CONCERNED CITIZENS OF MARSH COVE, 6 (DISPLAY)

Exhibit Content Summary:

Excerpts from Maine Scallop Aquaculture Report, Des Fitzgerald,10/21, pages 1,9,10,11,13,24,25,29 (full link: https://gmri-org-production.s3.amazonaws.com/documents/Scallop_Aquaculture_Report_1.pdf)

According to this study, scallop farms require 40 feet of water, whereas only half of the proposed 10-acre scallop farm qualifies. Approving the full 10 acres would cause an unnecessary visual impact that is not sufficiently minimized.

Maine Scallop Aquaculture Report

BY DES FITZGERALD

OCTOBER 2021

Gulf of Maine Research Institute
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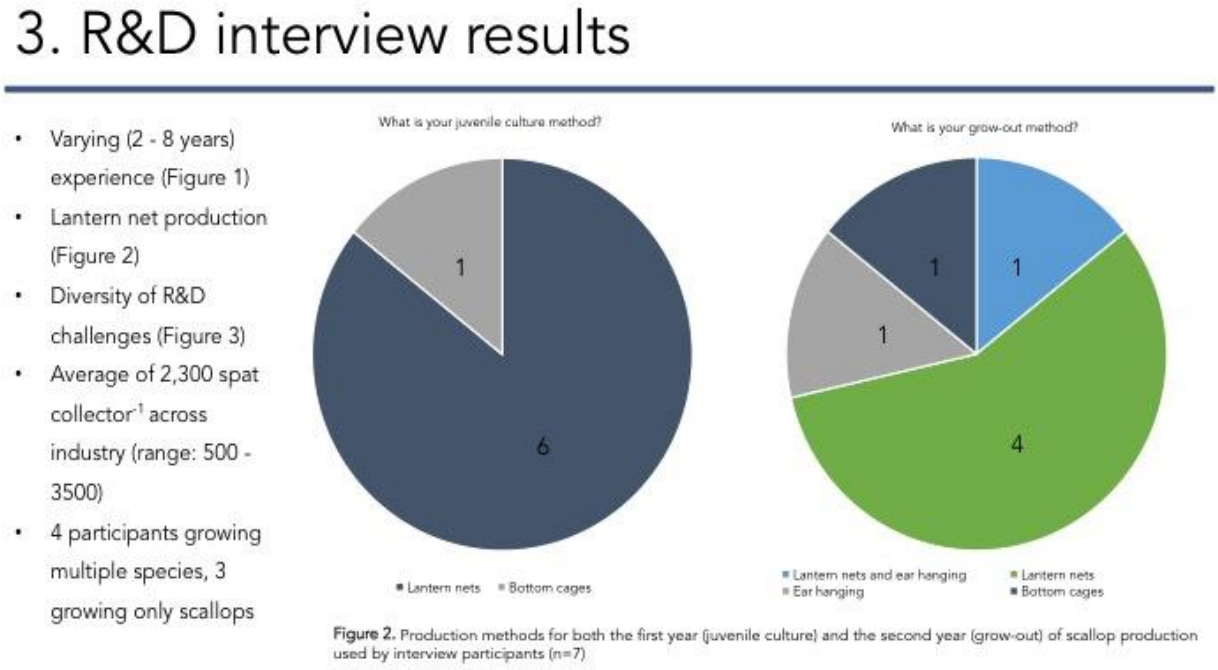
development, and efficient and pragmatic regulatory processes. Innovation can come from both large and small companies. Start-up farmers need the option and ability to build a business to a scale, to attract investment, and/or grow business assets to sell or pass to the next generation. Maine's policymakers must proactively align the State's historical support for aquaculture R&D/innovation, the goals of 10-Year Economic Strategic Plan, new resources at the Department of Marine Resources (DMR) aquaculture programs, and revisions to legislation/rulemaking on leasing. As will be discussed in the aquaculture enhancement best practices section of this report, there are examples of state governments that thoughtfully support the growth of an aquaculture sector through any number of leasing policies that allow for growth, while at the same time protecting and enhancing local communities.



