Lobster and Ocean Planning

A Spatial Characterization of the Lobster Fishery
for the New England Regional Planning Body

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“Somewhere there’s got to be a little give and take on both sides”
-Midcoast Maine Lobsterman

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The Northeast Regional Ocean Plan sets up a structure that fundamentally changes the relationships between federal agencies and those who use the water. The draft plan requires federal agencies to follow a set of best practices for identifying and engaging with stakeholders who might be impacted by their decisions. A critical part of this engagement is understanding how certain ocean users like fishermen are going to be affected by specific projects. Creating processes that embed this understanding in federal agencies gives coastal communities in New England a stronger voice in future decisions.

By providing important contextual information about the fishery and outlining some common concerns that fishermen have when they are facing changing ocean uses, this document helps set the stage for a more positive and constructive dialogue. I hope federal agencies will consider the information presented here and use it to improve interactions with fishermen.

Many thanks to the people who participated in this project and helped us think through a variety of issues. In particular, I'd like to thank the fishermen who were interviewed by George and Sam, the other fishermen who we have talked to about ocean planning over the last five years, and the people who helped review parts of this document.

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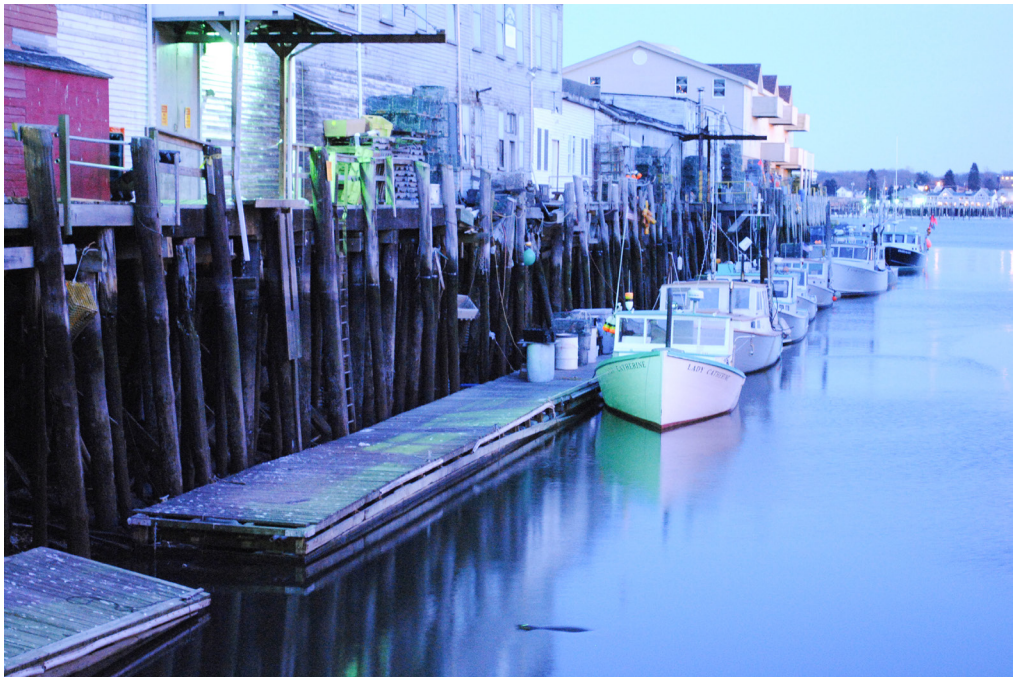

Above: Portland, Maine. Photo: Nick Battista
Cover: Chebeague Island, Maine. Photo: Maren Granstrom

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Introduction

Introduction

The lobster fishery is synonymous with New England's coast, providing food, economic and cultural value since the colonial era. Nowhere is this more evident than in Maine. For many coastal communities, the lobster fishery has provided stability and a sense of place that is more important today than in the past. Increased landings in the fishery, combined with reduced fishing opportunities in other fisheries, create a significant economic dependence on the lobster fishery. The area covered by the fishery has changed over the past 20-30 years with fishery landings shifting farther offshore and farther to the eastern portion of the range of U.S. lobster fishing. Information on the spatial characteristics of the lobster fishery are generally understood by the industry and managers, but are poorly quantified.

Mapping of lobster fishing patterns has been an objective of regional ocean planning efforts[1,2]. This effort has been hampered by lack of regional spatial characterization products with sufficient resolution or consistency to determine how other ocean uses, particularly place-based uses, would impact lobster fishing locally, sub-regionally, and regionally.

The Island Institute used interviews with Maine lobstermen to better understand spatial use patterns in the lobster fishery, and how lobstermen view new and shifting uses of the ocean in the context of their lobster fishing businesses. Lobstermen were selected in all lobster management zones, with an emphasis on lobstermen who fish federal waters because the developing New England Regional Ocean Plan focuses on federal waters.

Cliff Island, Maine. Photo: Nick Battista

1.1 Ocean planning and the lobster fishery

The primary effort to characterize various spatial uses of the ocean in New England has been through support in the development of a regional ocean plan pursuant to the National Ocean Policy[3] approved in 2010. In support of developing this plan, the Northeast Regional Ocean Council (NROC) sponsored two projects to characterize spatial use by commercial fisheries[4,5].

The two NROC projects primarily used federally available data sets: Vessel Trip Reports (VTR) and Vessel Monitoring System (VMS) data. The lobster fishery is not subject to VMS reporting and the vast majority of the industry, particularly in Maine, is not subject to VTR reporting requirements. These projects examined other data sources and prior mapping efforts that describe the spatial use by the lobster fishery and determined that most of these information sources are not of the appropriate scale, scope, or content for characterizing the lobster fishery in development of the regional ocean plan.

One region-wide map that used consistent methods regionally in describing the lobster fishery is the endline survey conducted by the National Marine Fisheries Service and New England states. The resultant map of endline density can be used as a proxy for lobster fishing intensity, understanding that there are confounding issues that don't allow using this map as a completely accurate map of lobster fishing. However, this survey mapped endlines at a broad geographic scale which precludes examining lobster fishing patterns at a level that is useful for federal agencies making decisions about specific ocean use projects.

This report builds on the prior fisheries characterizations conducted by NROC and provides contextual information about the lobster fishery that is relevant to the New England Regional Planning Body (NERPB). There is a large body of information available about the lobster fishery, but much of the available information is not spatially based. (See supplementary materials for more information.) This report provides an introduction to selected topics that are relevant to the ocean planning process, including:

- Background about the lobster fishery and management of the fishery
- Changes in landings, value, and location of the fishery
- Important considerations for the ocean planning process
- A case study about the impacts of vessel traffic on the lobster fishery
- Recommendations for specific new ocean uses for improving interactions with the fishing industry

2

New England's lobster fishery

2.1 Background

The American lobster fishery occurs from Virginia through the Canadian Maritime provinces, but is most robust from Cape Cod through Nova Scotia. In 2014, the American lobster was the single most valuable species landed in the United States with a dockside value of $566.6 million.[6] Maine and Massachusetts accounted for 84.0% and 10.4%, respectively, of the 147.8 million pounds landed.

In spite of high landings in the fishery, the lobster resource is robust. The latest stock assessment conducted by the Atlantic States Marine Fisheries Commission concluded that the lobster resource in the Gulf of Maine and Georges Bank did not exhibit overfishing and was not overfished (i.e., have a depleted stock biomass)[7].

In addition to being a valuable fishery, the lobster fishery has a lot of participants. In Maine alone, there are over 6,000 license holders. In Maine, lobster license numbers have declined from approximately 7,100 in 1997 to 6,040 in 2014[8]. Each license holder in Maine can fish up to 800 traps. Although license numbers decreased, the number of trap tags issued has increased slightly from 2.56 million in 1997 to 2.91 million in 2014[9], showing that effort in the fishery has increased.

Lobster license numbers in New Hampshire increased slightly from 1997 to 2015, while Massachusetts licenses declined from 1997 to 2015 (Figure 1).

