



South Portland Pier Aquaculture & Fishing Needs Assessment

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**Gulf of Maine
Research Institute**

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We thank the Maine Department of Marine Resources and NOAA Fisheries for providing landings and permit data that was critical to the quantitative components of this needs assessment.

Introduction

The following needs assessment was created to support development of a long-term vision, or “Master Plan,” for the Portland Street Pier (Pier) as useful infrastructure for Casco Bay’s aquaculture and fishing industries. It is intended to help the City of South Portland (City) understand how Casco Bay’s aquaculture and commercial fishing industries might utilize the Pier as they develop their long-term vision for the structure; but we hope that it is also useful to the broader community in understanding what type of working waterfront infrastructure currently exists and how it supports these sectors’ business operations.

In the Fall of 2016, the Gulf of Maine Research Institute (GMRI) first learned of the City’s interest in more-fully utilizing and possibly expanding the Pier to support additional commercial uses. Upon hearing that the City was planning to prioritize the needs of aquaculture and commercial fishing industries, GMRI was eager to help. GMRI’s work is focused on supporting the economic resiliency of local communities that depend on the Gulf of Maine ecosystem to make a living. As such, the City’s goal to revitalize the Pier to support current and future needs of aquaculture and commercial fishing industries at a time when commercial working waterfront facilities are dissipating, aligns precisely with GMRI’s mission.

This project represents a partnership between the City, GMRI, and GEI Consultants. GMRI’s role, through our needs assessment, is to help the City understand: 1) which aquaculture and commercial fishing sectors are likely to use the Pier and 2) what type of pier-scale infrastructure would be practical and useful to them. The City will use the needs assessment as a key data point to select design alternatives. Finally, GEI will do a financial feasibility analysis of the design options.

It is important to note the outcome of GMRI’s needs assessment and GEI’s engineering and economic work will result in creation of a planning document only. Further action by City leadership will be necessary to move this project from planning to implementation.

Scope and Methodology

Our research took the approach to: 1) identify specific commercial aquaculture and fishing sectors that are most likely to use the Pier and 2) provide operational details of these sectors to help the City understand how different pier configurations and services might or might not be useful or practical. Data sources include: publicly available permit and landings data sets; structured interviews with aquaculturists and commercial fishermen; unstructured conversations with aquaculturists and commercial fishermen (typically as follow-up conversations); a Casco Bay aquaculture needs assessment survey; an aquaculture industry listening meeting, and a commercial fishing industry listening meeting.

Executive Summary

Overview

The Portland Street Pier has provided a vital but perhaps underutilized role on Portland Harbor's working waterfront. While many aspects of the current design work well, there is an opportunity to utilize the pier to better meet the needs of the existing users as well as build capacity for new users including those from the emerging aquaculture industry. In fact, there is great potential for the Pier to serve both wild-capture and aquaculture because these sectors have similar support infrastructure needs in most cases.

Summary of Aquaculture Industry Needs

Aquaculture operations are not new to Casco Bay, but are historically less represented than wild-capture fisheries. In the last few years though, interest in aquaculture has surged. Approximately 70% of leases within 10 miles of the Pier were issued in the last five years and approximately 80% of limited purpose license sites (LPA) within 10 miles of the Pier were issued in the last two years. The vast majority of these LPAs were issued for oyster operations, though the overall aquaculture landscape of Casco Bay is quite species diverse with established commercial-scale oyster, mussel, and kelp businesses, and a budding scallop sector. The majority of the commercial-scale companies currently meet their infrastructure needs through a combination of company-owned assets and existing Portland Harbor resources, while the LPA-based start-up farms are operating at such small scales that their infrastructure demands are low. However, with the nascent production potential of these start-up operations, infrastructure demands in Portland Harbor are likely to increase, especially by the oyster sector.

Based on the results of the aquaculture industry survey and the stakeholder's meeting, as well as conversations with establish aquaculturists in the area, there does not appear to be an immediate need for aquaculture industry infrastructure. However, we did identify several infrastructure services specific to aquaculture that could be met at the Pier. Looking towards future infrastructure demands from the aquaculture industry, the most promising uses at the pier are:

- Boom with 2,000 lbs capacity for moving product and gear
- Affordable slips, in the 20 – 35 ft range
- Cold storage for efficient harvest to distribution chain

- Upweller space was identified as a potential use for the pier, though it's currently unclear if the regulations would allow for locating an upweller at this site.

The oyster sector was identified as the most promising aquaculture users of the Pier due to 1) high likelihood of significant production increases in the sector and 2) typical shoreside infrastructure of oysters producers are at a scale that fits with the size of the Pier. The kelp sector could also be potential users of the Pier, though only for a short season and contingent on cold storage being available there. The nascent scallop sector holds promise as users of the Pier, though usage is dependent on successful commercialization of growing techniques. So, while there are no immediate aquaculture infrastructure needs to be met, the City has the opportunity to position the Pier as an aquaculture hub by considering aquaculture specific infrastructure needs in the long-term plans for the Pier.

Summary of Commercial Fishing Needs

Portland Harbor is a hub for several commercial fishing sectors, most prominently the lobster, groundfish, and tuna sectors. There are a significant number of state-permitted lobster vessels in Portland Harbor (a handful also carry scallop permits) that fish in-shore seasonally from June through December. Approximately 2/3 of these vessels berth on the Portland side of the Harbor, and while there are 20-50' vessels berthed on either side of the Harbor, all vessels larger than 50' berth on the Portland side. There are also a significant number of federally-permitted vessels for offshore lobster or groundfish in Portland Harbor, many of which fish year-round. The vast majority of these vessels berth on the Portland side of the Harbor due to the availability of critical resources (ie. Portland Fish Exchange) and year-round protected slips. These vessels are larger than those for the inshore fishery, ranging from 40' to 60'. There are also a significant number of vessels holding federal tuna permits in Portland Harbor, which are nearly evenly distributed between South Portland and Portland. While the most common tuna fishing vessel sizes ranges from 30' to 60', all vessels larger than 50' berth on the Portland side, following the trend of the other sectors. It was mentioned several times in our discussions with fishermen that it would be dangerous to try to maneuver a vessel larger than about 45' to berth at the Pier given the proximity of surrounding structures.

Based on our research of the commercial fishing sectors and our conversations with commercial fisherman, including the existing Pier users, **the most promising sectors for using the Pier are the state-waters lobster and tuna fishermen.** Perhaps unsurprisingly, in 2017, berthing slips were rented by lobster and tuna fishermen exclusively. The large vessel size, year-round seasonality, and lack of critical services (ie. Portland Fish Exchange) make federal-waters lobster and groundfish vessels unlikely users of the Pier.

Affordability is a key reason why current tenants berth at the Pier, which is consistent with the need and high demand for affordable slip space throughout the Harbor. Because the most promising fishing sectors (lobster and tuna) are seasonal, a seasonal Pier would likely meet their needs. However, there was interests in extending the current season by about a month in the spring and fall.

The most useful infrastructure services for the commercial fishing industry are:

- Affordable, seasonal slips in the 20 – 45 ft. range
- Winch or boom with 1,000 lbs capacity
- Secure space to temporarily store lobster traps.

Pier Overview

The Portland Street Pier is owned by the City of South Portland and currently operates as a municipal fishing pier. It is located at the end of Portland Street in the Ferry Village neighborhood of South Portland between the Portland Pipeline Corporation oil tanks and Sunset Marina. The fixed pier structure is approximately 20' x 200' and supports a 16' x 60' building. Floating docks are put in from April – November (Figure 1-3) with 15 seasonal commercial slips.

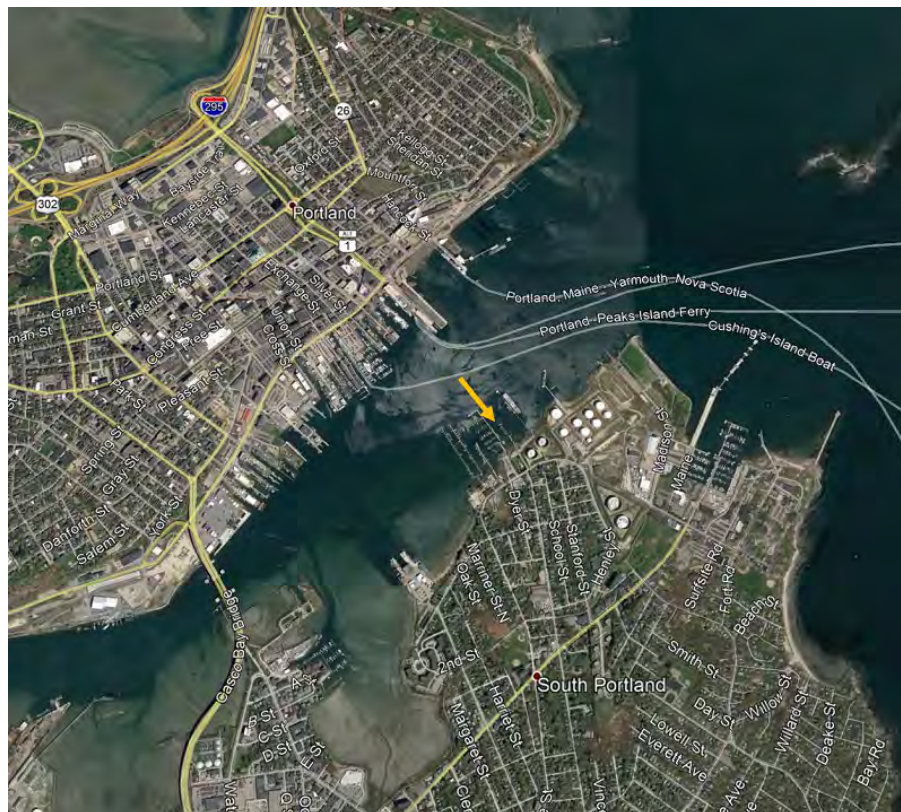


Figure 1. Overhead view of Portland St. Pier



Figure 2. Zoomed overhead of Portland St. Pier

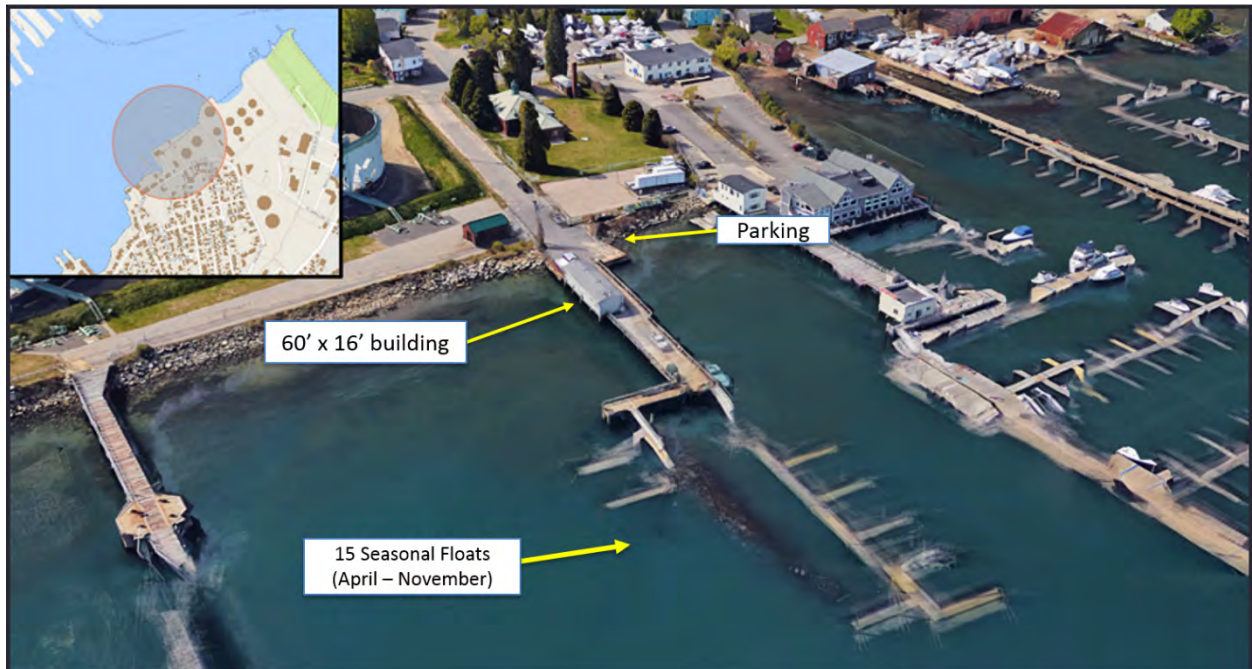


Figure 3. Aerial photo of Portland St. Pier. Source: GEI Consulting.

Existing Portland Harbor Working Waterfront Infrastructure

Overview

Portland Harbor is comprised of two distinct waterfronts, the South Portland waterfront on the southeast side of the Fore River and the Portland waterfront on the northwest side of the River. The landscape of Portland Harbor is characterized as a vibrant working waterfront that provides a plethora of marine infrastructure and services to both aquaculturists and commercial fishermen. Based on our existing knowledge of Portland Harbor and the operations of these industries, one-on-one conversations with individuals familiar with the harbor, and some additional research, we have identified key infrastructure and services and inventoried their availability in the harbor. Understanding the current landscape of working waterfront infrastructure will allow the City to focus on services that are in short supply and avoid redundancy within Portland Harbor as they consider Pier designs.

Descriptions of Key Infrastructure and Services

This section provides a brief description of waterfront infrastructure that is used by aquaculture and commercial fishing businesses, most of which can be found in Portland Harbor.

Moorings:

A mooring is an anchored buoy where a boat is tied and stored when not being used. Because moorings are not attached to the shore, a small boat or skiff is required to access them. Users need a nearby shoreside location, typically on a beach or pier, to store their skiff as well as adequate parking for vehicles. Because of winter storms, commercial boat users prefer to keep their boats on slips that are protected from northeast winds during the winter months for ease of access, protection, and maintenance in any weather conditions. As such, moorings in Portland Harbor are only available seasonally. Most of the moorings available in Portland Harbor are managed by the Portland Harbor Commission and cost \$80 for residents and \$160 for non-residents for the season. The availability of these mooring varies from year to year, but there is often a waiting list for moorings as they are in high demand. Moorings are useful to aquaculturists and commercial fishermen.

Slips and Landings:

A boat slip is a specified part of a pier or wharf where a boat can be berthed. Slips are generally rented out to users on a monthly or seasonal basis for a set fee. Most slips include additional services such as electricity, waste pump-out, and fresh water hose-downs. Transient slips and boat landings are usually available for an hourly fee. In addition to berthing, slips and landings are used for off-loading gear, supplies, and product. Depending on the product or gear, access to a boom or crane may be necessary for loading/offloading, as well as vehicle access to the slip. Adequate and affordable nearby parking is also necessary. Commercial boat users prefer to keep their boats on slips, rather than moorings, during the winter to keep them protected from storms and allow for ease of access and maintenance in any weather conditions. However, some slips are only available during the summer months due to ice and wind exposure, limiting use during the winter. Slips and boat landings are useful to aquaculturists and commercial fishermen.

Space for Gear Storage, Tending, and Rigging:

Access to yard space for making gear repairs as well as space for gear storage is useful to aquaculturists and commercial fishermen. Some slips provide space for these activities, but due to space limitations on the waterfront many aquaculturists and commercial fishermen must move inland for these activities.

