

2022 CONNECTICUT SHELLFISH HARVESTER MEETING

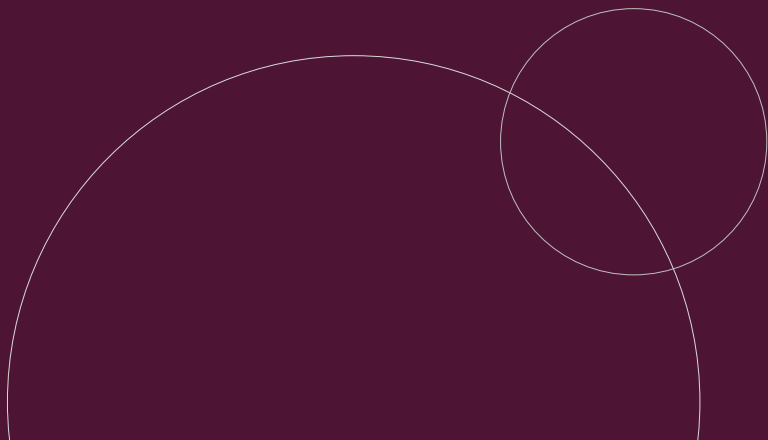
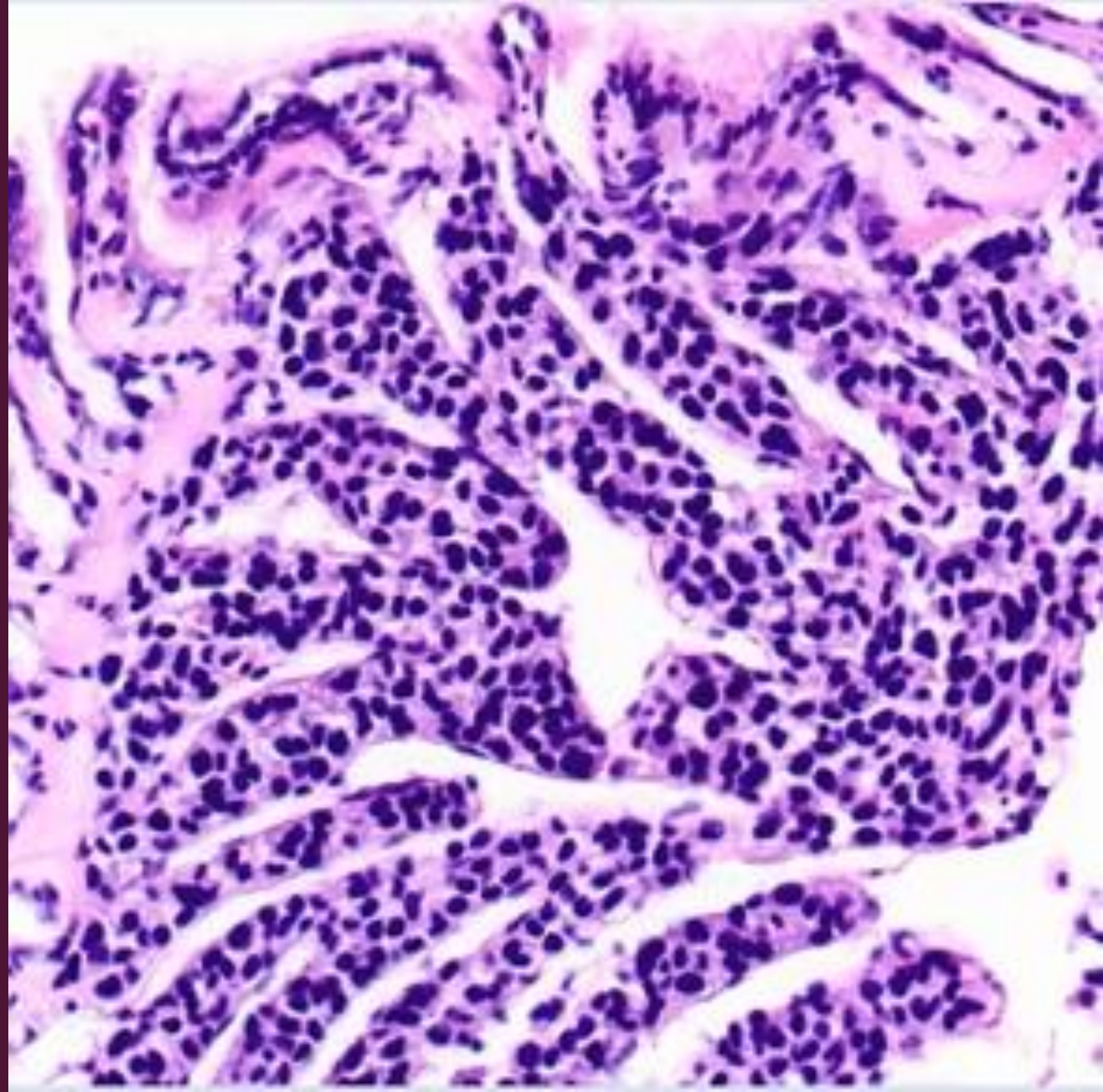
CONNECTICUT DEPARTMENT OF AGRICULTURE, BUREAU OF AQUACULTURE

EMILY MARQUIS, FISHERIES BIOLOGIST I

OVERVIEW OF PRESENTATION

- Statewide Shellfish Disease Update
- Harmful Algal Bloom Update
- Vibrio Update

SHELLFISH DISEASE UPDATE



SHELLFISH PATHOLOGY METHODS

1997-2016
Histology

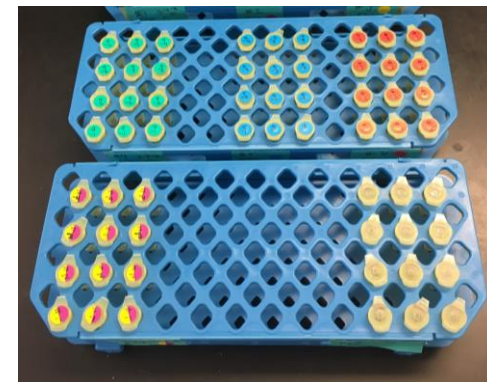


2019-2021

Triplex PCR (genetic)

