Collaborating with the Commercial Fishing Industry to Monitor Ocean Conditions off the Northeastern United States

George Maynard – NOAA/NMFS/NEFSC
Melissa Sanderson – Cape Cod Commercial Fishermen's Alliance

NOAA FISHERIES

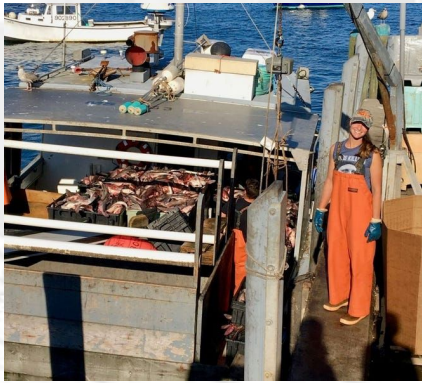
CAPE COD COMMERCIAL FISHERMEN'S ALLIANCE

“Fishers” vs. “Fishermen”

Capt. Olivia
F/V Buggin’ Out

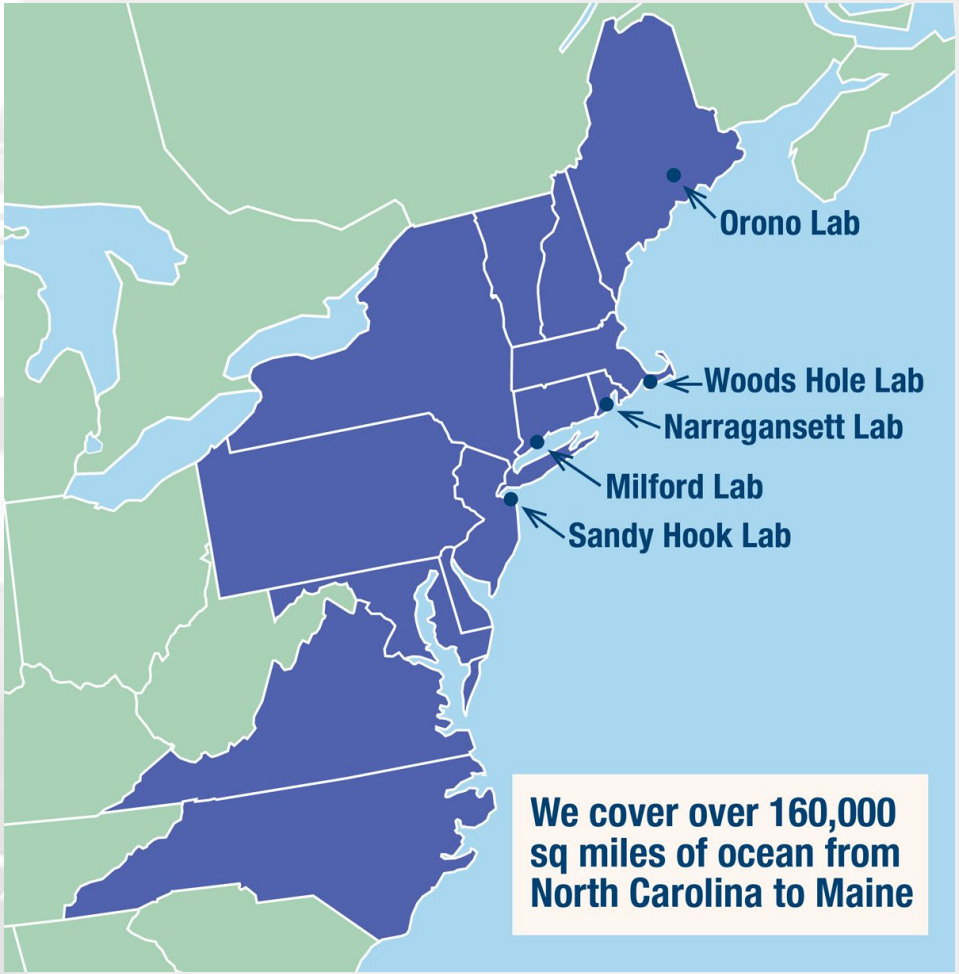
Sarah
F/V Oceana

Captain Therese
F/V Sea Anchor



Stephanie
F/V Dawn T

What is the Northeast Fisheries Science Center?