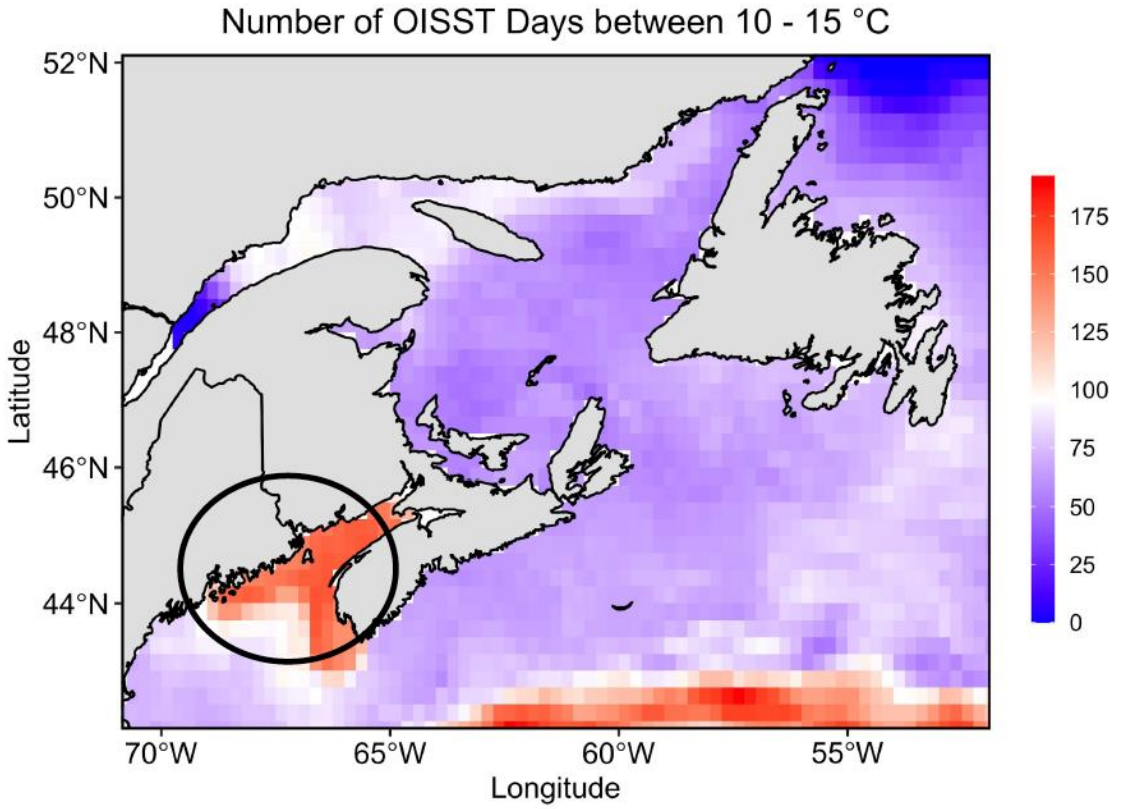
Courtesy of Struan Coleman

Site Selection

Site selection is key to beginning to actualize a successful aquaculture operation. Sea scallops require a farm site with cold and deep water (greater than 40 feet) with enough tidal exchange to deliver feed to the filter feeding scallops, but not enough wave and weather action to stress the animals and slow growth. Other considerations are the amount of biotoxin activity that has been historically measured in the prospective lease area. Sites with a low or no evidence of Paralytic Shellfish Poisoning (PSP) or Amnesic Shellfish Poisoning (ASP) organisms are the most preferable. Sites with historically high nutritional loads of edible organisms are another factor to consider, as is the amount of biofouling organisms experienced on the site.

Water temperature is also a key component. It has been determined by a number of growth studies for sea scallops that optimal ocean temperatures are between 10 to 15 degrees C. Recent work by

University of Maine graduate students Struan Coleman and Thomas Kiffney looked at average ocean temperatures from the north shore of Newfoundland to Midcoast Maine and found that the highest number of ideal temperature days for growing sea scallops fell along Maine's Down East coast. Given that there are currently no active sea scallop farm lease sites Down East beyond Frenchman's Bay, this region may hold particular promise.



