Managing Recreational Shellfishing

CONNECTICUT'S SHELLFISH SANITATION PROGRAM: ADHERENCE TO NATIONAL STANDARDS AND SIGNIFICANCE FOR RECREATIONAL PROGRAMS

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- **EA II, HAB Specialist**, Emily Marquis
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Connecticut Industry Profile

Eastern Oyster

Crassostrea virginica

Hard Clam

Mercenaria mercenaria

Connecticut Industry Profile

- Licensed Shellfish Harvesters 34
- Shellfish Harvest Vessels 90
- Licensed Seed Oysterers 26
- Licensed Seed Helpers 155
- Licensed Seed Boats 56
- Licensed Wholesale Firms 24

Connecticut Industry Profile

- Shellfishing is an important component of the State's economy, recreation, and tourism industries. CT shellfishing generates over **$30 million in farm-gate sales annually**
- The CT shellfishing industry provides **over 300 jobs statewide**
- More than **61,000 acres are under cultivation** in CT's coastal waters
- CT oysters have a reputation for quality & an outstanding safety record

Connecticut Industry Profile

CT Oyster & Clam Landings 2019-2022

CT Oyster & Clam Landings 2023 & 2024*

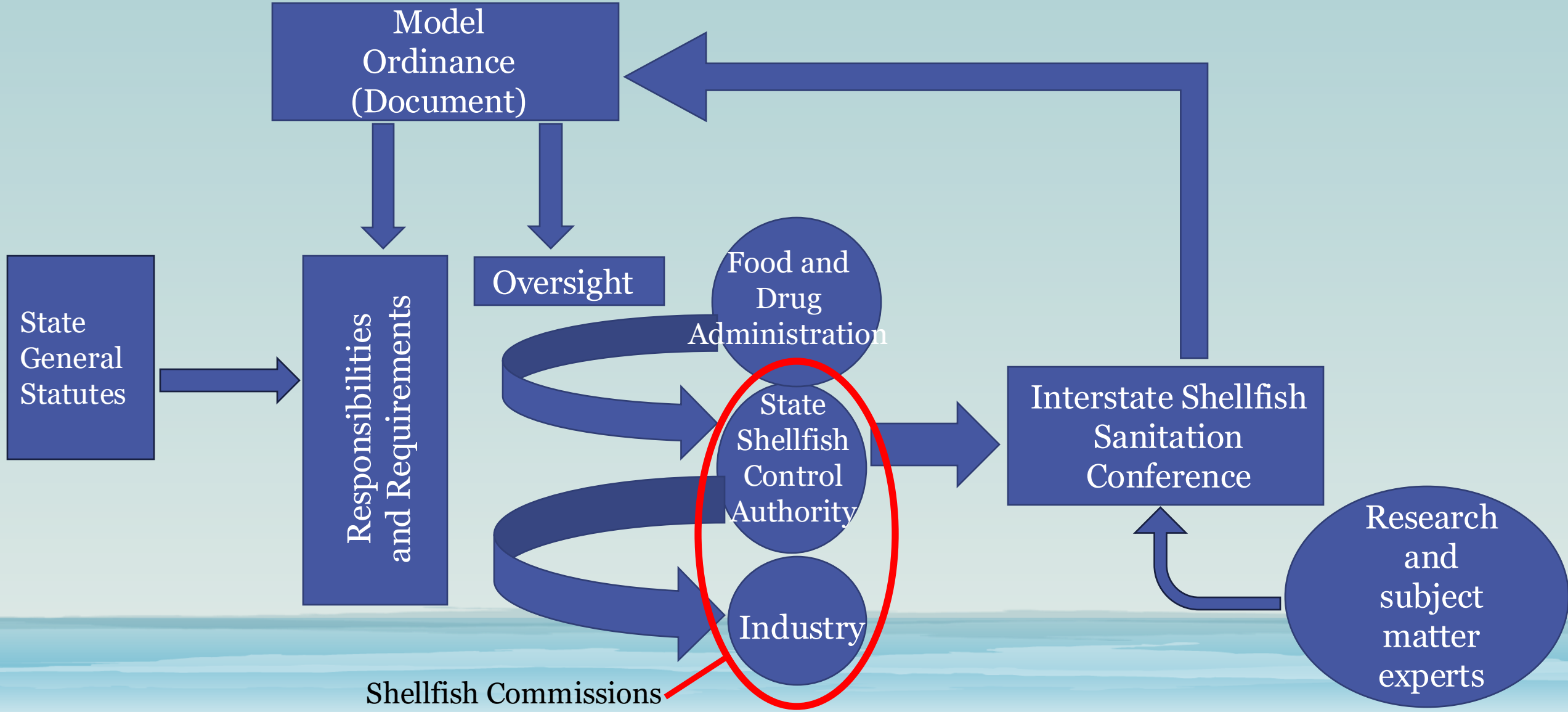
Year	Oysters	Clams	Approx Value
2023	27,953,701	10,790,801	$16,709,388
2024*	20,690,082	14,571,927	$13,463,954

*Not all landings have been submitted by industry

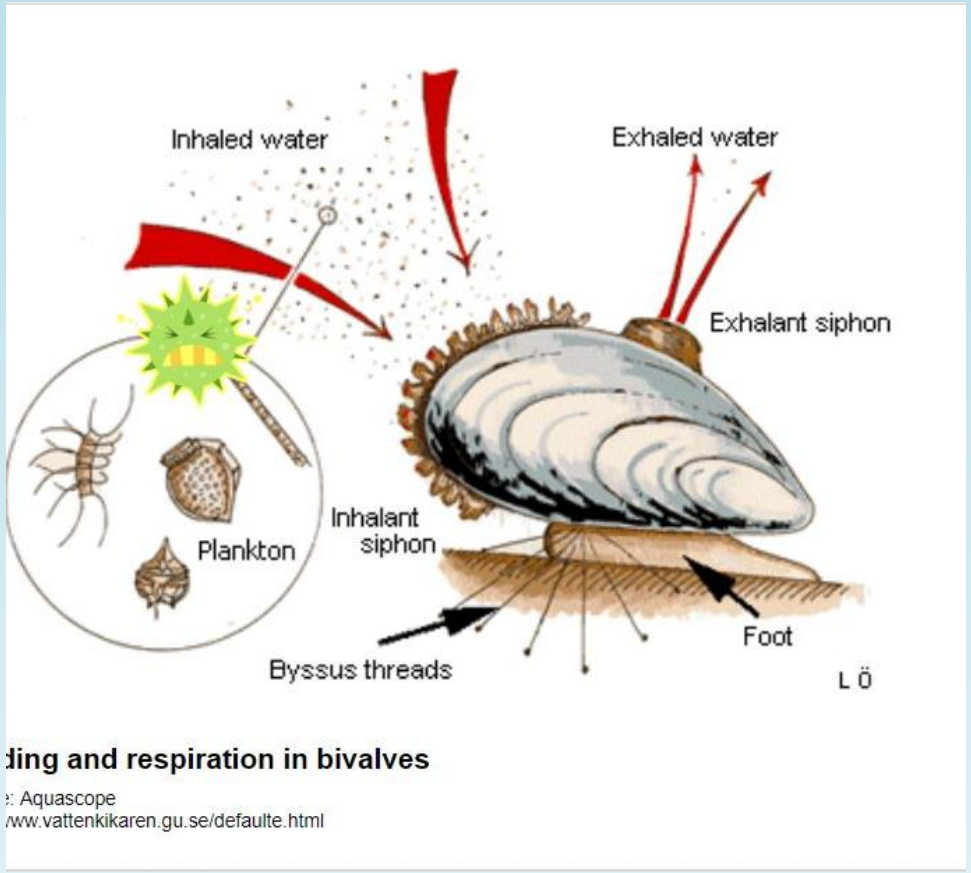
Introduction to the CT Shellfish Program