Northeast Fisheries Science Center

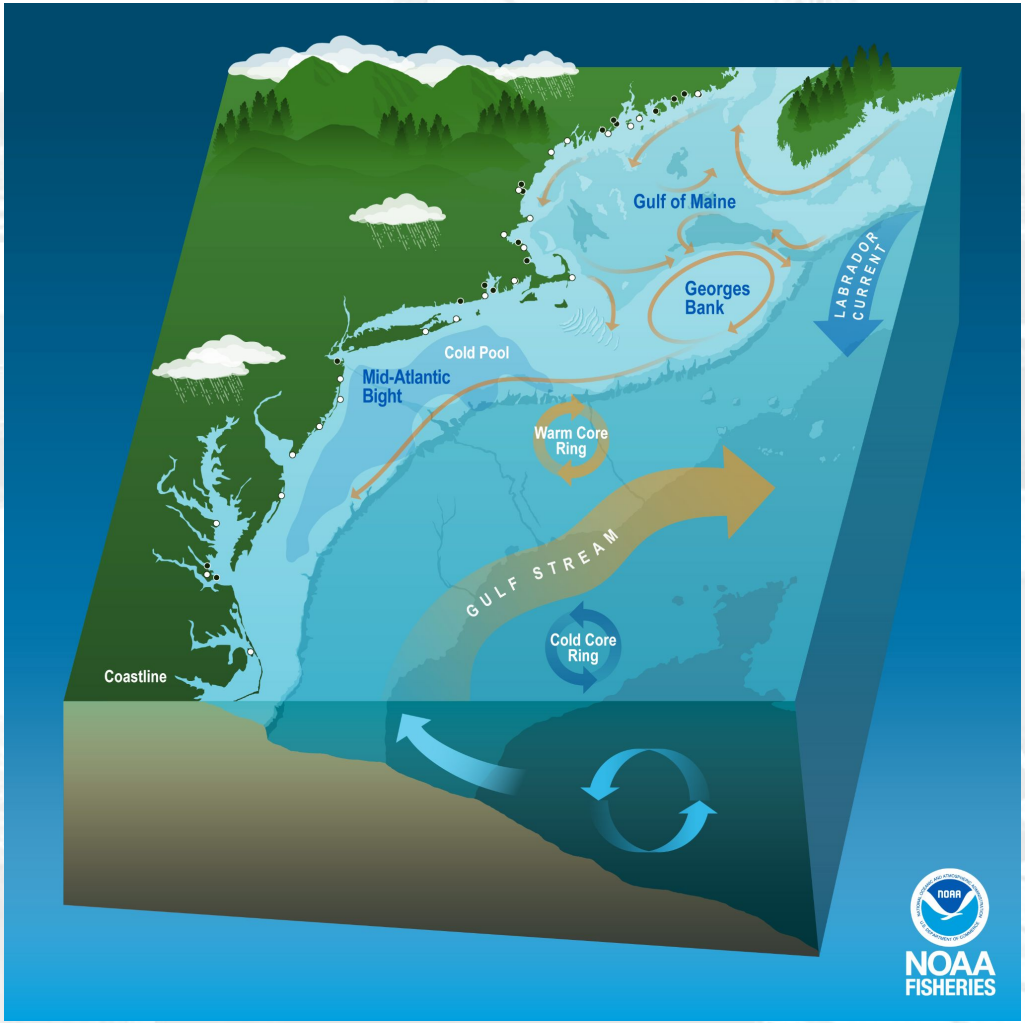
- Staff conduct research on fishes, marine mammals, seabirds, oceanography, weather, etc. from the Canadian border to North Carolina
- Six Labs
  - Orono, ME (Protected Species)
  - Falmouth, MA (Fisheries Observing)
  - Woods Hole, MA (Main campus)
  - Narragansett, RI (Apex Predators, Cooperative Research)
  - Milford, CT (Aquaculture)
  - Sandy Hook, NJ (Estuaries and General Ecology)

NOAA FISHERIES

Cape Cod Commercial Fishermen's Alliance

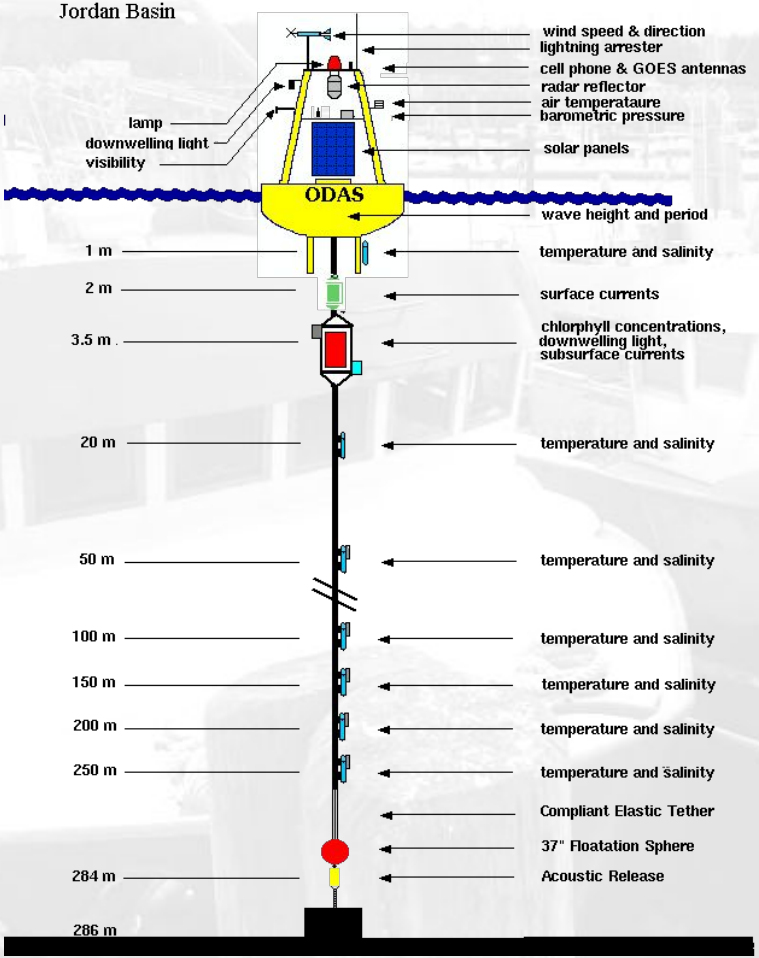
- Non profit organization that collaborates with fishing industry to ensure sustainable fishing businesses
  - Policy & Advocacy
  - Economic Development
  - Research
  - Workforce Training
  - Working Waterfronts
  - Public Education/Outreach