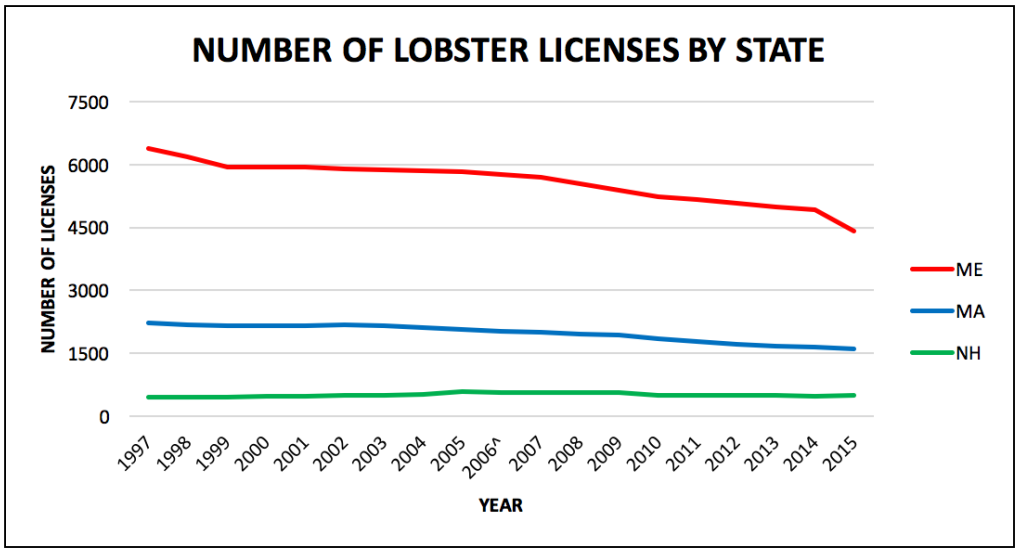


Figure 1: Lobster license numbers by state, 1997 to 2015[10]

The increase in landings and high effort levels mean that the fishery has numerous fishermen and traps, and high fishing activity levels throughout the region, particularly closer to shore, with 80% of lobstermen fishing in coastal waters—within the three-mile line.[11]

The regional value of the fishery means that the lobster fishery is very important to the states, particularly in coastal regions. In more isolated and economically challenged areas, such as in Downeast Maine, the lobster fishery provides a valuable economic and social contribution that is important to the social fabric of coastal communities.

2.2 Lobster management framework

The lobster fishery is predominately a state-managed fishery and as such, it is managed differently than many of the other fisheries in the region that take place in federal waters. Each level of management offers the opportunity for interaction with ocean planning generally, and the Northeast Regional Ocean Plan specifically. Some of the layers of management in the fishery are formal and stem from federal authority, others stem from state authority over public resources, and others are more local—either authority formerly given by the state or informal practices within the fishery. Some management entities are directly responsible for the management of the lobster resource itself, while some entities manage other resources and can have an impact on the lobster fishery. Since components of the NERPB plan propose to identify how federal agencies will use information in the plan as part of specific decision-making processes, it is important to know how ocean planning and projects could impact the various management layers in the lobster fishery.

The New England Fisheries Management Council[12], established by the Magnuson Stevens Fishery Conservation and Management Act[13] manages federal fisheries including bycatch and other cross-fishery issues. An example of management of another fishery impacting the lobster fishery is herring, where reduced or restricted catch can significantly impact the availability and price of lobster bait. An example of an indirect effect of another fishery on the lobster fishery was concerns raised in the groundfish fishery about cod bycatch and mortality in lobster pots. This issue had the potential to limit or change lobster fishing practices to minimize cod bycatch in traps.

The management of protected resources, particularly large whales under both the Marine Mammal Protection Act (MMPA)[14] and the Endangered Species Act (ESA)[15], impacts the lobster fishery. Through regulations to protect Atlantic large whales, the National Marine Fisheries Service requires lobster trap gear modifications that impact lobster fishing practices and business costs. Off the coast of Massachusetts, these regulations also impose seasonal closed areas.

Other federal impacts on the lobster fishery can occur during the permitting processes by other federal agencies, such as the Bureau of Energy Management (BOEM), the Defense Department through the U.S. Army Corps of Engineers, and the Department of Transportation.

Barrels of bait at a lobster co-op. The availability of bait is important for fishing businesses and fishermen pay attention to management of these species. Photo: Nick Battista

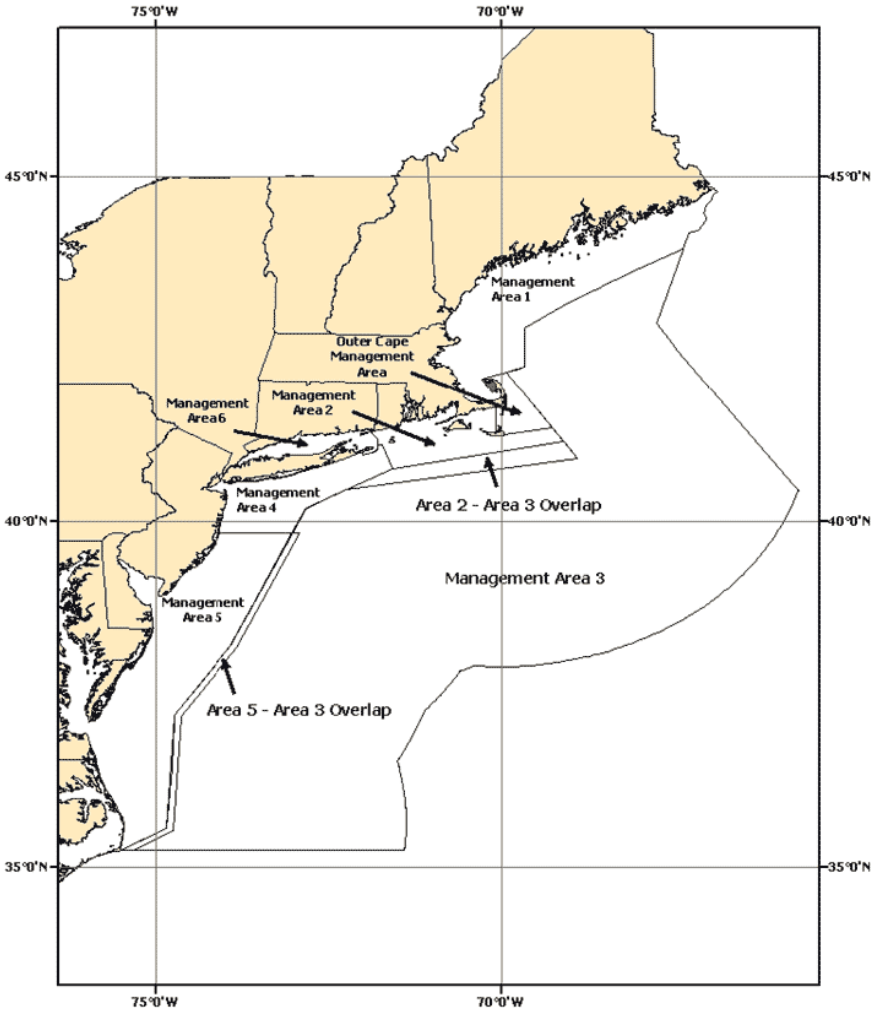


Figure 2: ASMFC Lobster Management Area boundaries[18]

The lobster resource and fishery itself are managed regionally through the Atlantic States Marine Fisheries Commission (ASMFC). The ASMFC has a lobster fisheries management plan that coordinates management across the various states. Amendment 3 to the Fishery Management Plan for American Lobster[16] included a number of important management actions, including managing the fishery by Lobster Management Areas (Figure 2) and using a form of co-management through Lobster Management Area advisory committees comprised of lobstermen from the local area. While the plan has core management measures for all areas, many management strategies are used within the Lobster Management Areas, such as trap limits, v-notch protection, minimum size, and maximum size, to best suit the localized fishery conditions. These measures are implemented by each state through its fisheries laws and regulations.[17]

Almost all of Maine's lobster fishery occurs in Lobster Management Area 1. In Maine, LMA 1 is further broken down into seven Lobster Management Zones[19] (Figure 3, page 11). Pursuant to state law, these local zone councils[20] can vote on recommendations on the number of traps allowed per fisherman within a zone, the number of traps per trawl, time of day for fishing, and whether to institute a limited entry system for licenses within a zone.

When the Lobster Zone Management Councils were established in the 1990s, the regulatory structure gave each zone the power to set its own limited entry program. This means that in most zones a certain number of lobster licenses or trap tags (issued to individuals) must be retired before a new fisherman is allowed to enter that zone and fish. These rates range from a low of 3:1 to a high of 5:1. This process has limited the amount of effort at the level of the fishery and has also resulted in a waiting list for people who desire to become lobstermen. Some have been on this list for almost 10 years and may not receive a license for another 10 or more years.

Fishermen are licensed to fish in a particular "home" zone and have to fish a majority of their traps in that zone. The geologic and oceanographic differences between Southern and Downeast Maine means that people fish differently in different places. As one Zone E fishermen noted, "Fishing is so different along the coast. Trying to compare Zone E with Zone A and B, or even Zone G, doesn't work. We're probably more like Zone G, but we're nothing like Zone A or B. That's a whole different world out there." It is worth noting that lobsters zones, rather than counties or other regions of the state, provide the most relevant management level for discussing landings and differences among different parts of the state.