- The CT Shellfish Program operates as part of the **National Shellfish Sanitation Program (NSSP)**
- NSSP is a cooperative program consisting of State, FDA, and Industry partners who agree to accept and meet specific responsibilities in order to ensure the safety of molluscan shellfish
- Additional regulations under state statutes

National Shellfish Sanitation Program



Why are shellfish so regulated?



ding and respiration in bivalves

: Aquascope
/ww.vattenkikaren.gu.se/defaulte.html

- Shellfish are filter feeders and concentrate what is in the environment around them
  - Contaminants, pathogens, toxins, etc.
  - Natural or related to pollution
- Shellfish are consumed RAW
- Shellfish often grow in nearshore areas more likely being exposed to contaminants
- Shellfish do not move naturally from their environment

Required Program Elements under the NSSP Evaluated by FDA

(1) Growing Areas

- Designation of growing areas (shoreline surveys)
- Daily Management (opening and closing)
- Water and Tissue sampling
- Growing Area Reports
- Biotoxins

(2) Shellfish Sanitation

- Inspection program (Whole sale)
- Licensing (Vessel Monitoring System)

(3) Enforcement and Patrol

- DEEP and DoAG

(4) Laboratory

- Shellfish and Dairy
- Pathology

(5) Risk Assessment and Risk management

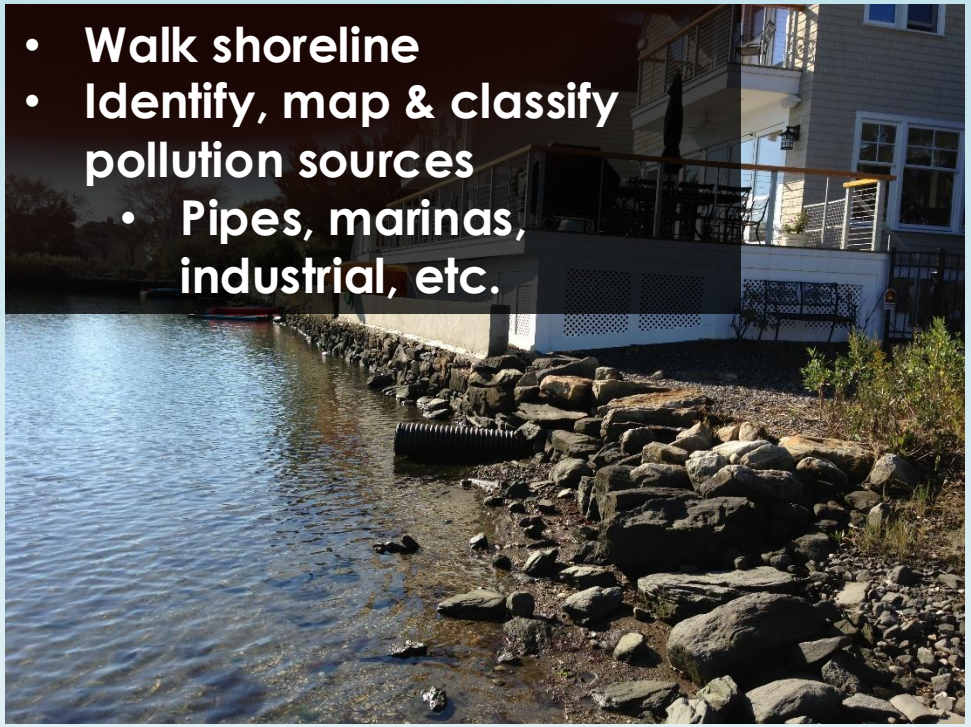
- Shellfish related illnesses
- Vibrio Control Plans

Growing Areas

- Growing Area means any site which supports or could support the propagation of shellstock by natural or artificial means.

Growing Area - Classifications

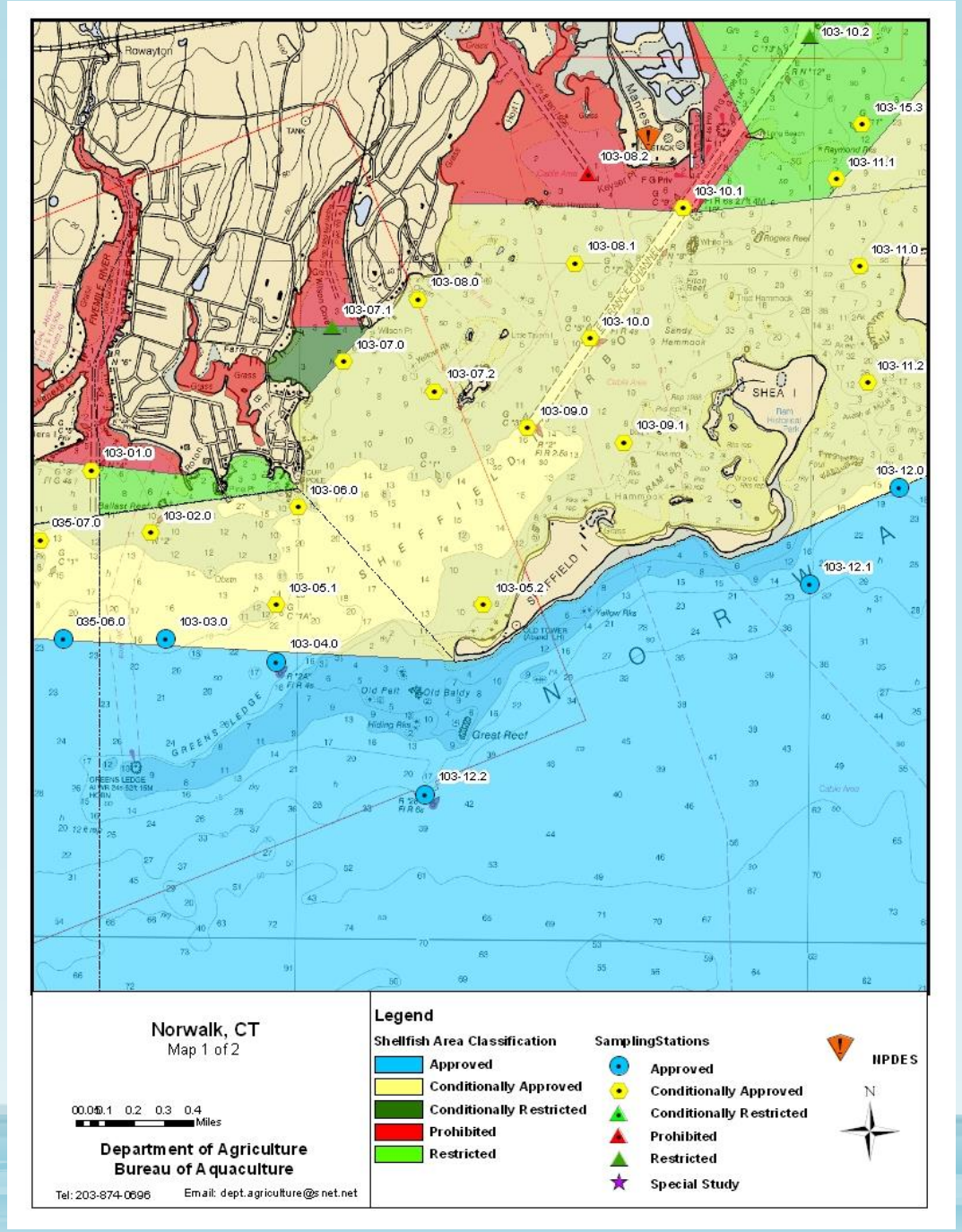
- Determine which areas are suitable for direct human Consumption
- Shoreline Survey



