

Climate Change & Commercial Fisheries in Newport, RI

INTRODUCTION

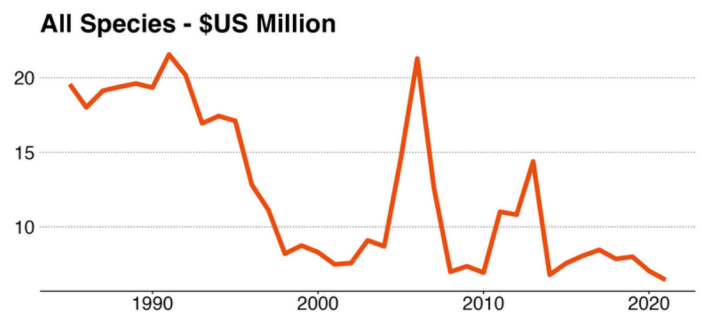
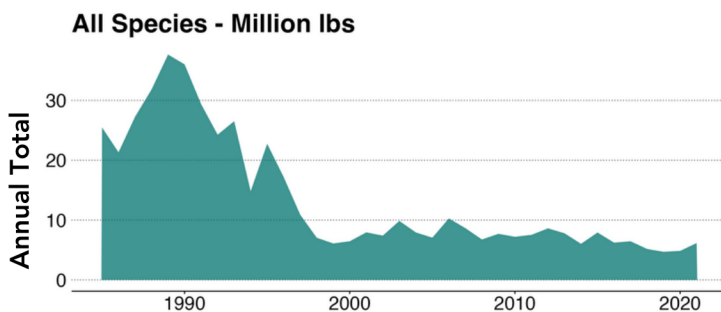
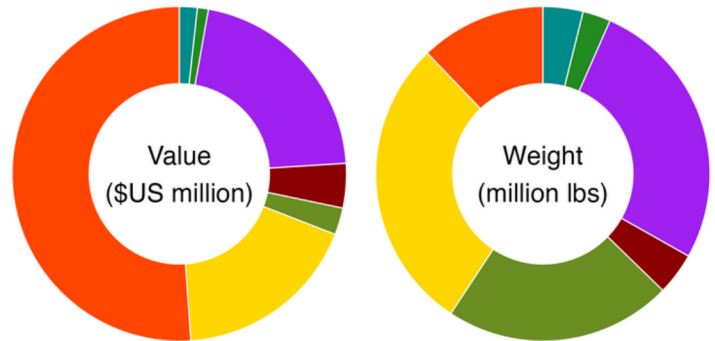
Climate change is altering the physical and chemical characteristics of our ocean and affecting marine ecosystems and fisheries. As environmental conditions continue to change, fishing communities may be affected by changes in the distribution and availability of species. This report summarizes the current status of fisheries in Newport 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 fisheries in Newport landed an average 6.4 million pounds of finfish and shellfish, valued at an average \$8.5 million per year from 2012-2021.* American lobster was the highest value species landed, contributing nearly \$4.4 million on average per year. Jonah crab was the highest volume species landed, with over 1.8 million pounds on average coming into Newport each year. The volume of commercial landings peaked in 1989 at 37 million pounds and has fluctuated between 5-10 million pounds for most years since 1998. The value of commercial landings has varied significantly, declining from values near \$20 million in the late 1980s and early 1990s to around \$7 million since the late 1990s, with a few short-term spikes in the value of landings.