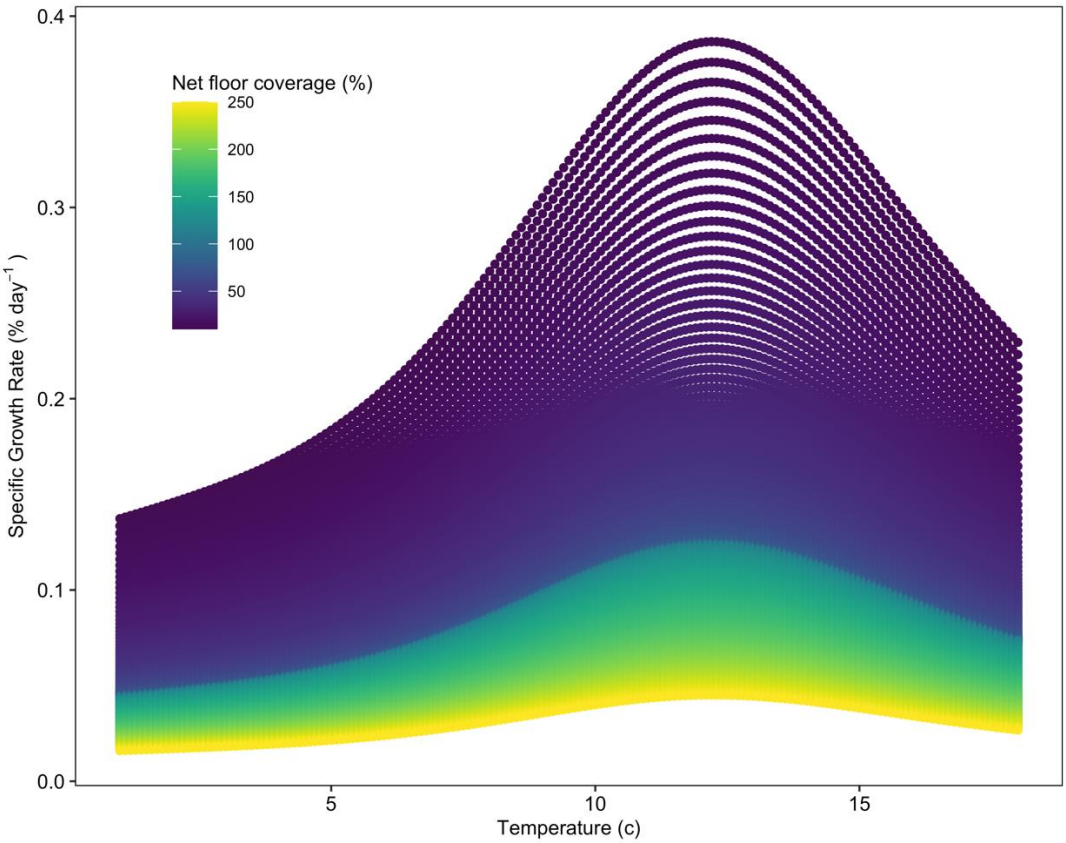
Optimum Interpolation Sea Surface Temperature (or daily OISST) for Sea Scallops, Courtesy Tom Kiffney and Struan Coleman

Husbandry: Stocking Density, Handling, Biofouling and Mechanization

Three key elements to successfully farming sea scallops are a result of the fragile nature of these animals. Unlike other bivalves that live in the intertidal zone and are exposed to the air at low tide and can hermetically seal their shells to prevent desiccation (like mussels, clams, and oysters), sea scallops live under water all of the time and cannot seal their shell shut as well or as long as their intertidal cousins. That natural "gaping" makes sea scallops susceptible to stress when out of the water or, when crowded together, can cause open scallops to cut each other as one inserts its sharp-edged shell inside another.

A result of the natural characteristic of gaping and the fragile nature of the sea scallop then initially impacts the number of scallops a farmer can stock in their growing equipment. This stocking density configuration should be low enough to allow the scallops to grow within the equipment they are stocked in for as long as possible without grading or moving them to another system. What may feel like an economic burden of a low volume of animals in a single net or tray system pays for itself in

higher growth rates and lower mortality over time. Reduced stocking density can also speed the growth of each scallop as it is able to compete better for filtered nutrients.