Water & Tissue Sample Results support shoreline survey findings

Growing Area – Classification

- Approved
  - Direct human consumption almost all conditions
- Conditionally Approved
  - Direct human consumption under certain conditions
    - Low rainfall, >7 days after exceedance of rainfall trigger
- Restricted Relay
  - Not approved for human consumption
  - Relay of clams and oysters to approved areas for a 2 week depuration
    - Sampled prior to adding to license
- Prohibited
  - Not approved for human consumption
  - Relay of oysters to approved areas for a 6 month depuration
    - Sampled prior to adding to license



Growing Area Classification vs. Status

Classification

- Consistent
  - Approved
  - Conditionally Approved (Includes Seasonal Areas)
  - Restricted
  - Prohibited

Status

- Changes due to conditions
  - Administratively Closed
  - Closed (Rainfall, Sewage, HAB, etc.)
  - Open

NSSP-MO Sampling Compliance (*check DoAG cheat sheet*)

WATER SAMPLES

1. Monthly OPEN Samples:

- Once per month **OPEN** status (12 total) at **each** station in Conditionally Approved Areas

2. APC Samples:

- Collected 0-4 days following **≥0.5”** rainfalls
- 5 per year *required at **each*** Conditionally Approved and Approved Station.

3. Re-Opening Samples:

- After rainfall or sewage closure of Conditionally Approved or Approved Stations

TISSUE SAMPLES

- After Sewage event
- Shellfish tissue samples required to verify 7 day closure
- Post Relay

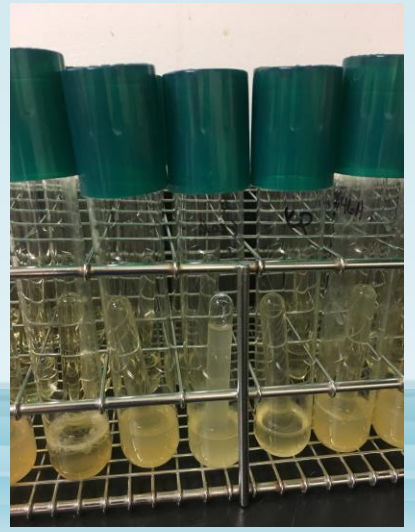
Sampling Types (non- vibrio)

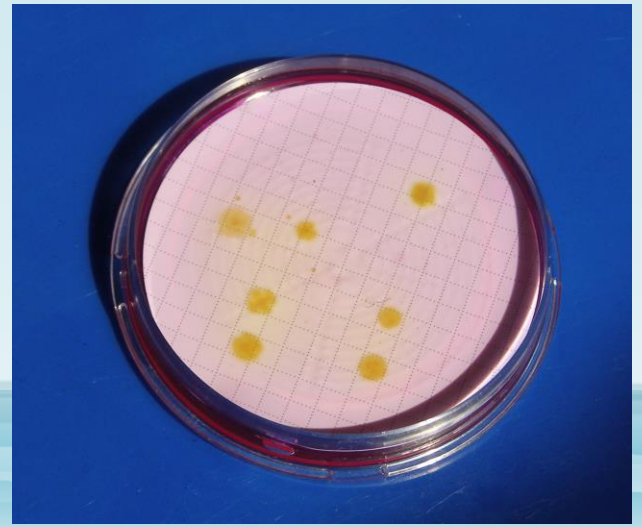
BACTERIAL (Fecal Coliforms)

- Water
- Tissue

VIRAL (MSC)

- Water
- Tissue





DoAG NSSP Reporting Requirements

STATE OF CONNECTICUT
DEPARTMENT OF AGRICULTURE, BUREAU OF AQUACULTURE

2023 ANNUAL ASSESSMENT OF SHELLFISH GROWING AREAS FOR THE TOWN OF BRANFORD, CONNECTICUT

Period Covered: 01/01/21 – 12/31/23

Date Completed: September 25, 2024

Period Covered by Last Twelve Year Comprehensive Evaluation:
01/01/09- 12/31/22
Date Completed: 11/11/23
Period Covered by Last Triennial Evaluation:
01/01/18 - 12/31/20
Date Completed: 12/1/22

Alissa Dragan, Supervising Environmental Analyst
Jenifer Yeadon, Environmental Analyst III
Emily Marquis, Environmental Analyst II
Michal Zuber, Environmental Analyst II
Matthew Bartell, Environmental Analyst I
Maylani Velazquez, Environmental Analyst I

Reviewed by:
David Carey, Director

DavidHCarey

State of Connecticut Department of Agriculture Bureau of Aquaculture

Approved Stations

Table 1. All Approved station fecal coliform (CFU/100mL) samples collected from 2021-2023 under APC for the Branford growing area. Samples collected 0-4 days after ≥0.50" rain. Fecal coliform results >31 CFU/100mL are in red. Data are sorted by primary rain event. A portion of the Approved area off Stony Creek (represented by stations 11.0, 11.2 and 11.3) was administratively closed from 5/13/22-3/23/23 due to failure of 11.2 to meet the NSSP-MO Approved criteria in the 2021 reporting period.

Primary Rain	Days Prior	Secondary Rain	Days Prior	Status	Sample Date	014-02.0	014-05.3	014-09.1	014-09.4	014-09.5	014-09.6	014-11.0	014-11.2	014-11.3	014-13.2	014-14.3	014-15.0	014-15.4	014-25.0	014-26.0
0.59	1	0.13	14	C	7/20/22							9	22	3						
				O	7/20/22	3	0.9	0.9	4	1	1				3	4	4	3	0.9	0.9
0.73	4	0.01	6	O	3/23/21	1	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1	0.9	1	1	0.9	0.9
0.86	1	0.22	10	O	8/8/23	1	4	2	3	1	2	54	14	10	2	3	6	4	1	7
0.87	0	2	6	O	7/10/23	24	0.9	0.9	3	7	7	36	81	81	3	35	32	51	5	19
0.87	3	2	9	C	7/13/23	0.9						1	1	0.9		5	2	2		
1.16	4	0.07	3	O	4/12/22	0.9	0.9	1	0.9	0.9	0.9	0.9	1	0.9	0.9		2	3	1.9	1.9
1.23	2	3.42	6	O	11/2/21	3	4	1	3	1	1	2	1	1	2	3	7	3	2	0.9
1.23	4	1.58	12	C	12/20/22							1	5	2						
				O	12/20/22	1	0.9	4	2	0.9	0.9				5	0.9	4	5	0.9	0.9
1.30	4	0.25	3	O	9/28/21	1	2	0.9	3	0.9	1.9	0.9	2		3	0.9	0.9	2	1	2
1.39	3	0.37	10	O	10/24/23	1	0.9	1	3	1	1	4	2	0.9	1	0.9	3	8	0.9	2
1.58	0	0.14	4	C	12/7/22							16	22	79						
				O	12/7/22	9	1	3	10	0.9	4				27	13	10	21	5	4
1.69	2	2.07	10	O	5/3/23	8	1	0.9	0.9	0.9	3	2	0.9	0.9	0.9	1	1	0.9	2	0.9
1.80	3	0.17	5	O	8/26/21	5	1	1	1	2	1	8	9	2	1	2	3	2	1	4
1.98	3	0.24	15	O	5/23/23	9	4	0.9	11	5	0.9	4	6	10	0.9	2	0.9	2	1	3
2.41	3	0.69	24	O	6/3/21	0.9	0.9	1	0.9	0.9	0.9	10	18	2	0.9	1	4	1	1	1
3.07	2	0.42	9	C	12/13/23	16	11	9	10	6	12	6	10	9	9	11	8	14	5	7
					Station	**014-02.0**	**014-05.3**	**014-09.1**	**014-09.4**	**014-09.5**	**014-09.6**	**014-11.0**	**014-11.2**	**014-11.3**	**014-13.2**	**014-14.3**	**014-15.0**	**014-15.4**	**014-25.0**	**014-26.0**
					Class	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
					# Spls	16	15	15	15	15	15	16	16	15	15	15	16	16	15	15
					GeoMean	2.70	1.54	1.37	2.57	1.42	1.67	4.10	4.83	3.37	2.13	2.66	3.30	3.64	1.54	2.26
					% > 31	0.00	0.00	0.00	0.00	0.00	0.00	12.50	6.25	13.33	0.00	6.67	6.25	6.25	0.00	0.00
					Pass/Fail	P	P	P	P	P	P	F	P	F	P	P	P	P	P	P
					# > 31	0	0	0	0	0	0	2	1	2	0	1	1	1	0	0
					2023 Spls	7	6	6	6	6	6	7	7	7	6	7	7	7	6	6