Within fishing communities and on the water, there is an informal but very real governance structure based on stewardship and traditional fishing practices. The informal governance structure of the lobster fishery is well documented in the academic literature.

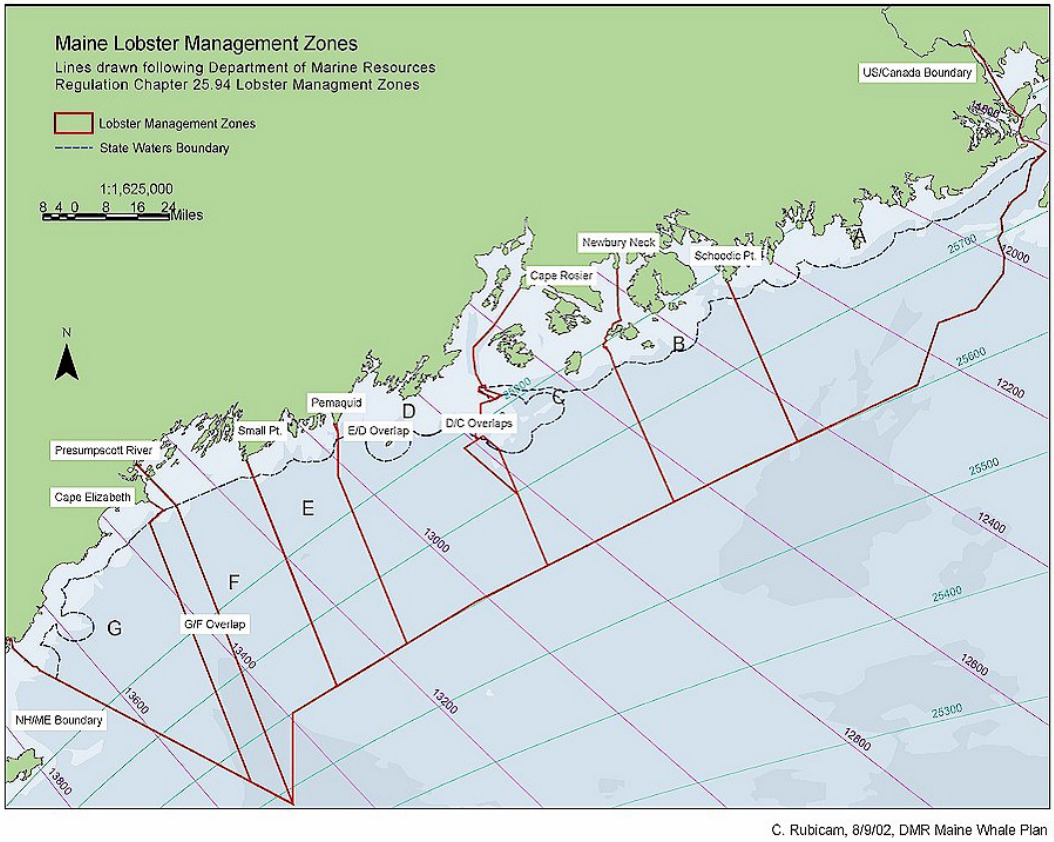


Figure 3: Maine Lobster Management Zones

2.3

Key management measures

Due to the structure of Maine's lobster zone-based management, it is extremely difficult for a fisherman to move between zones, should the need arise, because of displacement. This difficulty is exacerbated in communities that fish near the borders between management zones.

Some fishermen are further constrained in shifting between near-shore and offshore fishing locations by the size of their vessel and whether or not they hold a federal lobster permit. Smaller boats appropriate for a nearshore fishery are not suitable for, and can be quite dangerous if used in, an offshore fishery where environmental and weather impacts can be severe. Upgrading from an inshore to an offshore vessel can be cost-prohibitive and cost several hundred thousand dollars.

The fishery also has strict conservation measures, including a minimum and maximum size, and protections for female lobsters. This means that each lobster is handled individually, and on the water, fishermen regularly return to the ocean 60-80% of the live lobsters they catch. Lobsters are landed alive and kept alive through much of the value chain. Many of these measures have been in place for 100 years or more.

It is also important to note that the fishery is an owner-operator fishery. Individuals are licensed to the fish in the fishery and they have to be on board their boat when it is fishing. They are responsible for the implementation of all of the conservation measures by their crew. Fundamentally, each lobster boat is its own small business.

A key cumulative impact of these layers of management – ASMFC Lobster Management Areas, state Lobster Management Zones, state and zone gear limits, and marine mammal protection rules – is that the lobster fishery is spatially constrained and has limited ability to respond to changes in the ocean environment or changing ocean uses.

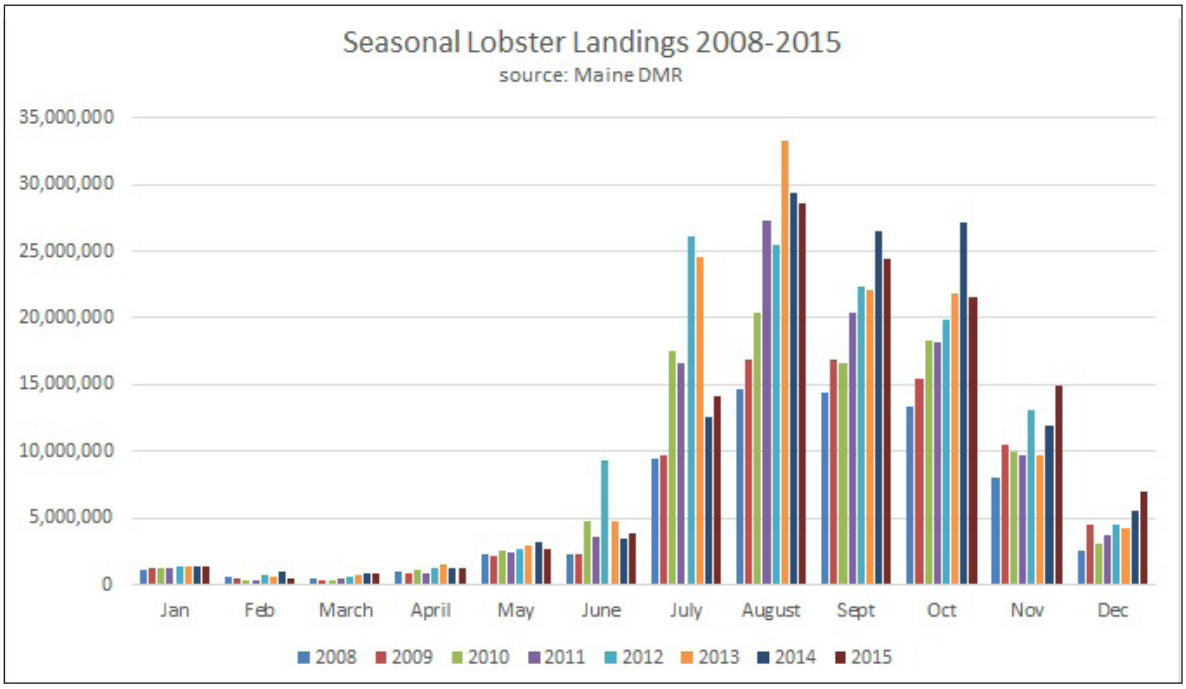


Figure 4: Seasonal lobster landings[21]

Seasonal shifting of gear

Many fishermen shift their gear throughout the year to follow the changing distribution of lobsters within the Gulf of Maine. This is often described by fishermen as a 'non-stop' process once they get their traps in the water. Typically, the fishery moves inshore in the spring/ summer and starts to go to deeper waters offshore in the winter.

Timing of the fishery

The lobster fishery, with the exception of Monhegan Island, is open year-round. With 1 small exception there is no set lobster fishing season in any part of Maine's lobster zones. Fishermen are allowed to fish all year, though many do not. The peak landings of lobster in Maine comes between July and November. 80% of Maine's lobster catch is sweet "new shell" a softer shelled lobster.

3

Changes in the fishery

There have been a number of changes in the fishery in the last several decades. These changes include the size of the fishery, its value, and distribution of this value along the coast, as well as changes in how the fishery works.

3.1 Change in size and value of the fishery

Landings in the lobster fishery have increased significantly over time in the Gulf of Maine and Georges Bank stock areas (Figure 4) and specifically in Maine (Figure 5).