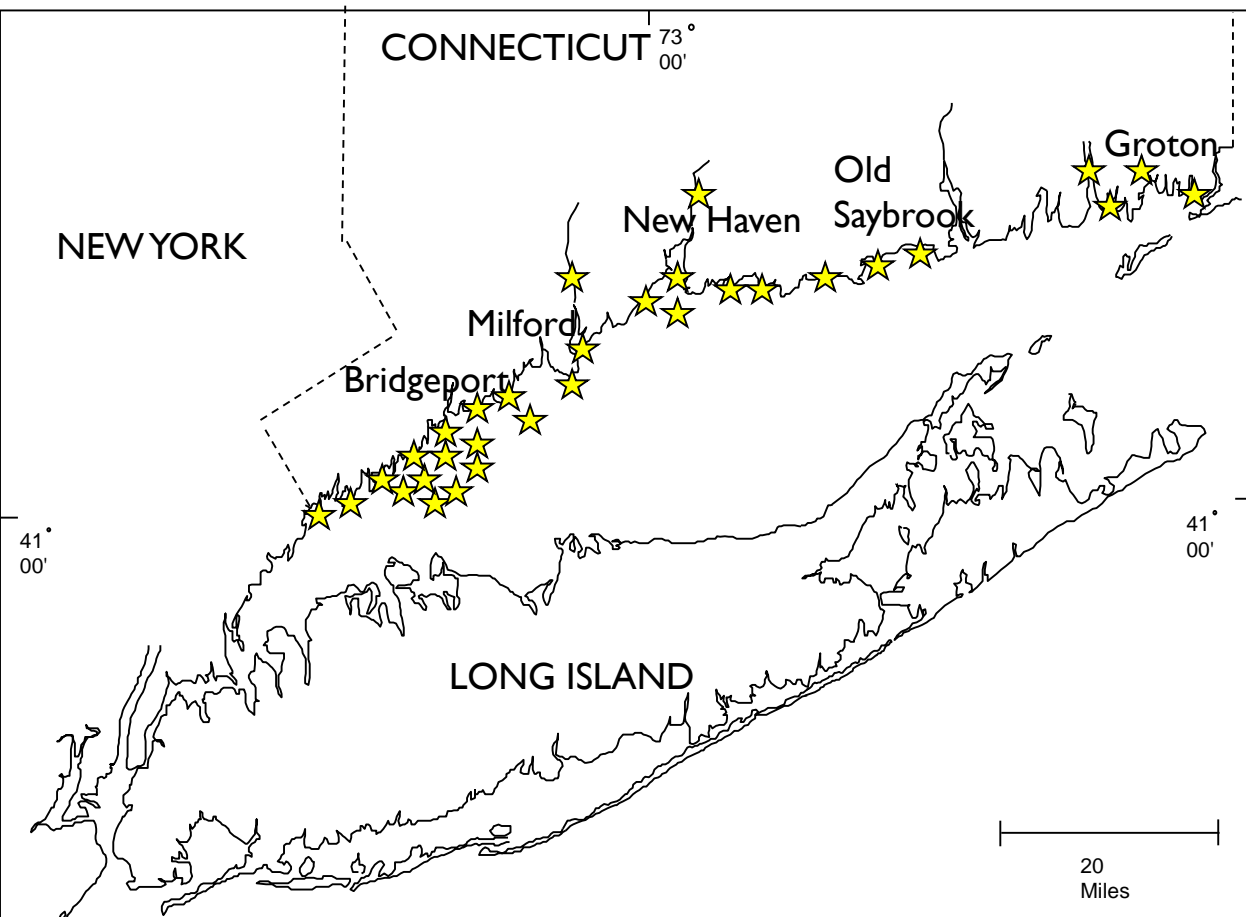
Roger Williams
University

USDA

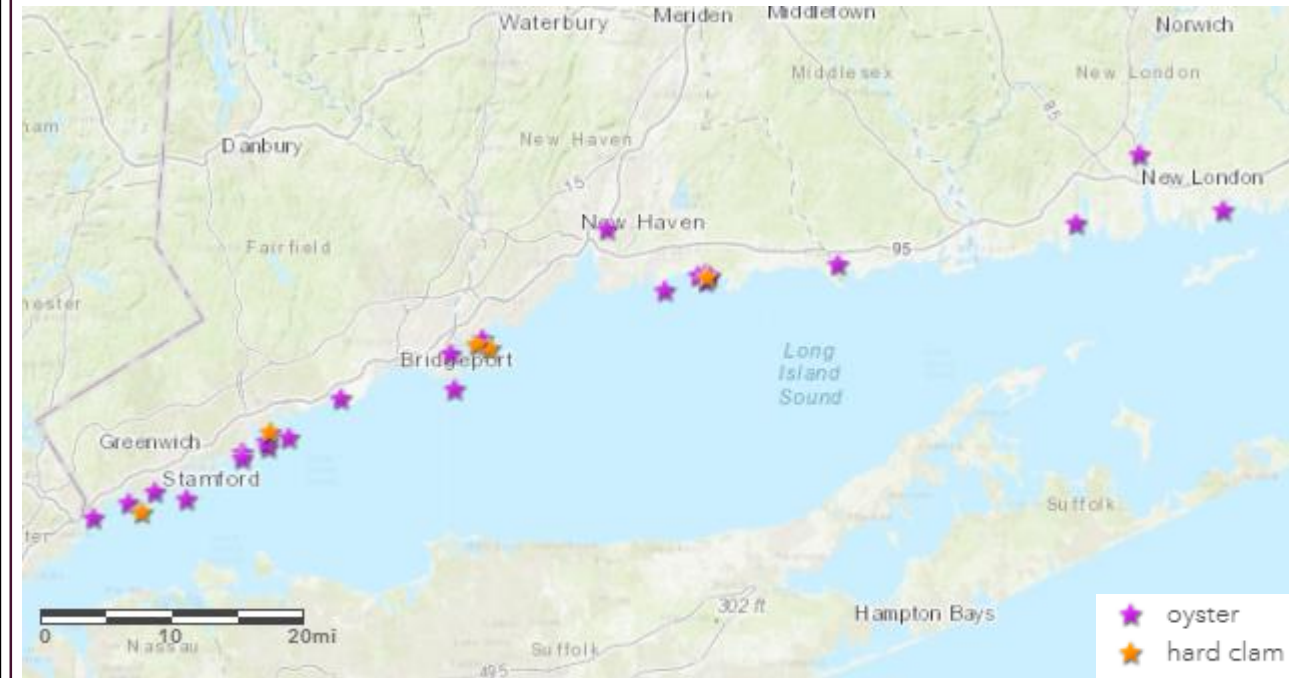


SHELLFISH DISEASE SURVEILLANCE SAMPLING LOCATIONS

1997-2016



2019-2021

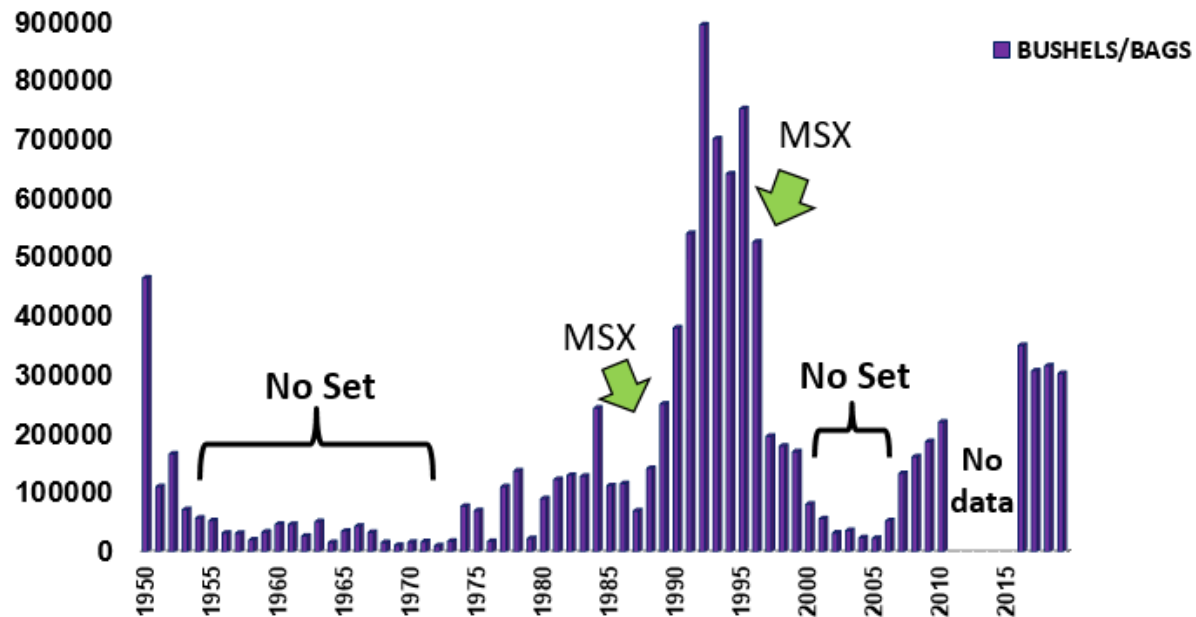


PATHOLOGY DATA INTERPRETATION

- **Prevalence:** percent of animals positive in the population (each sample set was typically 30 shellfish)
- **Weighed Intensity:** total of the scores for each individual animal/total number of animals in the sample set. Weighed intensity is used to report findings from any pathology lab, regardless of the method used to do the evaluation, and provides an overall standardized score to assess the level of infection in each group of oysters by each of the parasites.
 - **Dermo:** Intensity ratings are: 0.5, very light; 1.0, light; 2.0, light to moderate; 3.0, moderate; 4.0, heavy; 5.0, very heavy. **Populations with weighed intensities above 2.0 usually show noticeable mortality.** Populations with intensities above 2.0 can also show sporadic mortality.
 - **MSX and SSO:** Intensity rating are: 1, light; 2.0, moderate; 3.0, severe. **Populations with weighed intensities of 2.0 and greater usually show noticeable mortality.** Populations with MSX or SSO intensities of 1.5 can show sporadic mortality.