Public Boat Ramp:

A boat ramp is built into the shore, usually out of concrete, and extends from the shore into the intertidal zone. Users launch boats by driving a trailered vessel down the ramp, into the water. Boat ramps are also used to haul out boats for servicing or winter storage. Adequate and affordable parking is necessary at public boat ramps. Most boatyards and marinas have private boat ramps or boat lifts, but public boat ramps are useful to aquaculturists and commercial fishermen who may not have access to these private ramps.

Fuel:

Most vessels larger than a skiff require access to shoreside fuel, either diesel and gasoline. Most marinas and boatyards sell dockside fuel, both diesel and gasoline, though some only operate during the summer months. Shoreside fuel services are useful to aquaculturists and commercial fishermen.

Marinas and Boat Yards:

Full-service marinas and boat yards offer a variety of vessel and engine repair services, as well as winterization and storage. Engine and boat parts can also be purchased for do-it-yourself repairs. Many of these businesses are also boat dealers and are a wealth of knowledge about all things related to marine operations. Marinas and boat yards are useful to aquaculturists and commercial fishermen.

Marine Supplies:

The broad category of marine supplies covers everything from boots and bibs to traps and nets. There are several businesses that sell most of the basic equipment, supplies, and apparel used by both commercial and recreational boat users. There are also several businesses that sell a narrower range of more specialized products such as lobster traps and liferafts. Many marinas and boat yards have a marine supply store with basic equipment and supplies. Marine supply businesses are useful to aquaculturists and commercial fishermen.

Marine Algae (Kelp) Nurseries:

In Maine, marine algae (commonly referred to as kelp or sea vegetables) aquaculture begins in a nursery. In the laboratory setting of the nursery, spores are isolated from mature plants and collected on spools of nylon twine. The spores are then reared for several weeks in the nursery. Kelp aquaculturists purchase these kelp-seeded spools to deploy and grow-out on their farms. Kelp nurseries are useful to kelp aquaculturists.

Oyster Hatcheries:

The majority of Maine's cultured oysters begin their lives in a hatchery, where juvenile shellfish, called "spat," are produced. In the laboratory setting of a shellfish hatchery, adult oysters are induced to spawn and the resulting larvae are reared in the hatchery to the juvenile stage. Aquaculturists can purchase this oyster spat to grow it out in an upweller or plant directly on their farm depending on the size of the spat and growing technique. There are no oyster hatcheries in Portland Harbor.

Upwellers:

Upwellers (also known as a “floating upweller system” or FLUPSY) are commonly used for oyster aquaculture. With this method, oyster spat purchased directly from the hatchery that is too small to survive if planted directly on site is reared in an upweller for several months during the warm seasons. Some oyster growers with upwellers purchase spat from a hatchery, rear it until it’s large enough to transfer out of the upweller, and sell this larger spat to small-scale or new growers who do not have upwellers. Upwellers can be built directly into floating docks or connected parallel to a dock structure. While designs vary, all upwellers include mesh covered underwater silos to hold the spat, and a pump that increases waterflow and thereby delivers naturally abundant phytoplankton (shellfish’s food source) to the spat, which increases its growth rate. Upwellers require reliable electricity to run the pump and are typically located nearshore at marinas or boat yards. Upwellers are useful to oyster aquaculturists.

Waterfront Cold Storage:

Cold storage facilities are refrigerated warehouses used to store a variety of goods including seafood. These facilities can be used to store seafood products until they can be distributed, maintaining the cold chain. Public cold storage facilities may be utilized indirectly by aquaculturists and commercial fishermen through processors and wholesalers, though many processors and wholesalers have private cold storage. Cold storage facilities used to store shellfish require certain sanitation certifications and must be managed by a certified shellfish dealer. Contact the Maine Department of Marine Resources, Bureau of Public Health for details about required certifications. Cold storage facilities are useful aquaculturists and commercial fishermen.

Ice:

Ice is often required on-board to maintain the cold chain while harvesting product or fishing, as well as during transportation of seafood products. Commercial fisherman, except lobstermen, use large quantities of ice in on-board coolers. Many shellfish aquaculturists also use ice on-board, though some use reusable ice packs or coolers rather than cubed or block ice. Ice used to chill food products including seafood must be manufactured with a commercial food processing license acquired through the Department of Agriculture. Contact the Maine Department of Agriculture or the Maine Bureau of Public Health for more details about required licenses. Ice is useful to aquaculturists and commercial fisherman.

Processors, Dealers, & Wholesalers:

Seafood products are distributed to market through a network of processors, dealers, and wholesalers. The supply chain is complicated and varies depending on the species, but all shellfish species (mussels, oysters, clams, and scallops), whether harvested from the wild or farm raised, must be sold to certified shellfish dealers who process the product for wholesale distribution. Most shellfish dealers also operate as wholesalers, distributing product to restaurants and retailers. Casco Bay’s two established mussel aquaculture companies operate mussel processing facilities, though at this time they only process their own product. The supply chain for kelp is similar, though there is currently only one processor and wholesaler in the state, located in Saco. For commercial fishermen and lobstermen the supply chain is similar, but there are some slight differences. Essentially all the finfish that comes through Portland is sold through the Portland Fish Exchange, and lobster landed in Portland is sold through a complicated network of processors, wholesalers, and dealers with many companies

occupying multiple roles. Some of the seafood processors and wholesalers in Portland only buy and sell lobster. Most of the processors and wholesalers deal in a variety of seafood products including aquaculture products.

Lobster Bait:

Lobstermen use fish bait in their traps to catch lobsters. A variety of fish can be used from herring to redfish to menhaden (pogies). Many lobster processors, dealers, and wholesalers sell bait to the lobstermen they buy lobsters from. Lobster bait is useful to commercial fishermen, specifically lobstermen.

Table 1. Waterfront services by commercial sector.

WATERFRONT SERVICES	USER GROUP		
	Shellfish Aquaculturists	Seaweed Aquaculturists	Commercial Fishermen
Moorings	X	X	X
Slips and Landings	X	X	X
Public Boat Ramp	X	X	X
Fuel	X	X	X
Marinas & Boat Yards	X	X	X
Marine Supplies	X	X	X
Kelp Nursery		X	
Hatchery	X		
Upweller	X		
Waterfront Cold storage	X	X	X
Ice	X	X	X
Processors, Dealers & Wholesalers	X	X	X
Lobster Bait			X

Infrastructure and Services Available in Portland Harbor

Table 2 and Figure 4 (next pages) list infrastructure and services available in South Portland and Portland. The map shows the relative locations of these infrastructure and services.

Table 2. Working waterfront infrastructure or service by city.

	SOUTH PORTLAND	PORTLAND
* MOORINGS	<ol style="list-style-type: none"> 1) Bug Light, Bug Light Park 2) Centerboard Yacht Club, 271 Front Street 3) Spring Point, Front Road 4) Sunset Marina, 231 Front Street 5) Turners Island LLC, 40 Mechanic Street 6) Willard Beach Mooring Field, 44 Beach St. 7) Dana Beach, 1 Bay Road 	<ol style="list-style-type: none"> 1) East End Beach, East End Beach 2) Maine Yacht Center, 100 Kensington Street 3) Martin's Point
SLIPS & LANDINGS	<ol style="list-style-type: none"> 1) *Aspasia Marina, 257 Front Street 2) *Knightville Boat Landing, Knight Park 3) Port Harbor Marine, 1 Spring Point Drive 4) *Portland Street Pier, Portland Street 5) South Port Marine, 14 Ocean Street 6) *Sunset Marina, 231 Front Street 7) Turner Island LLC, 40 Mechanic Street 	<ol style="list-style-type: none"> 1) Across the 16 private piers of the Central Waterfront there is 16,000 feet of commercial slip space. 2) DiMillo's Marina, 1 Long Wharf 3) Maine State Pier transient slips, 70 Commercial St. 4) Maine Yacht Center, 100 Kensington Street 5) Portland Fish Exchange, 6 Portland Fish Pier 6) Portland Ship Yard, 100 West Commercial Street
PUBLIC BOAT RAMP	<ol style="list-style-type: none"> 1) South Portland Municipal Boat Ramp, Bug Light Park 	<ol style="list-style-type: none"> 1) Portland Public Boat Ramp, East End Beach
FUEL	<ol style="list-style-type: none"> 1) Port Harbor Marine, 1 Spring Point Drive 2) South Port Marine, 14 Ocean Street 3) *Sunset Marina, 231 Front Street 	<ol style="list-style-type: none"> 1) DiMillo's Marina, 1 Long Wharf 2) *Maine Yacht Center, 100 Kensington Street 3) *Vessel Services Inc., 1 Portland Fish Pier
MARINAS & BOAT YARDS	<ol style="list-style-type: none"> 1) *Aspasia Marina, 257 Front Street 2) Port Harbor Marine, 1 Spring Point Drive 3) Reo Marine, 187 Sawyer Street 4) South Port Marine, 14 Ocean Street 5) *Sunset Marina, 231 Front Street 	<ol style="list-style-type: none"> 1) Maine Yacht Center, 100 Kensington Street 2) Portland Ship Yard, 100 West Commercial Street 3) Portland Yacht Services, 400 Commercial Street
MARINE SUPPLIES	<ol style="list-style-type: none"> 1) Port Harbor Marine, 1 Spring Point Drive 2) Sea Rose Trap, 120 Breakwater Annex 3) South Port Marine, 14 Ocean Street 4) Turner Island LLC, 40 Mechanic Street 	<ol style="list-style-type: none"> 1) Chase Leavitt Co., 144 Fore Street 2) Hamilton Marine, 100 Fore Street 3) Maine Liferaft, 36 Union Wharf 4) Maine Marine Supply, 416 Commercial St. #7 5) Sawyer & Whitten Marine, 36 Union Wharf 6) Vessel Services Inc., 1 Portland Fish Pier
KELP NURSERY	<ol style="list-style-type: none"> 1) Ocean Approved Kelp Nursery, Southern Maine Community College Marine Science Center 	

	SOUTH PORTLAND	PORTLAND
WATERFRONT COLD STORAGE		1) Portland Fish Exchange, 6 Portland Fish Pier
ICE		2) Vessel Services Inc., 1 Portland Fish Pier
PROCESSORS, DEALERS & WHOLESALERS		1) Bangs Island Mussels, 72 Commercial St. #15 2) Bristol Seafood, 5 Portland Fish Pier 3) Browne Trading, 261 Commercial Street 4) Calendar Island Mussels, Deake's Wharf 5) Calendar Islands Lobster, 6A Portland Fish Pier 6) CBS Lobster, 52 Union Wharf 7) Cozy Harbor, 35 Union Wharf 8) Custom House Seafood, 26 Custom House Wharf 9) Douty Brothers, 10 Portland Fish Pier 10) Down the Bay Lobster, 60 Portland Pier 11) Free Range Fish & Lobster, 450 Commercial St. 12) Harbor Fish, 9 Custom House Wharf 13) ISF Trading, 390 Commercial Street 14) Lucky Catch Lobster, 41 Union Wharf 15) Maine Lobster Direct, 48 Union Wharf 16) North Atlantic Inc., 2 Portland Fish Pier 17) Nova Seafood, 555 Commercial Street 18) Ready Seafood, 40 Commercial Street 19) Upstream Trucking, 72 Commercial Street #5
LOBSTER BAIT		1) CBS Lobster, 52 Union Wharf 2) Coastal Bait, 26 Custom House Wharf 3) Cozy Harbor, 35 Union Wharf 4) Dropping Springs Bait Co., 6A Portland Fish Pier 5) Maine Fisheries LLC, 430 Commercial St. 6) New England Fish Company, 446 Commercial St.
OTHER		1) Maine Intl. Trade Center, 2 Portland Fish Pier

*Seasonal

†Diesel only

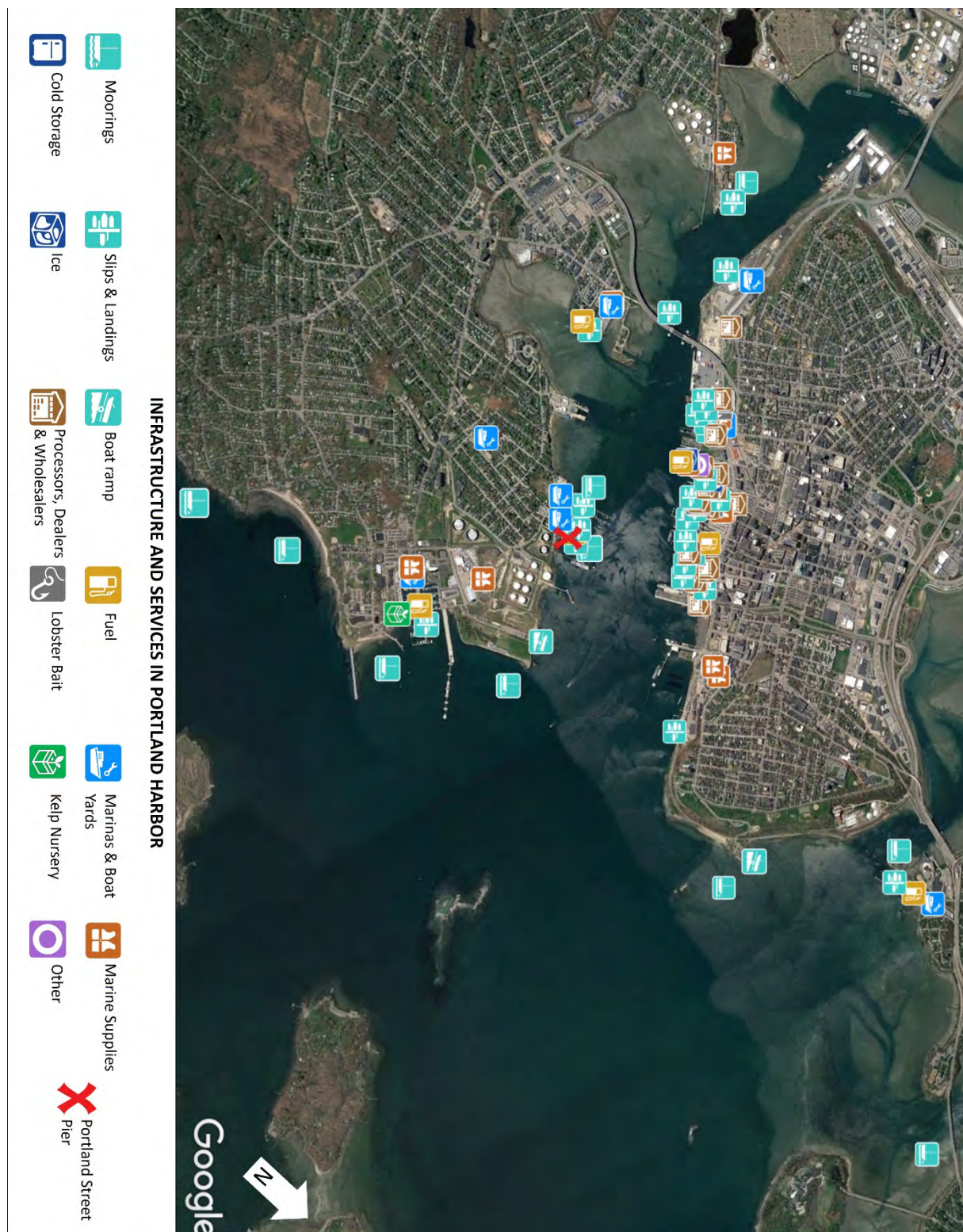


Figure 4. Map of Portland Harbor working waterfront infrastructure and services¹.