Small Boats. Big Ideas.

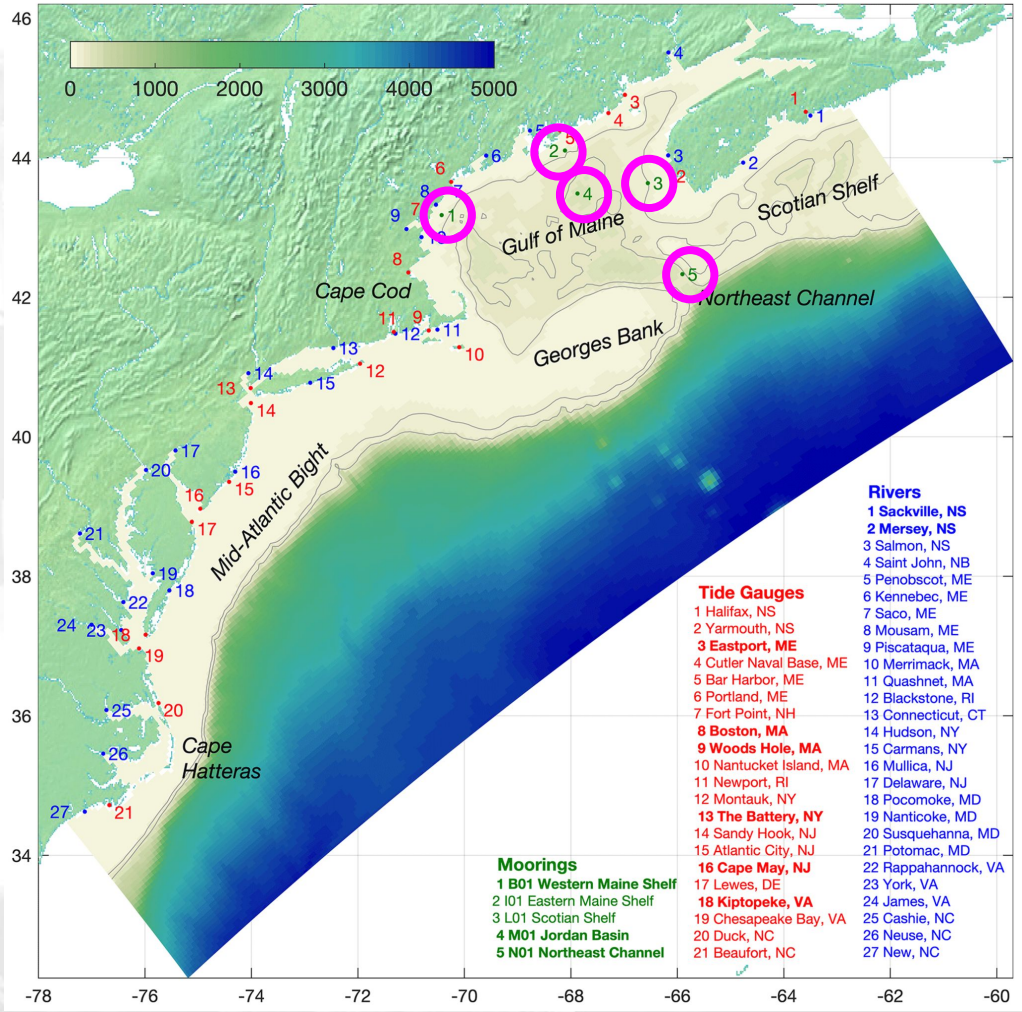

Gulf of Maine
Georges Bank
LABRADOR CURRENT
Cold Pool
Mid-Atlantic Bight
Warm Core Ring
GULF STREAM
Cold Core Ring
Coastline
NOAA
FISHERIES