- Annual, Triennial, Sanitary Survey (12 years)

- Reports analyze water and tissue data to ensure growing area is classified correctly.
- Reviews management decisions.
- Reviews events that resulted in non-standard closures (sewage, fire runoff, failing systems, etc.)
- Reviews new potential pollution sources (new construction, WWTF changes/upgrades, etc.)

Introduction to the CT Shellfish Program: Growing Area Classification, NSSP Bacteriological Standards

NSSP Fecal Coliform Criteria for an Approved area:

Geometric Mean of a station's sample results shall not exceed **14 CFU/100 mL**

AND

no more than 10% of all samples at a sample station shall exceed **31 CFU/100mL**

Introduction to the CT Shellfish Program: Growing Area Classification, NSSP Bacteriological Standards

To meet the Approved Criteria, it takes **8 million cubic feet** of dilution water to dilute **one person's waste in one day**

OR

59,850,779 gallons

OR

Volume equal to **12 football fields covered in 10 feet of water**

Growing Areas – Biotoxins

- Some algae produce toxins that can cause illness or death in humans
  - Pseudonitzschia – Domoic acid
  - dinoflagellates – Okadaic acid
  - Karenia brevis – Brevetoxins
  - Alexandrium – Saxiotoxins (PSP)
  - Microcystins (typically freshwater)
- Shellfish concentrate those toxins when in waters currently in an active bloom
- SSCAs are required to have a Biotoxin monitoring plan that is consistent with the areas threat level
  - Grab samples are taken monthly in each growing area
  - Mussels are collected in the summer in areas with historic issues for bioassay

Inspection and Licensing- Inspections

- All Dealers are inspected 2-3 times per year
  - Follow-up
  - Additionally as needed
- Sanitation issues
- HACCP records
- Tracability

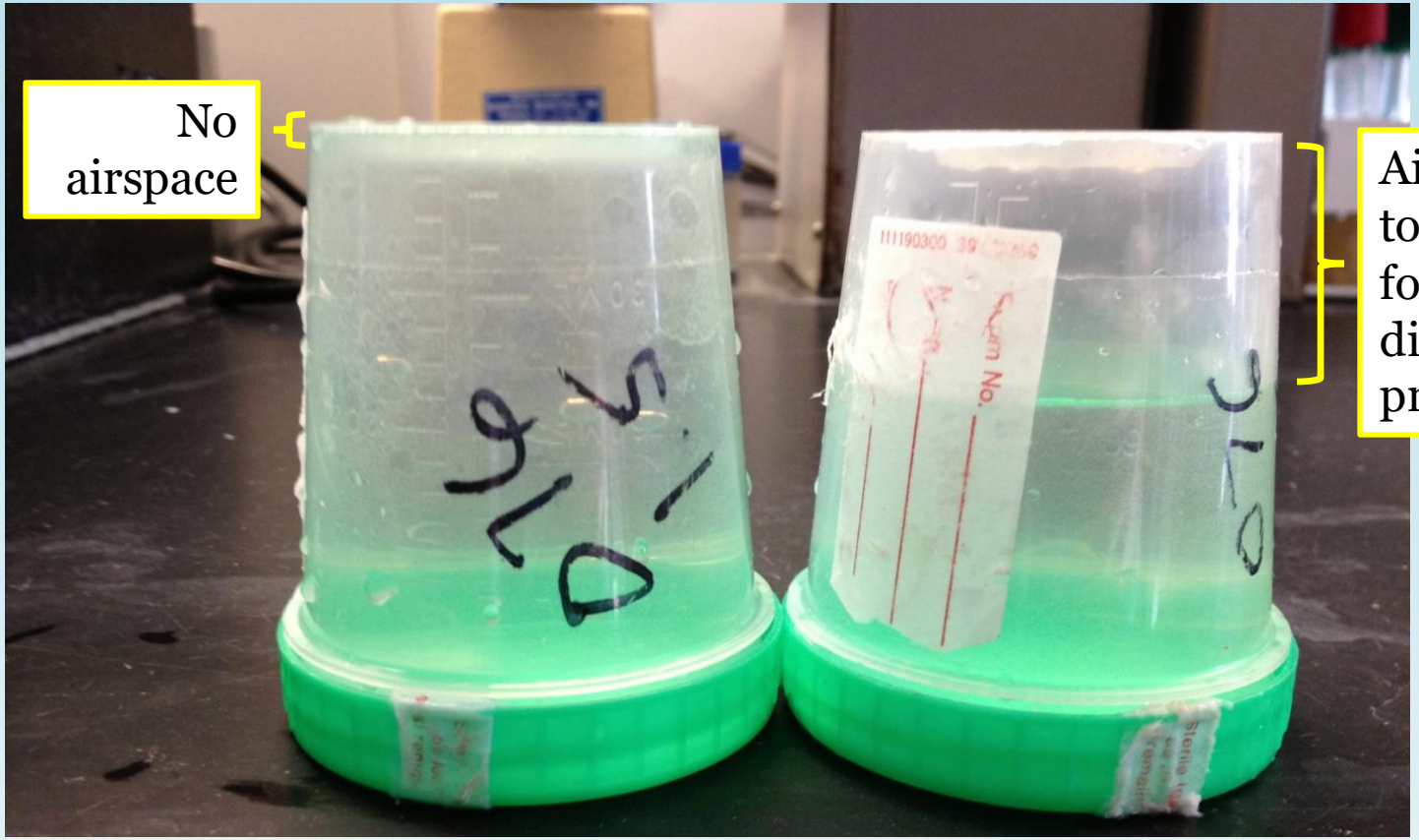
Seed Importation and Licensing

- DoAG website has both the importation policy and links to eLicense
- Relay activity shall be approved by DoAG

Seed Importation License: This license is required by municipalities, institutions, shellfish companies, or individuals involved in importation or introduction of molluscan shellfish species from outside of Connecticut. **You will be required to attach two years of pathology reports to demonstrate good technique, and one report within 2-3 months prior to the date you plan to plant seed in Connecticut from out-of-state source areas or hatcheries.** All entities must follow the **shellfish importation policy**. Failure to comply with these policies will result in the rejection of your application.