Species	Annual Average Value	Annual Average Volume
American lobster	\$4,362,837	777,377 lbs
Jonah crab	\$1,537,355	1,826,432 lbs
Monkfish	\$367,227	261,479 lbs
Little skate	\$221,944	1,408,011 lbs
Winter skate	\$148,176	248,312 lbs
Scup	\$90,778	172,336 lbs
Other	\$1,809,303	1,701,024 lbs

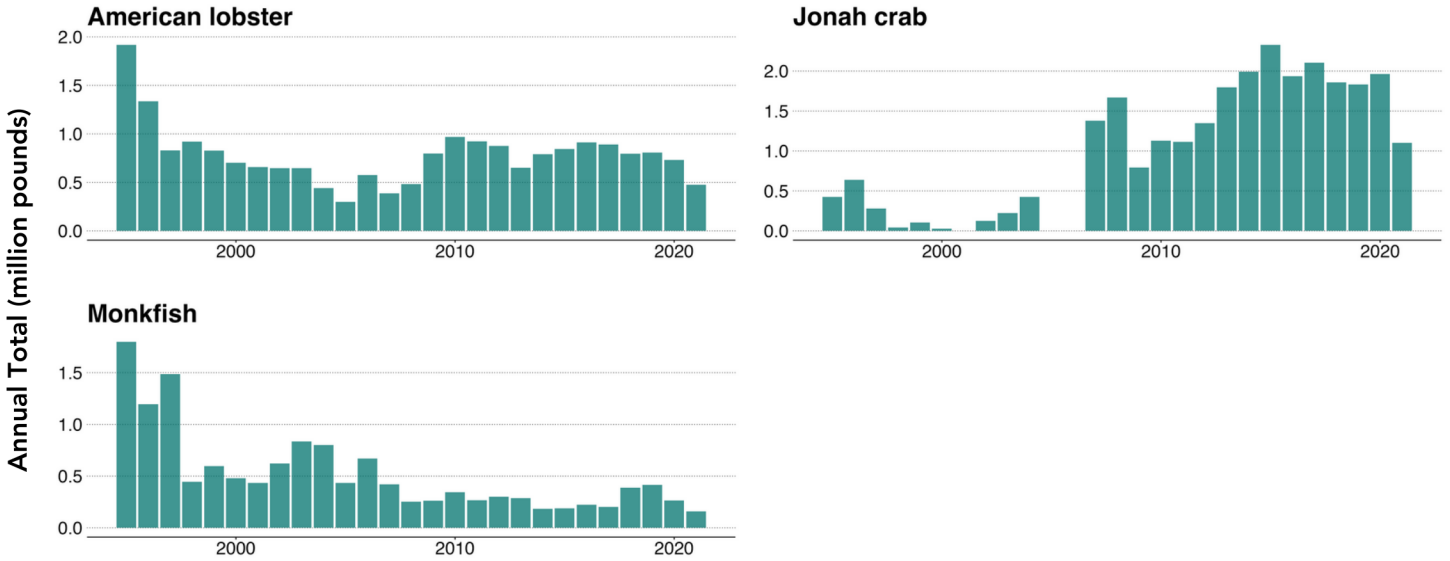
Above are the annual average value and volume for the top species landed at this port in each year from 2012-2021.



*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.