MOORING M

Jordan Basin



$$$$$


0 1000 2000 3000 4000 5000
Gulf of Maine
Scotian Shelf
Cape Cod
Georges Bank
Northeast Channel
Mid-Atlantic Bight
Cape Hatteras
Moorings
1 B01 Western Maine Shelf
2 I01 Eastern Maine Shelf
3 L01 Scotian Shelf
4 M01 Jordan Basin
5 N01 Northeast Channel
Tide Gauges
1 Halifax, NS
2 Yarmouth, NS
3 Eastport, ME
4 Cutler Naval Base, ME
5 Bar Harbor, ME
6 Portland, ME
7 Fort Point, NH
8 Boston, MA
9 Woods Hole, MA
10 Nantucket Island, MA
11 Newport, RI
12 Montauk, NY
13 The Battery, NY
14 Sandy Hook, NJ
15 Atlantic City, NJ
16 Cape May, NJ
17 Lewes, DE
18 Kiptopeke, VA
19 Chesapeake Bay, VA
20 Duck, NC
21 Beaufort, NC
Rivers
1 Sackville, NS
2 Mersey, NS
3 Salmon, NS
4 Saint John, NB
5 Penobscot, ME
6 Kennebec, ME
7 Saco, ME
8 Mousam, ME
9 Piscataqua, ME
10 Merrimack, MA
11 Quashnet, MA
12 Blackstone, RI
13 Connecticut, CT
14 Hudson, NY
15 Carmans, NY
16 Mullica, NJ
17 Delaware, NJ
18 Pocomoke, MD
19 Nanticoke, MD
20 Susquehanna, MD
21 Potomac, MD
22 Rappahannock, VA
23 York, VA
24 James, VA
25 Cashie, NC
26 Neuse, NC
27 New, NC
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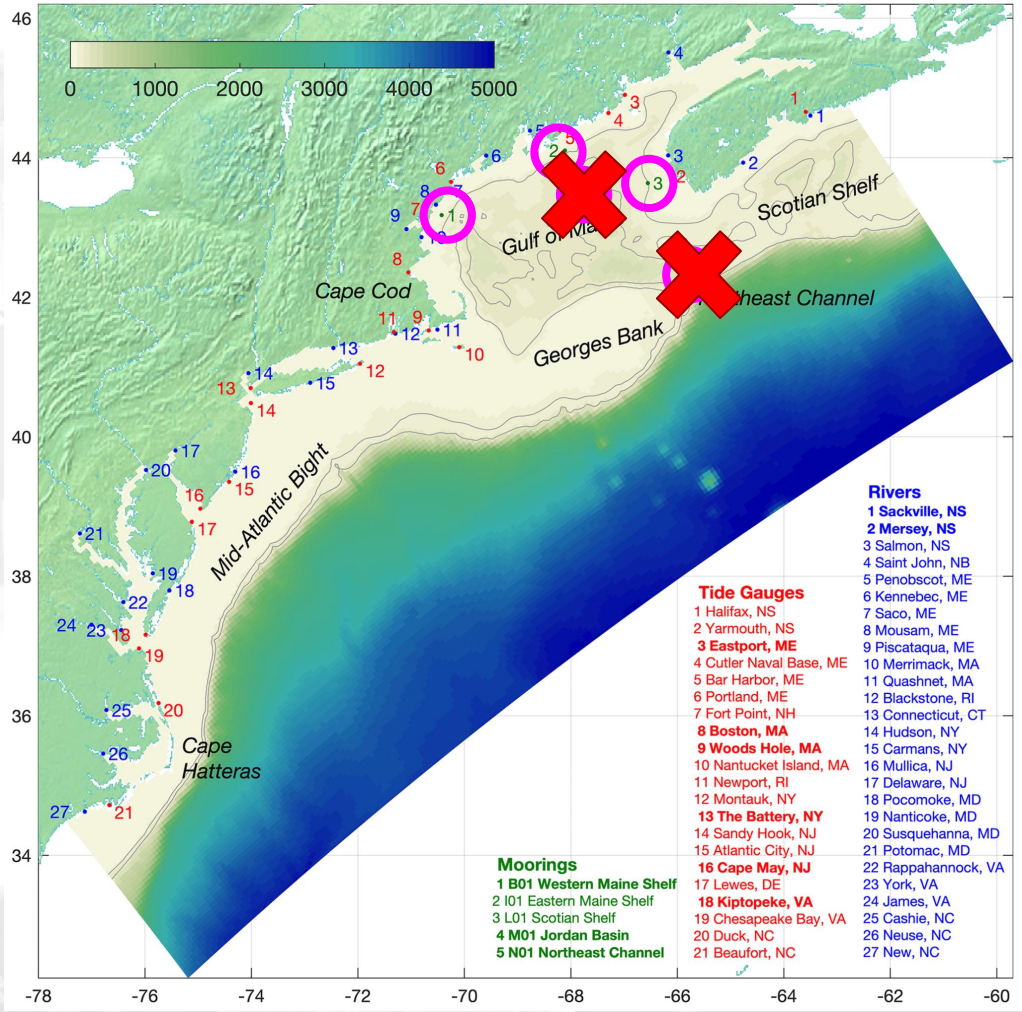
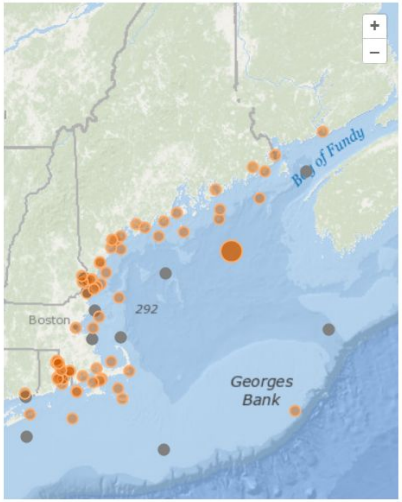
-60