CT OYSTER DISEASE HISTORY: MSX

Connecticut oyster market harvest 1950-2019

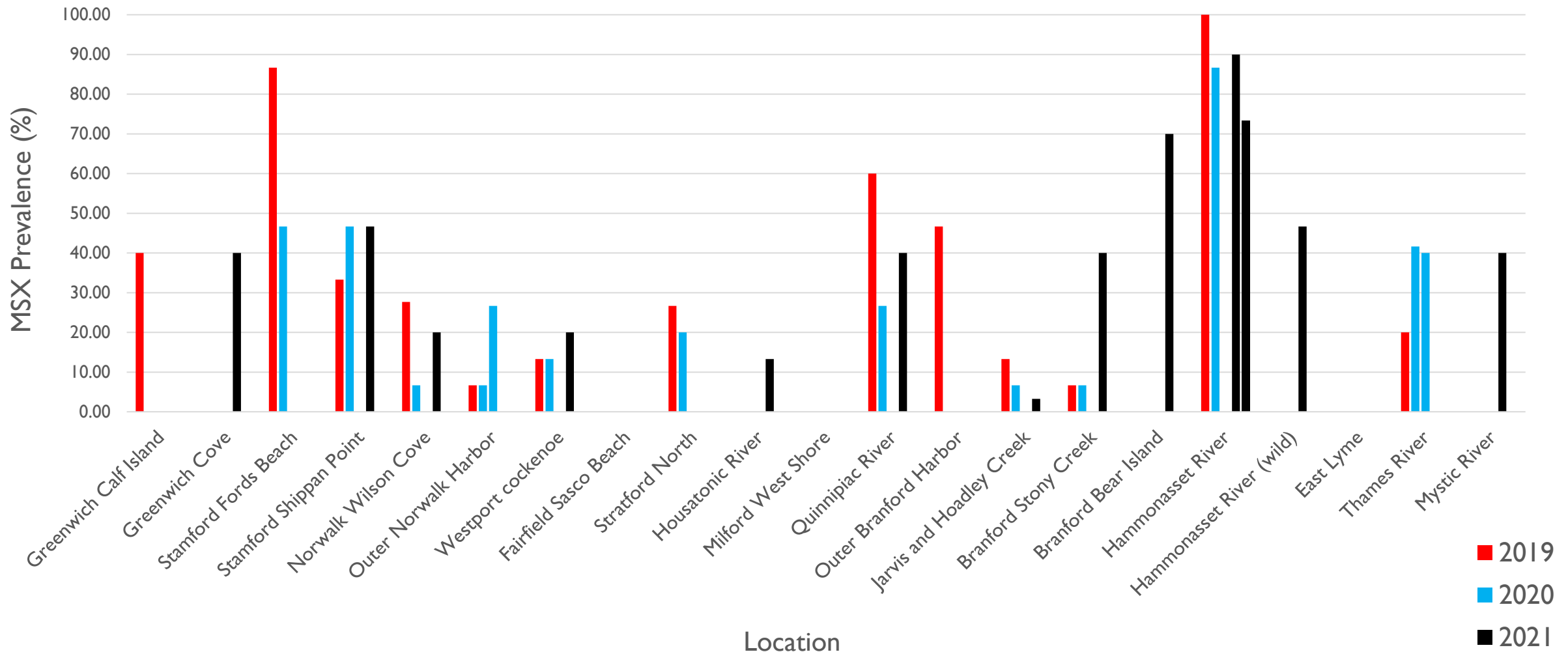


- The 1997 outbreak of MSX infection in market size oysters caused serious economic damage to the oyster industry.
- The following year, infection spread to seed oyster beds and caused devastating mortality.
- Populations began to recover after 2004.
- MSX-prevalence in Connecticut oysters has been in steady decline since the 1998 outbreak.
- MSX occurs in CT as a co-infection with another haplosporidian parasite, SSO.

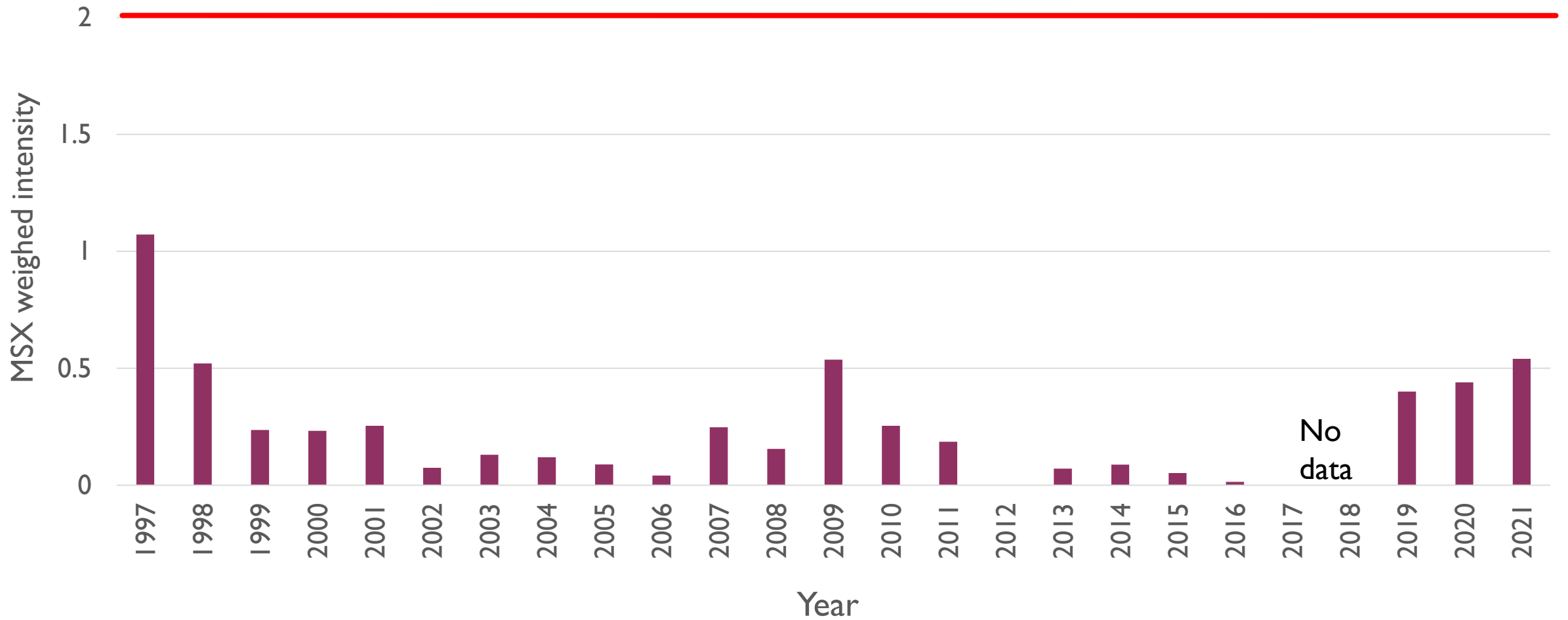
ANNUAL AVERAGE PREVALENCE OF MSX AND SSO (1997-2021)



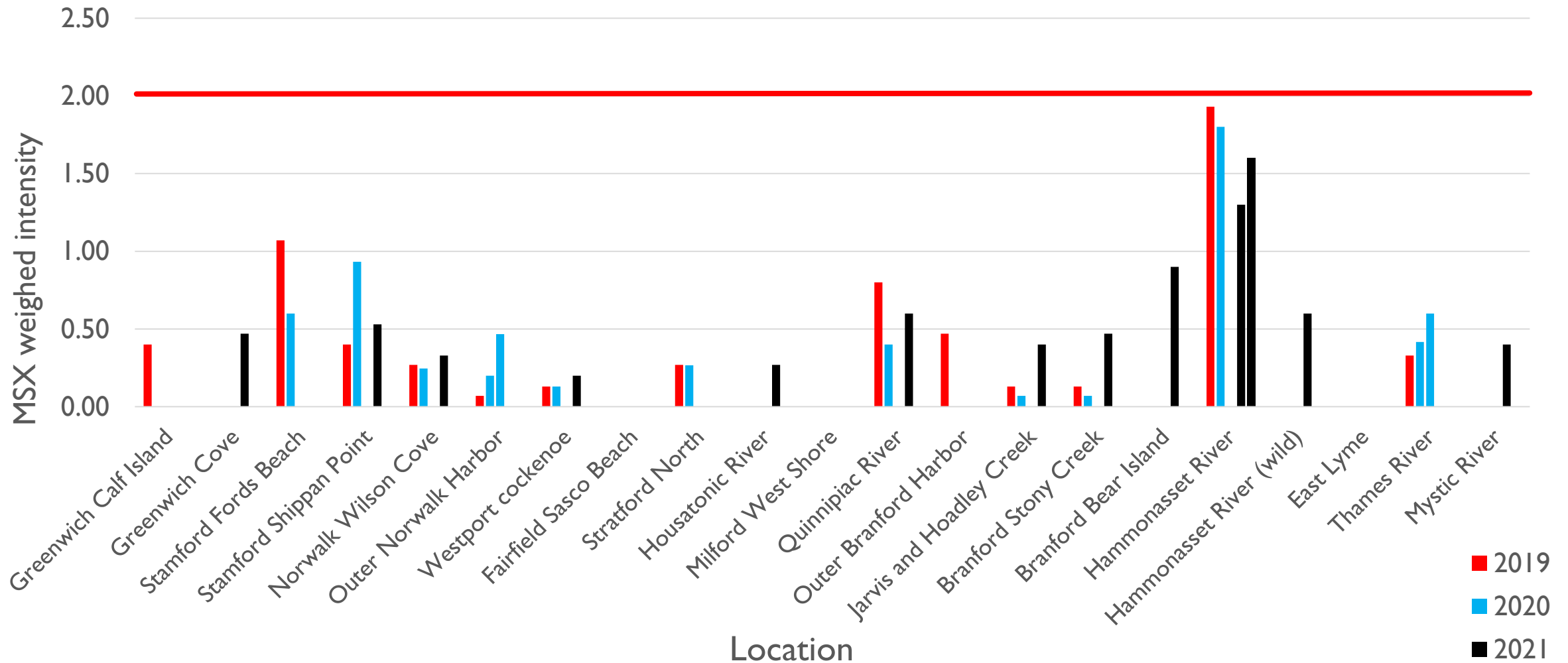
MSX PREVALENCE BY LOCATION (2019-2021)



ANNUAL AVERAGE MSX WEIGHED INTENSITY (1997-2021)

