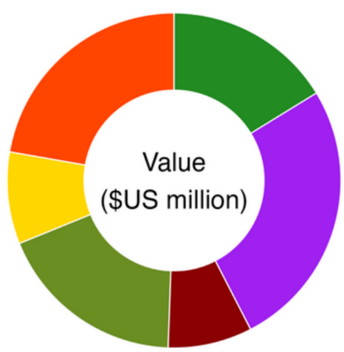
Climate change is altering the physical and chemical characteristics of our ocean and affecting marine ecosystems and fisheries. As environmental conditions continue to change, fishing communities may be affected by changes in the distribution and availability of species. This report summarizes the current status of fisheries in New London and shares information on changes in harvested species that may occur in the future. Used alongside the Climate Adaptation Resource Hub for Fishing Communities, this report provides information for understanding potential impacts on a fishing community, which can be used to consider ways to adapt to a changing climate.

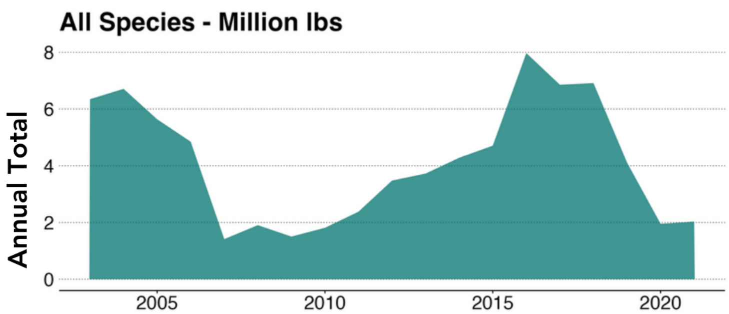
WHAT IS LANDED HERE?

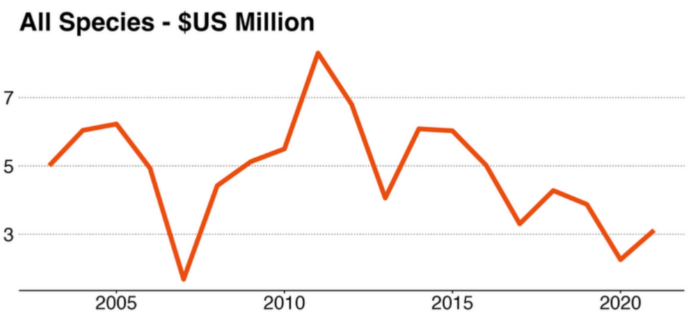
Commercial fishing vessels in New London landed an annual average 4.6 million pounds of shellfish and finfish, valued at $4.5 million per year from 2012-2021.* Sea scallop was the highest value species landed, contributing an average of nearly $1.2 million per year. Longfin squid, silver hake, monkfish and scup also made significant contributions to the volume and value of landings in New London. Total landings across all species declined to low levels in the mid- to late-2000s; they then steadily rose to a peak of nearly 8 million pounds in 2016 but have declined in recent years. The value of commercial landings increased sharply in the late 2000s but declined steadily since 2011.

Species	Annual Average Value	Annual Average Volume
Sea scallop	$1,172,573	106,102 lbs
Longfin squid	$998,016	721,926 lbs
Silver hake	$728,848	850,740 lbs
Monkfish	$397,689	288,624 lbs
Scup	$365,574	391,696 lbs
Other	$820,180	2,244,798 lbs

Above are the annual average value and volume for the top species landed at this port in each year from 2012-2021.