NERACOOS Home Regions Water Level About



Buoy M01 was struck by a vessel on 8/23/24 and is no longer reporting data. The buoy has been recovered, some data is being backfilled. Re-deployment is scheduled and awaiting a clear weather window (update: 12/10/24).

Station M01

Jordan Basin
NDBC ID: 44037
Lat: 43.5 **Lon:** -67.87
University of Maine

There is no recent data from M01

Unit system: Metric English

No Observations available | Latest Conditions | Forecasts | More info

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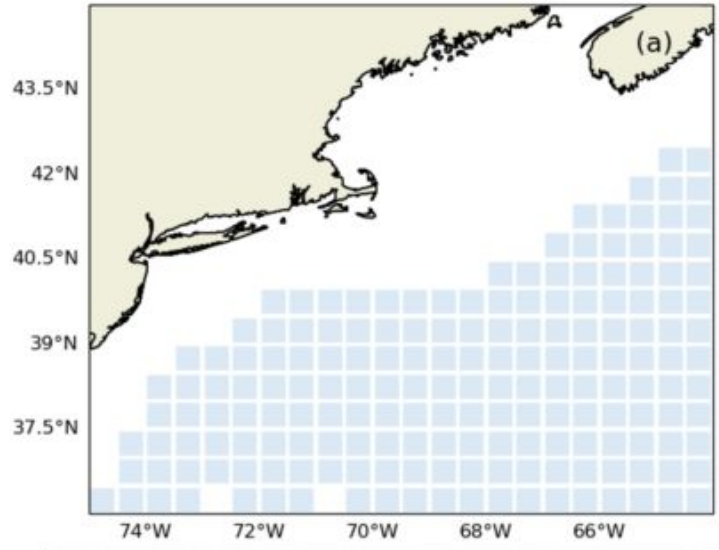
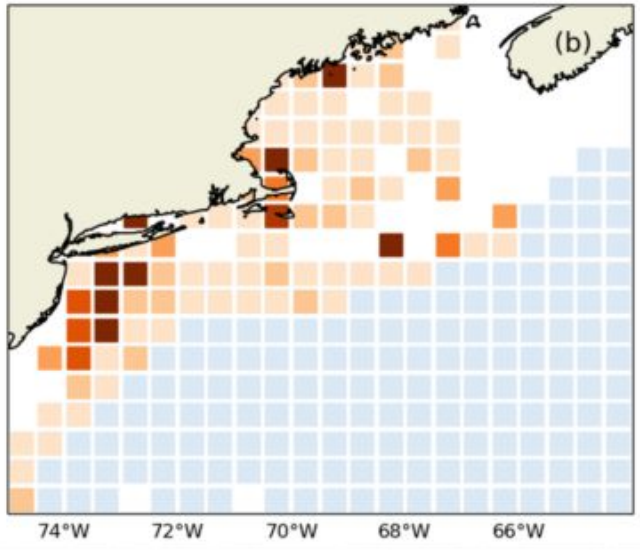
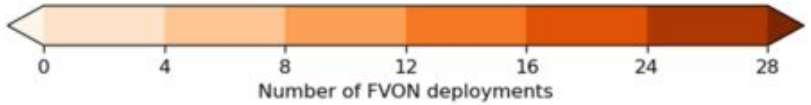
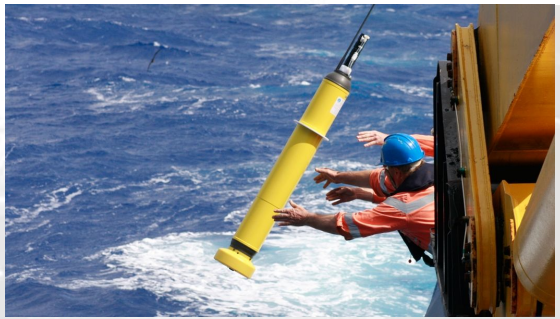