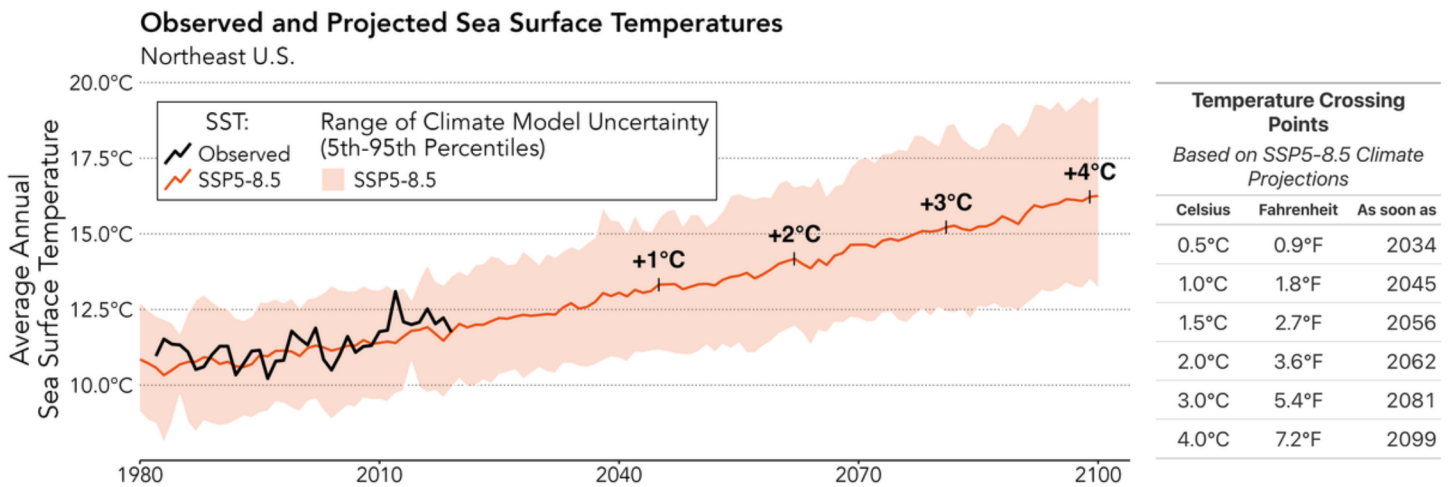
LANDINGS OVER TIME

Lobster landings fluctuated between 0.5 and 1.0 million pounds for most years in this analysis, aside from two high-landings years in 1995 and 1996. Landings of Jonah crab were low from 1995-2006 but increased dramatically in 2007, surpassing 2 million pounds in 2015 and 2017. Monkfish landings in Newport were high between 1995-1997 and then fluctuated near 0.5 million pounds through the mid-2000s and at a lower level near 0.25 million pounds since then.



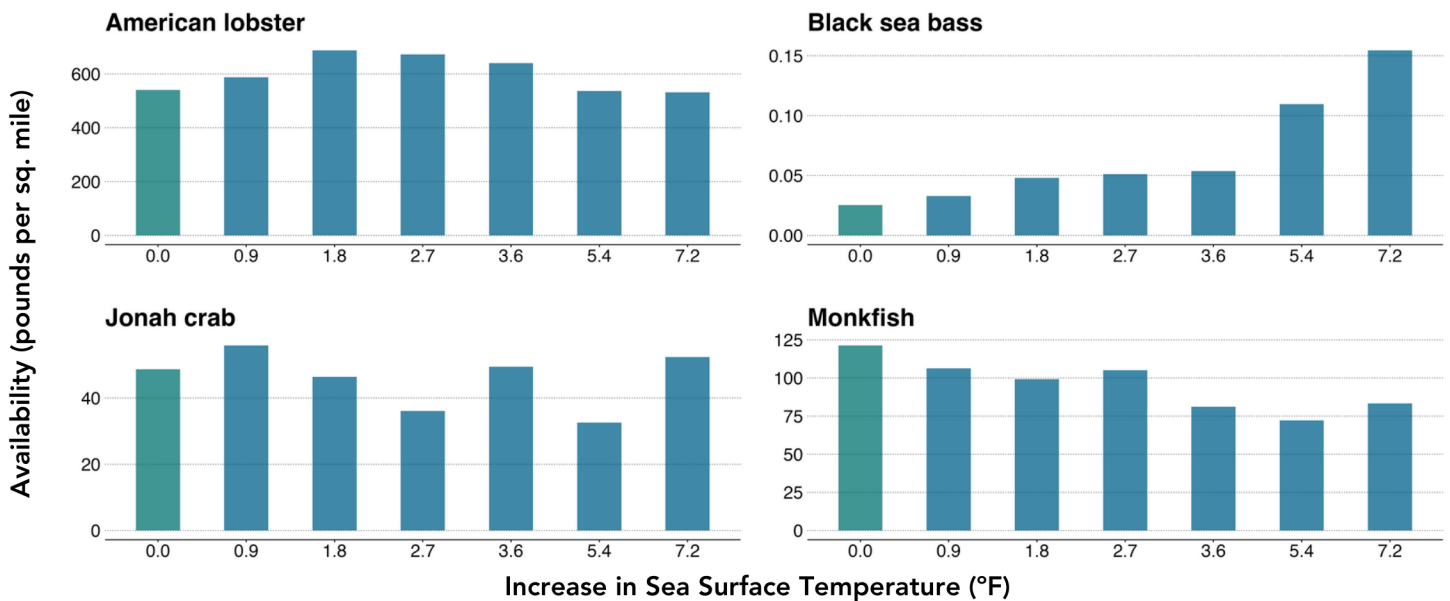
OUR CHANGING CLIMATE AND WARMING WATERS

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.