¹ KMZ digital file of infrastructure map with additional information available upon request.

Table 3 characterizes which infrastructure and services are available, in short supply, and unavailable on each side of the Harbor based on our research, conversations with knowledgeable parties, and our own knowledge of the area. The aquaculture and commercial fishing sections of this report provide further details of sector specific needs including perceptions.

Table 3. Working waterfront infrastructure availability summary table

WATERFRONT SERVICES	SOUTH PORTLAND			PORTLAND		
	Available	Short Supply	Unavailable	Available	Short Supply	Unavailable
Moorings	X			X		
Slips and Landings		X			X	
Public Boat Ramp	X			X		
Fuel	X			X		
Marinas & Boat Yards	X			X		
Marine Supplies	X			X		
Kelp Nursery	X					X
Hatchery			X			X
Upweller			X			X
Waterfront Cold Storage			X		X	
Ice			X		X	
Processors and Wholesalers			X	X		
Lobster Bait			X	X		

Infrastructure Needs in Portland Harbor

- Slips – Affordable, year-round, commercial slip space is in high demand. The slip space (commercial or recreational) available in South Portland is almost entirely seasonal, while almost all the year-round slips are located on the Portland side of harbor.
- Waterfront Cold Storage – The only public waterfront cold storage facility (Portland Fish Exchange) is located on the Portland side of the harbor.
- Ice – There is only one ice manufacturer located on the Portland side of the harbor.
- Upweller – There are currently no upwellers located in Portland harbor. If the regulations allow for it², upweller space in Portland Harbor could be a valuable resource for shellfish aquaculturists.

² It is unknown if the 300:1 dilution ratio specified in the March 15, 2018 DMR regulatory package would prohibit the use of upwellers at the Pier. See http://www.maine.gov/dmr/laws-regulations/documents/Chapter2_PDMAPAFILING1.pdf for details.

Key Takeaways for Existing Portland Harbor Infrastructure:

- Aquaculturists and commercial fishermen share many of the same infrastructure and service needs.
- The least common infrastructure in Portland Harbor is: 1) affordable, year-round, commercial slip space; 2) waterfront cold storage; 3) ice manufacturer; 4) upweller space.
- Many of the key infrastructure and services used by aquaculturists and commercial fishermen are available on both the South Portland and Portland sides of the Harbor. Specifically: fuel, marinas and boat yards, marine supply stores, and moorings.
- There are a number of key infrastructure and services that are only available on the Portland side including: processors, dealers and wholesalers; lobster bait dealers; waterfront cold storage; and ice.
- In general, infrastructure on the South Portland waterfront is available seasonally, while most of the infrastructure on the Portland waterfront is available year-round.
- It appears that commercial fishermen, and potentially aquaculturists, operating out of South Portland are dependent to some extent on the Portland waterfront for commercially specific services such as wholesalers, dealers, processors, and ice.

Aquaculture

Current Landscape

Overview

The following section provides a brief overview of oyster, mussel, and kelp aquaculture practices and summarizes aquaculture activity within a ten mile radius of the Pier. Additional details about Casco Bay's aquaculture sites are available at <http://www.maine.gov/dmr/aquaculture/leases/decisions/index.html>.

Oysters

Oyster aquaculture involves three main stages:

- 1) Nursery phase: Step one to growing oysters typically involves purchasing spat (juvenile oysters) from one of two hatcheries located on the Damariscotta River, though some aquaculturists do collect wild oysters to grow out on their sites. Hatchery spat is generally too small to survive on the grow-out site, so it is typically grown to a larger size during the nursery phase for a few months first. Statewide, the most common techniques for the nursery phase are upwellers and floating tiny-mesh bags, though Casco Bay's aquaculturists typically utilize upwellers.
- 2) Grow-out phase: When they are large enough, oysters are transferred from the nursery to the grow-out site. Aquaculturists in Casco Bay will either scatter their oysters directly on the bottom (bottom planting), place the oysters in cages or bags that are sunk to the bottom (bottom cages/bags), or put the oysters in cages or bags outfitted with floatation to hold them at the surface (surface cages/bags). Growing oysters in either cage system (on bottom or floating) requires regular maintenance to remove biofouling organisms that restricts flow and sorting oysters to maintain healthy

densities. Many growers who use cage systems will also tumble oysters in large stainless steel or aluminum “tumblers” to shape their shells. Tumblers are usually fairly large (~10 feet in length) and may be located on shore or on a floating barge at the farm site. Most aquaculturists who bottom plant oysters also employ suspended aquaculture techniques at some point during the process. During the winter, most oyster growers will sink (if using floating cages) or “overwinter” their oysters to prevent any damage from winter ice, during which time, product is unavailable for sale. Some of Maine’s leading oyster businesses have gained a competitive advantage by having market-ready oysters available in the winter months when demand is high and supply is low. While this technique is uncommon for early-phase oyster farms, some of Casco Bay’s more established oyster producers have succeeded in providing winter oysters in recent years. It is likely that this trend will increase as new companies mature.

- 3) Harvesting market-ready product: Oysters grown in Casco Bay take approximately three years to reach market size, but growth rates vary depending on the environmental conditions of the site and husbandry techniques. Statewide, oysters are generally harvested during the summer months, but there is a growing contingent of aquaculturists harvesting year-round as noted above. Harvesting oysters grown in bags or cages is relatively simple, as they just need to be removed from the bag or trays they’ve been growing in and cleaned. Again, there are many techniques and equipment used to increase the efficiency of the process, but in general small-scale aquaculturists, like those in Casco Bay, will haul the bags, cages, or trays onto their boat and empty the oysters into buckets, fish totes, or insulated Xactics. Bottom planted oysters are harvested by hand at low tide, by a diver, or from a boat with a dredge or rake. Often oysters harvested from the bottom will be finished in floating bags prior to being sold. Once harvested, the next steps are cleaning and sorting the oysters, which is done either from a work float or on shore. Cleaning typically involves spraying the oysters down (with either salt or freshwater) to remove any mud and silt, though some growers will take the extra step of cleaning the oysters with a hand-held brush. Clean oysters are then sorted by size and quality. There are large scale machines that wash and even sort oysters, but most small-scale aquaculturists will do both steps by hand with just a table and a hose. If large volumes of oysters are being harvested a crane may be required to transfer Xactics or multiple fish totes from the boat to the shore. Tidal height would influence when harvesters could offload onto a fixed pier. Smaller volumes or smaller containers could be offloaded by hand. Once oysters are clean and sorted, they are bagged for distribution. Oyster harvesters are required to get their product to a certified shellfish dealer within a certain timeframe.

Blue Mussels

In Maine, mussels are cultured by spreading them directly on the bottom (Dutch style) or beneath a floating wooden raft (Spanish raft method). Currently, Casco Bay mussel aquaculturists are exclusively using the Spanish raft method, which is described below. The seeding and grow-out happens on a series of 40'x40' floating rafts below which 300 to 400 vertical lines that mussels are attached to are hung.

- 1) Seed collection phase: Unlike oyster aquaculture, which utilizes hatchery produced seed, commercial mussel aquaculture requires collecting spat from the wild. Casco Bay's mussel farmers accomplish this step by hanging specialized ropes below their rafts during the spawning season (usually begins in late spring in Casco Bay). The spat will naturally attach to the ropes similar to how mussels collect on a piling, dock, or boat hull. Specialized stripping and socking equipment is then used to remove the seed mussels from the collection ropes, and then sort and reattach them to dropper lines for the grow-out phase.
- 2) Grow-out phase: Mussels do not require much maintenance as they grow, except for protecting them from predators, which is done by hanging 40' wide predator exclusion nets to the sides of the rafts. Mussel farmers must routinely remove and clean predator nets to ensure good water-flow. A sorting process that involves stripping the lines, sorting the mussels, and reattaching them may be done during the grow-out phase to achieve the optimal density of mussels per foot of dropper line.
- 3) Harvesting market-ready product: Mussel seed grows to market size in approximately 18-20 months. The general steps to this process are to haul the dropper lines covered with market-ready mussels onto the work barge, separate the mussels from the dropper lines (by hand or with a machine), break apart any the clumps (by hand or machine), and sort by size. Market-ready mussels are transported back to a processing facility in insulated Xactics bins. At the processing facility, mussels are put through specialized processing equipment that cleans, removes byssal thread, and bags the mussels before they are moved into cold storage until they are distributed. Access to a processing facility is an essential part of the mussel harvesting process. Both of Casco Bay's established mussel aquaculture companies operate their own processing facilities on Portland's waterfront and are believed to have excess capacity.

Kelp

Kelp aquaculture involves three main stages:

- 1) Nursery phase: Similar to oysters, kelp seed is produced in land-based nurseries. During the nursery phase, kelp spores are induced to attach to spools of nylon twine. The seeded spools are maintained for about six weeks in the nursery before they are deployed on the farm site.
- 2) Grow-out phase: During the late fall, seeded kelp spools are unspooled to wrap around suspended longlines to which the kelp plants will attach and grow. The growing season for kelp is November to March. Routine monitoring for tangled longlines and ice damage is required during this phase.
- 3) Harvesting phase: Kelp grows very quickly. It takes six months or less for kelp seed to reach harvestable size. Harvesting begins in March and usually wraps up in June. For

this step, longlines are hauled up onto a boat or barge, the kelp is cut from the lines and collected in fish totes, insulated Xactics, or large net bags. Kelp for dried product is brought back to shore and hung out in the sun to dry, avoiding mold growth. Kelp for non-dried food product (e.g., frozen noodles), must be kept refrigerated and processed in a specialized facility. There is one non-dried commercial kelp processing facility currently operating in Maine, out of Saco. Producers who sell to this processor are met onshore by the facility truck which brings it back to the facility for processing. During transport from the farm to the processing facility the kelp is kept chilled in insulated Xactics. Sometimes ice is used by harvesters during the warmer spring months.

Casco Bay Aquaculture

Background

Practically speaking, there are two types of aquaculture permissions for Maine³, which are both utilized in Casco Bay: 1) the limited purpose aquaculture license (LPA), and 2) commercial lease.

LPA: An LPA is a small-scale license that many businesses use to test the suitability of a location and refine their operation prior to applying for a commercial lease (which can be an expensive and time-consuming process). LPAs are restricted to 400 square feet and limited to four per person. The LPA is relatively inexpensive (\$50 per LPA) and quick to procure. For the purposes of this report, Casco Bay's commercial LPAs should be generally viewed as early-phase businesses with potential to become full-fledged commercial scale operations by transitioning to a lease (described below).

Commercial lease: A lease provides businesses with the necessary space to achieve a commercial scale. As opposed to LPAs that are measured in square feet, leases are measured in acres⁴. For the purposes of this report, Casco Bay's leases should generally be viewed as commercial-scale, established businesses.

Existing Aquaculture Sites in Casco Bay

Note: The following analysis focuses on aquaculture businesses that are located within 10 miles of the Pier to reflect a reasonable travel distance for aquaculturists.

There are 12 active and one pending commercial leases within 10 miles of the Pier that are operated by 8 individual businesses (Table 4). Oysters are the most commonly grown species by both acreage and number of leases (Table 5).

³ Visit <http://www.maine.gov/dmr/aquaculture/documents/CONDUCTINGAQUACULTUREINMAINErev2-22-17.pdf> for a detailed summary of lease and license types.

⁴ It would take 109 LPAs to equal one acre (LPA = .009 acres)

Table 4. Commercial lease sites within 10 miles of the Pier by primary species and size. Note: CAS BC pending. Source: Maine DMR

SITE NAME	PRIMARY SPECIES	SIZE (ACRES)
CAS CHEB2	Marine Algae	3.03
CAS LCI2	Marine Algae	0.82
CAS ELCx	Marine Algae	3.83
CAS CF2	Blue Mussels	1.68
CAS BA2	Blue Mussels	1.99
CAS BASK2	Blue Mussels	4.01
CAS LONG	Blue Mussels	1.74
CAS NLCx	Oysters	0.65
CAS LJlx	Oysters	1.97
SCAR SRR	Oysters	0.41
SCAR ERR	Oysters	5.93
SCAR SRR	Oysters	6.36
CAS BC*	Oysters	1.75

Table 5. Commercial leases within 10 miles of the Pier by number and combined acreage. Source: Maine DMR

PRIMARY SPECIES	NUMBER OF LEASES	COMBINED ACREAGE
Blue Mussels	4	9.42
Marine Algae	3	7.68
Oysters	6	17.07
GRAND TOTAL	13	34.17

There are 33 commercial⁵ LPAs within 10 miles of the Pier that are held by 15 individuals. Oysters are the most commonly grown species (Table 6).

Table 6. Number of commercial LPAs within 10 miles of the Pier by primary species. Source: Maine DMR

PRIMARY SPECIES	NUMBER OF LPAS
Blue Mussel	3
Marine Algae	9
Oyster	21
GRAND TOTAL	33

Aquaculture sites within 10 miles of the Pier are concentrated in three general areas: 1) to the immediate northeast; 2) in and around Kettle Cove, Cape Elizabeth; and 3) in the Scarborough River (Figure 5 & 6). Of these three areas, businesses with sites to the immediate northeast have a mostly direct travel route. The oyster farms located in the Scarborough River are unlikely to utilize the Pier infrastructure because their infrastructure needs are sufficiently met at the nearby Pine Point Marina and the actual travel distance is approximately 15 miles.

⁵ There are also 3 recreational and 3 scientific/educational LPAs within 10 miles of the pier held by 5 individuals.