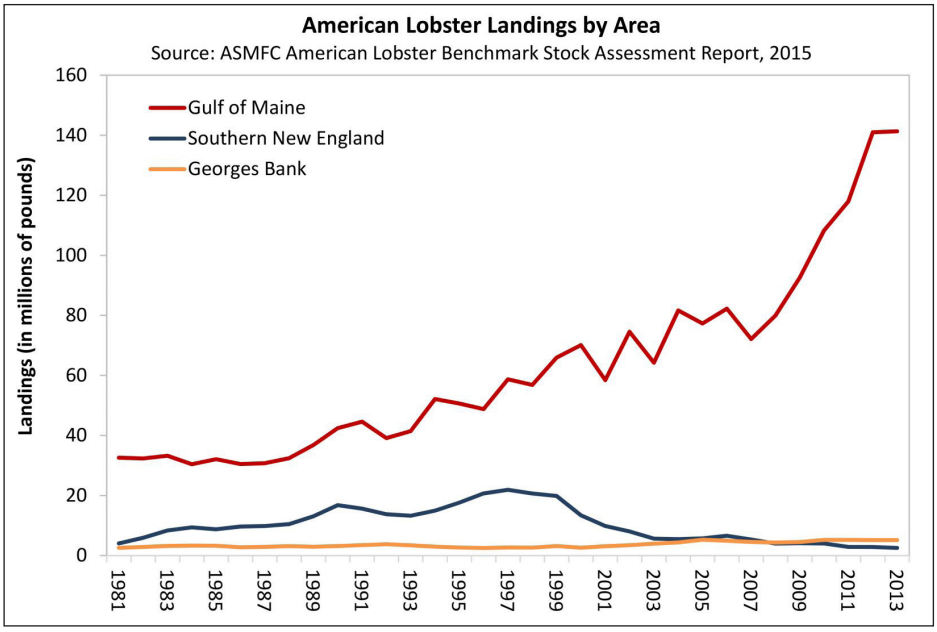


Figure 4: Lobster Landings by stock area[22]

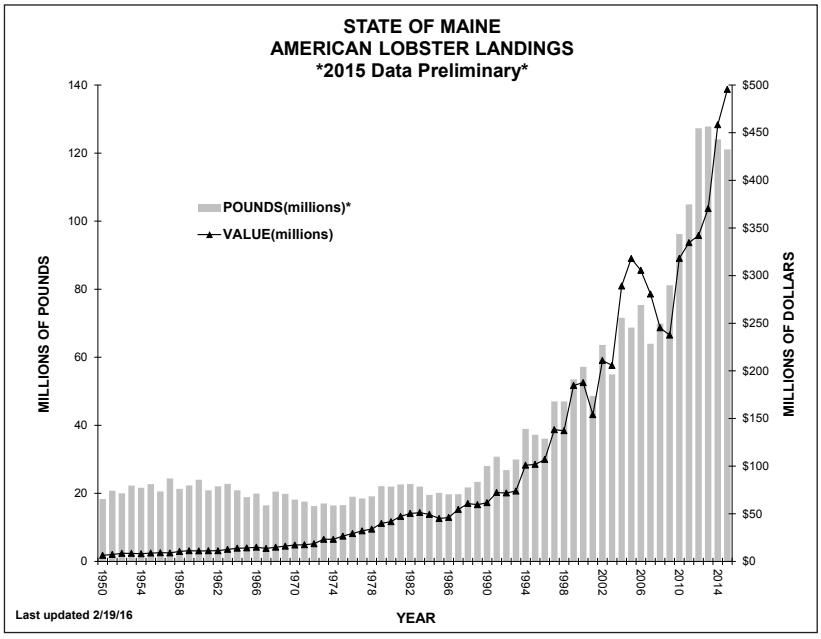


Figure 5: State of Maine historical American Lobster Landings[23]

Perhaps the largest change experienced by the Maine lobster fishery is the exponential increase in landings since the early 1990s. Prior to the early 1990s, the total catch for the state averaged roughly 20 million pounds[24]. Between 1990 and 2000, the average landings increased to just over 37 million pounds. Between 2000 and 2010, this jumped to just over 68 million pounds. The most dramatic increase has occurred over the last five years. In 2011, the industry broke the 100-million-pound mark for the first time, catching just under 105 million pounds, and statewide landings have averaged over 121 million pounds for the last five years.

This increase is not attributed to a marked increase in the number of people lobstering (6,617 in 1990 compared to 5,818 in 2014[25]) or the number of tags issued. (2.13 million in 1990 compared to 2.91 million in 2014, with a high of 3.283 million in 2006). Rather, favorable ecological and environmental conditions have combined to increase the biomass of lobsters available. These changes, coupled with corresponding changes in fishing practices, allow fishermen to harvest significantly more lobsters than have ever been landed before.

The increase in landings has varied along Maine's coast. Southern Maine has seen a decrease in its percentage of total state landings while Downeast Maine has seen the most dramatic increase in its percentage of the state's total landings (Figure 6).

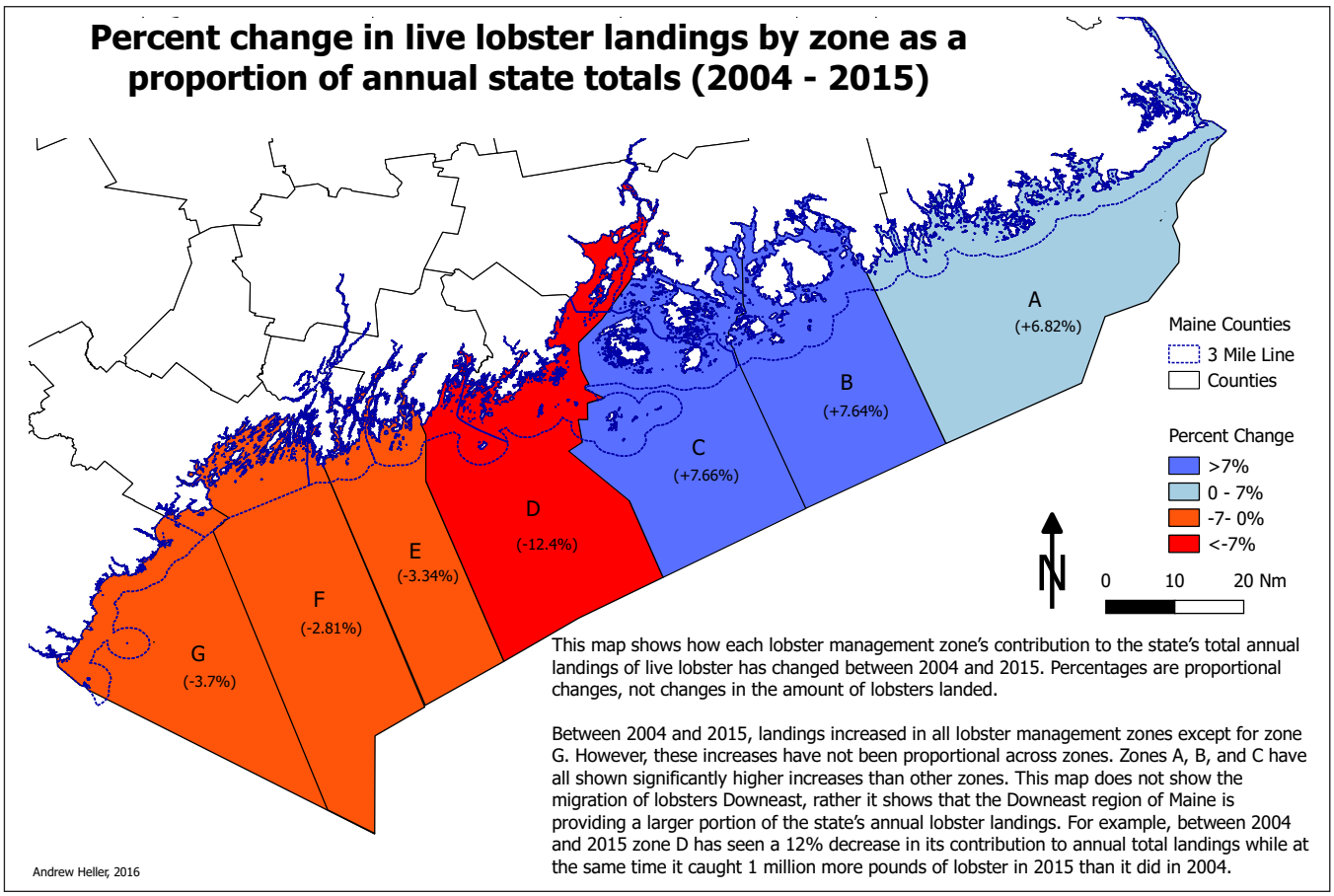


Figure 6: Percentage change in lobster landings by Maine management zone[26]

This change in the distribution of highest landings has led many to wrongly portray lobsters as 'marching north' to colder waters. While lobsters have a desired thermal range, the entire Gulf of Maine is well within that thermal envelope. The actual number of pounds landed in southern Maine has remained relatively stable through time. The declining proportion of lobsters landed in southern Maine is the result of significantly increased landings in Downeast counties. For example, for 2015, Zones A, B, and C accounted for 61.04% of Maine's annual landings, catching over 73 million pounds of lobster, an amount just under the state's total landings for 2006.