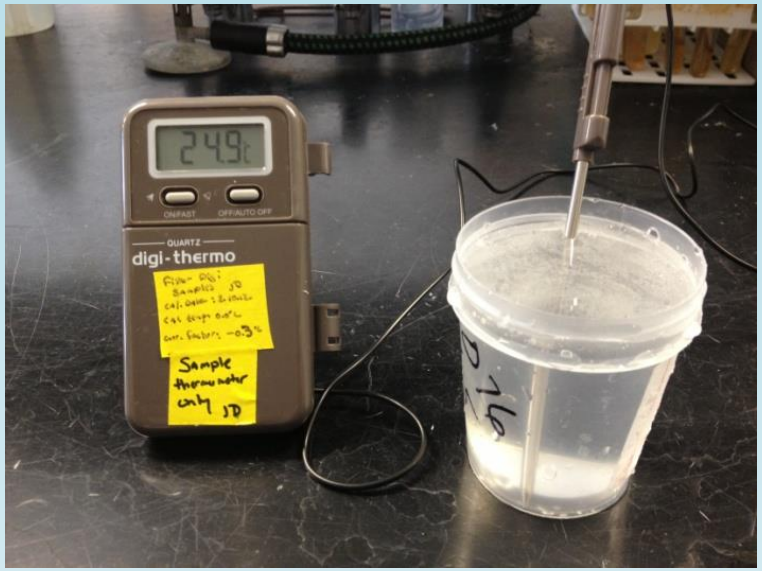
*Shellfish Seed Importation licenses must be completed using **www.elicense.ct.gov**. A step-by-step user guide is available for **download** .*

Common mishaps and tips to avoid them

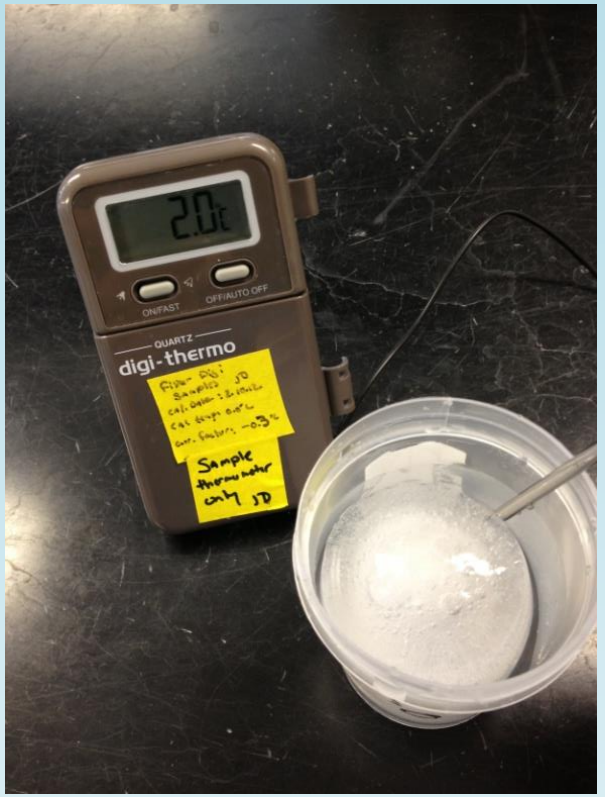


Adequate airspace is the width of the threads on the sample bottle or approximately ½ inch

Common mishaps and tips to avoid them



TOO HOT!!!



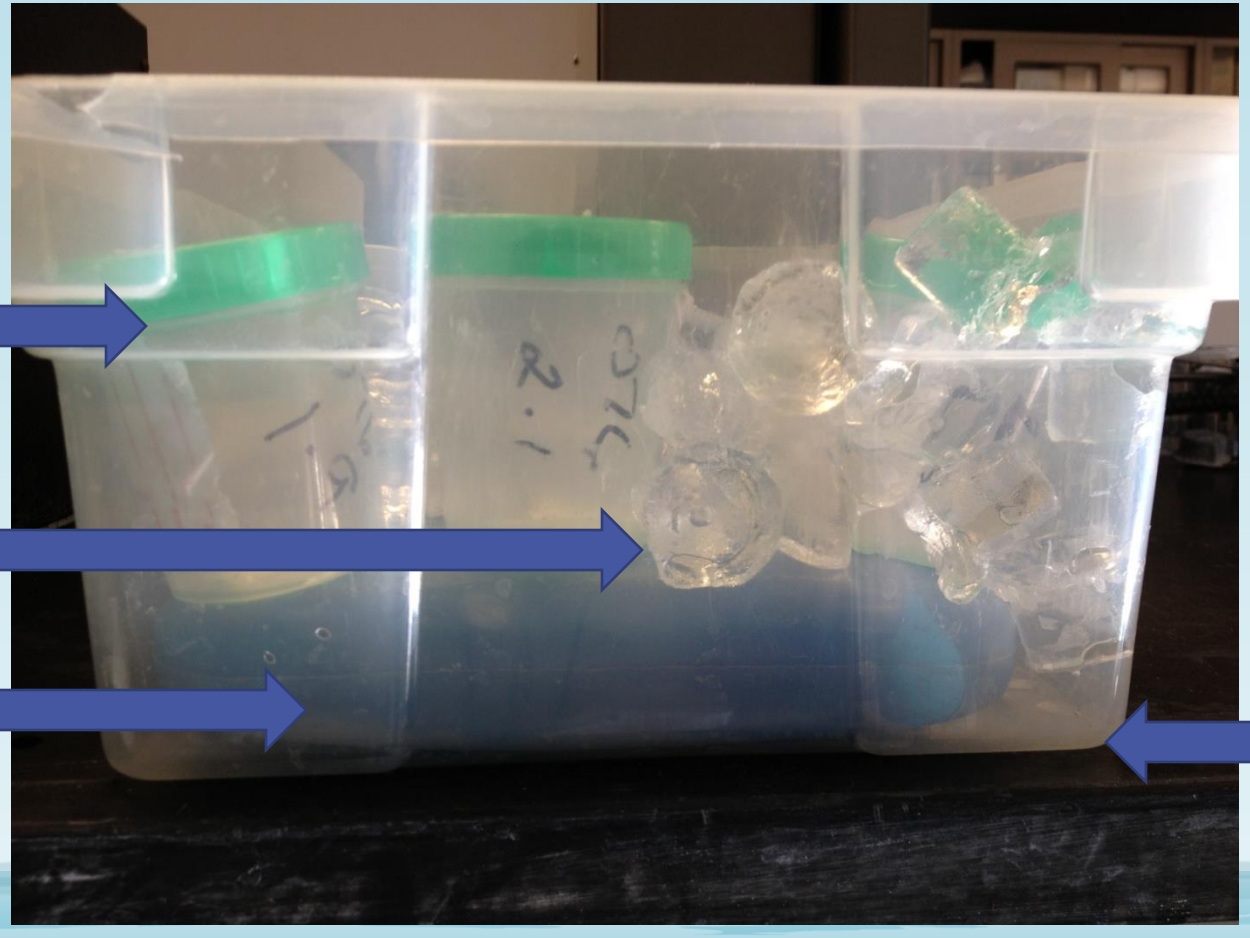
TOO COLD!!!