(a)
43.5°N
42°N
40.5°N
39°N
37.5°N
74°W
72°W
70°W
68°W
66°W

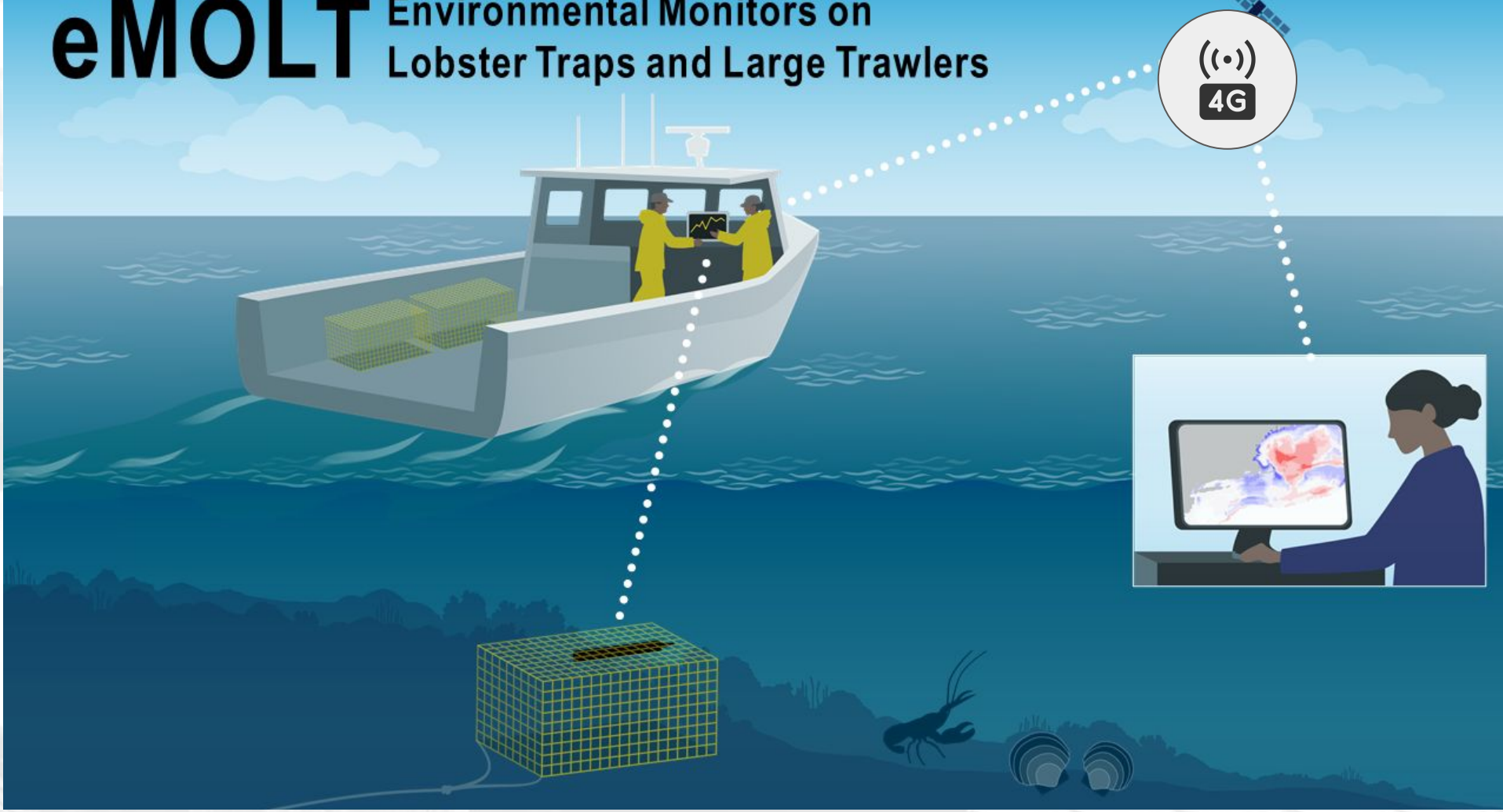

(b)
74°W
72°W
70°W
68°W
66°W

0
4
8
12
16
24
28
Number of Argo profiles

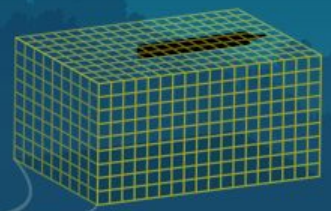

0
4
8
12
16
24
28
Number of FVON deployments



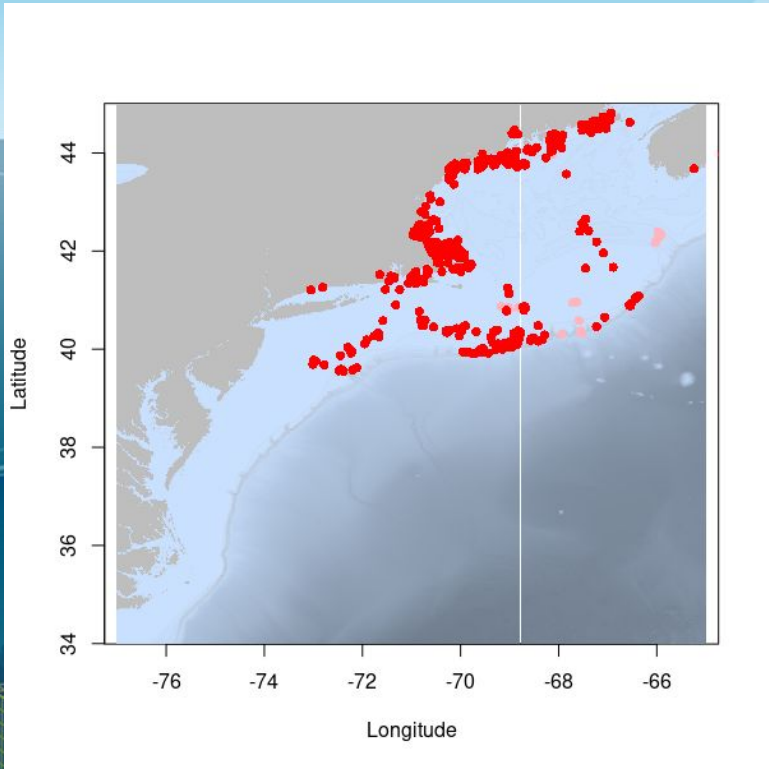
eMOLT Environmental Monitors on Lobster Traps and Large Trawlers