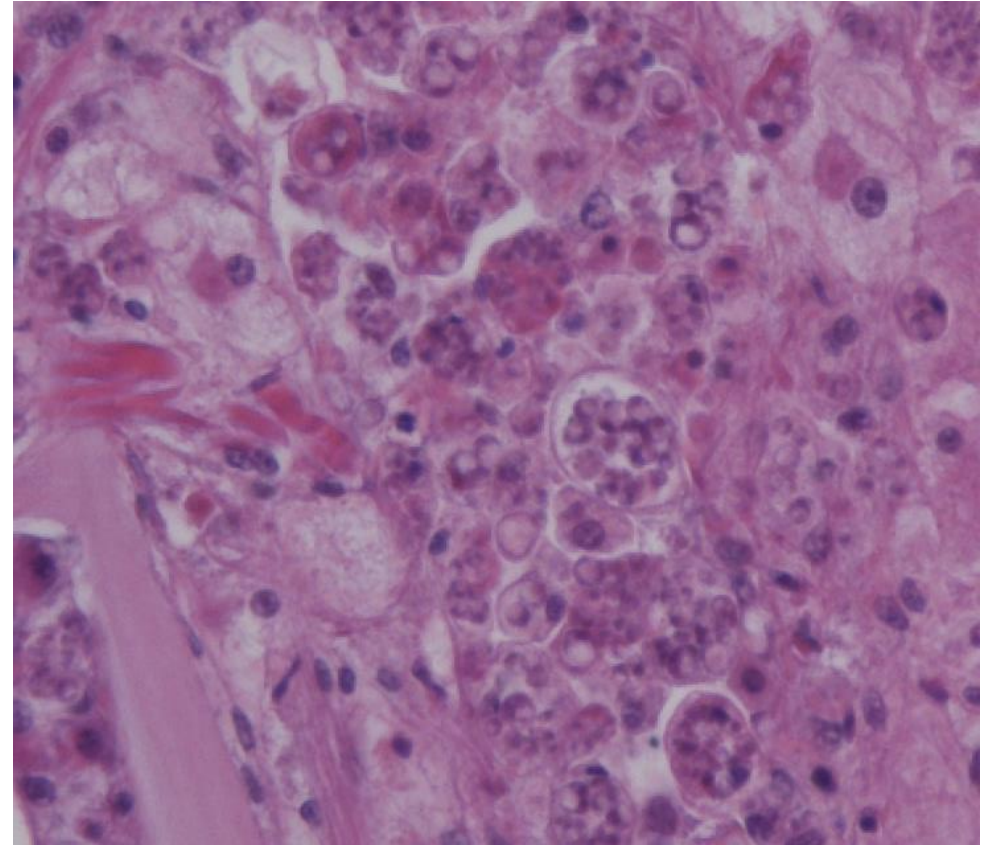


MSX WEIGHED INTENSITY BY LOCATION (2019-2021)



CT OYSTER DISEASE HISTORY: DERMO

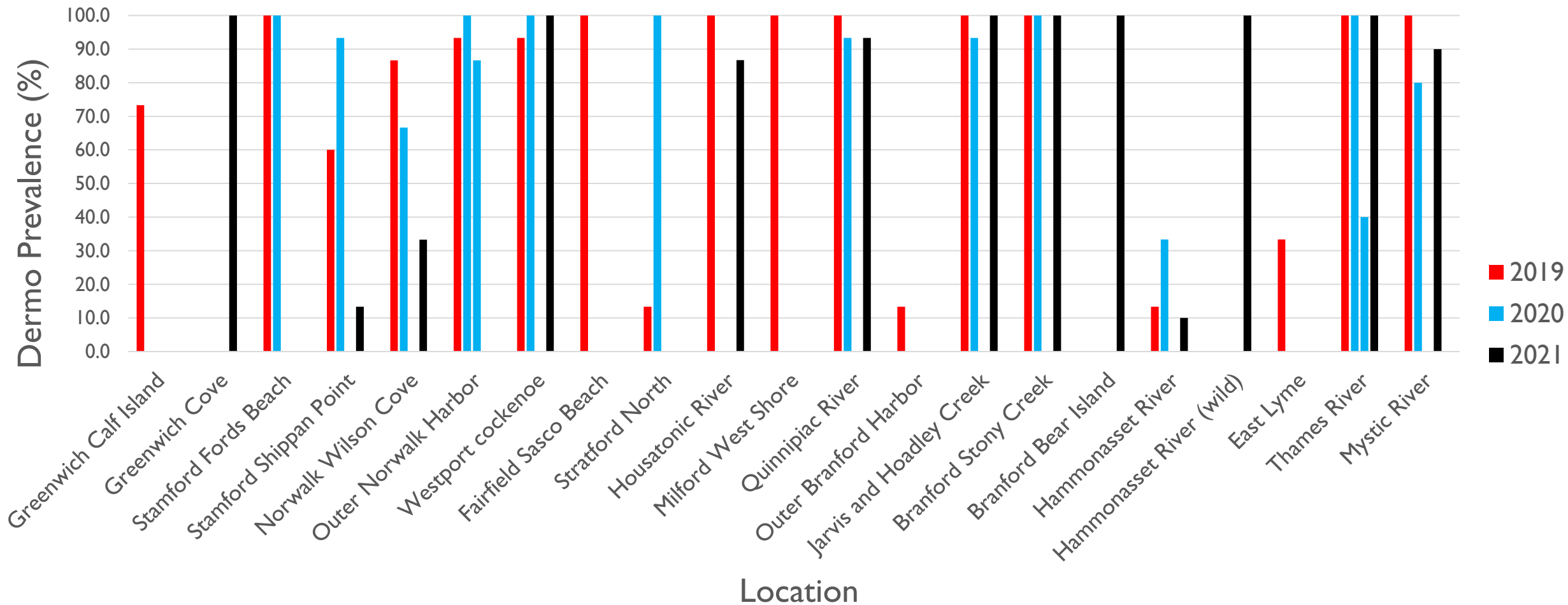
- Dermo is a slow-killing disease.
- It takes up to three years in Connecticut after initial infection for parasite intensities to approach levels high enough to cause death of the oyster.
- Oysters are marketed when they are three to four years old. Consequently, Dermo has not caused significant mortalities in Connecticut's commercial oyster stocks.
- Dermo-associated mortalities have been detected in areas of unusually slow oyster growth or during restoration efforts when oysters are grown indefinitely.



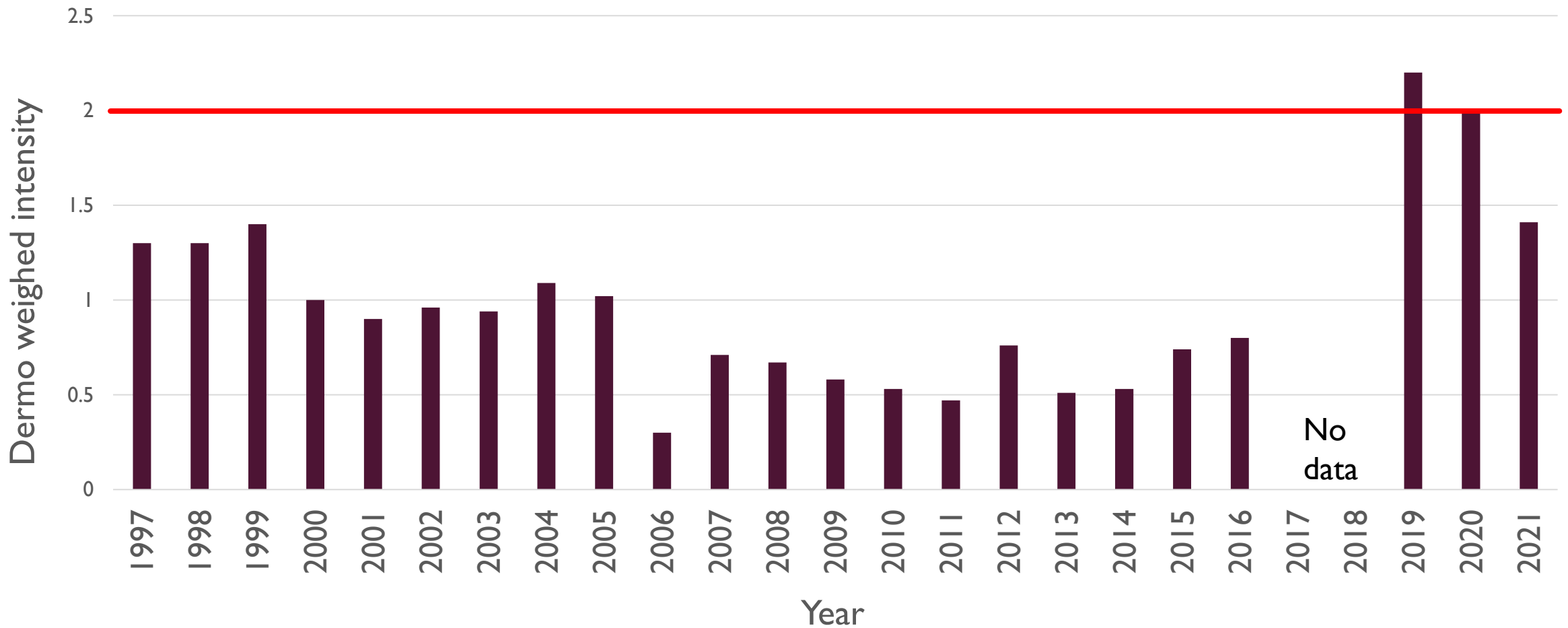
ANNUAL AVERAGE DERMO PREVALENCE IN CT (1997-2021)