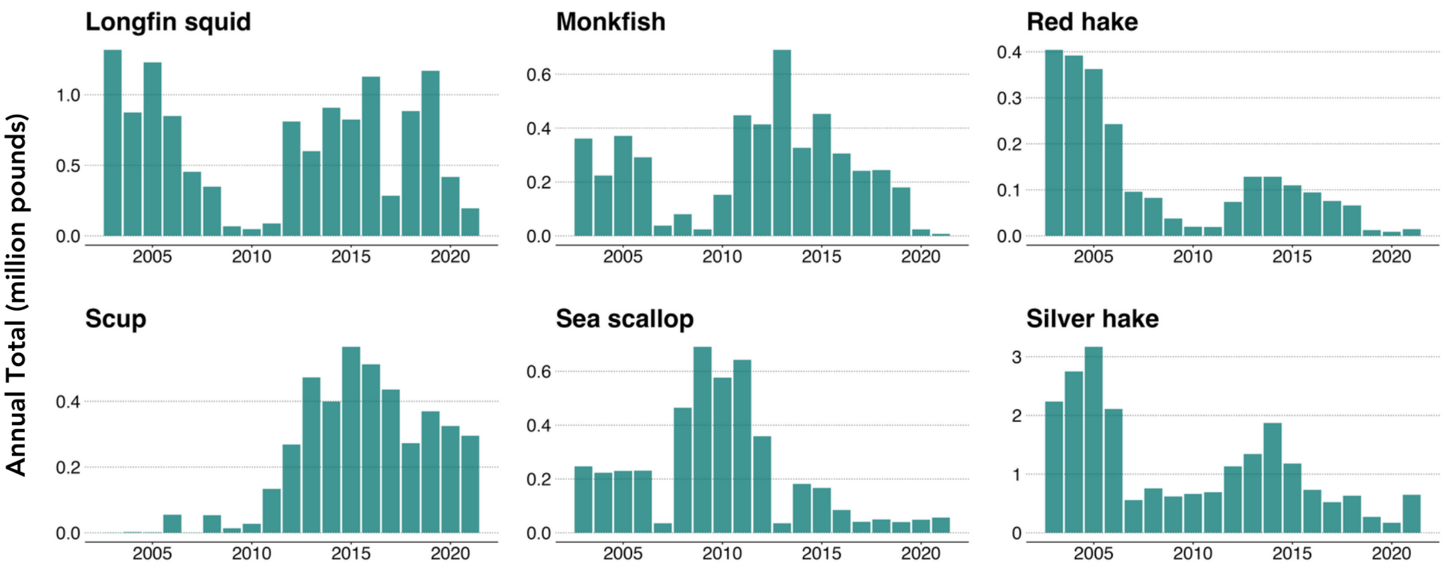


*Landings data were provided by NOAA Fisheries' Greater Atlantic Regional Fisheries Office. Due to confidentiality restrictions, some data may not be fully representative of the historical landings at a given location.

This report was developed through projects led by the Gulf of Maine Research Institute with funding from the National Oceanic and Atmospheric Administration's Climate Program Office under awards NA15OAR4310120 and NA19OAR4310384. Please contact Kathy Mills (kmills@gmri.org) for more information or questions.

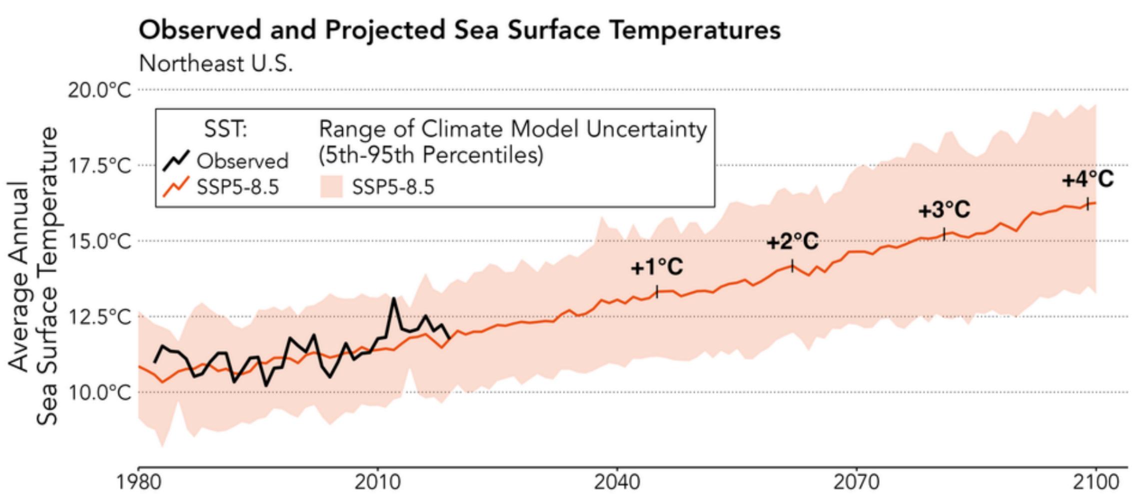
LANDINGS OVER TIME

Red and silver hake landings in New London were relatively high in the early 2000s and declined substantially after 2005. Both species experienced a modest increase between 2010-2015 but have declined since then. Monkfish and sea scallop landings were relatively low in the mid- to late-2000s. Sea scallop landings were higher during 2008-2012 but have been at low levels since then. Monkfish landings spiked in 2013 and have declined since. Longfin squid landings have been relatively stable, apart from a few low years in 2009-2011, 2017 and 2021. Scup landings rose in the early 2010s but declined since 2015.