- Goldilocks - We want to keep bacteria from growing and/or dying

Common mishaps and tips to avoid them

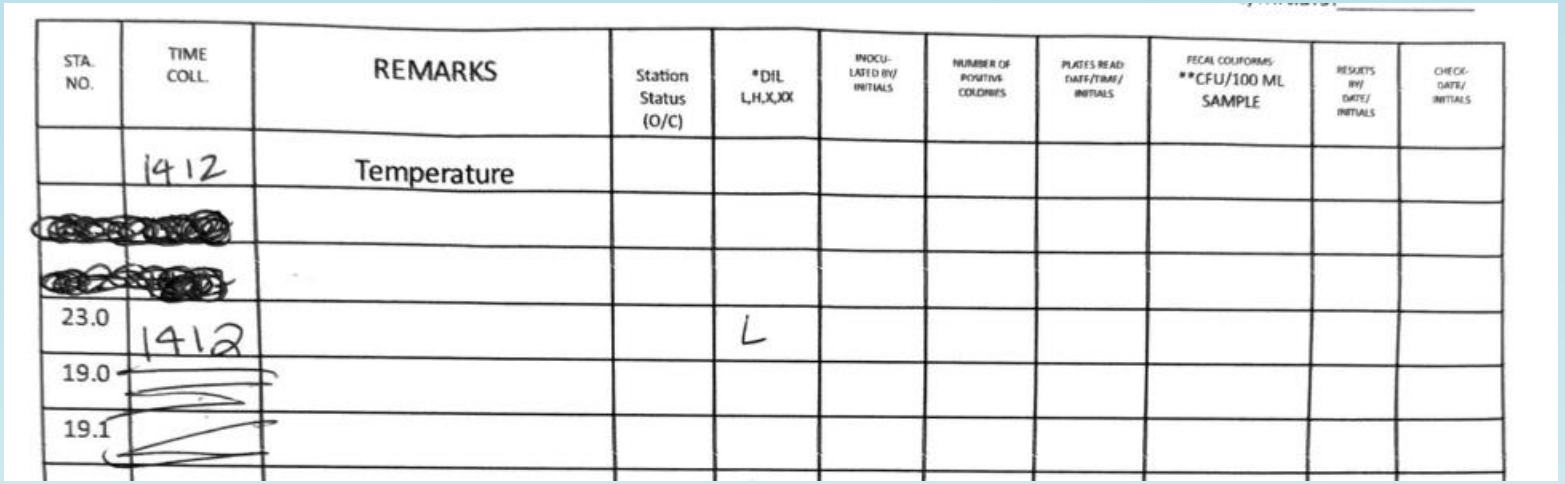
Bottles tipped over in water or water level higher than threads

Common mishaps and tips to avoid them



Common mishaps and tips to avoid them

- Do not break or drill ice for sample
  - Record iced over on the data sheet and make up the sample in another run



STA. NO.	TIME COLL.	REMARKS	Station Status (O/C)	*DIL L,H,X,XX	INOCU-LATED BY/ INITIALS	NUMBER OF POSITIVE COLONIES	PLATES READ DATE/TIME/ INITIALS	FECAL COLIFORMS **CFU/100 ML SAMPLE	RESULTS BY/ DATE/ INITIALS	CHECK-DATE/ INITIALS
	1412	Temperature								
[redacted]										
[redacted]										
23.0	1412			L						
19.0										
19.1										

Vibrio parahaemolyticus VS Vibrio Vulnificus

Vibrio parahaemolyticus

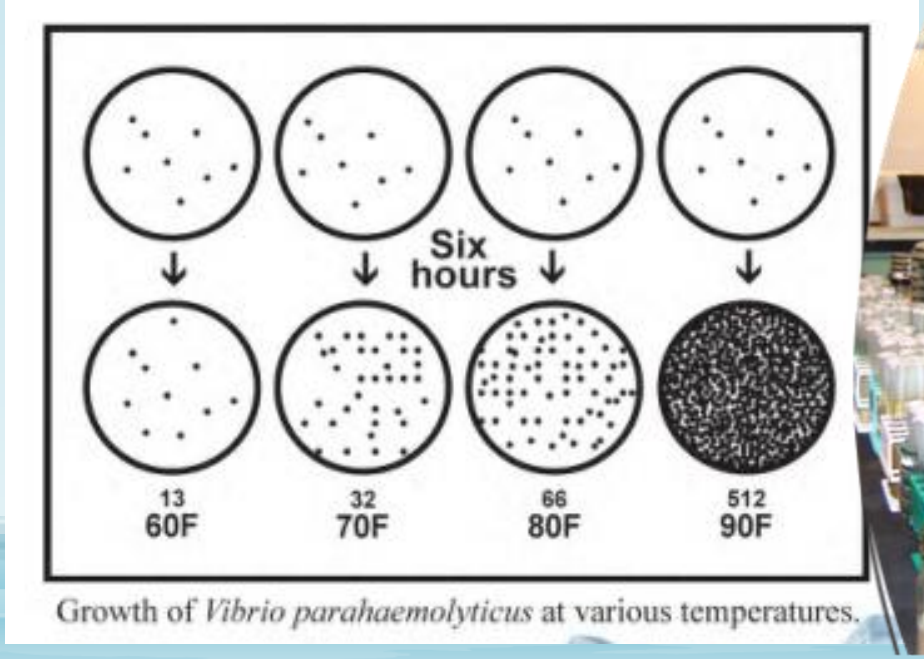
- Illnesses associated with consumption in CT oysters
- 2013 Outbreak
- Not associated with wound infections
- Less severe illness
- Nationwide in both cool and warm water, replicate rapidly in warm water

Vibrio vulnificus

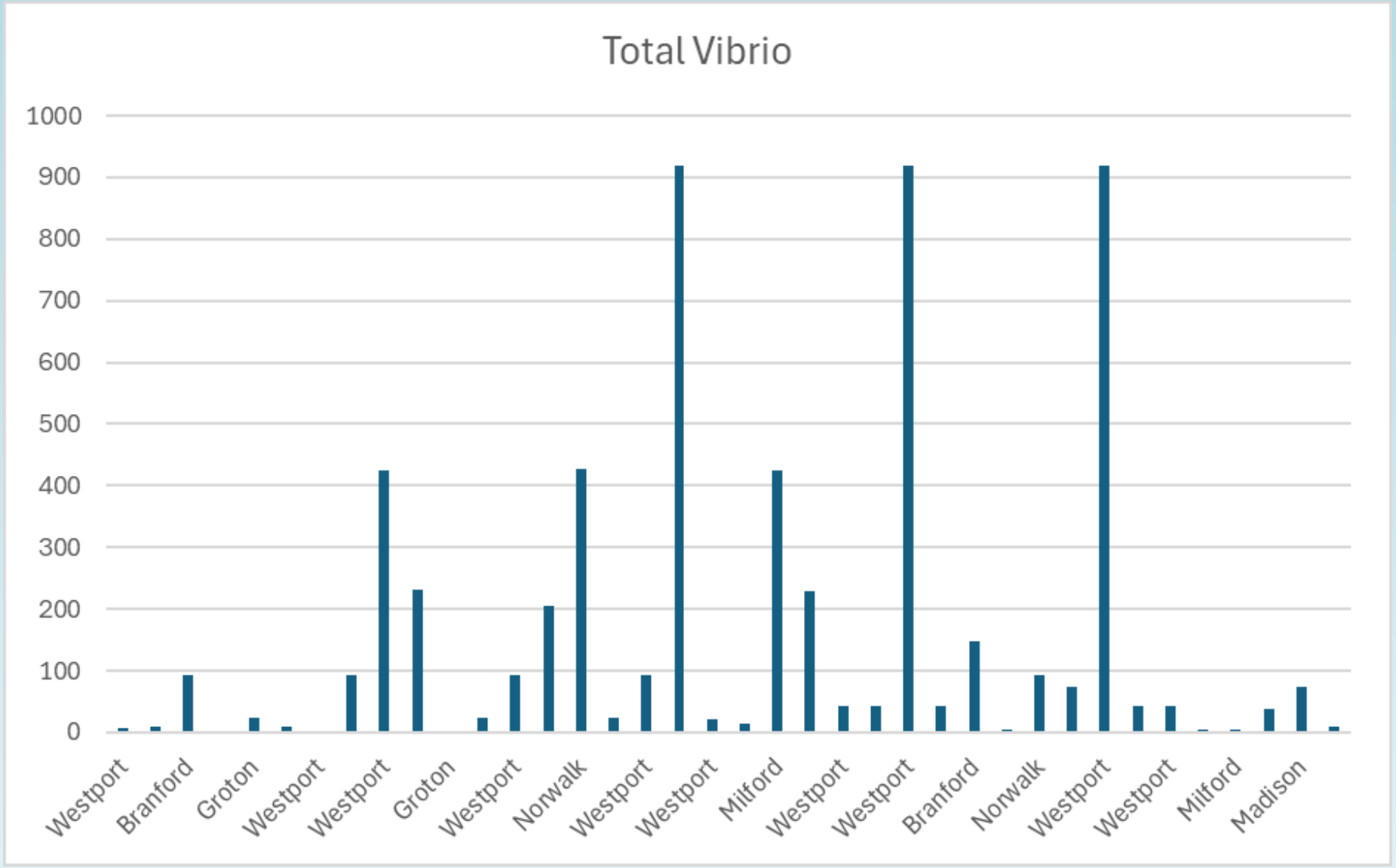
- No single source consumption cases associated with CT oysters
- Associated with both consumption and wound infection (only wound in CT)
- Severe illness
- Typically warm water bacteria, but found as far north as New Jersey