> **"You couldn't have done it 10 or 15 years ago anyway because there was too much ground fishing going on there. You couldn't have been able to keep the gear up."**
>
> *— Zone F lobsterman*

3.2 Increase in the offshore fishery

The second major trend in the lobster fishery over the last several decades is the changing nature of fishing activity offshore, particularly in federal waters. Some fishermen have always gone offshore, but industry trends are shifting towards larger vessels and longer trips. Anecdotally, fishermen are taking trips in the winter months that last for 50-60 hours and where they haul through all 800 traps. These changes are not well documented, but may shift how different segments of the lobster fishery interact with other ocean uses. Offshore wind, aquaculture, and resource extraction projects have the potential to impact, and be impacted by, the expanding offshore lobster fishery.

In addition to changes in how the fishery operates, there are also some shifts in where the offshore fishery takes place. Traditionally, the fishery was conducted on harder bottoms. More recently, areas of soft mud are seeing an increase in fishing activity. This is habitat that has historically not been productive. As one fisherman from Zone E said, "Back in the early '90s, back before things in the late '90s when things started getting really good, there's a lot of bottom that we didn't bother to fish." Another fisherman from Zone D noted that "there are lobsters now in deeper water that never were before. I always went shrimp dragging and I haven't been the last few years, so that's changed the way I fish."

The reasons for this shift in where lobsters are located are not well understood. Lobsters offshore may be expanding their range into new bottom habitat made available by the removal of predators such as groundfish predators. It may also be the direct result of more favorable environmental conditions for larval lobsters settling offshore.

Either way, a number of fishermen cited the decline of groundfish and shrimp as an important factor in their ability to fish offshore. The extensive mobile gear use by both of these fisheries precluded or significantly restricted trap gear use because the gear would get damaged, destroyed, or lost. Additionally, fishermen often divided the use of ocean bottom by gear types through mutual agreement to reduce gear conflict.

Offshore lobster boat (black) and small groundfish dragger (green) in Portland, Maine
Photo: Nick Battista

3.3

Increased economic reliance on the lobster fishery

Maine fishermen and fishing communities have become highly reliant on the lobster fishery. There is limited diversity in the fishing industry in Maine, in part because of the health of other fish stocks and in part because the lobster fishery is so lucrative. The shift in landings from 1995 to 2015 (Figure 7) shows just how much change there has been in Maine's fisheries over the last 20 years.

If something were to happen to the lobster population, fishermen would have to make drastic changes to their business models. Many fishermen are upgrading to larger fishing vessels and fishing more offshore because of the increase of lobster in offshore waters. Many of these larger vessels may not be able to transition back to the more traditional inshore fishery because their size limits navigation in restricted areas and because they are more expensive to operate.

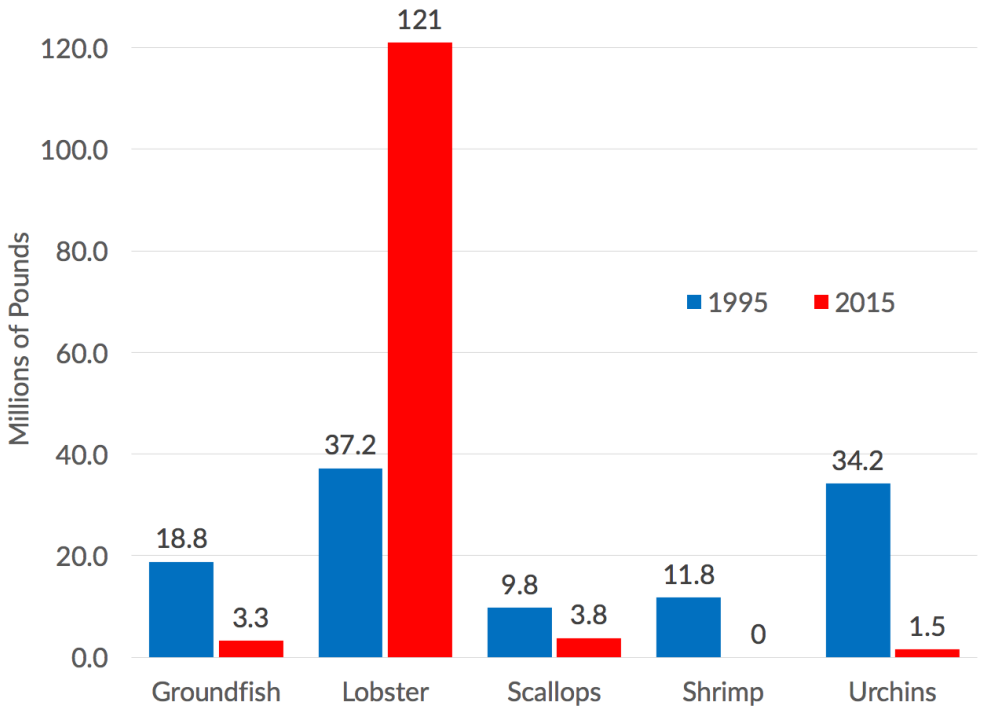


Figure 7: Commercial landings for 1995 and 2015[27]. 1995 landings represent a more diversified set of fisheries. In 2015, total lobster landings were roughly 10 million pounds greater than combined landings for all five listed species. This highlights just how reliant fishermen are on lobster as a resource, and just how vulnerable they are to things that may impact that resource.

> **"Mud bottom, too soft and there just wasn't anything on it. Now some of that bottom, is some of our best producing bottom."**
>
> *— Zone D lobsterman*

4

Important considerations about the lobster fishery in the ocean planning process

The New England Regional Planning Body should incorporate mechanisms or provisions in the plan or in its implementation that help the plan respond to or address these considerations. Based on prior NROC-funded fisheries characterization work, we believe that many of these considerations are not unique to the lobster fishery.

The interviews with lobstermen demonstrated their resilience, adaptability, and concerns about other ocean uses and how the lobster fishery may change in the coming decades. Broadly, the opinions expressed were:

4.1

Changing where fishing activity occurs is an important strategy employed by fishermen when responding to changes in management, markets, the environment and their businesses, and this creates uncertainty about where future fishing activity will take place.

Lobstermen have traditionally used different areas of the ocean, at different times of the year, based on their long experience of knowing where and when lobsters will be in a specific area. As a fisherman from Zone E said, "I guess I focus on specific areas and part of the reason is the lobsters just haven't been where they traditionally were and I'll go in and I'll set some prospect traps in there, and if I don't catch anything I'll move them out and move around. Until I start catching stuff, I'll focus more on that area."

As another from Zone D said, "Like I say, one year to the next, it all depends. It's variable. Some years I fish in areas, some years I might not." However, the need for spatial flexibility is not uniform across the fishery. As the same fisherman noted, "Some fishermen are creatures of habit. Some guys will set their gear the same spot every year, never move them, hardly ever shift their gear."

As one fisherman from Zone F said, "Thinking just because they're not there one year doesn't mean they're not going to be there another year." From these interviews, it is clear that the absence of fishing activity in one place during one year does not mean that fishing activity will not take place there in the future. Being able to hedge their bets over the long-term, rather than being required to focus on a specific area of the ocean, is a significant contribution to the resilience of the lobster fishery.

For most fishermen to effectively respond to changing ocean uses or changing ocean conditions in the future, the spatial mobility and flexibility within the existing management framework is an important part of their business strategy.

> **"Fifteen years ago if I thought I'd be doing what I'm doing now and fishing where I'm fishing I would think, no way… if you're going to be a fisherman you got to be ready to change"**
>
> *— Zone E lobsterman*

4.2

The impacts of climate change on both lobster location, movement, and how the fishery operates are not well understood, but the ability of the fishery to respond to long-term variability is a major concern.

Closely related to the operational importance of spatial flexibility in fishing practices are the unknowns of how climate change will impact where and when the fishery occurs. Climate change, including increasing ocean temperature and acidification,[28,29,30] is a major factor that fishermen mentioned when discussing the need for spatial flexibility in the future.

Climate and environmental change both impact the phenology of lobsters in the Gulf of Maine. This in turn changes when lobsters occupy certain areas of the Gulf. These changes impact the seasonal shifts mentioned above and exacerbate the difficulties in capturing how lobstermen are using specific areas of the ocean at certain times of the year.

The impacts of climate change are likely to be felt in both long-term trends in the fishery as well as over the course of the year. For many fishermen, the changes between the seasons and the timing of key biological functions drive a significant portion of their business practices. Climate change adds an additional layer of uncertainty about how fishermen will be able to respond and adapt to changing ocean uses.