Courtesy Tom Kiffney & Struan Coleman, 2021

Sea scallop farmers should try to limit time out of the water for the life of the scallop on the farm. Biofouling growth on the grow out gear and the scallops themselves can cause serious issues for a farmer by way of higher mortality, lower growth rates, and strain on mooring gear. The depth of the water the scallops are in and the seasonality and site location all impact biofouling volumes. The less the farmer needs to incur the labor expense to clean, and in turn stress the scallops, the better.

Wild Sea Scallop Fishery

Commercial fishing for scallops in the U.S. in 2020 represented the fourth most valuable seafood species landed at $541 million with sea scallops being the largest portion of that value bringing in $400 million of that total. Imports of all species of scallops from countries like China, Japan, Peru, and Canada (sea scallops) generally represent about 50% of the total U.S. landings. In most years, the higher the U.S. landings in volume, the lower the import volume, and the converse is also true. This trend suggests there is some limit on at least the scallop segment demand in total, but this may not correlate as closely to the market cap for sea scallops.

Among experts who study Atlantic sea scallop populations, there is a general consensus that stocks in the ocean are likely to decline slowly over time due to the impacts of climate change and the fact that there are not enough closures to allow populations to rebound throughout their range. There has not been a significant increase in year class populations since 2013 and, on top of that, commercial fishermen are tending to now target the larger spawning aggregations of sea scallops. This will conspire to put downward pressure on stock assessments and the resulting management into the near future.

For the Maine scallop farmer, the important fact is that Maine sourced wild sea scallops usually command a higher value in the marketplace than sea scallops from other New England waters. At the same time, the stability of the sea scallop adductor market in total has created a "commodity" price that has both elevated historically with no clear sign that the resource will grow and weakened the demand and price into the foreseeable future. Maine scallop farmers should be able to use the base line average U-10 auction price of about $10.00/lb. as the departure point price from which to market and sell a superior, fresher, drier and more year around supply of adductor meats.

It is reasonable to assume that if Maine scallop farmers can optimize the value of their scallops grown in Maine waters that this could lift the value of Maine diver and day boat scallops as well. Maine has seen this happen in other aquaculture species like salmon and mussels, where farmed product caused the market to view a wild catch product as higher value than it had been historically and at the same time farmed product has raised the bar on the quality of fishing and processing of wild caught. This is true for salmon in Alaska, blue mussels in the Northeast or oysters throughout the U.S. There is no reason why Maine-based wild catch and farmed sea scallop groups cannot benefit each other and together promote the value proposition that is Maine sea scallops.

CHALLENGES

Biotoxins

Sea scallops are a long-lived cold-water species that have the unfortunate characteristic of accumulating biotoxins from their environment and are unusually slow to purge the toxins from their system. Sea scallops from the George's Banks wild fishery tested positive for PSP in 1990 and caused the regulations to change such that no whole scallops could be landed in east coast ports. The regulations required that all scallops be shucked prior to the vessel arriving back to port and only the adductor muscles (meats) be sold.

For Maine, the concern over Paralytic Shellfish Poisoning (PSP) and more recently Amnesic Shellfish Poisoning (ASP) has been a major focus of both farmers, wild harvesters, and the Maine Department of Marine Resources (DMR). The toxins tend to reside in the viscera and digestive gland of the scallop and to a lesser degree in the gonads of both the male and female scallops. The adductor muscle meat itself does not hold harmful levels of biotoxins. It is not known if fast growing farmed scallops, that would rarely exceed three years of age before being harvested, would naturally retain less biotoxin than their wild counterparts that may live as long as 29 years. It is equally uncertain as to whether a younger farmed scallop is more able to depurate (purge) biotoxins compared to wild populations. This is an important area for future consideration.