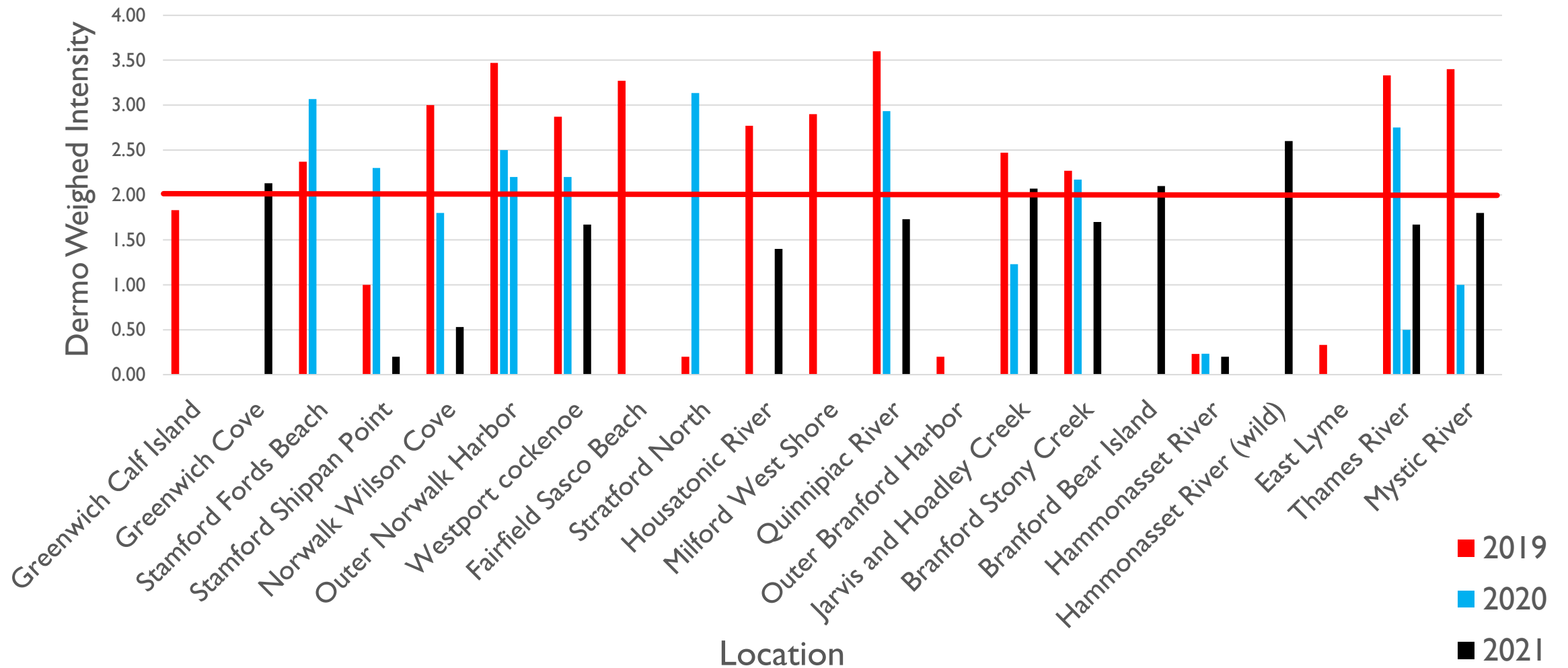
DERMO PREVALENCE BY LOCATION (2019-2021)



ANNUAL AVERAGE DERMO WEIGHED INTENSITY (1997-2021)



DERMO WEIGHED INTENSITY BY LOCATION (2019-2021)



EXPECTED MORTALITY - 2019-2021 SAMPLES

RESULT INTERPRETATION (MORTALITY) PROVIDED BY CONSULTING PATHOLOGIST

Type of expected mortality	2019	2020	2021	Total
Expected Dermo mortality	11 (61.11%)	8 (57.14%)	3 (20%)	22 (47.82%)
	Calf Island, Greenwich; Fords Beach, Stamford; Outer Norwalk Harbor; Wilson Cove, Norwalk; Westport Cockenoe; Sasco Beach, Fairfield; Housatonic River; West Shore, Milford; Quinnipiac River; Jarvis Creek, Branford; Mystic River, Stonington	Fords Beach, Stamford; Outer Norwalk Harbor; Wilson Cove, Norwalk (2 samples); Westport Cockenoe; Stratford North; Quinnipiac River; Stony Creek, Branford	Mystic River, Stonington; Hammonasset River (wild); Greenwich Cove	
Expected MSX mortality	1 (5.56%)	1 (7.14%)	2 (13.33%)	4 (8.7%)
	Hammonasset River	Hammonasset River	Hammonasset River (2 samples)	
Expected Dermo and MSX mortality	1 (5.56%)	1 (7.14%)	2 (13.33%)	4 (8.7%)
	Thames River	Stamford Shippan Point	Bear Island, Branford; Wilson Cove, Norwalk	
Expected Dermo and SSO mortality	1 (5.56%)	0	0	1 (2.17%)
	Stony Creek, Branford			
Total	2019: 14 (77.78%)	2020: 10 (71.43%)	2021: 7 (46.67%)	31 (67.39%)



2019-2021

Harvesters who are experiencing noticeable or significant mortality in their growing area(s) should report this finding to the Bureau and seek additional guidance from the consulting pathologist.



Dermo Status

- 97.83% of shellfish samples were infected with Dermo
- 54% of samples exceeded the Dermo weighed intensity of 2
- Dermo prevalence and weighed intensity were significantly higher for wild than hatchery samples
- In Connecticut this level of infection has not historically caused significant mortalities in our commercial oyster stocks.
- Individual grower reports have not indicated a high level of mortality despite this moderate to high prevalence of disease.

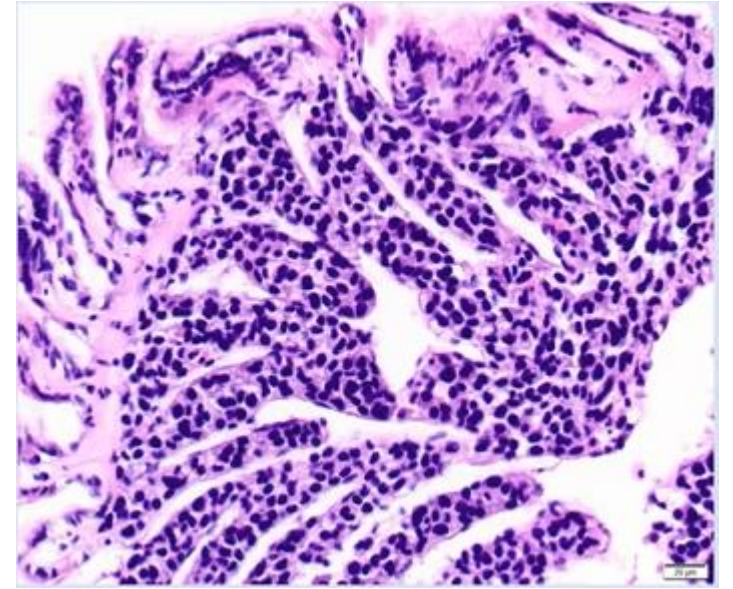


MSX Status

- 84.78% of shellfish samples were infected with MSX
- 0% of samples exceeded the weighed intensity of 2
- Hatchery populations had higher MSX prevalence and weighed intensity, but not significantly higher than wild oysters
- 26% of samples exceeded the MSX intensity of 1.5
- The current prevalence of MSX may be causing low levels of background mortalities in CT populations (e.g. the Hammonasset River)

HEMOCYTYC NEOPLASIA

- Hemocytic neoplasia (HN) was detected in 1 hard clam, from a New Jersey hatchery source.
- HN has been associated with high mortality rates in Wellfleet, MA, and is an infectious disease that is believed to mainly infect (and sometimes kill) hatchery hard clams.
- Health reports are required prior to importation of shellfish into CT. Ensure health reports have assessed hard clams for HN prior to importation.
- Hard clams that are sitting on the surface should be collected and tested for HN.



Roxanna Smolowitz

IMPORTATION POLICY

<https://portal.ct.gov/DOAG/Aquaculture/Aquaculture/Shellfish-Importation>

Northern quahog: The Bureau of Aquaculture will not allow the importation of clams from south of NJ.

Eastern oyster: The Bureau of Aquaculture does not allow the importation of oysters with the exception of hatchery stock from RI and MA, or stock from NY and Long Island Sound.

Bay scallops: The Bureau of Aquaculture does not allow the importation of scallops from outside of Long Island Sound.

Prior to all importations:

Prior to any shellfish importation, the source must be approved by the Bureau of Aquaculture.

The applicant must arrange with Bureau of Aquaculture for a sample of live animals to be tested.

The source of product is not guaranteed to be approved and should be a consideration in any project plans.