4.3

Loss of spatial flexibility in fishing due changing ocean uses further constricts the ability of fishermen to respond to environmental or other changes in their businesses.

Lobstermen are most concerned about future ocean uses that could restrict how they adapt to changing conditions in the environment and the lobster fishery. Their business model requires mobility and flexibility; anything that reduces these things is a major concern to lobstermen.

As one from Zone D said, “It’s hard not knowing what the project is and the size the displacement is; it’s hard to gauge exactly what the cost would be. This is what we do, this is what everyone does… [displacement] could create some barriers and some significant costs”.

As noted in section 4.1, lobstermen don’t know where the next good fishing location will be, so the ability to react to changes on the water is paramount to their success. Restricting access to areas through long-term ocean uses, areas that may not appear to be currently productive, could cause serious long-term impacts on a fisherman’s ability to adapt to the complex dynamics impacting the lobster fishery. Their concern is that the unpredictability of how lobsters will move and adapt to environmental drivers like climate change will require them to be more flexible in their fishing practices. Responding to climate change will require more spatial mobility and flexibility than they currently practice. New ocean uses that end up restricting them from certain areas near their customary fishing grounds may force them to fish in areas that are less profitable for their businesses or areas that put them in conflict with other fishermen.

4.4

Shifting effort in the fishery due to other ocean uses has a broader impact on the fishery than just the displaced fishermen, it also impacts fishermen in a broader area and the ocean plan should incorporate this important concept.

Space is very important to lobstermen. As noted above, the cumulative impact of regulations reduces the ability of fishermen to significantly shift their fishing businesses. As a result of being highly place-based and running businesses that are closely tied to specific places in the ocean, lobstermen are concerned about increases in effort and new fishermen moving in to their areas. As with many aspects of the fishery, the level of concern varies across the coast as well was with distance from the shore. Generally speaking, offshore fishing territories are less well defined.

Ocean uses that displace effort traditionally located in one area to another place have impacts to both the displaced fishermen and also to the fishermen in the area where the displaced fishermen are shifting to.

Simply relocating one's traps is not an option for most fishermen. Each lobstering harbor has a specific informal territory where it is 'allowed' to fish by surrounding communities. These territories are based on historical use patterns that extend back generations. Within this territory, fishermen are generally allowed to place their traps wherever they want, and to shift them seasonally. However, if one should cross into another harbors territory, then they can expect retaliation. These conflicts between fishermen take the form of graduated sanctions against the interloper, starting with minor gear molestation, and escalating to trap 'cutting' and worse should the breach continue. While this behavior is clearly not in line with the legal structure regulating the fishery, these informal practices have been scientifically demonstrated to have played a role in the successful, long -term sustainability of the Maine lobster fishery.

As one fisherman from Zone D noted, "I can't just take all my gear and go somewhere else. I can't just do that. I can set them there, but they won't be there when I go back. So it would be detrimental. I don't think some people understand that."

Another issue is the cost associated with displacement. As one fisherman from Zone F stated, "I mean, I might have to go a long way if certain areas were shut down. So the time and money, it would affect me, it would affect my sternman because sternmen only get paid for when we land." These considerations need to be articulated clearly and methodically to ensure that the true cost of any project is considered.

Issues of displacement invariably lead to contentious discussions about how many traps are in the water, and whether that number is appropriate or not. The perspective of a fisherman from Zone E captures the complexities of this issue well, "I think we probably have more traps in the water than we need. I think Canada is a good example of how many lobsters you can catch with a lot less traps. But that's a real touchy subject. There's people that believe in less and there's people that think we should have more."

4.5

The value of the lobster fishery extends well beyond its economic impact and importance. The historical, cultural, and social importance of fishing communities cannot be over-emphasized.

Fishing communities and the working waterfront on which they rely are the defining characteristics of New England's coast. Many communities have been fishing these waters for generations, sharing fishing traditions and stories that have helped shape community identity. Fishing is ingrained in the social fabric of these communities.

The idea of fishing communities provides an additional economic impact beyond the fisheries themselves. In Maine, tourism is the state's number one industry. In large part, this industry relies on the image of the rugged, individualistic lobstermen waking before dawn and heading out to sea. Working waterfronts and the notion of being in a fishing community are important elements of the culture of Maine's coasts.

If a handful of fishermen were to be negatively impacted through displacement by another ocean use, it could mean the end of some of these communities. The threat to communities can come directly from fishermen being displaced and struggling to access other areas or indirectly through the loss of working waterfront infrastructure because of changes in the business models of the fishermen who rely on and support that infrastructure. Once working waterfront is lost to other uses, it is not likely to be regained. The threat of poorly handled ocean projects means more than a threat to specific fishermen and communities; it means a threat to the state's overall economic well-being and cultural identity.

These historical and cultural factors should be taken into account in all interactions between lobstermen, the lobster industry, and other ocean uses. The white paper, "Incorporating Community into Regional Ocean Planning," provides some additional suggestions for how the ocean plan can start to address these concerns. The level of respect with which these outside interests treat the fishing interests is key to fruitful conversations.

4.6

Identifying the continued viability and strength of fishing businesses and communities within the ocean planning process will help the process incorporate the actions that are important to fishermen and reduce the feeling that the process is not paying attention to the things fishermen value.

Interviews with lobstermen revealed their perceptions of how they have been treated in the ocean planning process and the potential for new uses to start sharing the waters they use. As one fisherman from Zone E said about offshore wind developers, "These companies are used to dealing with big companies, big corporations, and what they don't realize is that we're all corporations too, just a bit smaller". A common theme in the interviews is that fishermen are businessmen with a vested interested in the ocean they rely on for their livelihoods. As noted in 4.5, this vested interest goes well beyond a simple financial interest. When lobstermen see other ocean projects proposed, they see more than a threat to their bottom line. They see a threat to the sustainability of the lobster resource that they have worked so hard to protect.

Recognizing the economic, social and culture connection between fishing communities and the use of ocean space can help the ocean plan address many of the fears and concerns that fishermen have about the process. Current fisheries data in the plan are organized by

fishery and not by coastal community. In Maine, fishermen tend to relate to the water by community rather than by fishery and as such, data and information about a fishery lead to fears about being left out.

A good first step in this process would be to make sure that the ocean plan recognizes these social, cultural, and economic factors, and that federal agencies incorporate processes to take these into account in their best practices. For example, using existing state and local institutions that regularly interact with the lobster industry would be an easy best practice to include. The Maine Department of Marine Resources is a key resource for information about the lobster industry and a key contact within the industry or in specific regions of the Maine coast. Questions about the lobster industry and where and how people fish can be directed to the Maine Marine Patrol, whose patrol officers are constantly interacting with lobstermen in their patrol areas, and through lobster-science and management staff who also have constant interactions with lobster fishermen. State Lobster Zone Councils also provide a logical, accessible source of information about social and economic factors in the fishery. This type of information will greatly enhance understanding of important issues in the fishery beyond the information that maps and landings statistics provide to ocean planners.

4.7

The RPB should use the project as a model for documenting and engaging the lobster fishery in other states as well as for the variety of different parts of the fishing industry in New England. Future fisheries-related work should focus on identifying and incorporating the key concerns about both the ocean planning process itself and interactions with specific projects.

To provide additional information for ocean planning processes, the locally oriented interview process used in this project could be considered for lobster fisheries in other states, and for other fisheries. Identifying common concerns from fishermen and fishing communities could provide information and perspectives to complement other spatial characterization efforts, importantly providing contextual information not contained in regional mapping efforts.

Fisherman from Islesford, Maine
Photo: Nick Battista

5

Case Study: Impact of temporary uses on the lobster fishery

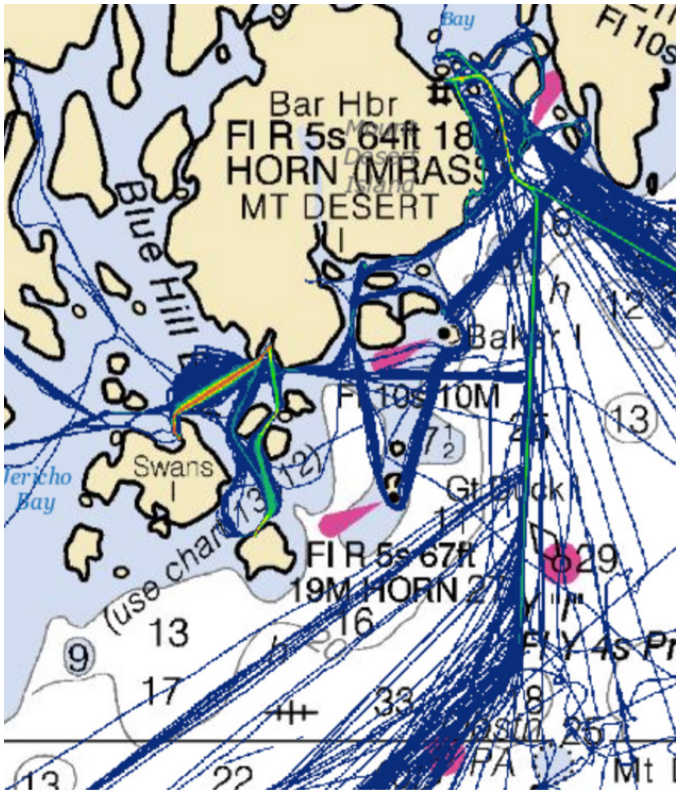
Case Study: Impact of temporary uses on the lobster fishery

Lobstermen regularly interact with other ocean uses in a non-regulatory setting. This case study focuses on how vessel traffic impacts lobstermen and understanding these interactions can be an important starting point for discussing how the ocean plan can help reduce conflicts between different ocean uses.