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 Newport. Black sea bass may increase with increasing temperatures, while monkfish is projected to decline. Lobster may increase at low levels of warming, while Jonah crab availability is variable over different warming levels.



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	Industry Actions
<ul style="list-style-type: none"> • Shifting fishing locations • Shifting harvested species • Diversifying livelihood (alternative fisheries, aquaculture, non-fishing jobs) 	<ul style="list-style-type: none"> • Improving product handling • Developing supply chain capacity • Diversifying markets and building consumer demand
Management Measures	Community Initiatives
<ul style="list-style-type: none"> • Reassessing quota allocations • Altering permit access and availability • Developing adaptive reference points • Applying dynamic and ecosystem-based management 	<ul style="list-style-type: none"> • 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 Newport

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.

Species	Increase in Sea Surface Temperature			
	0.9°F	1.8°F	3.6°F	5.4°F
Acadian redfish	-3.9%	-4.5%	-31.9%	-42.0%
American lobster	8.7%	27.2%	18.4%	-0.7%
American plaice	-3.2%	-5.8%	-13.2%	-18.2%
Atlantic cod	-4.3%	28.1%	46.6%	28.2%
Atlantic halibut	7.7%	3.6%	5.2%	-2.4%
Atlantic herring	16.2%	4.8%	-26.1%	11.4%
Atlantic mackerel	24.7%	45.4%	76.8%	66.8%
Black sea bass	29.2%	88.7%	111.1%	330.4%
Butterfish	-17.5%	-8.5%	13.0%	-2.4%
Deep sea red crab	-12.4%	-12.0%	-25.1%	-10.1%
Haddock	-4.5%	17.7%	15.6%	-29.1%
Hagfish	44.4%	103.9%	87.6%	41.1%
Jonah crab	14.8%	-4.6%	1.6%	-33.0%
Little skate	-42.3%	-43.5%	-35.4%	-31.6%
Longfin squid	51.5%	61.1%	-9.2%	150.4%
Monkfish	-12.3%	-18.1%	-33.0%	-40.4%
Ocean quahog clam	-30.6%	-24.1%	41.2%	-47.9%
Pollock	-14.2%	4.2%	1.0%	-10.5%
Red hake	31.9%	27.1%	16.8%	0.9%
Rock crab	63.1%	87.8%	95.9%	207.0%
Sand lance	-64.4%	-55.4%	-64.5%	-70.3%
Scup	-20.1%	10.0%	96.8%	195.7%
Sea scallop	23.7%	15.0%	-14.7%	2.3%
Shortfin squid	-47.3%	-19.7%	-36.1%	-5.9%
Silver hake	7.6%	2.6%	3.3%	-13.2%
Smooth skate	-11.0%	-18.6%	-12.1%	-8.9%
Spiny dogfish	-77.4%	-72.6%	-72.4%	-70.9%
Summer flounder	7.0%	46.4%	63.8%	154.7%
Thorny skate	-17.0%	-13.5%	-20.2%	-32.7%
White hake	-19.0%	-5.3%	3.1%	12.2%
Windowpane	20.9%	44.8%	28.1%	58.5%
Winter flounder	9.4%	9.1%	17.0%	12.1%
Winter skate	-36.0%	-38.0%	-28.8%	-23.8%
Witch flounder	-1.3%	-23.2%	-29.2%	-28.4%
Yellowtail flounder	-34.5%	-32.3%	-50.3%	-42.1%

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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