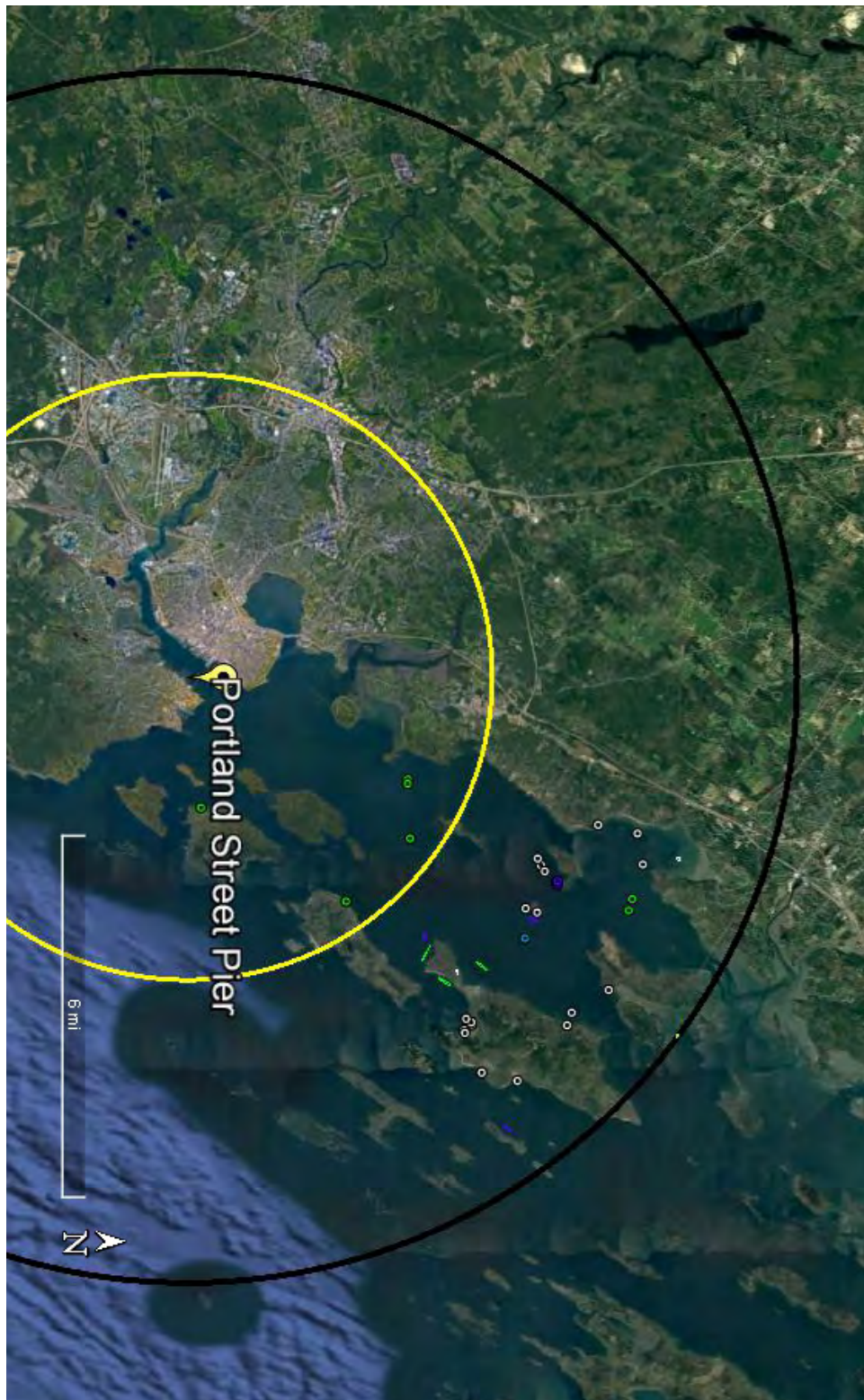


Figure 5. Northeast zoom of leases and LPAs within 10 miles of the Pier. Legend: yellow line = 5 mile buffer, black line = 10 mile buffer; small circle = LPA site, polygon = lease site; green = marine algae site, blue = blue mussels site; white = oyster site

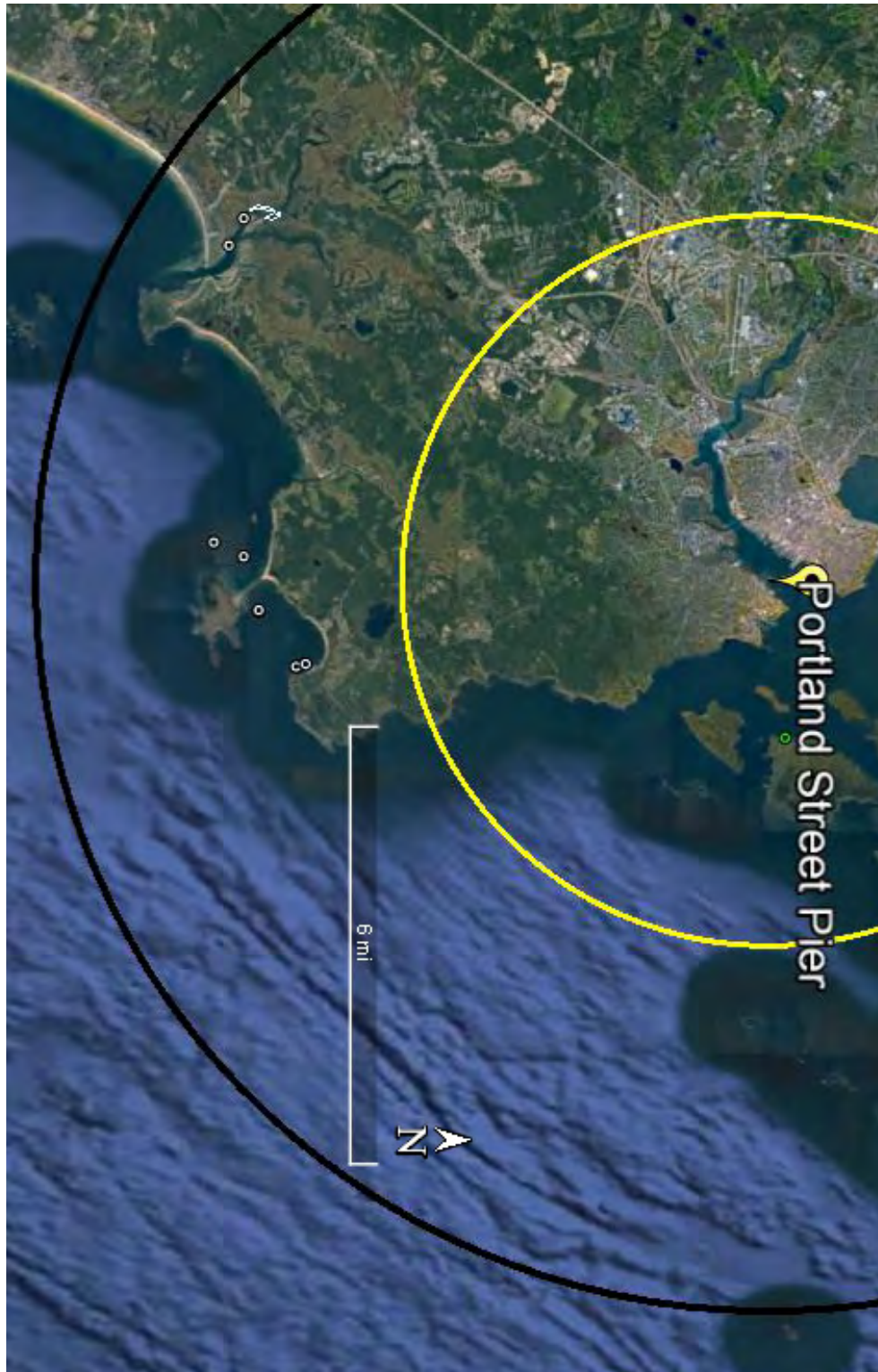


Figure 6. Southern zoom of leases and LPAs within 10 miles of the Pier. Legend: yellow line = 5 mile buffer, black line = 10 mile buffer; small circle = LPA site, polygon = lease site; green = marine algae site, blue = blue mussels site; white = oyster site

Casco Bay Aquaculture Growth

A plethora of variables and lack of access to proprietary production data make forecasting Casco Bay aquaculture growth with any degree of accuracy impossible. However, looking at trends is useful in a general sense.

There has been a steady influx of new leases within 10 miles of the Pier since 2008, with nine of the 13 active leases being issued in the last 5 years, with a spike in 2016 (Figure 7).

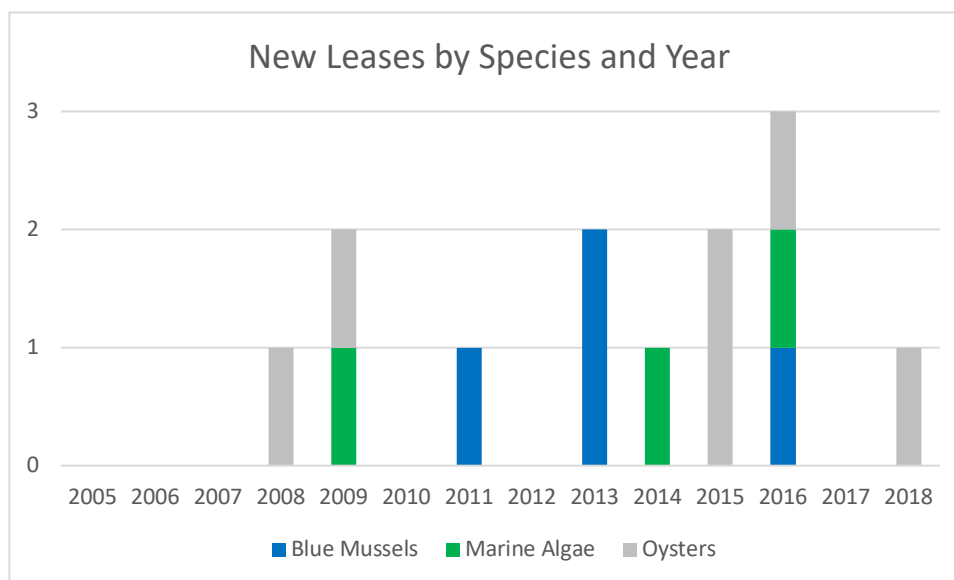


Figure 7. Date of issuance for active leases within 10 miles of the Pier. Note: 2018 lease pending. Source Maine DMR

Of the 33 active commercial LPA sites operating within Casco Bay, 27 were issued in the last 2 years, which represents a dramatic increase over the previous decade (Figure 8)

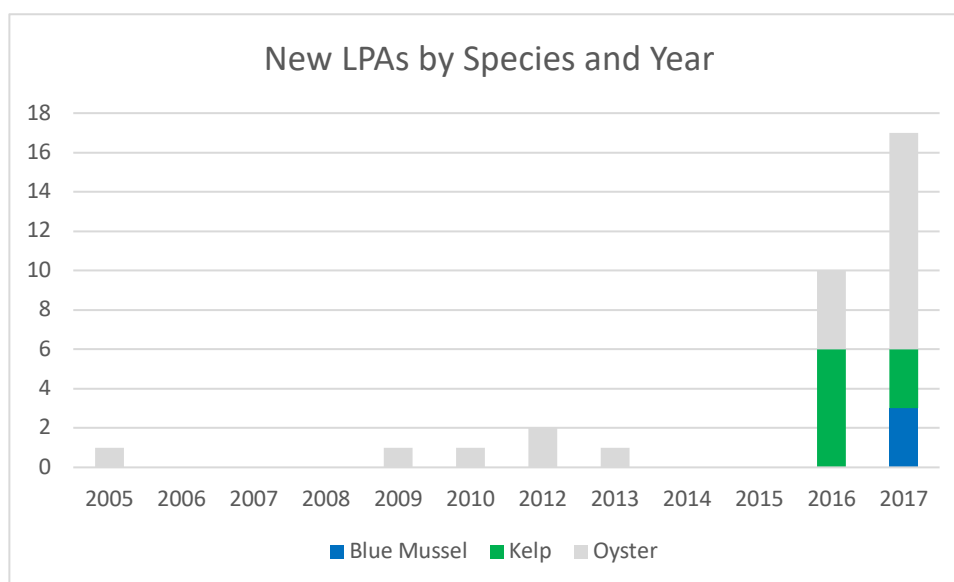


Figure 8. Issuance year for active LPAs located within 10 miles of the Pier. Source Maine DMR

Regulatory Closures:

The Department of Marine Resources (and state resource agencies throughout the US) often prohibits wild harvest and culture of shellfish and marine algae near urban centers⁶. Specific closures near Portland Harbor include the Fore River and waters continuing at least four miles offshore from the Pier (Figure 9). Consequently, aquaculturists need to travel a minimum of four miles to access the Pier from their site.

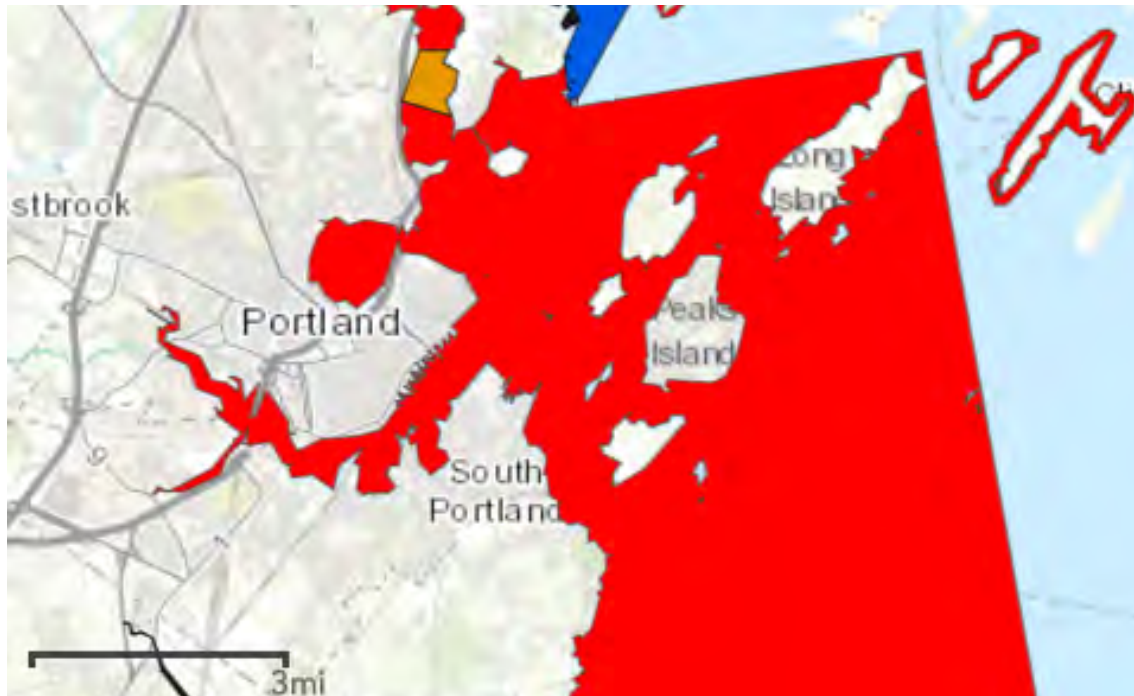


Figure 9. Areas closed to shellfish & marine algae culture. Red = closed; blue = seasonally closed. Source: Maine DMR.

Key Takeaways of Nearby Aquaculture Activity:

- Casco Bay is a hot-spot for aquaculture, with established oyster, mussel, and kelp sectors.
- The number of LPA licenses has skyrocketed in the last two years, particularly for the oyster sector, which likely foreshadows significant production increases in the next 5 – 10 years.
- Regulatory closures are a strategic disadvantage for the Pier as an aquaculture hub.

⁶ See <http://www.maine.gov/dmr/shellfish-sanitation-management/index.html> for more information.

Aquaculture Needs Assessment Survey and Stakeholders Meeting

Overview

To understand what infrastructure and services would be most useful to Casco Bay aquaculturists now and in the future, we distributed an industry survey to local aquaculturists and held a meeting with industry stakeholders. The survey was sent to 32 individuals operating the 13 leases and 41 LPAs⁷ within 10 miles of the Pier. The survey consisted of 19 questions asking the aquaculturists about their operations and production, the availability of certain infrastructure in Portland Harbor, and whether they would use certain types of infrastructure if it was available at the Pier.

Background Information Results

We received 10 responses to the survey, capturing the perspectives of approximately one third of aquaculturists operating locally. It is worth noting that two of Casco Bay's most established commercial-scale oyster growers were included in the distribution, but did not complete the survey⁸.

Survey respondents grow oysters, mussels, kelp, and scallops (Table 7) representing all species currently grown in Casco Bay. The respondents' ages ranged from 31 to 63 years with an average age of 49 years.