OUR CHANGING CLIMATE AND WARMING WATERS

Greenhouse gas emissions around the world are a primary contributor to the warming the planet has been experiencing over the past century. This warming affects the health and distribution of species that support fisheries in coastal communities. Scientists around the world use a common set of scenarios to project climate impacts into the future. These scenarios represent multiple global social and economic development patterns paired with different levels of greenhouse gases in Earth's atmosphere. The scenario representing the largest build-up of greenhouse gases, labeled SSP5-8.5, indicates global average temperatures will warm by approximately 4°C (7°F) above pre-industrial levels by the end of this century. We use this scenario to understand how species may respond to changes in ocean temperatures in the Northeast U.S. relative to those experienced during 2010-2019. These species projections allow us to explore different potential futures of fisheries and support decisions now that can buffer the severity of future climate change impacts on fishing communities.



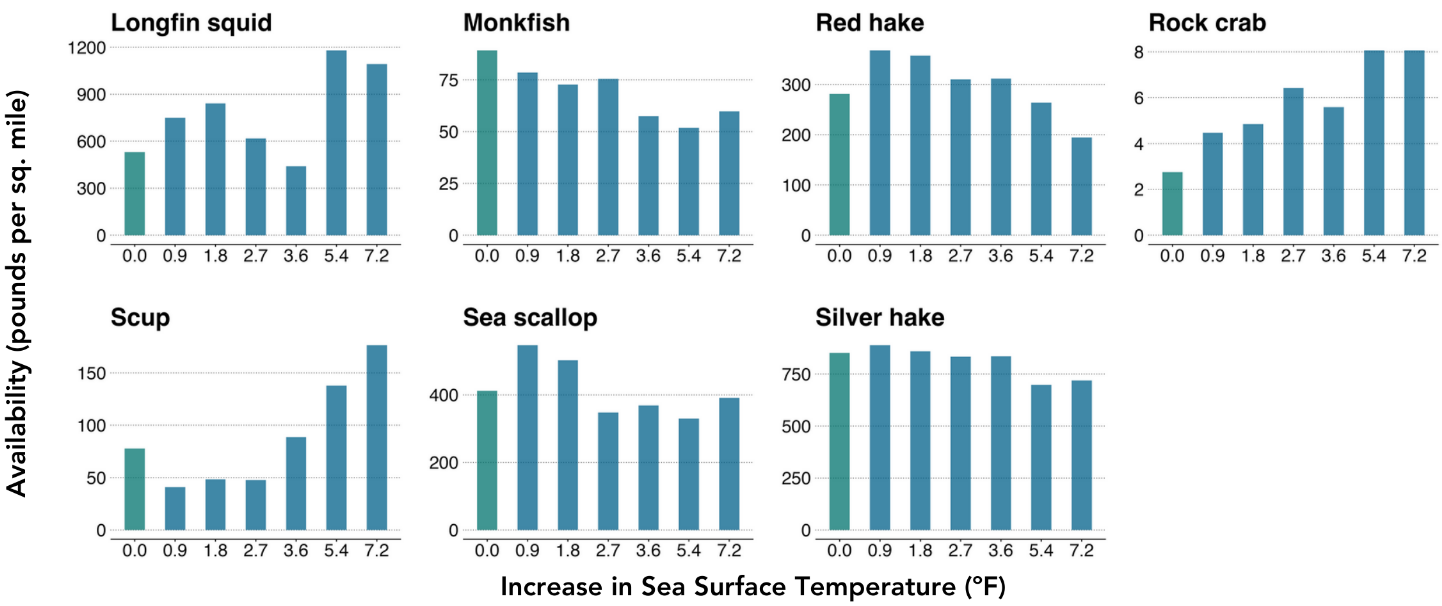
Temperature Crossing Points

Based on SSP5-8.5 Climate Projections

Celsius	Fahrenheit	As soon as
0.5°C	0.9°F	2034
1.0°C	1.8°F	2045
1.5°C	2.7°F	2056
2.0°C	3.6°F	2062
3.0°C	5.4°F	2081
4.0°C	7.2°F	2099

FUTURE CHANGES IN AVAILABILITY

As the abundance and distribution of certain species changes with warming waters, communities may need to respond to ensure the continuity of the fishing industry. By combining historical species observations with future climate information, we can estimate how the availability of certain species may change, and what new opportunities may emerge. Availability is given here as the total estimated weight of a particular species of fish in a given area, as modeled from bottom trawl survey data. Warming ocean temperatures may affect the availability of some commercial species in the waters near New London. The availability of rock crab and longfin squid may increase at most levels of warming, while monkfish are projected to decline. Scup may decline at lower levels of warming and then increase, while red hake and silver hake are projected to remain stable or increase with low levels of warming and then decline at higher temperatures..