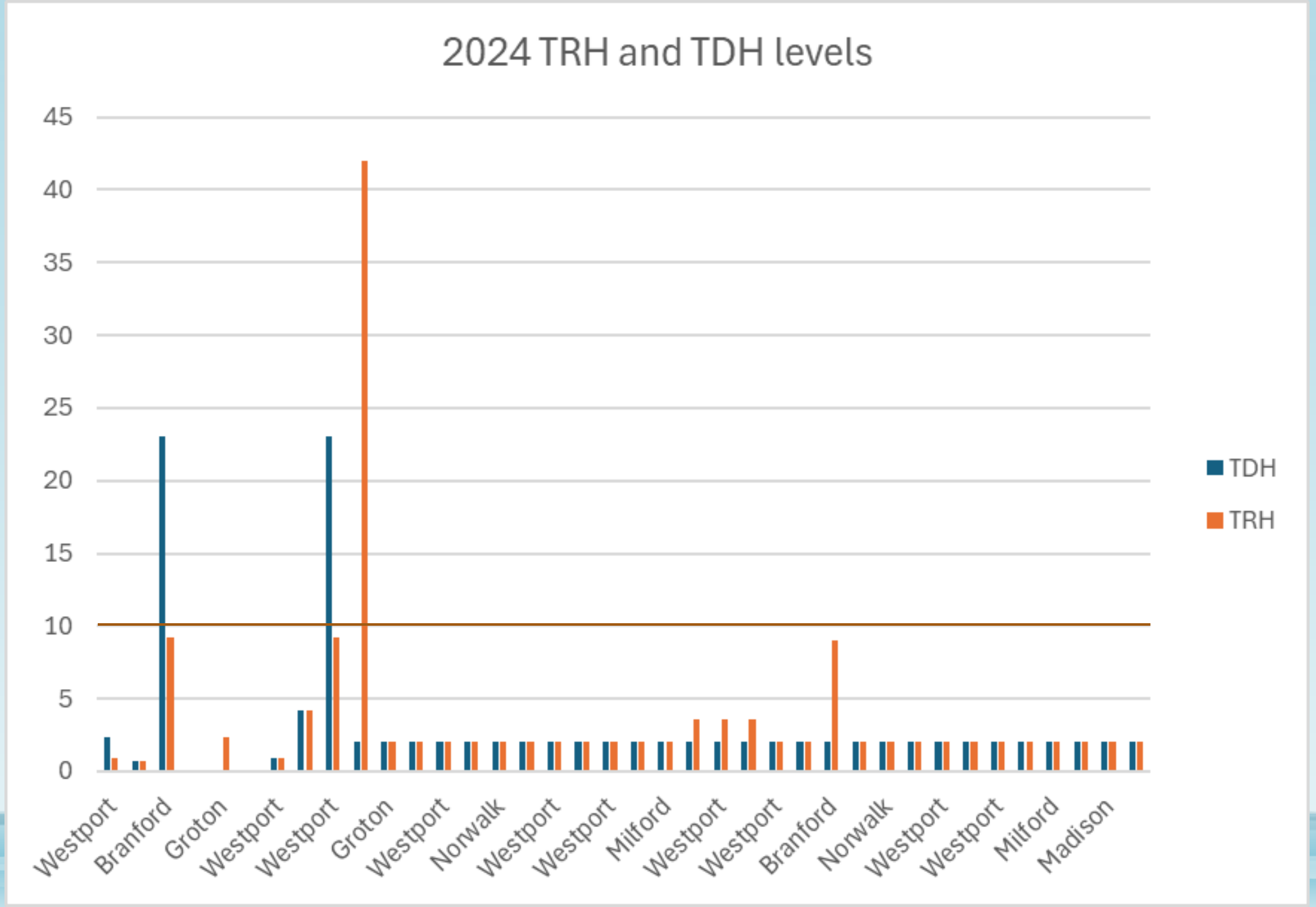
CT DoAG Response

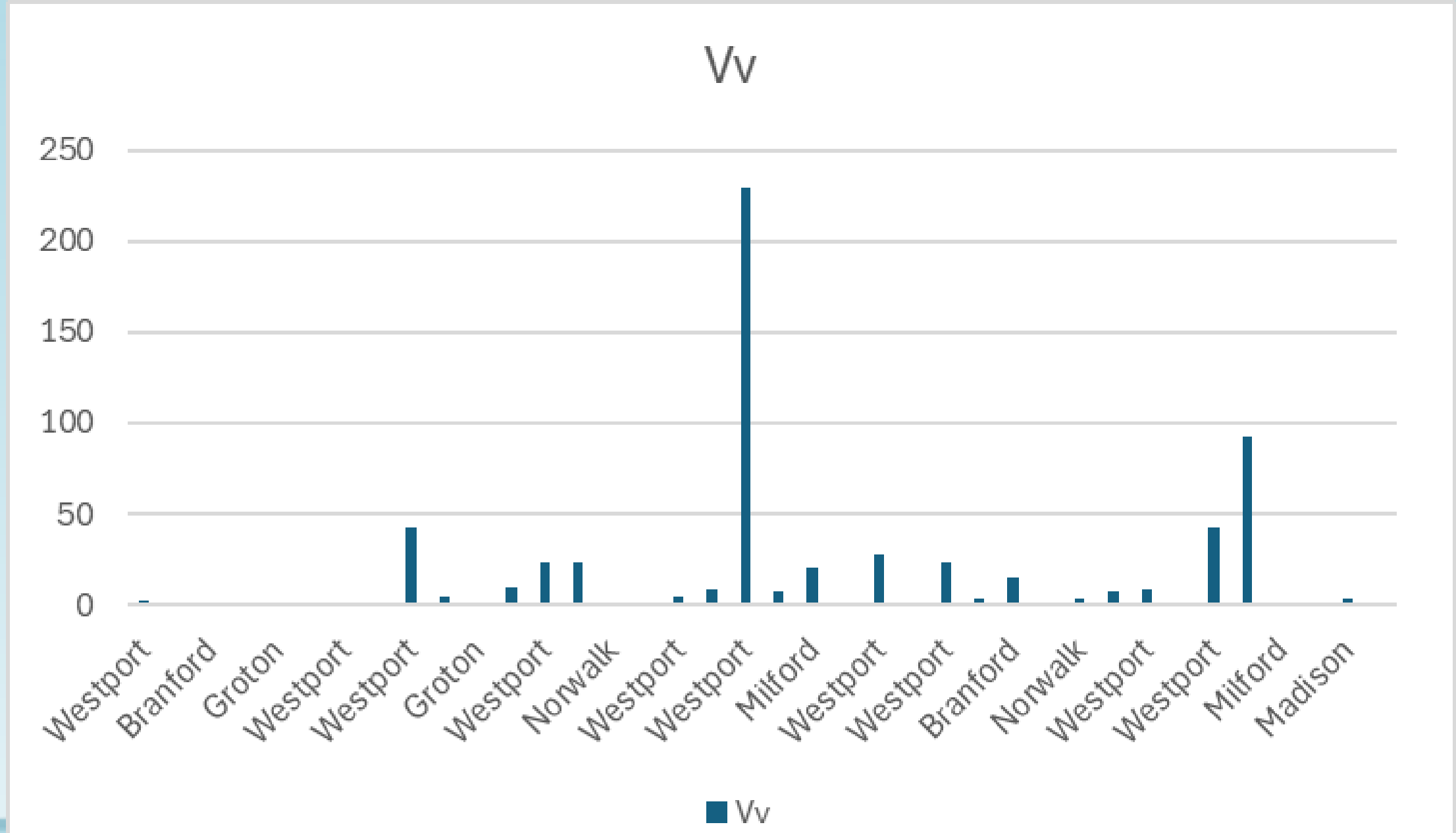
- Vibrio control plans that focus on cooling shellfish quickly
- Environmental sampling to monitor levels and suggest actions to industry
  - Tissue samples NOT WATER



Growth of *Vibrio parahaemolyticus* at various temperatures.

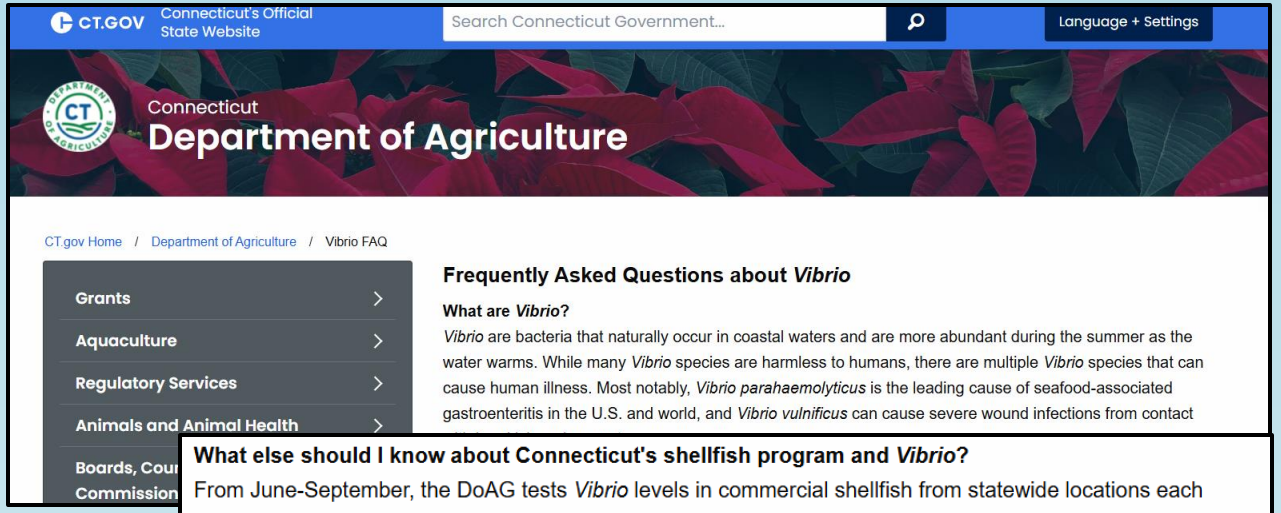

Total Vibrio
1000
900
800
700
600
500
400
300
200
100
0
Westport
Branford
Groton
Westport
Westport
Groton
Westport
Norwalk
Westport
Westport
Milford
Westport
Westport
Branford
Norwalk
Westport
Westport
Milford
Madison


2024 TRH and TDH levels
45
40
35
30
25
20
15
10
5
0
TDH
TRH
Westport
Branford
Groton
Westport
Westport
Groton
Westport
Norwalk
Westport
Westport
Milford
Westport
Westport
Branford
Norwalk
Westport
Westport
Milford
Madison


Vv
250
200
150
100
50
0
Westport
Branford
Groton
Westport
Westport
Groton
Westport
Norwalk
Westport
Westport
Milford
Westport
Westport
Branford
Norwalk
Westport
Westport
Milford
Madison
Vv

Vibrio and the Press

- Aquaculture employees are not allowed to address the press
  - All correspondence must go through PR in Hartford
- Provide permit holders with general guidance on wound avoidance/care and keeping product cold
- Provide permit holders with links to CT DoAGs website for more vibrio guidance
  - General information is best as ‘canned’ response for each specific situation are virtually impossible
- Limit or avoid speaking with the press
  - Vibrio is a complicated topic and reporters often misrepresent key points
  - Never use the word ‘safe’
  - Keep liability in mind



What else should I know about Connecticut's shellfish program and *Vibrio*?