Table 7. Number of responses by species cultured. Note that two respondents culture multiple species.

SPECIES CULTURED	# OF RESPONDENTS
Oysters	5
Kelp	4
Mussels	2
Scallops	2

The respondents use a variety of vessel types for their operations including lobster boats, pontoon boats, barges, and skiffs. Most respondents use multiple vessels of different types. The vessel sizes ranged from 18 foot skiffs to 45 foot lobster boats and barges (Table 8). The drafts ranged from 1 foot to 5 feet. While some of the vessel types used in the aquaculture industry differ from those used in the commercial fishing industry, the most common vessel sizes are similar to those used by lobster and other commercial fishermen. Therefore, aquaculturists can likely use the same size slips as commercial fishermen.

Table 8. Summary of the size of respondents' vessels.

	LENGTH (ft)	WIDTH (ft)	DRAFT (ft)
Max	45	18	5
Min	18	6	1
Average	28	11	3

⁷ Note: Includes LPAs issued for non-commercial and scientific purposes.

⁸ We did speak individually with these growers about the needs assessment which has been incorporated into other sections of this report.

We also asked the aquaculturists where they currently keep their vessel(s). The responses included Portland, Long Island, Chebeague Island, Falmouth Town Landing, and trailered (Figure 10). While most of the respondents keep their vessels down the bay rather than in Portland Harbor, it is possible they could use transient slip space at the Pier for off-loading product. Their use would likely depend on what other types of infrastructure is available at the Pier, such as a boom or cold storage.

Where do you keep your vessel(s)?

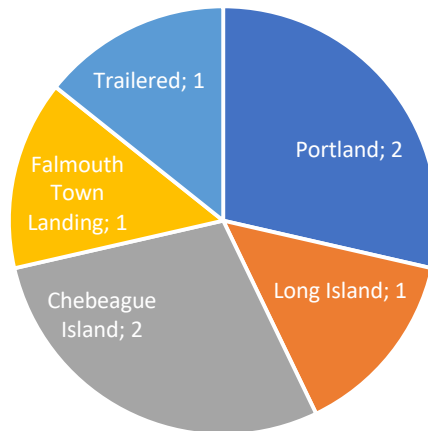


Figure 10. Locations where respondents keep their vessels. Numbers indicated the number of respondents that keep their vessel(s) at that location

To get a sense for future industry expansion we asked the aquaculturists about their current and five-year projected production outputs (Figure 11). On average, the mussel aquaculturists are currently producing the greatest volume of product. Note that mussel production is recorded in pounds and oyster production is recorded in pieces, so the two cannot be compared directly. However, we know the mussel companies that responded to the survey are more mature than the oyster companies that responded. There are mature oyster companies operating in Casco Bay that may have higher production numbers, but these companies were not captured in the survey. The respondents' projected production goals indicate significant expansion of the industry for each species from a six-fold increase in mussel production to a 30-fold increase in oyster production. The projected expansion of the oyster and kelp industries suggest an increasing need for infrastructure to accommodate these industries.



Figure 11. Respondents' current production and projected production goals.

Infrastructure Needs

We asked the aquaculturists about the availability of certain infrastructure in Portland Harbor to understand what infrastructure are plentiful and what are in short supply. Providing infrastructure that are in short supply could make the Pier a unique resource for aquaculturists. More than 40% of respondents consider space for offloading, cold storage, affordable boat slips, and upweller space to be in short supply (Figure 12). Sixty percent of respondents consider fuel and ice to be abundant or available.

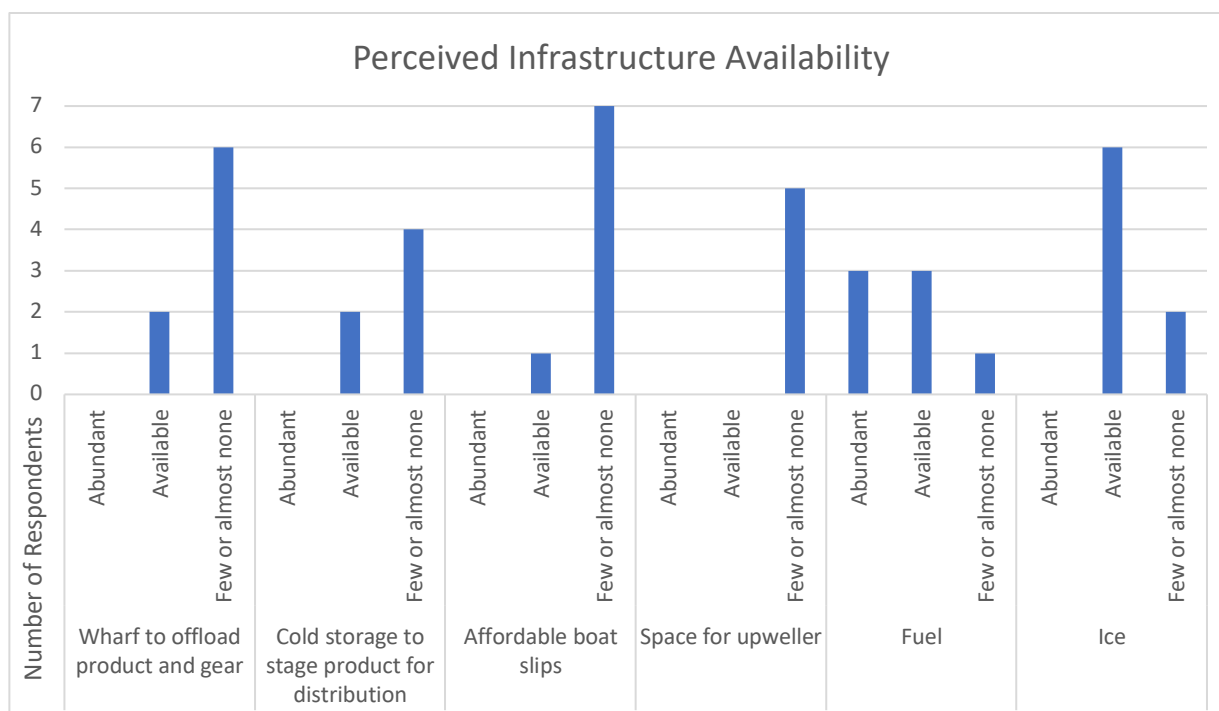


Figure 12. Respondents' perceptions about infrastructure availability in Portland Harbor.

Regarding potential infrastructure provided at the Pier, the greatest interest was in a boom to offload gear or product (Figure 13). There was mild interest in cold storage and boat slips. There was also a surprising lack of interest in operating an upweller at the Pier, especially since 50% of respondents consider upweller space to be in short supply. This discrepancy could be because some of the respondents are operating down the bay and the Pier would be inconvenient for them. Regarding gear storage, 40% of respondents expressed interest in storing gear at the Pier. When asked what additional infrastructure could be useful at the Pier, respondents suggested a truck-level loading dock with pallet jack or forklift, workbench and electric plugs for tools to make repairs, and space for kelp seed production.

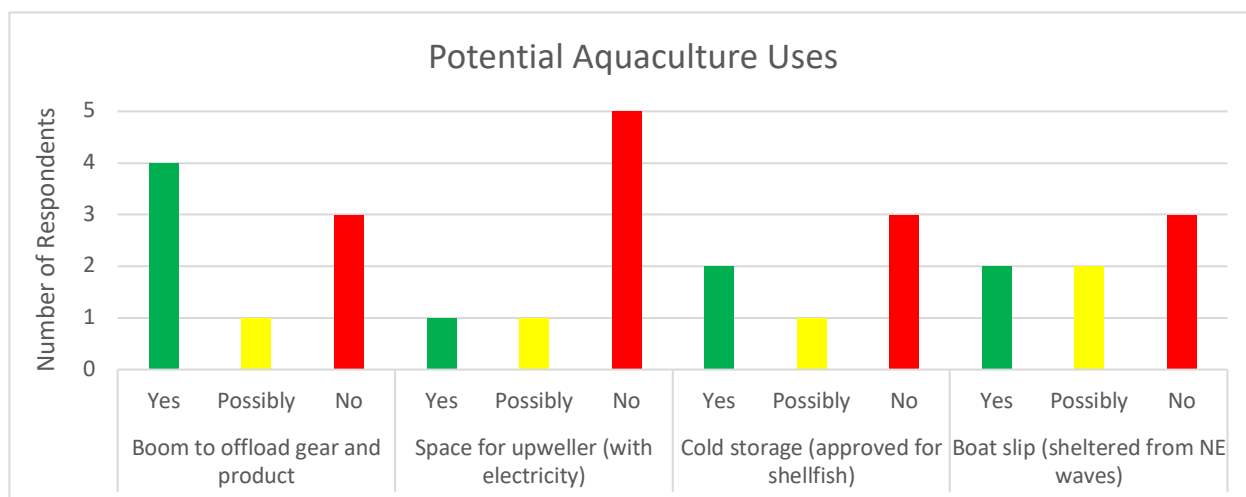


Figure 13. Respondents' possible infrastructure uses at the Pier.

We also asked the aquaculturists about the seasonality of their potential use of the Pier. The responses reflected peak usage in the spring and fall with moderate usage in the winter (Figure 14). Interest was greatest in using the Pier for offloading product and for cold storage with little interest in using the Pier for an upweller or berthing. Interest in using the Pier for offloading product and cold storage is consistent with other survey responses about infrastructure needs. However, the lack of interest in using the Pier during the summer was surprising. The seasonality of aquaculturists' needs should be considered in developing the Pier for coexisting aquaculture and commercial fishing uses.

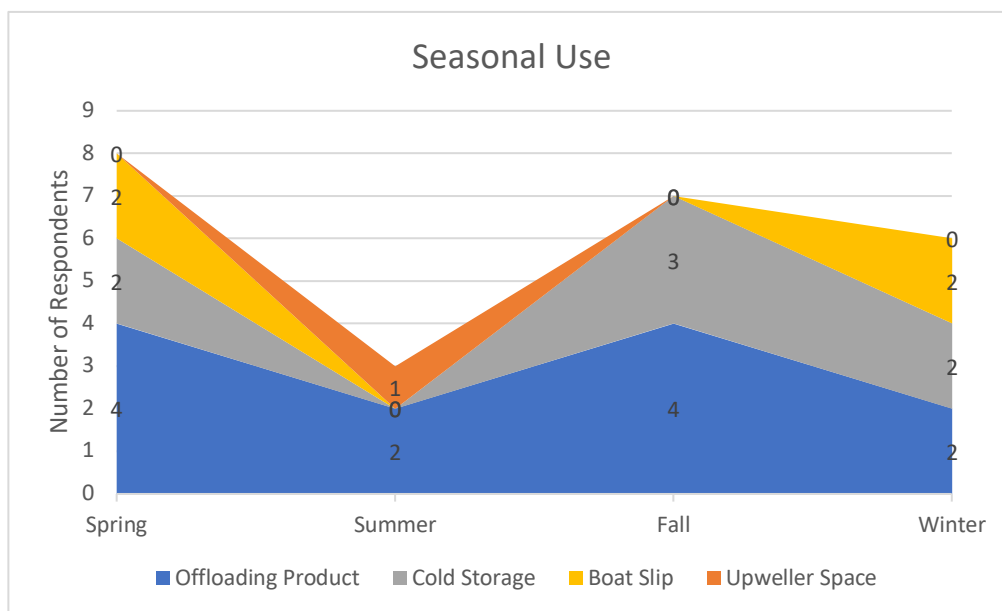


Figure 14. Respondents' potential seasonal usage needs at the Pier.

Summary of Aquaculture Stakeholders' Meeting

In addition to the industry survey, we held an aquaculture stakeholders' meeting to discuss the survey results and possible uses for the Pier. Attendees offered the following specific input about the usefulness of an upweller, tumbler, boom or davit, and cold storage at the Pier.

Upweller: Attendees agreed that although space to accommodate an upweller in Portland Harbor is in short supply, upweller space at the Pier may go unutilized based on the lack of interest recorded by the survey and impending regulations that may prohibit an upweller there.

Tumbler: Providing a tumbler or space for a tumbler at the Pier was briefly discussed. The oyster aquaculturists present commented that the Pier would be an inconvenient location because it would require significant travel from the farm to Pier and back again.

Davit/Boom: Attendees agreed that a davit or boom at the Pier would be very useful and suggested a weight capacity of 1,000-2,000 lbs. It was also suggested that multiple davits be provided, one per slip ideally.

Cold Storage: Cold storage was discussed in detail. One aquaculturist who also has a sales/distribution company mentioned that to qualify for an Interstate Shellfish Shippers License he must have access to cold storage and publicly available cold storage at the Pier would be an ideal resource for him. Considering the space constraints of the existing building, one aquaculturist suggested a 15 x 10 foot cold storage unit. The cold storage unit could take up half the building and the other half could be dedicated to wet prep space for washing and sorting product. It was mentioned that the current waterfront cold storage option requires product to come in clean, so providing washing and sorting space along with cold storage would be a unique resource for aquaculturists. It was also suggested that cold storage at the Pier could be used to overwinter oysters. Other considerations for cold storage are security to protect the product and a working bathroom.

Potential Users: The possible users of the Pier were also discussed, and it was agreed that oyster and kelp aquaculturists are most likely to use it because the majority of new growth is in these sectors and Casco Bay's existing mussel companies have established infrastructure with excess capacity.

Key Takeaways From Aquaculture Survey and Stakeholders Meeting

- The survey results and input from the aquaculture stakeholders meeting indicate significant increases in oyster and kelp production in the future, suggesting an increasing need for infrastructure to meet the needs of these industries.
- Fuel and ice were identified in the survey as being available in Portland Harbor, so additional infrastructure serving these needs may not be necessary.
- Offloading space, cold storage, affordable slips, and upweller space were identified in the survey as being in short supply.
- The survey indicated that local aquaculturists are most interested in having a boom for offloading product and gear, cold storage, and affordable slips.
- Based on all the information we collected, the three most promising uses for the Pier are: 1) boom with 2,000 lbs capacity; 2) affordable, approximately 20ft slips; 3) cold storage.

Aquaculture Discussion & Conclusions

Several themes emerged from the research into potential aquaculture uses and demand, which are summarized below.

Most Promising Sectors

Oysters

Casco Bay's oyster sector appears to be the best fit for the Pier:

- It is the most common type of sea farm within 10 miles of the Pier.
- It is the fastest growing sector based on the number of new oyster LPAs and leases, and aquaculture survey respondent's five-year production goals.
- The size of gear and tackle (e.g., bags, lines) are compatible with the size of the Pier.
- The final processing step does not require large machinery. In theory, the existing structure could be renovated as a washing/cold storage facility.
- The seasonal dock could accommodate upwellers if reliable electricity was available; and new regulations allow for it (See Infrastructure Needs in Portland Harbor Section for additional details).
- Winter demand for berthing may increase as oyster farms achieve winter harvest capabilities.

Kelp

Kelp aquaculturists may also use the Pier to some degree, though the existing Casco Bay businesses have established offloading, processing, and cold storage practices/facilities and were not particularly interested in using a redesigned Pier when we spoke with them:

- Casco Bay is an epicenter for Maine's growing sea vegetable industry. Nine new kelp LPAs were issued in 2016 & 2017 in Casco Bay.
- Kelp LPAs are the closest-proximity sea farms to the Pier.
- Cold storage could be occasionally useful to established businesses.