The primary dinoflagellate species that cause PSP ("red tide") in the warmer months of the year and are found most commonly in Maine waters are from the genus *Alexandrium*. The National Shellfish Sanitation Program closure threshold for PSP is 80µg/100g of scallop tissue. ASP is a more recent phenomena in the northwest Atlantic having been first seen at toxic levels in Prince Edward Island in 1987 and then in Maine in 2016. ASP is caused by the microscopic algal species of the genus *Pseudo-nitzschia* which produce toxic domoic acid. The closure threshold for ASP is 20µg/g of scallop tissue. Both PSP and ASP biotoxins in shellfish can be lethal to consumers at high enough concentrations and should be treated within the strictest requirements of the regulatory authorities. (Shumway & Cembella 1993)

The Maine DMR has one of the more sophisticated and strict monitoring, testing, and precautionary closure systems found anywhere in the world. Maine sea scallop farmers are subject to similar regulations around biotoxins, but are currently able to sell whole live scallops and roe-on scallops with specific DMR testing protocols and agreed upon MOUs. There are no testing requirements for farmers selling scallop meats, and there is pending legislation to include with that the sale of adductor meats on the shell. Currently, scallop farmers who want to sell meats on the half shell need a special license, but no biotoxin MOU is required.

When considering the sale of live or roe-on sea scallops, both existing and prospective sea scallop farmers should consider the historical data for both PSP and ASP levels in the area in which they plan to grow scallops. However, the occurrences of PSP and ASP are constantly changing. Relying on historical data does not replace the need for continuing monitoring going forward. Scallop farmers need to have a reliable and not cost prohibitive way to safely monitor/test for the presence of these biotoxins. There is an area off the Maine coast between the west side of Mount Desert Island and eastern Casco Bay often referred to as "the Penobscot Bay sandwich" which has been relatively free of historical levels of biotoxins. Areas that have tested historically high for biotoxins may be subject to

additional year-round testing, closures, and other requirements. The cost burden of testing for farmers of sea scallop products that fall into the "high risk" category (whole live, and roe-on) is a significant obstacle to the ongoing growth and marketability for these products. A number of studies are currently underway to reduce the cost of testing while at the same time improving efficacy. Additional funds should be made available to farmers to have this testing conducted and could be assisted by additional labs conducting the testing. Farmers should be assisted in testing product before it goes to market, for public safety.

* New or existing sea scallop farmers in Maine should consult with DMR and pay attention to their Biotoxin Monitoring Guidance Document for Bivalve Shellfish Aquaculture report:

https://www.maine.gov/dmr/shellfish-sanitation-management/forms/documents/BiotoxinGuidance2020.pdf