From June-September, the DoAG tests *Vibrio* levels in commercial shellfish from statewide locations each month as part of the routine monitoring program. This routine testing is not required by the National Shellfish Sanitation Program, but is conducted by DoAg to protect public health. The DoAG laboratory uses an FDA-approved DNA-detection method to monitor for two *Vibrio* species, *Vibrio parahaemolyticus* and *Vibrio vulnificus* (learn more about the **Bureau of Aquaculture Laboratory Services**). The DoAG lab has been analyzing samples for *Vibrio parahaemolyticus* since 2013, and *Vibrio vulnificus* since 2022. The *Vibrio vulnificus* testing was added to the DoAG lab's platform in 2022, partly in response to the five *Vibrio vulnificus* wound infections that occurred in 2020.

The routine *Vibrio parahaemolyticus* monitoring, annual Vibrio control plans, and illness investigations conducted nation-wide have demonstrated that CT has not had a Vibrio outbreak since the control plans were established in 2014. In collaboration with other state agencies, the DoAg routinely conducts illness investigations for all cases where Connecticut shellfish was on-hand when illnesses occurred. The national illness investigation program helps to protect public health by identifying illness outbreaks, identifying the source(s) of the illnesses, and removing implicated shellfish from the market.

Are there individuals who are more at risk of illness?

Because shellfish are consumed raw, certain individuals should always consult their physicians before consuming oysters or clams as they are more susceptible to food borne illnesses, including *Vibrio*. It is important to note that when shellfish are cooked, they are typically not cooked at a high enough temperature for long enough time to eliminate these risks. Individuals at a higher risk for foodborne illness when consuming shellfish include:

Pregnant individuals
Young children and older adults
Persons with compromised immune systems
Persons who are taking protein pump inhibitors and/or antacids

Questions?