Mussels

Mussel aquaculturists are less likely to use the Pier:

- Of the nearby sea farms, mussel aquaculture has not seen an increase of new businesses. Over the last decade, all new leases and LPAs issued with mussel listed as the primary species were distributed between two companies whose infrastructure needs are currently met. This is likely due to startup costs being significantly higher for mussel farms compared to oyster and kelp operations. These two mussel companies have established offloading, processing, and cold storage facilities.
- The scale of gear and tackle (e.g., 40'x40' predator nets) used by mussel farms would be too large for the existing structure.
- Mussels require a final processing to remove byssal threads, clean, and sort the mussels prior to distribution. This step requires large processing equipment. It would be inefficient for mussel farmers to utilize cold storage at the Pier unless the final

processing equipment was also available there. This scenario would likely require the Pier to be redesigned primarily for the mussel sector.

Scallops

Scallop aquaculture could be a good fit for the Pier once the sector develops to a commercial scale. At present, scallop aquaculture has not been fully commercialized, but markets are strong. There have been exponential advances in the past five years in developing the Japanese ear-hanging techniques and testing markets for specialized products (e.g., princess, whole, roe on). The ear hanging method requires several small, specialized pieces of equipment to drill, pin, sort, and clean scallops. In theory, the Pier could be outfitted with (or serve as a place to temporarily store) this equipment for a Casco Bay's developing scallop industry.

Vessel Berthing

Oysters

Aquaculturists growing oysters use a wide variety of vessel types depending on culture techniques and business maturity. Aquaculturists at all levels may use smaller vessels like Carolina Skiffs that are about 20 ft in length. Some aquaculturists also use lobster boats, which can range in size from 20 ft to 40 ft. More mature aquaculturists use pontoon boats or work floats on the scale of 24 x 8 ft. Pontoon boats or work floats are often kept on moorings or anchored at the farm site. However, it is possible that they would keep these vessels at a slip if one were available. In general though, oyster aquaculturists use fairly small vessels that could be accommodated by 20-30 ft slips spaces.

Mussels

Aquaculturists growing mussels also use different types of vessels for their operations, but all need some type of large work barge for harvesting mussels at their site. The mussel aquaculturists in Casco Bay use barges around 40 x 13 ft. As these companies grow, they may scale up the size of their barges. It's unlikely mussel aquaculturists would keep their barges on floating slips, they are more likely to keep them on moorings or slips on a permanent pier structure. Mussel aquaculturists also use smaller vessels like lobster boats around 20-30 ft, that they could keep on a floating slip.

Kelp

Aquaculturists growing kelp can use many types of vessels, but in general use small scale vessels like skiffs and outboards that are 20ft or less in length. More established growers may also use work barges around 24 x 8 ft. It is possible kelp aquaculturists would keep a barge on a slip, but they are more likely to keep the barge on a mooring. Kelp aquaculturists may also use lobster boats, but generally only require small vessels for their operations. They would likely use small slip spaces 20 ft or smaller.

Promising Aquaculture Uses

We identified possible uses for the Pier based on the results of the survey, feedback at the stakeholders' meeting, follow-up conversation with established aquaculturists, and our characterization of infrastructure needs. We followed up with several established oyster, kelp,

and mussel aquaculturists to understand the specific practical considerations of these infrastructure and services. The most promising possible uses are listed below:⁹

Offloading space with boom

There was consistent interest for a boom to offload product, mooring gear, and engines. A 2,000 pound capacity boom would be adequate for moving kelp and mussel product, and mooring gear for mussel farms. A larger capacity boom, up to 4,000 lbs or 5,000 lbs would be needed to move engines. There was mild interest in moving engines, though these aquaculturists acknowledged that this is usually done at boat yards and is not a Pier necessity. The mussel aquaculturists would generally not use a boom at this Pier. Kelp aquaculturists would use it from time to time during the harvest season from March to June, though likely only if cold storage were also available.

Affordable slips

As noted above, aquaculturists use a wide range of different vessels. Oyster and kelp aquaculturists generally use smaller vessels like Carolina Skiffs, that are less than 20 ft in length. Some aquaculturists will also use larger pontoon boats or barges that may be 25 ft in length. Mussel aquaculturists use larger barges, up to 44 ft, but it is unlikely they would keep a mussel barge at the Pier. In general, smaller slips around 20-30 ft would be practical for most shellfish and kelp aquaculturists. The survey respondents only expressed mild interest in using slips at the Pier, but there is general consensus that affordable commercial slip space is limited in Portland Harbor.

Cold storage/washing facility

A cold storage facility with adjacent washing stations could be useful to the oyster sector, and kelp to some degree. It is worth noting that none of the growers we spoke with were personally interested in using cold storage if made available at the Pier. Considerations for a cold storage facility are as follows:

- Efficient design is critical, including how product is offloaded from the vessel, transferred to the building, and moved between the washing station, into cold storage, and out of cold storage for distribution.
- Two efficient methods for offloading from the vessel are: 1) directly into a pickup truck that backs up into the building, or 2) a pallet-based system where product is offloaded directly onto a pallet that is moved into cold storage by an electric pallet jack or forklift. We were cautioned that electric pallet jacks can be finicky in cold marine environments.
- Several growers that operate their own facility recommended 10 x 15 ft as sufficient size for use by multiple companies, though larger would be better.
- A pallet-based organization system in the cooler is effective to allow individual companies to keep their product separate (Figure 15).
- A cold storage facility requires HACCP certification from the Maine Department of Marine Resources Bureau of Public Health and a shellfish dealer's permit is also necessary to make its use practical. These certifications are not simple to obtain and involve regular inspections and annual renewals.

⁹ A commercial ice machine, space for gear storage, and building redesign as a kelp nursery were also suggested to a much lesser degree.

- Several individuals recommended one or more washing tables (with hose and possibly including a sink) adjacent to the cold storage facility for oyster washing (Figure 16). The ideal setup would have oysters offloaded at one end of the building, immediately cleaned at the washing tables, and then moved to the cooler. Washing tables require a floor drain system, which may require a discharge permit from the Maine Department of Environmental Protection unless plumbed directly to the City sewage system.
- Multiple companies operating in a small space will require a strong and organized manager for efficient operations, conflict resolution, and maintaining the necessary certification/permits. Several people suggested leasing the cold storage facility to a single certified shellfish dealer who would wash, sort, and distribute product. A cooperative could serve a similar function.



Figure 15. Example of pallet-based cold storage facility.



Figure 16. Example washing and sorting table.

Bathroom

Several aquaculturists noted that bathroom access would be nice to have.

Upweller Space

The oyster farmers we spoke with had little direct interest in locating upwellers at the Pier. However, upweller space could be very useful to the growing oyster sector and is a good match for the seasonality and size of the Pier. Access to freshwater and reliable electrical hookups are necessary. As noted earlier in this report, it is unclear if Maine Department of Marine Resources (DMR) regulations allow upwellers to be situated in the Fore River.

Commercial Fishing

This section summarizes commercial fishing sectors that frequent Portland Harbor and are therefore potential users of the Pier. The goal of this research was to help the City understand: 1) what fisheries are most common in Portland Harbor and 2) how and when might the most common fishing sectors utilize the Pier? Informational sources for this section include analysis of permit/license and landings data from publicly available sources, interviews with commercial fishermen, and input at a commercial fisheries stakeholders meeting.

In-Shore Fisheries (Lobster and Scallop)

Maine Department of Marine Resources (DMR) Permitted Lobster/Crab

There were 78 DMR permitted commercial lobster/crab fishing vessels operating out of Portland Harbor in 2017. Throughout Maine, the peak season for these in-shore lobster vessels generally begins in early June and ends in December. Approximately 1/3 anchor in South Portland and 2/3 anchor in Portland (Table 9).

Table 9. Number of DMR permitted lobster vessels operating out of South Portland and Portland. Source. DMR Licensing Program

City (Anchorage Town)	# Permits
Portland	54
South Portland	24

In greater Portland Harbor, state-permitted lobster vessels range in size from 10 to 75 feet with the greatest percentage falling in the 40-50' (39%), 20-30' & 30-40' (~20%), and 50-60' length (14%) (Table 10).

Table 10. Portland Harbor DMR-permitted lobster vessels by size. Source. DMR Licensing Program

Size Range (feet)	# Vessels	%
0-10	0	0.0%
10-20	1	1.3%
20-30	16	20.5%
30-40	17	21.8%
40-50	31	39.7%
50-60	11	14.1%
60-70	1	1.3%
70-80	0	0.0%
80+	1	1.3%

State lobster vessel sizes differ slightly between Portland and South Portland however, with vessels in the 50-60' range anchoring primarily in Portland, while there is only one vessel larger than 50' that anchors in South Portland (Table 11). The vast majority of lobster vessels in South Portland fall within the 20-30' (25%), 30-40' (37.5%), and 40-50' (33.3%) size categories.

Table 11. DMR-permitted lobster vessel size by city. Source. DMR Licensing Program

Size Range (feet)	Portland		South Portland	
	# of Vessels	% in Range	# of Vessels	% in Range
0-10	0	0.0%	0	0.0%
10-20	1	1.9%	0	0.0%
20-30	10	18.5%	6	25.0%
30-40	8	14.8%	9	37.5%
40-50	23	42.6%	8	33.3%
50-60	11	20.4%	0	0.0%
60-70	0	0.0%	1	4.2%
70-80	0	0.0%	0	0.0%
80+	1	1.9%	0	0.0%

DMR Permitted Scallop Vessels

There were four DMR-permitted scallop vessels operating out of Portland Harbor in 2017. All of these vessels fished out of Portland and *also held a DMR commercial lobster/crab license and are captured in the DMR Permitted Lobster/Crab section above*. Vessel sizes are listed in Table 12 below.

Table 12. DMR-permitted scallop draggers Source. DMR Licensing Program

Permit Type	Vessel Length	Anchorage City
Scallop Drag	43	PORTLAND
Scallop Drag	36	PORTLAND
Scallop Drag	32	PORTLAND
Scallop Drag	17	PORTLAND

Key Takeaways for Inshore Fisheries (Lobster & Scallops)

- There are a significant amount of DMR-permitted lobster vessels that fish out of Portland Harbor.
- The greatest demand for supporting infrastructure would be from June through December.
- The most common vessel sizes for this group are between 40-50', 30-40', and 20-30'. There are a handful of vessels larger than 50' that anchor in Portland.

Federal Fisheries (non-Tuna)

In addition to the state-waters fisheries described above, understanding the volume of federal-waters commercial fishing vessels provides another useful data point to gauge potential demand. The following section focuses on vessels that berth their vessel or offload in Portland Harbor and are permitted to fish commercially in federal waters (further than 3 miles offshore).

Permit Types

There are 112 vessels that hold some type of federal commercial¹⁰ fishing permit and list South Portland, Portland, or nearby Islands (Chebeague, Long, or Peaks Island) as their “home port” or “principle port.”¹¹ Of this group, Portland is the most common city for each category (Table 13).

¹⁰ Either northeast Multi-Species (Groundfish), Lobster, Monkfish, Squid/Mackerel/Butterfish, Skate, Tilefish, Red Crab, Ocean Quahog, Surf Clam, or Scup.

¹¹ Home port defined as the port where the vessel is located for most of the year. Principal port defined as the port where the majority of the vessel's landings occur.

Table 13. total number of federally permitted commercial vessels by home port and principal port. Source NMFS, Fisheries Statistics Division

CITY	# HOME PORT	# PRINCIPLE PORT
PORTLAND	73	95
CHEBEAGUE ISLAND	5	5
LONG ISLAND	9	5
SOUTH PORTLAND	7	4
PEAKS ISLAND	0	1
Total	94	110

Commonly Held Federal Permits

Groundfish and lobster are the most common permits held by this group (Table 14). Of the 112 federal permit holders who berth or land in Portland Harbor, 50 vessels are permitted solely for lobster and 7 are solely for groundfish¹². The average number of permits held by the 55 vessels that hold multiple permits is 8.8 (Table 15.).

Table 14. Number of each type of federal commercial permit assigned to vessels that berth or offload in Portland Harbor. Source NMFS, Fisheries Statistics Division

FISHERY	TOTAL PERMITS
GROUND FISH	61
LOBSTER (AREA 1)	61
LOBSTER (AREA 3)	1
MONKFISH	51
SPINY DOGFISH	51
BLUEFISH	50
SQUID/MACKEREL/BUTTERFISH	50
HERRING	50
SKATE	44
TILEFISH	40
ATLANTIC DEEP SEA RED CRAB	34
SURF CLAM	14
OCEAN QUAHOG	13
SCALLOP (GENERAL CATEGORY)	12
SCUP	6
BLACK SEA BASS	5

¹² Note: These seven vessels hold one or more types of open access federal groundfish permits and are likely to also have a Federal General Category Tuna Permit.

Table 15. Number of federal commercial fishing permits held by vessels that berth or offload in Portland Harbor. Source NMFS, Fisheries Statistics Division

# OF PERMITS HELD	# OF VESSELS HOLDING THIS NUMBER OF PERMITS IN 2017
1	57
3	2
4	1
5	3
6	3
7	6
8	6
9	16
10	5
11	2
12	8
13	1
14	2

Commercial Landings

Of the commercial species caught in federal waters by vessels that use Portland Harbor as their home port or principle port, lobster, Atlantic herring, and groundfish make up the bulk of landings followed by monkfish, mackerel, and sea scallops (Figure 17, 18). The majority of Portland Harbor federal herring vessels hold a category D permit that limits them to incidental catch amounts, which means herring are not the target of their fishing trip. Fishermen we spoke with confirmed that the D herring permits are held by vessels that primarily target groundfish. In other words, fishing behavior is dictated by catching groundfish, not herring. Therefore, lobster and groundfish are the primary federal waters commercial sectors operating out of Portland harbor¹³ with vessel sizes compatible with the Pier. While herring is an important fishery, and there are vessels in Portland targeting herring, their size is not compatible with the Pier.

¹³ Note: Federal commercial tuna vessels discussed in next section.