ALL INFORMATION PRESENTED IN THE 2021 DISEASE UPDATE REPORT



Bryan P. Hurlburt
Commissioner

STATE OF CONNECTICUT
DEPARTMENT OF AGRICULTURE
Bureau of Aquaculture & Laboratory Services

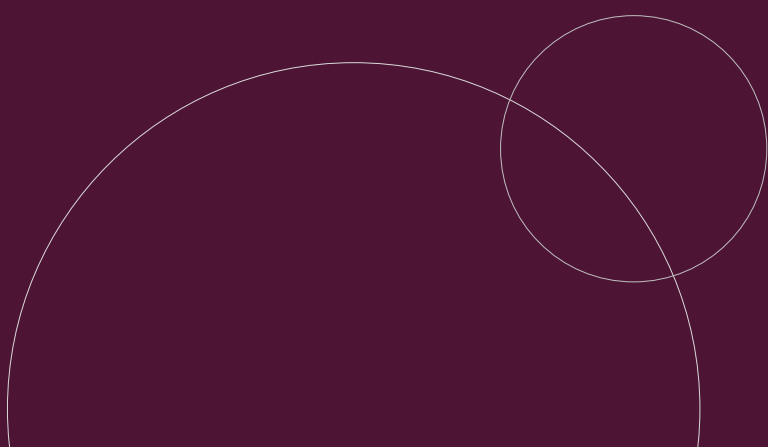




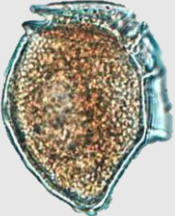

David H. Carey
Director

2021 Statewide Shellfish Disease Update

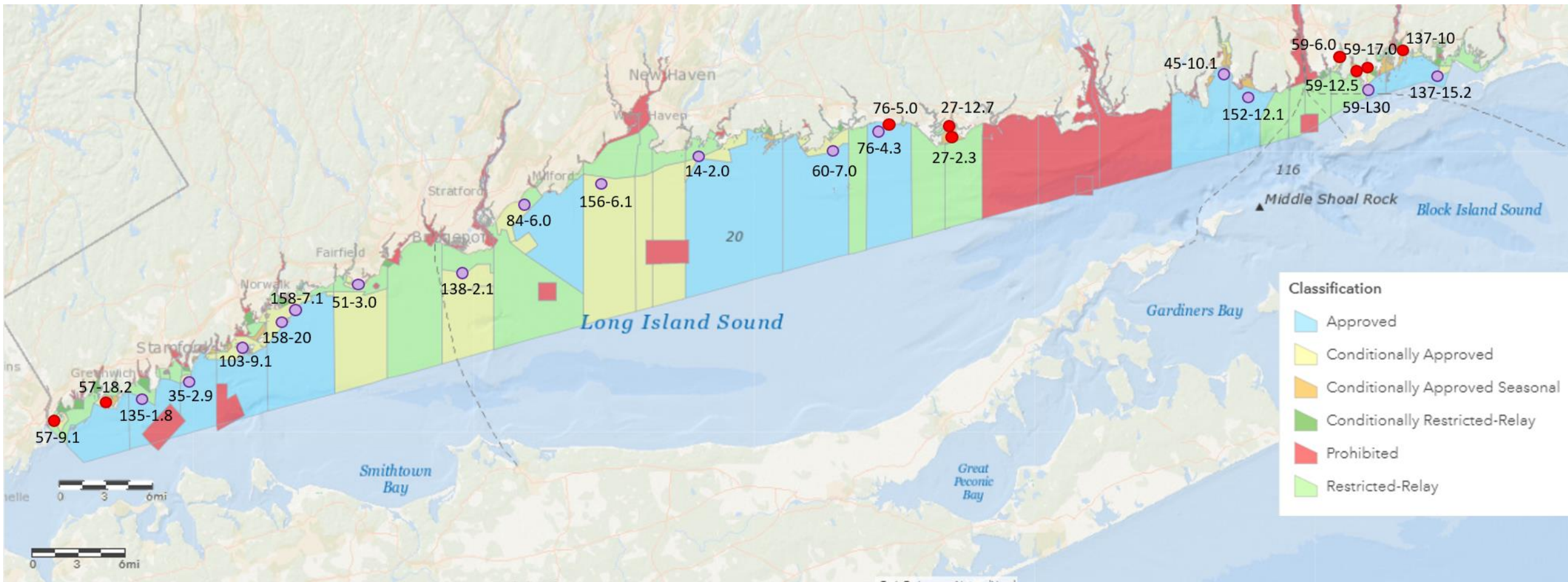
Shellfish health is a critical factor in maintaining viable wild and cultivated populations, which support a robust aquaculture industry. The Connecticut Department of Agriculture, Bureau of Aquaculture (DABA) has monitored shellfish health since 1997. This report provides recent oyster and hard clam disease data with historic context.

HARMFUL ALGAL BLOOM UPDATE



HAB genus	Toxin	Syndrome	Potential effects
Alexandrium 	Saxitoxin Potentially lethal	Paralytic Shellfish Poisoning (PSP)	Tingling, numbness, burning in extremities or mouth; lack of coordination/staggering; drowsiness; fever; rash; respiratory difficulty and/or arrest; death -Gastrointestinal: Nausea, vomiting, diarrhea
Pseudo-nitzschia 	Domoic acid Potentially lethal	Amnesic Shellfish Poisoning (ASP)	-Dizziness; headache; disorientation; short-term memory loss; seizures; respiratory difficulty; coma; long-term neurological damage, including memory defects and weakening/death muscles in extremities; death -Gastroenteritis usually develops within 24 hours of consumption – nausea, vomiting, abdominal cramps, diarrhea
Dinophysis 	Okadaic acid	Diarrhetic Shellfish Poisoning (DSP)	-Gastrointestinal onset within 30 mins-few hours of consumption: Incapacitating diarrhea, nausea, vomiting, abdominal pain; recovery typically within 3 days -Potential association with cancer (long-term exposure)
Prorocentrum 			

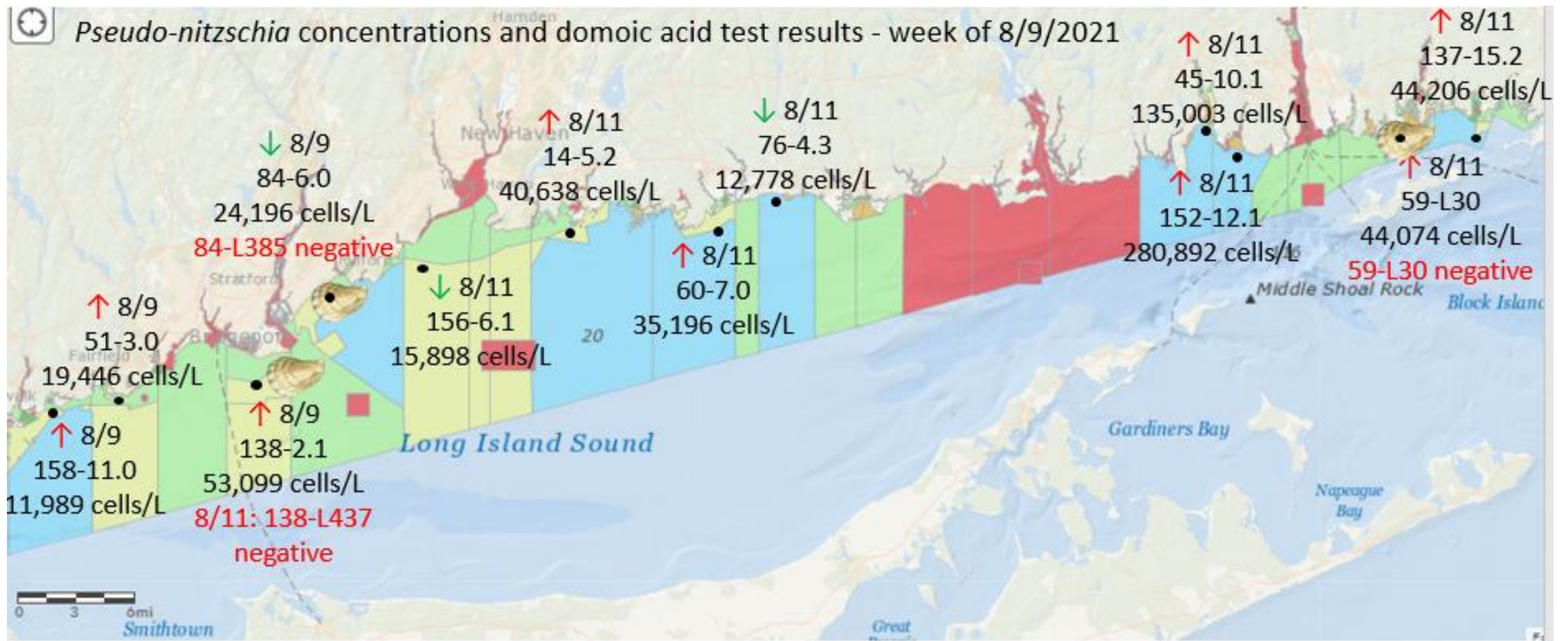
HAB MONITORING STATIONS (RECREATIONAL SHOWN IN RED)