Whether pleasure boats, tankers hauling oil, cruise ships, tug and barges, or scientific research cruises, vessel traffic can have a direct impact on individual lobstermen through the loss of gear. When a large vessel runs over fishing gear, sometimes traps are cut off and the gear is lost. Losing gear costs fishermen in two ways. First, there is the direct cost to replace the trap. Depending on how they are set up, lobster traps can cost $100 or more apiece. In the offshore environment, regulations require 10 or more traps to be fished from one lobster buoy. Second, and in addition to the direct costs of replacing the trap, there is also the lost productivity of that trap. It may take a couple of weeks to get new trap tags, and buy, assemble, outfit, and set the new traps out.

When large cargo vessels, ships, or cruise liners stray from formally or informally established and expected lanes, they have an impact on fishermen. As one from Zone E stated, "I wish all of the tankers and all of the barges and tugs that we have to deal with offshore would take certain routes… Irving has got tankers that are running pretty steady from New Brunswick coming down and going into Portland and Portsmouth, and Boston".

Fishermen try and keep track of where these ships go so as to avoid setting traps in the travel lanes. As one fishermen from Zone D stated, "At least if you have that warning, you had a choice; well, I'm going to get the heck out of here for awhile, while they're here." This ability to get out of the way is hampered when vessels do not stick to establish shipping lanes.



Additionally, some vessels regularly travel outside of designated shipping lanes, and this is particularly true for tug and barge traffic, research vessels, or small cruise vessels. In some instances, fishermen have worked with specific businesses to establish an understanding about which routes vessel traffic typically follows. For example, fishermen from the Bar Harbor area had suffered significant trap loss from vessels entering the port and were frustrated. By meeting with representatives of the cruise ship industry and working to establish an informal practice, fishermen were able to significantly reduce the amount of lost gear.

Passenger vessel traffic in the Bar Harbor area, as displayed on the Northeast Ocean Data Portal. Established lanes are in green. Blue lines show individual vessel tracks outside of normal traffic patterns. The vessels making these tracks are more likely to cause conflict with the fishing industry.

For federal activities such as tug and barge traffic related to dredging, hydrographic surveys or federally funded oceanographic research, there is a significant opportunity to adopt or improve best practices around outreach to the fishing community about when a vessel will be working in a certain area, the gear it will be using, and how it will be working.

From an ocean planning perspective, the loss of gear due to federal government vessels or vessels working on projects for the federal government may not seem like a huge issue; however, for a process devoted to reducing user conflicts, the direct economic impact of lost gear, due to poor communication about where and when survey vessels will be operating in a particular area, is one of the more visible conflicts that regularly impacts the fishing industry.

QUEEN ELIZABETH in Bar Harbor, Maine. Photo: Tony Hisgett / Creative Commons

6

Conclusion and recommendations for specific projects or other ocean uses

While the ocean plan is focused on federal agency action, it is important to note that for fishermen, one of the largest impacts of the plan will be on how specific project proponents interact with potentially impacted fishermen. Other work in the region starts to identify best practices or specific ideas about how undertake these activities but below are a couple of key highlights that federal agencies can suggest that project applicants follow.

6.1 Proposed projects should recognize the place-based nature of the lobster fishery

As noted throughout this report, lobster fishing is a territorial, place-based activity, which means that lobstermen from a particular area or lobster management zone cannot move to an adjacent area that is already occupied by another group of lobstermen or harbor community. Additionally, moving among lobster zones is difficult due to management regulations.

It is also very important to recognize that, within a given lobster management zone or local area, mobility is critical to a lobsterman's ability to chase lobsters as the lobsters move and therefore fish successfully and earn a living.

While the spatial use of the lobster fishery is not quantified as with other New England fisheries, it is important that ocean planning and specific ocean use projects recognize the importance of both local lobster spatial use and the need for spatial mobility for the success of individual lobstermen and groups of lobstermen in a localized area.

6.2 Specific place-based ocean use projects should determine local or project-level spatial use by the lobster fishery and there are location tracking technologies or other techniques to help do this.

Specific place-based ocean uses have impacts on specific fishing businesses. These impacts happen at the operational scale of the fishery and cannot be determined from regional-scale data. It is quite possible for a project to significantly impact a few fishermen and, while the impact to specific fishermen may be significant, there may not be an impact to the overall value or landings of the fishery. Using techniques to better understand the operational scale of the fishery can be an important tool.

There are technologies available to get precise spatial-use information from the lobster fishery for specific projects as part of the project evaluation process. Location-tracking devices such as Succorfish™ (Figure 9), Yellowbrick™, Point97, or the eTrips Mobile/ACCSP reporting system can accurately track a vessel's location for as long as is needed to obtain spatial-use information to evaluate ocean-use projects. This could be done by offering location-tracking devices to every lobsterman who declares an interest in a proposed ocean-use area for an entire year to include all aspects of the lobster fishery's annual spatial-use patterns.

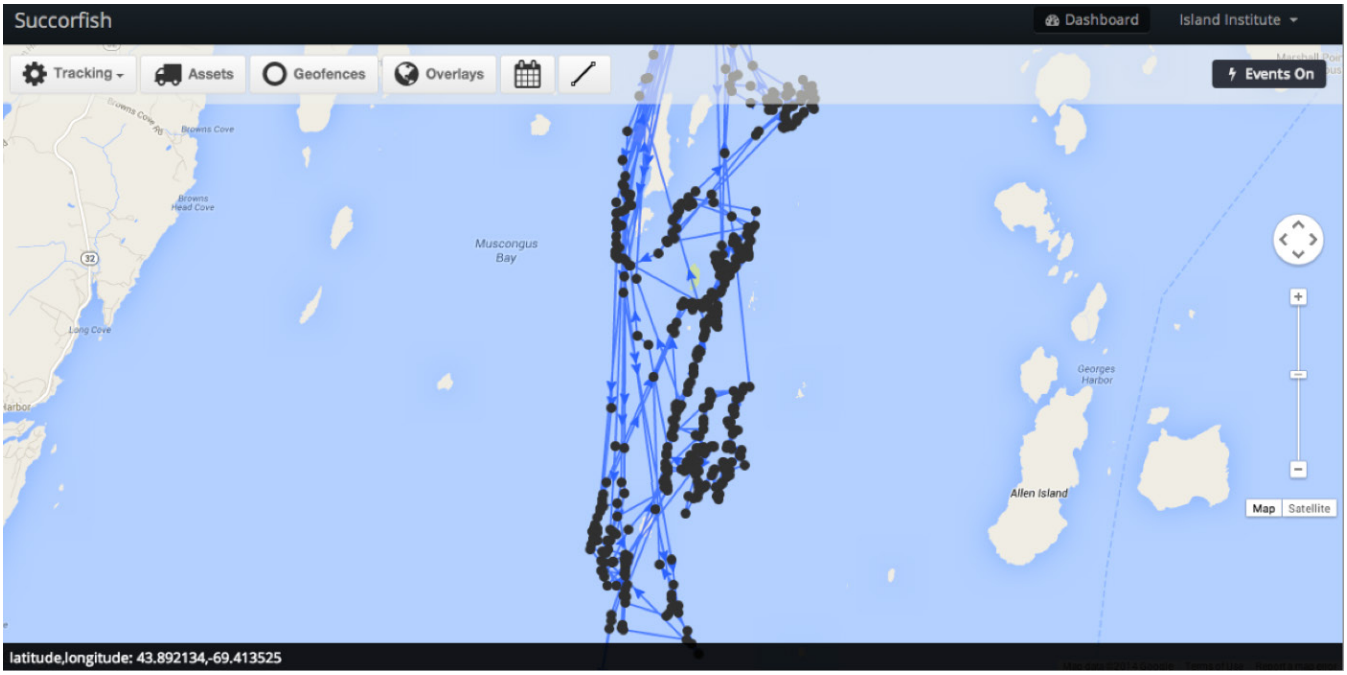


Figure 9: Image of Succorfish screen, showing location tracking and trap locations of a fisherman from Friendship

To protect confidentiality of individual lobstermen, data could be held confidentially until combined with the data of other lobster fishermen in the proposed ocean-use area as was done with the NROC Phase II mapping project[31]. The result would be accurate spatial characterization of an area by lobstermen for the time period of location tracking, resulting in a picture of the lobster community's "footprint" in the area of a proposed ocean use.