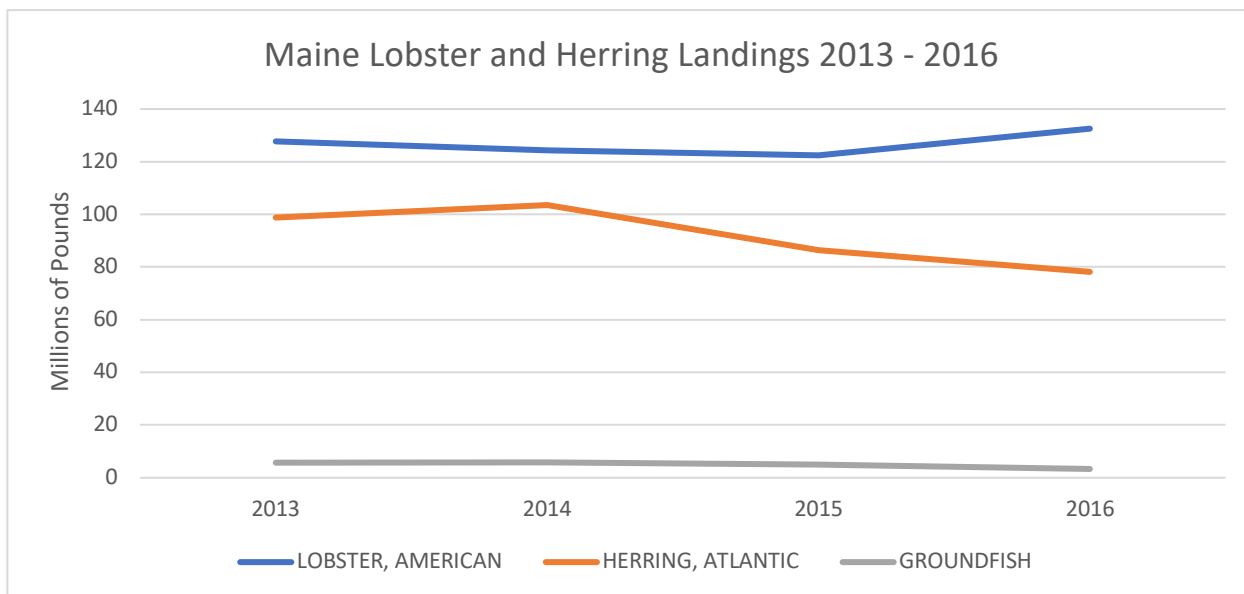


Figure 17. Maine lobster, herring, and groundfish landing 2013 – 2016. Source: NMFS, Fisheries Statistics Division & DMR Landings Program

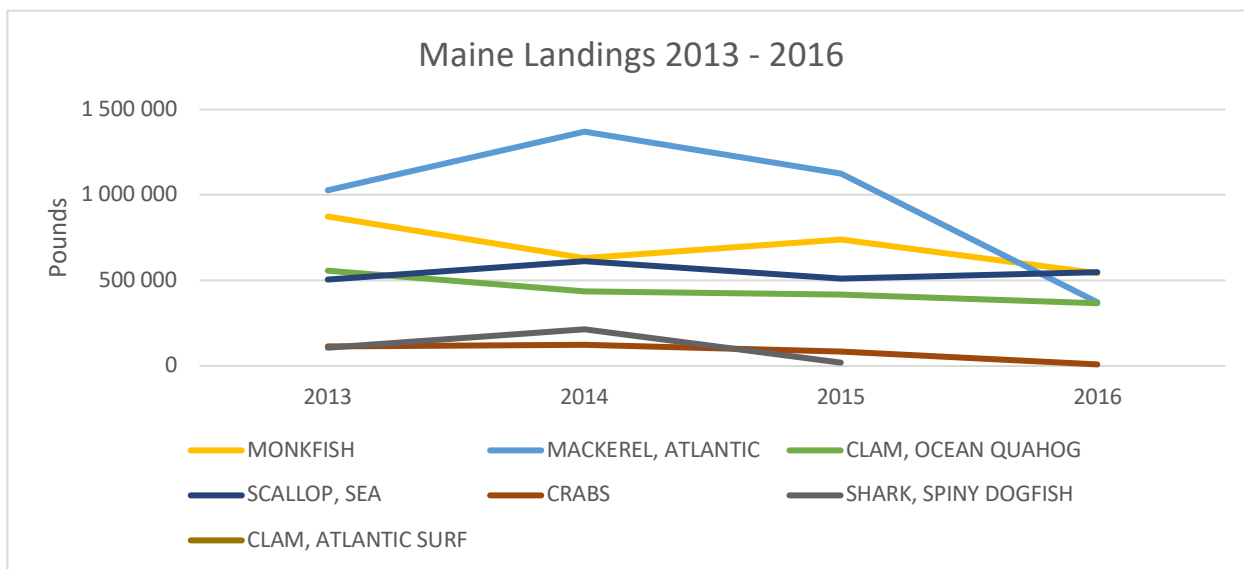


Figure 18. Maine landings for lower volume federal waters fisheries. Source: NMFS, Fisheries Statistics Division

The federal commercial permit data includes vessel length (width and draft unavailable), which is a useful metric to size berthing slips. The majority (81%) of the 112 commercial federally permitted vessels that utilize Portland Harbor fall into three length ranges with 40.2% in the 40-50' range, 28% in the 50-60' range, and 12.5% in the 20-30' range (Figure 19).

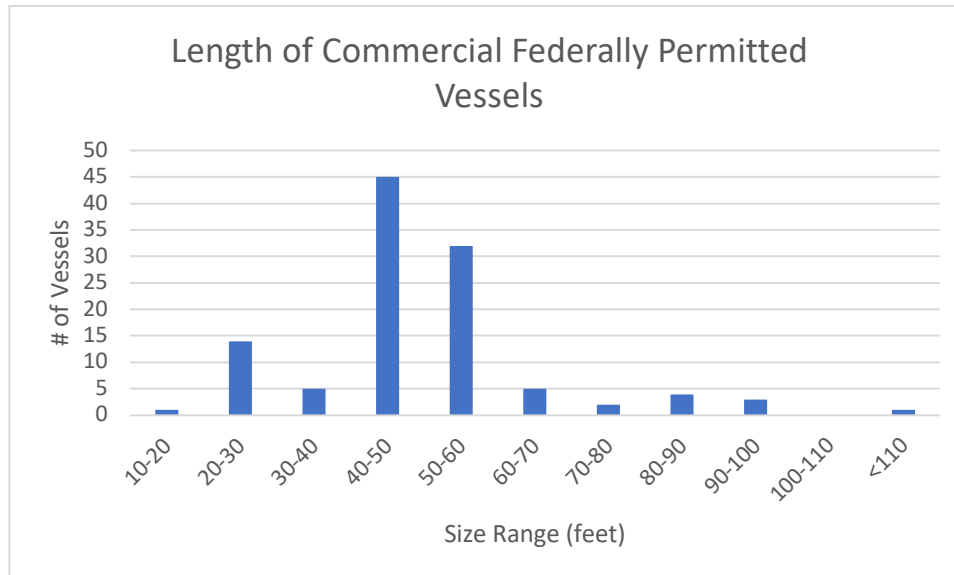


Figure 19. Portland Harbor federally permitted vessel size ranges for all permit categories. Source: NMFS, Fisheries Statistics Division

Because the City may wish to size berthing slips to meet the needs a specific type of fishery, we also looked at length of federally permitted lobster and groundfish vessels individually. As a percentage, groundfish vessels are evenly distributed between the three common size bins (20-30', 40-50', and 50-60'), however, the majority of the 20-30' length groundfish permitted vessels have party-charter permits. Lobster vessels are mostly in the 40-50' and 50-60' size range (Table 16).

Table 16. Federally permitted commercial vessel size ranges. Source: NMFS, Fisheries Statistics Division

VESSEL LENGTH (ft)	ALL VESSELS	LOBSTER (A1)	GROUNDFISH
10-20	0.9%	0.0%	1.6%
20-30	12.5%	3.3%	23.0%
30-40	4.5%	0.0%	8.2%
40-50	40.2%	55.7%	23.0%
50-60	28.6%	37.7%	21.3%
60-70	4.5%	1.6%	6.6%
70-80	1.8%	1.6%	3.3%
80-90	3.6%	0.0%	6.6%
90-100	2.7%	0.0%	4.9%
100-110	0.0%	0.0%	0.0%
<110	0.9%	0.0%	1.6%

Additional Information

The Pier may not be a good match for groundfish vessels for a few key reasons. First, several of the essential services for groundfish vessels are only found on the Portland side of the harbor. These include ice and services provided at the Portland Fish exchange (berthing, offloading). Additionally, their size (40 – 60') may be un-maneuverable given the available

space between the Pier and neighboring structures. Fishermen we spoke with felt that there would be insufficient room for any vessel larger than 45' to maneuver.

Key Takeaways For Vessels Holding a Federal Permit

- The lobster and groundfish sectors are the most common federally permitted (offshore) vessels that berth or land in Portland Harbor (excluding tuna).
- The majority of federally permitted (offshore) commercial groundfish and lobster vessels are either 40-50', or 50-60'.
- Groundfish vessels are less likely to use the Pier due to a lack of critical infrastructure (Portland Fish Exchange) on the South Portland side of the Harbor.

Federal Commercial Tuna Vessels

The federal General Category Tuna fishery is a good match for the Pier since a majority of the current Pier tenants are commercial tuna/lobster fishermen and it was confirmed during interviews and the commercial fishing industry listening session that the size, seasonality, and location of the Pier work well for these fishermen.

The peak tuna fishing season is generally from June 1st through late October, though some of the current tenants indicated that they would berth at the Pier earlier in the year in order to prep for the season if slips were available. It is fairly common for lobster fishermen (state and federal) to also hold an open access tuna permit and fish for tuna while their traps soak. Tuna fishermen frequently offload directly into a refrigerated box truck that is outfitted with a crane. Therefore, a pier mounted crane would not be useful for these fishermen in offloading their tuna catch. A pier structure that can support a box truck would be useful to them in offloading.

Tuna fishermen in Portland Harbor hold one of the following three types of General Category federal waters permits that allow them to retain tuna for commercial purposes.¹⁴

- Charter/Headboat¹⁵ = Atlantic HMS Charter/Headboat Permit
- General = Atlantic Tunas handgear permit (may use rod & reel, handline, or harpoon)
- General & Swordfish = Combination Swordfish/General Tunas Permit

There were 87 vessels that held a commercial federal tuna permit in 2017 and listed Portland, South Portland, Chebeague, Long Island, or Peaks Island as their principal port¹⁶ (Table 17). Interestingly, tuna vessels are distributed fairly evenly between South Portland and Portland, which is unique to this fishery.

¹⁴ Note: There is one vessel holding a limited access Tuna Longline Permit with a Portland home address that was not included because this individual is known to have access to a wharf and Island that they own.

¹⁵ For completeness, Party/charter vessels were included in this section, but the data for each permit was separated out to allow the City of South Portland to have a detailed understanding of each user group.

¹⁶ The tuna permit dataset does not include "home port" so principal port was used as the location metric.

Table 17. Number of Portland Harbor commercial fishing vessels that held a federal tuna permit in 2017. Source: NMFS, Fisheries Statistics Division

PERMIT TYPE	CHEBEAGUE	LONG ISLAND	PEAKS ISLAND	PORTLAND	SOUTH PORTLAND	GRAND TOTAL
Charter/ Headboat		1		10	14	25
General	1	1		24	20	46
General & Swordfish		1	1	11	3	16
GRAND TOTAL	1	3	1	45	37	87

The permit dataset includes length, which allows us to understand the most common sizes. For all Portland Harbor cities combined, the most common vessel sizes are 30-40' (48.8%), 40-50' (33.3%), and 50-60' (19.5%). This trend generally holds true for South Portland and Portland vessels in the 30-40' and 50-60' range, but the majority of 50-60' vessels are in Portland (Table 18, Figure 20).

Table 18. Size range of federally permitted tuna vessels using Portland Harbor by city. Source: NMFS, Fisheries Statistics Division

SIZE RANGE (ft)	SOUTH PORTLAND	PORTLAND	CHEBEAGUE	LONG ISLAND	PEAKS ISLAND	TOTAL
20-30	2	0	0	0	0	2
30-40	20	19	0	0	1	40
40-50	14	11	1	3	0	29
50-60	1	15	0	0	0	16
60+	0	0	0	0	0	0

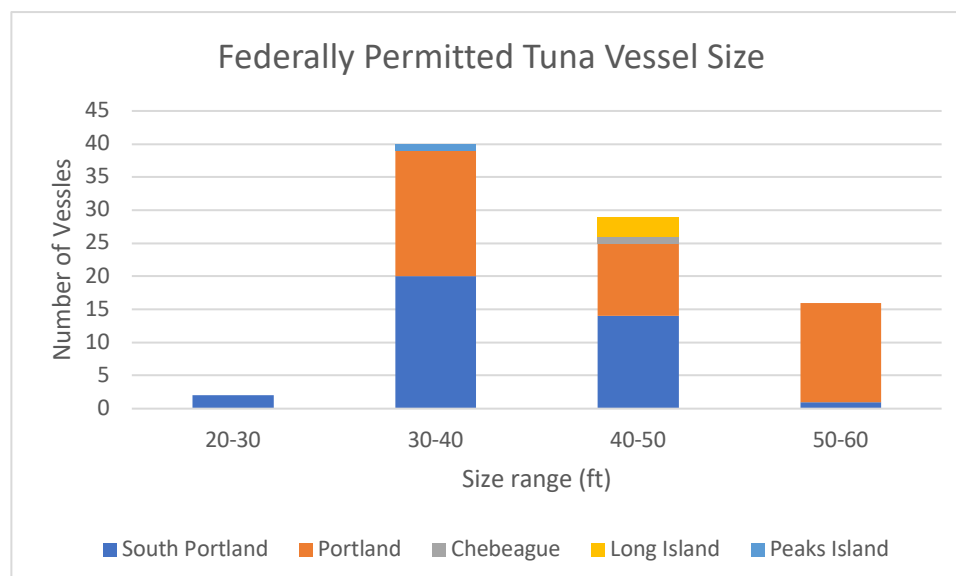


Figure 20. Size range of federally permitted tuna vessels using Portland Harbor by city. Source: NMFS, Fisheries Statistics Division

The majority of the charter/headboat and general category permitted vessels fall into the 30-40' and 40-50' length classes. The general & swordfish category vessels tend to be larger, with 56% falling into the 50-60' size range (Table 19, Figure 21, Table 20). The larger size of the swordfish vessels coincides with other input we received, that swordfish vessels must be particularly large because the fish are found further offshore than tuna.

Table 19. Size range of federally permitted tuna vessels by using Portland Harbor by permit category and amount. Source: NMFS, Fisheries Statistics Division

SIZE RANGE (ft)	CHARTER/ HEADBOAT	GENERAL	GENERAL & SWORDFISH
20-30	0	2	0
30-40	14	22	3
40-50	9	16	4
50-60	2	6	9
60+	0	0	0

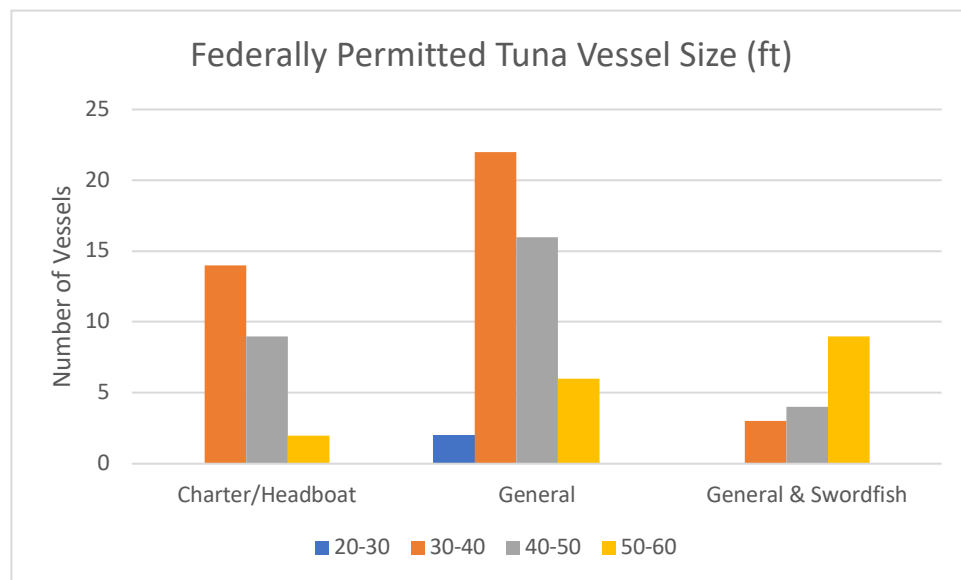


Figure 21. Size range of federally permitted tuna vessels using Portland Harbor by permit type. Source: NMFS, Fisheries Statistics Division

Table 20. Size range of federally permitted tuna vessels using Portland Harbor by permit category by percentage. Source: NMFS, Fisheries Statistics Division

SIZE RANGE (ft)	CHARTER/ HEADBOAT	GENERAL	GENERAL & SWORDFISH
20-30	0.00%	4.35%	0.00%
30-40	56.00%	47.83%	18.75%
40-50	36.00%	34.78%	25.00%
50-60	8.00%	13.04%	56.25%

Key Takeaways for Vessels Holding a General Category Federal Tuna Permit

- There are a significant number of commercial vessels that participate in the federal-waters tuna fishery and identify a Portland Harbor city as their principle port.
- The fishery generally runs from June 1 – late October, but tuna fishermen would berth earlier if slips were available to prep for the season.
- Tuna fishermen are unlikely to use a boom to offload, but need access to a pier that can support the weight of a box truck.
- The most common vessel sizes for Portland Harbor cities and permit types combined are 30-40' (48.8%) & 40-50' (33.3%).
- There are some vessels in the 50-60' length range that target offshore swordfish.