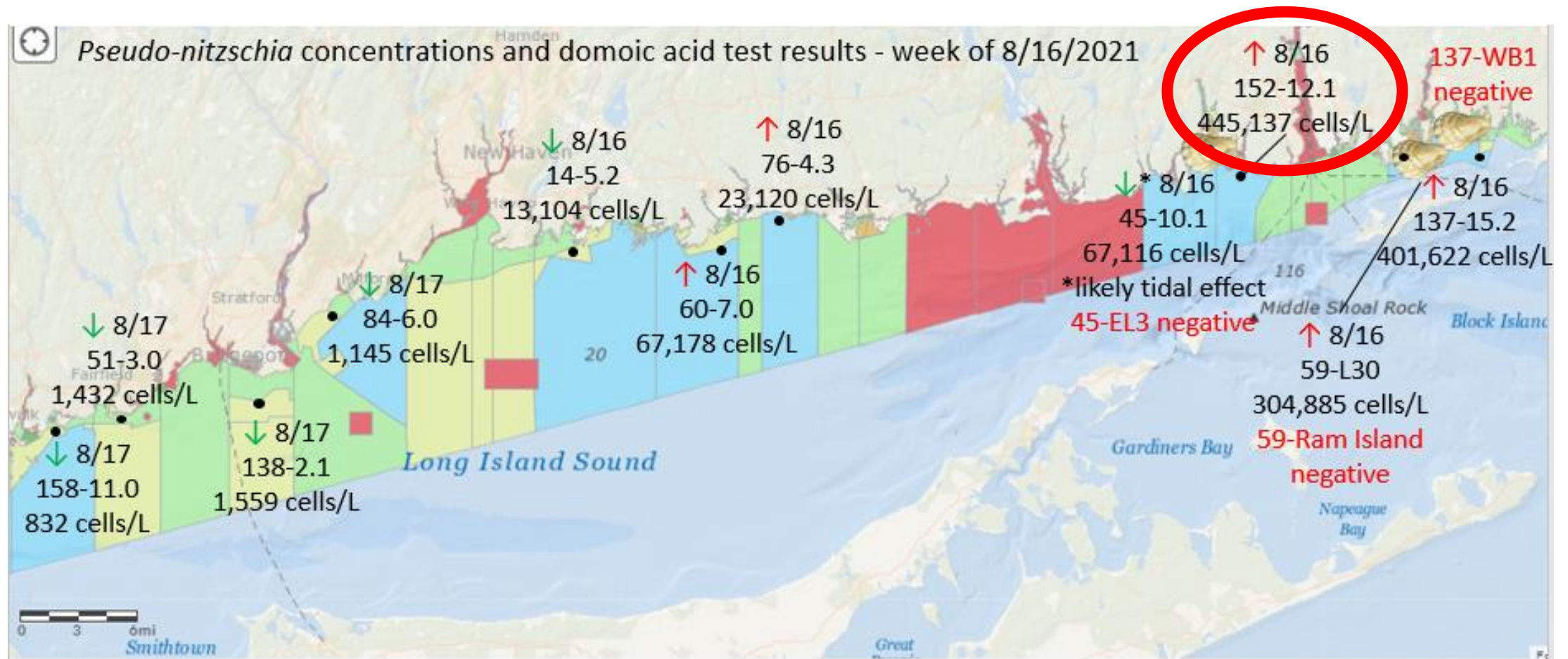
ANNUAL NUMBER OF HAB SAMPLES

Year	2019	2020	2021
Recreational HAB samples	14	56	83
Total HAB samples	179	226	244

AUGUST PSEUDO-NITZSCHIA BLOOM



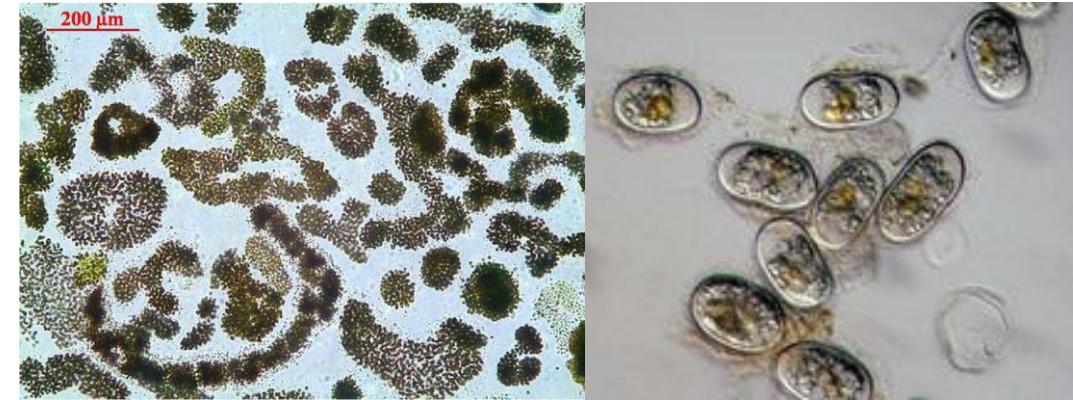
AUGUST PSEUDO-NITZSCHIA BLOOM



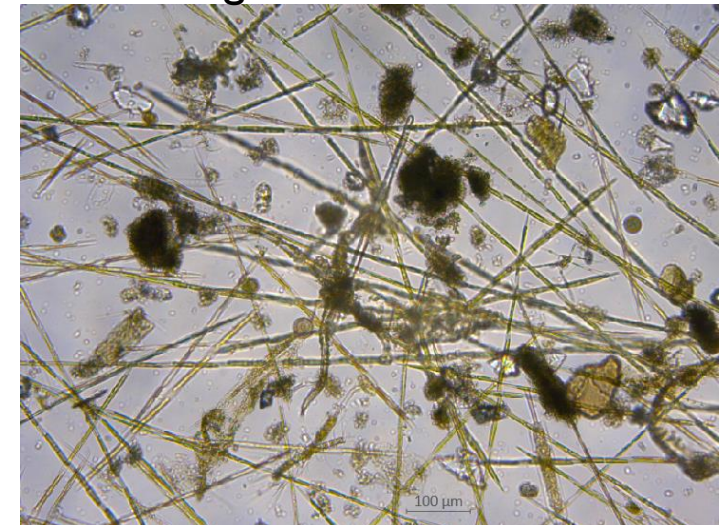
RESEARCH TO DIRECT MANAGEMENT

- Funded 2022-2023: Transport of microcystin into Greenwich shellfish growing areas
- Future funding (2023-2025?): *Alexandrium* cyst surveys
- Future funding (2023-2025?): *Pseudo-nitzschia* species assemblage and domoic acid monitoring (statewide)

Microcystis aeruginosa bloom | *Alexandrium catenella* cysts



Connecticut August 2022 *Pseudo-nitzschia* bloom



ANNUAL HAB REPORTS



Bryan P. Hurlburt
Commissioner

STATE OF CONNECTICUT
DEPARTMENT OF AGRICULTURE
Bureau of Aquaculture & Laboratory Services



David H. Carey
Director

2020 Connecticut Harmful Algal Bloom Report

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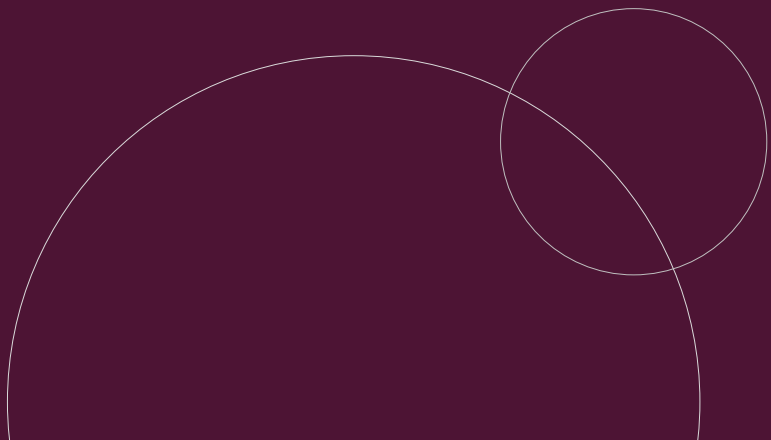
WE NEED YOUR HELP TO COVER CT'S COASTLINE...

Please report discolored water, strange marine animal behavior and/or animal kills!

1) Take a sample; 2) take a photo; 3) call DA/BA



VIBRIO UPDATE



WHAT ARE *VIBRIO*?