EMERGING OPPORTUNITIES AND ADAPTATION OPTIONS

Harvesting emerging species and diversifying catch are some ways individual harvesters can adapt to changing fisheries. In the table below, we outline other potential adaptation options spanning the different scales of the fishery system. As the climate continues to change, new impacts will take shape, requiring re-evaluation and revision of goals in order to respond to climate change. For more information on adaptation options in fishing communities, please visit the Climate Adaptation Resource Hub for Fishing Communities.

Individual Harvester Actions

- Shifting fishing locations
- Shifting harvested species
- Diversifying livelihood (alternative fisheries, aquaculture, non-fishing jobs)

Industry Actions

- Improving product handling
- Developing supply chain capacity
- Diversifying markets and building consumer demand

Management Measures

- Reassessing quota allocations
- Altering permit access and availability
- Developing adaptive reference points
- Applying dynamic and ecosystem-based management

Community Initiatives

- Maintaining and securing shoreside infrastructure
- Improving transportation networks
- Developing local seafood initiatives
- Conducting vulnerability and resilience assessments
- Using early warning monitoring
- Community adaptation and resilience planning

Projected Changes in Species Availability in New London

Values represent percent change in modeled species availability at potential levels of warming relative to *2010-2019* baseline conditions.
Species in gray had low availability *(<5 lbs/sq. mile)* during the baseline period.

	Increase in Sea Surface Temperature			
Species	0.9°F	1.8°F	3.6°F	5.4°F
Acadian redfish	0.2%	−6.8%	−32.4%	−45.3%
American lobster	14.2%	30.6%	21.1%	−1.4%
American plaice	−4.2%	−5.9%	−12.7%	−16.8%
Atlantic cod	−3.2%	33.8%	48.2%	31.3%
Atlantic halibut	9.8%	4.7%	2.7%	−3.6%
Atlantic herring	12.8%	3.7%	−21.8%	5.5%
Atlantic mackerel	29.0%	47.9%	84.0%	72.1%
Black sea bass	27.4%	84.0%	97.5%	322.4%
Butterfish	−5.9%	−17.3%	6.5%	−16.0%
Deep sea red crab	−12.9%	−10.1%	−28.8%	−19.4%
Haddock	−6.1%	22.4%	17.2%	−31.1%
Hagfish	45.0%	98.9%	98.6%	41.4%
Jonah crab	16.2%	−3.7%	0.5%	−31.7%
Little skate	−42.0%	−41.1%	−35.7%	−34.3%
Longfin squid	41.3%	58.4%	−17.2%	122.2%
Monkfish	−11.9%	−18.4%	−35.6%	−41.9%
Ocean quahog clam	−35.7%	−20.6%	37.6%	−47.3%
Pollock	−11.5%	5.0%	−6.1%	−15.1%
Red hake	30.8%	27.2%	10.8%	−6.2%
Rock crab	62.4%	76.2%	103.0%	193.2%
Sand lance	−55.1%	−44.0%	−55.9%	−63.9%
Scup	−47.5%	−37.8%	14.0%	77.2%
Sea scallop	32.7%	21.8%	−10.6%	−19.9%
Shortfin squid	−47.7%	−21.1%	−38.9%	−16.6%
Silver hake	4.4%	1.0%	−1.8%	−18.0%
Smooth skate	−13.2%	−17.0%	−11.3%	−10.9%
Spiny dogfish	−78.9%	−76.7%	−75.0%	−78.4%
Summer flounder	−0.4%	18.4%	46.9%	99.0%
Thorny skate	−20.2%	−14.8%	−20.9%	−35.8%
White hake	−14.0%	−7.6%	7.6%	7.2%
Windowpane	9.2%	35.8%	23.2%	43.6%
Winter flounder	8.7%	10.2%	17.4%	8.8%
Winter skate	−38.1%	−40.2%	−32.7%	−27.3%
Witch flounder	−4.1%	−27.0%	−33.2%	−32.5%
Yellowtail flounder	−34.9%	−38.8%	−48.9%	−44.5%

MAKING SENSE OF CLIMATE PROJECTIONS AND SPECIES DISTRIBUTION MODELS

The species results shown here were developed using a spatio-temporal species distribution model, which can estimate the current and future distribution of marine species through time and space. The model uses projected regional sea surface and bottom temperature data from the globally coordinated Coupled Model Intercomparison Project (CMIP6) and species data from bottom trawl surveys conducted by the Northeast Fisheries Science Center and the Department of Fisheries and Oceans. Estimated species biomass densities are then averaged over an area fished by vessels from the port of interest. This enables us to interpret local changes in availability of a species at a specific time or temperature.

LEARN MORE

For more information regarding climate change, species distribution change, fisheries adaptation options, and adaptation barriers and enablers, please visit:

gmri.org/adaptationhub

ASK QUESTIONS

For specific questions regarding your community, contact Kathy Mills at:

kmills@gmri.org

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