Existing Users

Overview

To understand how the Portland Street Pier is being used currently, we spoke individually with each of the existing users. We asked them how and why they use the Pier. We also asked them for recommendations for improvements to the Pier. Several of them also provided feedback at the listening session.

Characterization of Existing Users

Across the floats of the Pier, there are a total of 15 slip spaces (Figure 22). Slip #14 is currently vacant, and the fire boat is berthed on slip #7. The remaining 13 slips are rented to commercial fishermen.

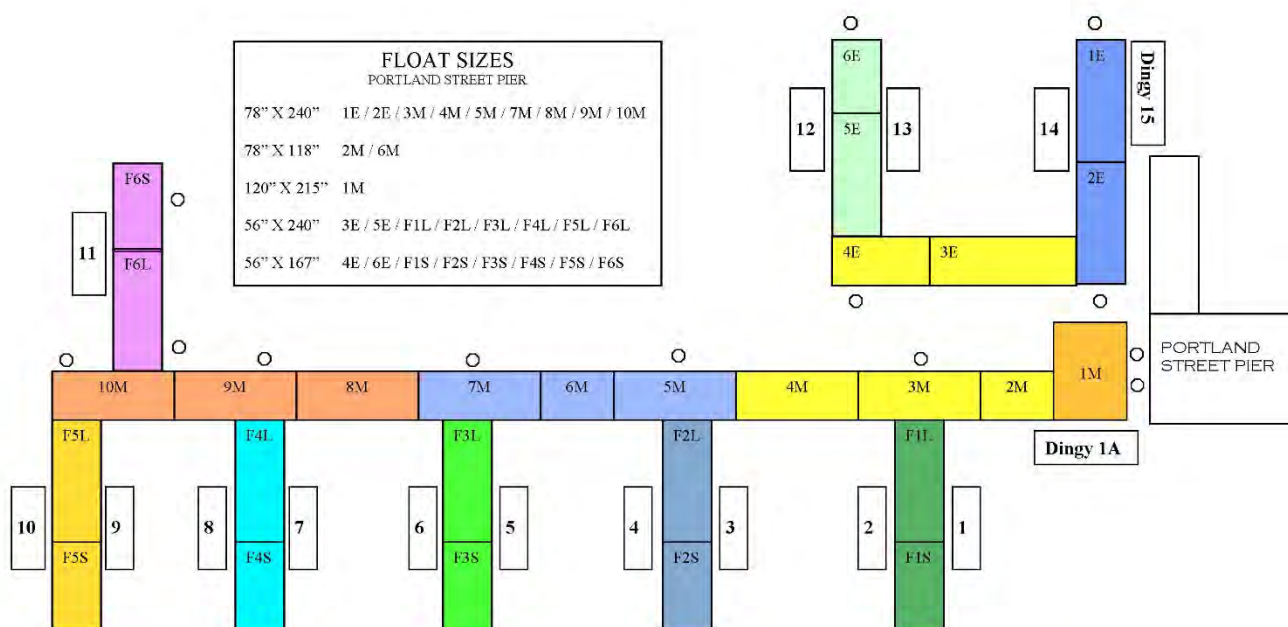


Figure 22. Pier float layout.

About 70% of existing users are involved in the lobster fishery and about 40% are involved in the tuna fishery (Table 21). The vessels berthed at the Pier range in size from 19 to 43 feet in length, with an average vessel size of 32 feet (Table 22). The smaller vessels (<30 feet) are lobster boats and the larger vessels (>30 feet) are lobster and tuna boats.

Table 21. Breakdown of fisheries that the existing Pier users are involved in. Note that some users are involved in multiple fisheries.

FISHERY	# OF USERS
Lobster	9
Tuna	5
Seaweed	2
Scallop	1
Pelagic fish	1

Table 22. Length in feet of existing Pier users' vessels.

VESSEL SIZE (ft)	
Min	19
Max	43
Average	32

In our conversations with the existing Pier users we asked them what factors make the Pier favorable to them. They mentioned seven factors: price, convenience, accessibility, they live in South Portland, the community at the Pier, simplicity, and seasonality (Figure 23). Over 75% of users mentioned the affordable price of boat slips at the Pier as a significant factor. About 40% of users mentioned the convenience and accessibility of the Pier as factors, and three users specifically mentioned that they use the Pier because they live in South Portland. About 20% of users also mentioned that the community at the Pier is important to them. The simplicity of services provided as well as the seasonality were also mentioned as contributing factors. It is clear that one of the major advantages of the Pier is the affordable price of the slips.

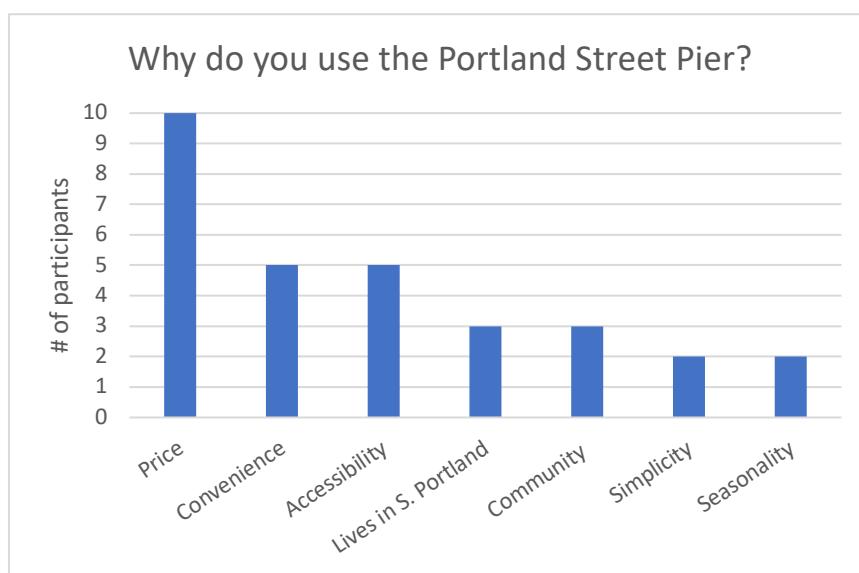


Figure 23. The number of participants that mentioned each of the seven factors that make the Pier favorable to them. Note that some participants mentioned multiple factors.

Recommendations for Pier Improvements

The existing users provided a number of recommendations for Pier improvements (Figure 24). The majority of users mentioned that parking is limited at the Pier and should be expanded, especially if the number of users at the Pier is expected to increase. Nearly 40% of users mentioned that the electrical supply needs to be upgraded to accommodate the number of vessels. One user suggested installing individual pedestals at each slip with electrical and fresh water hook-ups. About 40% of users also mentioned that they would like to see the floats improved. Two users noted that the floats should be wider and that the cleats should be more robust, and one user mentioned that the connections between the floats should also be improved. About 30% of users mentioned that there should be some sort of security at the Pier. Several users shared that they have had gear stolen from the Pier or have witnessed illegal activity. Security cameras were suggested as a potential solution. Two users suggested each of the following recommendations: extending the Pier itself, providing trash bins, and installing freshwater hook-ups. Recommendations suggested by only one user were grouped in the “other” category. These recommendations include installing a hydraulic winch, providing space for gear storage, being able to unload fish at the Pier, having a lobster and bait dealer operating on the Pier, and providing public restrooms. In summary, the primary recommendations for Pier improvements were addressing the parking issue, upgrading the electrical supply, improving the floats, and providing security.

Recommendations from Existing Users

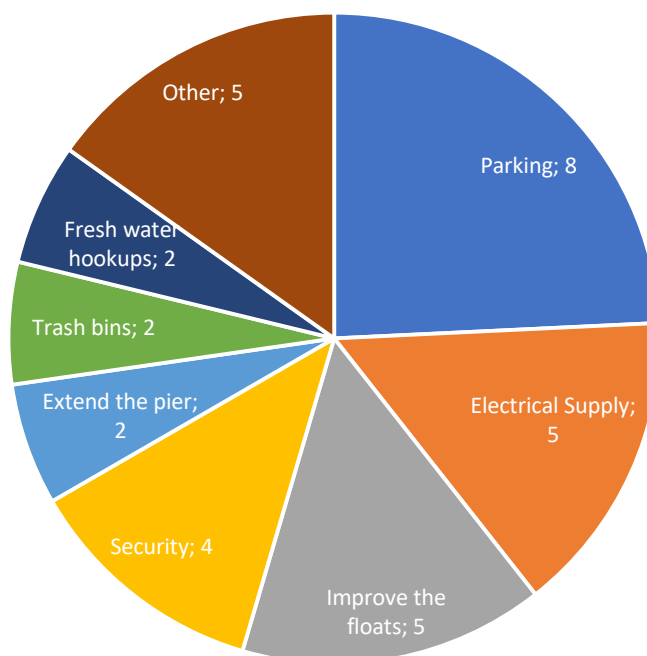


Figure 24. Summary of existing users' recommendations. The numbers indicate the number of users who mentioned each recommendation. Note that some users mentioned multiple recommendations.

At the fishing industry listening session, several fishermen stated that waves from passing vessels were a problem. While the Pier is technically in a no wake zone, it is in the final/beginning stretch when vessels speed up (exiting the Harbor) or have yet to slow down (entering the Harbor). These fishermen also noted that northeast winter storms will prevent the Pier from being used for year-round berthing.

We also discussed the seasonal availability of the Pier with the existing users. Several users expressed that the seasonality of the Pier is a benefit to them because they only fish seasonally. When we asked the users if they would use the Pier year-round if it was available, about 50% responded that they would be interested in using the Pier year-round (Table 23). About 40% of users responded that while they may not have a use for the Pier year-round, they would use the Pier for an extended season. Several users suggested putting the floats in during April or at the end of March and taking them out in November or December. One user told us that he always launches his boat before the floats are put in. He keeps his boat at a nearby marina for a month, but would prefer to keep it at the Pier as soon as he launches. Two users responded that the current season works well for their needs. Based on these conversations, it appears that there is interest in a year-round pier, or at least in extending the current season.

Table 23. Existing user's seasonal needs for the Pier.

PREFERRED SEASON	# OF USERS
Year-round	6
Extended Season	5
Current Season	2

Existing Users Perceptions of Pier Redevelopment

During our conversation, about half of the existing users expressed concerns about the redevelopment of the Portland Street Pier. Most acknowledged that the infrastructure needs maintenance, but were concerned about the displacement of commercial users at the Pier by recreational users and potential conflicts with aquaculturists. A handful were also under the impression that one of the priorities of the Pier redevelopment project is to increase the City's revenue. The City addressed both the concern about recreational users at the Pier and the priorities of the project at the fishing industry stakeholders' meeting. They clarified that the Pier will remain a commercial user resource and that the priority of the project is to make the Pier more useful to the current users and possibly to new users rather than to increase the City's revenue. It is worth mentioning that the user who leases the building is concerned about being displaced from the building with the redevelopment, and there may be some pushback to redeveloping the building.

The existing users also expressed concern that encouraging new aquaculture users at the Pier would lead to conflicts with existing users because of space constraints at the Pier and the differing operational needs of aquaculturists. They felt that this could disrupt the community structure of the Pier users. One user mentioned that there are already conflicts between lobster industry users and tuna industry users and worried about exacerbating existing challenges by diversifying further. If the existing users would not accept or would resent new aquaculture users, this could lead to a contentious environment at the Pier. Considering and

addressing these perceptions of the existing users during the planning process could help to ensure a positive environment of coexistence between new and existing users.

Key Takeaways of Existing Pier Users

- The existing users are mostly lobstermen, with a handful of tuna fishermen.
- The largest vessel currently berthed at the Pier is 43 ft.
- The affordable price of the slips is a key reason why existing users berth at the Pier.
- Recommendations for improvements: increase parking, upgrade electrical supply, improve floats, provide security. Waves from the wake of passing vessels was also noted as an issue.
- There was some interest from the users in a year-round pier, or extending the current season.
- Many of the existing users are concerned that sharing the Pier with aquaculture users will generate conflict.

Commercial Fishing Conclusions

This section summarizes the most promising uses for the commercial fishing industry based on our database research, one-on-one interviews, and feedback at the commercial fishing industry listening session.

Affordable Slips

Affordability was a key reason why current tenants berth at the Pier and was a commonly stated need by almost every fisherman we spoke with. The landings data and input from attendees at the stakeholders meeting find that in-shore lobster and smaller tuna vessels in the 30-45' range are the best match for the Pier; and larger vessels might be dangerous to maneuver in the available space.

Winch/Boom/Crane

A hydraulic lift could be useful to load/offload gear, traps, tackle, and moorings. Fishermen we spoke with said that a 1,000 lb capacity would be sufficient for their needs.

Space to stage lobster traps

A location to temporarily (24 - 48 hours) store traps would be useful to lobster fishermen for times when they are offloading from the truck to the dock or vice versa, or boat to dock or vice versa. It is imperative for these staging areas to be secure to prevent traps being stolen or pushed into the water.

Bathroom

Several fishermen noted that bathroom access would be a nice thing to have.

Trash

Several fishermen noted that access to regularly maintained trash cans would be nice to have.

Conclusions

Our research found a high potential for developing the Pier as a mixed-use facility that serves commercial fishing and aquaculture users alike. Specifically, the combination of affordable slips in the 20 – 45' range, a boom/winch with 1,000 – 2,000 # lift capacity, and space for temporary gear storage would serve Casco Bay's abundant lobster and tuna fishing vessels and growing oyster and kelp aquaculture sectors equally well, while complementing Portland Harbor's other working waterfront infrastructure (e.g., Fish Exchange, Vessel Services). Building capacity for the developing aquaculture sector as well as adequately meeting the needs of the commercial fishing industry will allow the City to maintain a working waterfront that serves the rapidly diversifying local marine economy for decades and positions the City of South Portland as a unique asset to Maine's working waterfront.