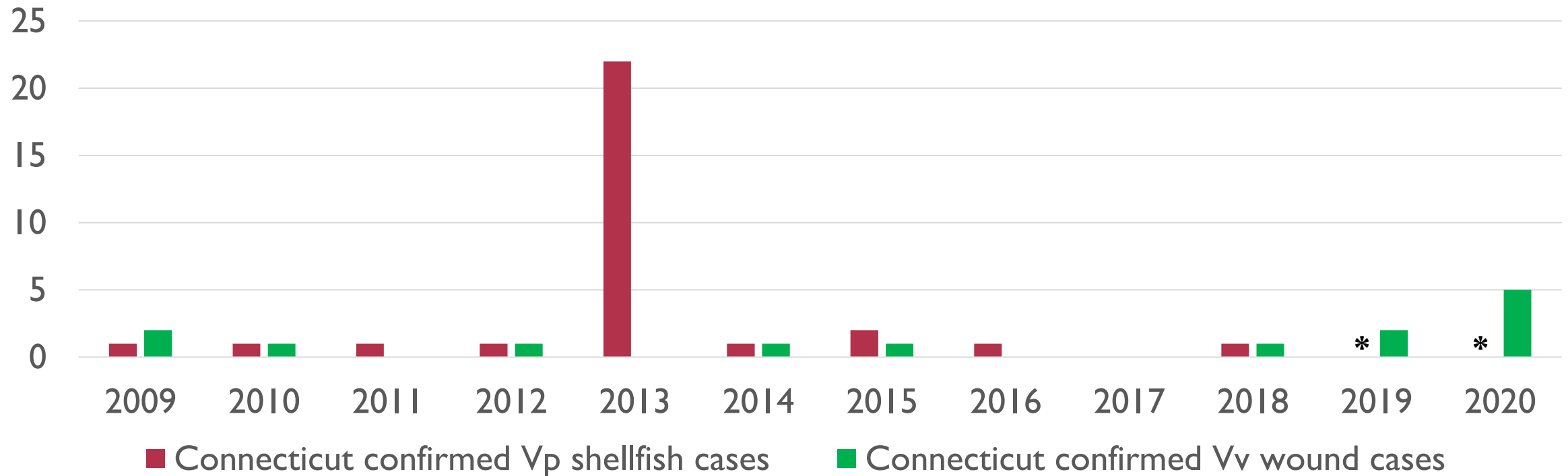
- *Vibrio* are naturally-occurring brackish-salt water bacteria that can be pathogenic.
- Exposure to *Vibrio* can occur through consumption of raw seafood or direct wound contact with seawater.
- Globally, *Vibrio parahaemolyticus* is the leading cause of seafood-associated gastroenteritis.
- *Vibrio vulnificus* can cause life-threatening illness, including sepsis, through seafood consumption or wound infection (salt water contact). Commonly referred to as “flesh-eating bacteria.”
- *Vibrio cholerae* causes cholera, which is rare in the US and other industrialized nations. Cholera can be life-threatening but is easily prevented and treated.

PREDISPOSED RISKS

- Keep in mind that some people are at greater risk for foodborne illness, and should not eat raw or partially cooked fish or shellfish.
- Susceptible groups include:
 - Pregnant women
 - Young children
 - Older adults
 - Persons whose immune systems are compromised
 - Persons who have decreased stomach acidity
 - Persons who have chronic liver disease or reduced liver function
- If you are unsure, **ASK YOUR HEALTHCARE PROVIDER**

CONFIRMED CONNECTICUT *VIBRIO PARAHAEMOLYTICUS* SHELLFISH ILLNESSES (DABA) AND *VIBRIO VULNIFICUS* WOUND INFECTIONS (DPH)

Confirmed Connecticut Vp shellfish and Vv wound cases (2009-2020)

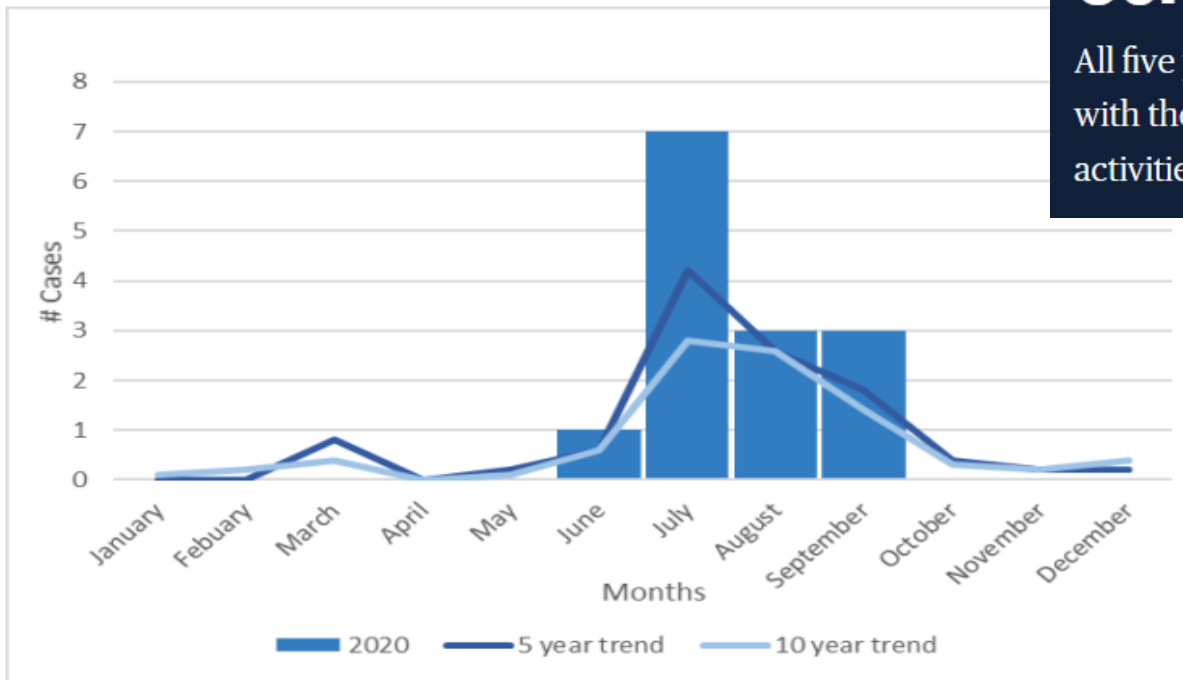


*Shellfish Vp cases for 2019 and 2020 not yet available, but were similar to 2013-2018 range, with low to very few annual confirmed cases

Vv wound cases provided by Connecticut Department of Public Health

VIBRIO VULNIFICUS MAKES HEADLINES IN SUMMER 2020

Figure 1. Vibriosis wound infection cases by month - Connecticut, 2020



Potentially deadly bacteria sickens 5 along Connecticut shoreline, prompting warning

All five patients had pre-existing wounds or sustained new wounds when they were infected with the *Vibrio vulnificus* bacteria while swimming, crabbing or engaging in other water activities.



<https://portal.ct.gov/DPH/Epidemiology-and-Emerging-Infections/CTEPI/Volumes/41/No4/a1>

Health officials said there has been an unusually high number of infections caused by bacteria in the salt or brackish water (a mix of salt and fresh water) along Long Island Sound.

HOW TO MINIMIZE VIBRIO RISKS

- Do not expose wounds to seawater during the summer-fall.
 - If you cut yourself in the field, immediately wash the wound and apply antibiotic ointment and a waterproof Band-Aid.
- Keep it shaded, keep it cool!
- Follow *Vibrio parahaemolyticus* Control Plan statewide and rapid cooling requirements for Norwalk, Westport, and Darien



WEBSITE RESOURCES

Welcome to the Bureau of Aquaculture

David H. Carey, Bureau Director

[Staff & Contact Us](#)

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General information about the Bureau

[Shellfish Sanitation Program](#)
[Laboratory Services](#)

[Shellfish Area Classifications and Maps](#)

[Harmful Algal Bloom Monitoring](#)

New for 2022:

Shellstock Shipper III License:

Shipper III licenses must be completed using [elicensing](#). A step-by-step user guide is available for [download](#)  .

General Information about Connecticut Shellfish Aquaculture

[Environmental Benefits of Shellfish & Shellfish Aquaculture](#)

[Oyster & Clam Disease Fact Sheets](#)

[Shellfish Handling and Guidance](#)

[Importation Policy](#)

[Related Links](#) | [Definitions and FAQs](#)

Industry

[Shellfish Industry Profile and Economic Impact](#)

[Commercial Shellfishing in Connecticut](#)

[Shellfish Ground Leasing Procedure and Lease Opportunities](#)

[DA/BA Applications, Forms, and Licenses](#)

[Aquaculture Permit Requirements](#)

[HACCP Information and Forms](#)

[Regulatory Guidance](#)

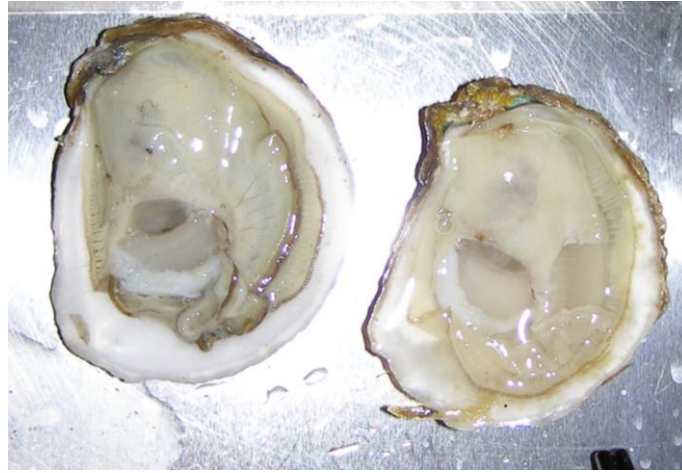
Aquaculture

[What is aquaculture?](#)

[Seaweed Aquaculture Guidance](#)

[Inland Finfish Aquaculture](#)

QUESTIONS?



THANK YOU

Roger Williams
University