There are also a variety of other techniques, such as in-person interviews and aerial surveys that have been successfully used in other places. In some instances, where the applicant has worked hard to build trust and understanding, fishermen have shared their chart plotters or provided other very specific, proprietary business information. Fundamentally, understanding the operational-scale impacts of a project to specific fishermen is a critical part of engaging in substantive conversations about how to minimize or mitigate potential impacts.

6.3

The lobster fishery should be engaged by specific projects through a variety of techniques, including industry trade associations and established fishing industry media.

The Maine lobstermen who were interviewed want to get information on ocean planning and specific place-based ocean use proposals from state-wide industry associations, such as the Maine Lobstermen's Association, Downeast Lobstermen's Association and the Maine Lobster Union. They trust and rely on these industry associations to keep them apprised of developing issues and for suggestions about how to react individually and as an industry. The Maine Lobstermen's Association publishes a newsletter that is sent to every license holder in the fishery and this is a particularly important source of information for lobster industry members.

Additionally, fishing-industry trade publications such as Commercial Fisheries News are valued and used sources of information. Information inserts similar to those used by the NMFS Greater Atlantic Regional Fisheries Office in Commercial Fisheries News to promote public knowledge, transparency, and dialogue could be used. It is worth noting that federal permit holders receive a lot of mail from NFMS and it worth assuming that not every letter sent to permit holders will be read in a timely fashion – particularly during the peak of the fishing season.

6.4 Specific project proponents should also make an effort to talk to the right fishermen

In addition to engaging the lobster industry through trade publications, the lobster fishery should be engaged by discussing proposed actions with industry leaders and representatives, local fishermen, and fishermen who are potentially impacted by a particular ocean plan or process.

The engagement process for the lobster fishery isn't mysterious, but ocean planning processes need to recognize that it is complex. Attempts to shortcut the stakeholder engagement process will result in missing important information and conversations. Additionally, not engaging properly with the lobster fishery will reinforce feelings of disenfranchisement in these processes.

6.5 Conclusion

This report has attempted to characterize how lobstermen use the ocean and how those practices are changing. It has also sought to identify items of concern at the intersection of the lobster fishery and other ocean uses. When considering ocean uses that could impact the lobster fishery, it is critical to look at the type of impact a proposed use will have, such as (1) long-term exclusion from an area (not being able to fish), (2) non-exclusive, temporary exclusion (other people fishing in an area), or (3) transient use that causes trap loss or an inability to fish an area for a certain time period. Identifying the type and magnitude of impact and the general background information about a particular ocean use will help to improve stakeholder dialogue and communication.

The recommendations made in this report reflect, to some extent, what fishermen are seeking out of the Ocean Plan and the planning process. It does not capture the specifics of what lobstermen from across the state of Maine desire out of the process. The reason for this has been touched on in this report: the uniqueness of each fishing community along Maine's diverse coast necessitates that conversations about what lobstermen want out of the process occur at the local level on a project-by-project basis. It would do the industry a disservice if we were to make blanket statements about what the industry wants out of the process as we would overshadow the place-based nature of the fishery, as well as the place-based impacts of any future ocean-use projects.

7

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Appendix

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Appendix: Lobster resources relevant to ocean planning

The following resources provide detailed information on the American Lobster fishery not included in the official report. These resources are intended to provide additional contextual and background information on the fishery that are relevant to ocean use.

Resource:
Department of Marine Resources "A Guide to Maine Lobstering"

Description:
This web page and downloadable report provide information about the history of lobstering, the biology of the lobster, conservation practices, and laws and rules pertaining to the fishery in the State of Maine.

Available at:
http://www.maine.gov/dmr/rm/lobster/guide/index.htm

Resource:
Island Institute's "Mapping Working Waters- Offshore Fisheries"

Description:
These maps are the result of a series of interviews with commercial fishermen with decades of experience fishing off Maine's shores. The maps were created through the Island Institute's Mapping Working Waters project to fill the gap in information on where and when commercial fishing occurs in Maine state and proximate federal waters. Maps included here show fishing areas for lobster, groundfish, tuna, hagfish, and shrimp, as well as bottom names in select parts of the coast.

Available at:
http://www.islandinstitute.org/resource/mapping-working-waters-offshore-fisheries

Resource:
Island Institute's "Incorporating Community in Regional Ocean Planning " Report

Description:
This report builds off of the Island Institute's history of community level engagement with island and remote coastal communities and provides recommendations for how to incorporate community level information into the regional planning process

Available at:
http://www.islandinstitute.org/resource/incorporating-community-regional-ocean-planning

Resource:

NOAA- Endangered Species Act Section 7(a)(2) consultation on the American Lobster Fishery

Description:
This report details the assessment of the American Lobster fishery in regards to it's actual and potential impacts on whales. The report consists of a description of the gear used, and a description of the current American Lobster fishery. This report contains information on effort in the fishery, federal lobster permits and VTR reporting, and the timing and location of fishing activity

Available at:
http://www.greateratlantic.fisheries.noaa.gov/protected/section7/bo/actbiops/2014finalamericanlobsterbiop073114.pdf

Resource:

Northeast Regional Ocean Council "Final Report to the Northeast Regional Ocean Council: Commercial Fisheries Spatial Characterization"

Description:
This report describes how New England's commercial fishing utilize ocean space. It uses National Marine Fisheries Service information, Vessel Monitoring System (VMS) information, and Vessel Trip Report data to create maps of ocean use. The purpose of this project was not to map individual actions, but rather, to use existing VMS and VTR data sets to begin to understand the spatial footprint of fishing over the entire Northeast region. Appendices also provide additional information.

Available at:
http://northeastoceancouncil.org/wp-content/uploads/2013/09/Commercial-Fisheries-Spatial-Characterization-Report.pdf
http://neoceanplanning.org/wp-content/uploads/2013/12/Commercial-Fisheries-Spatial-Characterization-Appendices-B-C.pdf
http://neoceanplanning.org/wp-content/uploads/2013/12/Commercial-Fisheries-Spatial-Characterization-Appendices-D-G.pdf

Resource:

Maine Lobstermen's Association "Lobster Pot Gear Configurations in the Gulf of Maine"

Description:
This publication documents the range of fixed-gear lobster fishing methods in the Gulf of Maine. It provides new data and illustrations on how lobster trap gear is configured and deployed by season and location. It fills a major gap in understanding the characteristics of trap gear, and is intended to help fishery managers better understand the fishery and evaluate the relative impacts of potential regulatory changes involving lobster gear.

Available at:
http://mainelobstermen.org/pdf/Lobster_Gear_Report.pdf

Resource:

Gulf of Maine Research Institute "Gulf of Maine Lobster Forecasting"

Description:
This report provides information regarding the timing of the period of high landings in the fishery. This can be a tool to help provide specific information regarding the timing of the fishery specific to a calendar year/

Available at:
http://www.gmri.org/our-work/research/projects/gulf-maine-lobster-forecasting

Resource:

Maine Department of Marine Resources "Governor's Task Force on the Economic Sustainability of Maine's Lobster Industry"

Description:
This executive order created a task force who produced a strategic plan for Maine's lobster fishery. This report focuses primarily on the economics of the fishery and recommends several steps for improving the fishery and it's marketability. Resources include the executive action, the presentation by the consulting group, and the official report.

Available at:
http://www.maine.gov/dmr/council/eslobster/index.htm

Resource:

The University of Maine's Wahle Lab: American Lobster settlement Index

Description:
The American Lobster Settlement Index (ALSI) is an annual monitoring program that quantifies the pulse of newly settled lobsters that repopulate rocky coastal nursery grounds in New England and Atlantic Canada. Quantifying this segment of the life history is especially valuable because it is the only time when one can identify with certainty the strength of an individual year class. It is a pivotal life stage that both sheds light on the ocean processes that deliver larvae to nurseries, and is useful as a predictor of future trends in recruitment to the fishery. It also identifies areas of study that are important nursery areas. The identification of these and similar areas are relevant to ocean use.

Available at: http://umaine.edu/wahlelab/current-projects/american-lobster-settlement-index/

Back cover photo: Nick Battista


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