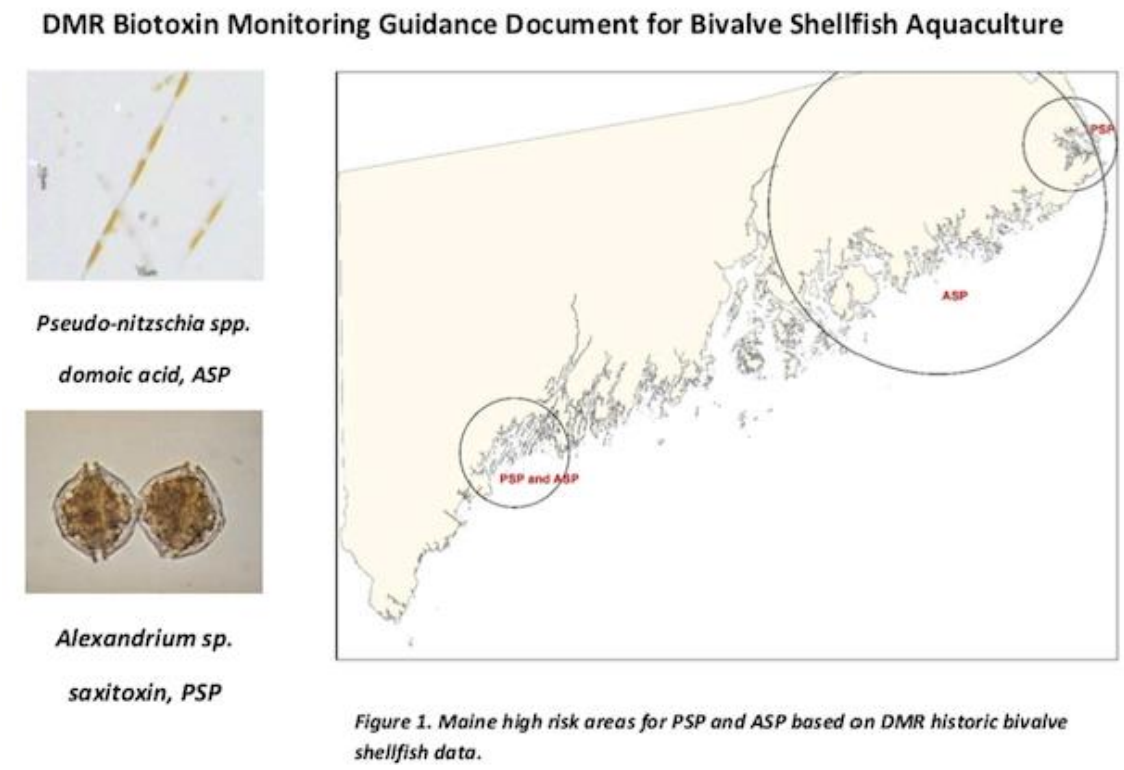


Figure 1. Maine high risk areas for PSP and ASP based on DMR historic bivalve shellfish data.

Sea Scallop Farming Financials

Because of the still start-up state of sea scallop farming in Maine, there is very little financial information that can begin to represent a mature industry. Today's financial picture for growing any of the sea scallop products discussed earlier does not look as positive as it could and should with higher volume producers, more advanced labor-saving equipment, an evolved hatchery system, and a marketing program to enhance selling prices.

Temperature

In the Gulf of Maine sea scallops are usually found in water that stays below 17°C and above 0°C but they can tolerate, for a time, temperatures as high as 20°C. However, sea scallops have been found to perform best on farms at between 10 and 15°C. Over the last 15 years the average temperature in the Gulf of Maine has risen 3° C making it one of the fastest warming oceans in the world and potentially impacting sea scallops. For the scallop farmer, warmer temperatures, if they exceed the 15°C optimal range, will stress their scallops and can lead to mortality or slower growth below what is optimal. A warmer Gulf of Maine could also create the environment for increased harmful algae blooms resulting in more closures and testing for PSP and ASP. In addition, there is the chance that increasing ocean temperatures could have unforeseen impacts on the spread of disease pathogens like Vibrio, with negative effects on scallops.

It is also worth recognizing that a warming ocean will probably shrink the southern range of sea scallops on the east coast and could push populations more into the Gulf of Maine seeking cooler waters and cause a temporary increase in local abundance. A counter to that could also be that as Maine's shallower inshore coastal waters warm faster than deeper water, Maine could see decreases in their closer to shore dive and day boat catch.

Invasive Species

The Gulf of Maine is starting to lose its subarctic characteristics as it warms, and with that comes troubling signs of decreasing populations of native species like cold water shrimp, cod, herring, and the changing dispersion of lobsters. With warming ocean waters also comes the infiltration of warmer water species both indigenous to states to our south as well as non-native and invasive species like the green crab (*Carcinus maenas*). The green crab is an example of a relatively new predator prospering due to warmer winters and that is now eating its way through many species of Maine shellfish including scallops.

Maine Marine Aquaculture Growth

Maine possesses a unique set of natural and social characteristics that satisfy many of the prerequisites that marine aquaculture requires in order to be a successful part of the coastal working waterfront. With over 3,500 miles of continuous shoreline and some 3 million acres of generally clean marine state waters, an ocean trained labor force and proximity to one of the largest seafood markets in the world, Maine would appear to be the ideal state to grow a prospering aquaculture industry. The current reality is that Maine's aquaculture industry has been slow growing or stagnant over the last 20 years and today totals just 1,650 acres in farm leases.

In 2009, there were some 1,300 aquaculture acres under cultivation. In the last 11 years aquaculture in Maine has grown by 350 acres or on average 32 acres per year. Today's total aquaculture leases, if put together side by side, would fit onto the footprint of the Bangor International Airport. It currently takes between two to three years for a Standard Lease application to be finalized through DMR, and there are over 40 Standard and Experimental leases in queue (Spring 2021). By way of comparison, one Prince Edward Island mussel farmer alone has aquaculture lease sites that total 4,300 acres. That one farm in PEI leases more than two and a half times the total farmed acreage of all aquaculture projects in the ocean in Maine. This topic is part of ongoing work that is both a challenge and an opportunity for the Maine DMR, the legislature, and other partners.