eMOLT Environmental Monitors on Lobster Traps and Large Trawlers

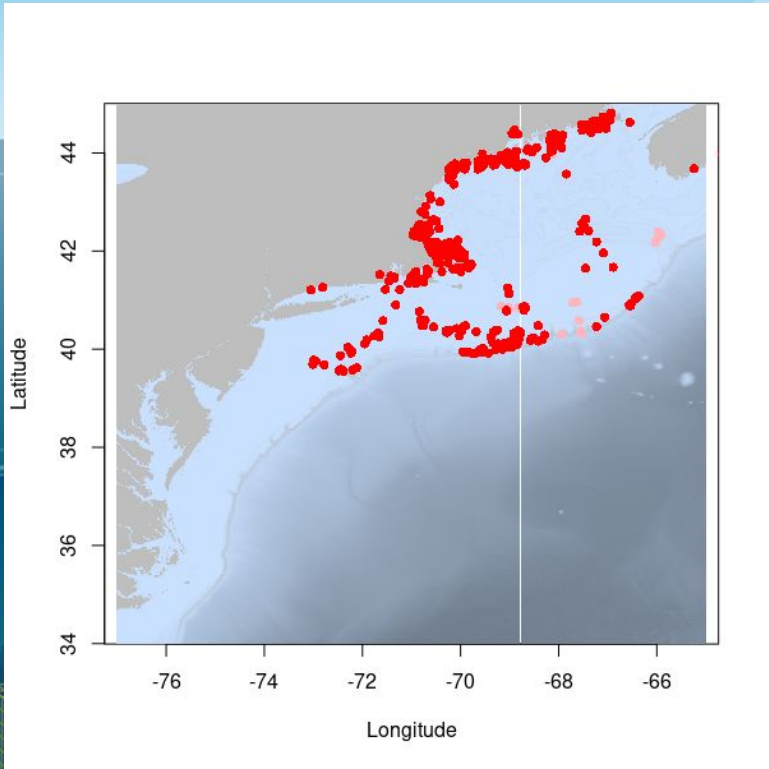


eMOLT Environmental Monitors on Lobster Traps and Large Trawlers



eMOLT Environmental Monitors on Lobster Traps and Large Trawlers

1995 – Present



SCIENTIFIC REPORTS

Article | OPEN

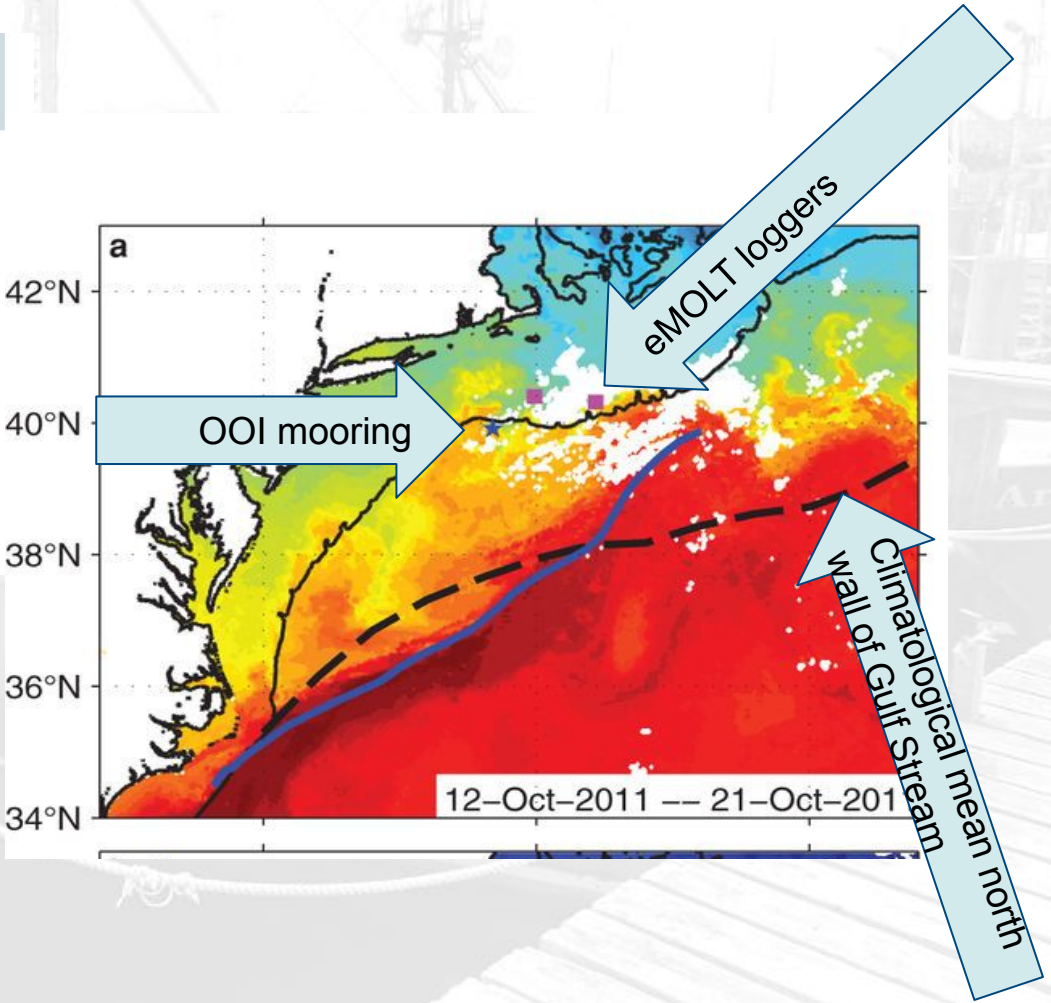
Direct interaction between the Gulf Stream and the shelfbreak south of New England

Glen G. Gawarkiewicz, Robert E. Todd, Albert J. Plueddemann, Magdalena Andres & James P. Manning

Scientific Reports **2**, Article number: 553 (2012)
doi:10.1038/srep00553
Download Citation

Atmospheric science | Biooceanography

Received: 22 May 2012
Accepted: 19 July 2012
Published online: 02 August 2012



Volume 76, Issue 4
July-August 2019

Article Contents

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Material and methods
Results
Discussion
Acknowledgements
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Supplementary data

JOURNAL ARTICLE

A model-based approach to incorporate environmental variability into assessment of a commercial fishery: a case study with the American lobster fishery in the Gulf of Maine and Georges Bank

Kisei R Tanaka ✉, Jie Cao ✉, Burton V Shank, Samuel B Truesdell, Mackenzie D Mazur, Luoliang Xu, Yong Chen

ICES Journal of Marine Science, Volume 76, Issue 4, July-August 2019, Pages 884–896, https://doi.org/10.1093/icesjms/fsz024
Published: 22 February 2019 **Article history** ▾

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Abstract

Changes in bottom-up forcing are fundamental drivers of fish population dynamics. Recent literature has highlighted the need to incorporate the role of dynamic environmental conditions in stock assessments as a key step towards adaptive fishery management. Combining a bioclimate envelope model and a population dynamic model, we propose a model-based approach that can incorporate ecosystem products into single-species stock assessments. The

Atlantic States Marine Fisheries Commission

2020 American Lobster Benchmark Stock Assessment and Peer Review Report

Accepted for Management Use
by the American Lobster Management Board
October 19, 2020

Sustainable and Cooperative Management of Atlantic Coastal Fisheries

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Published: 22 February 2019 **Article history** ▾

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Sustainable and Cooperative Management of Atlantic Coastal Fisheries

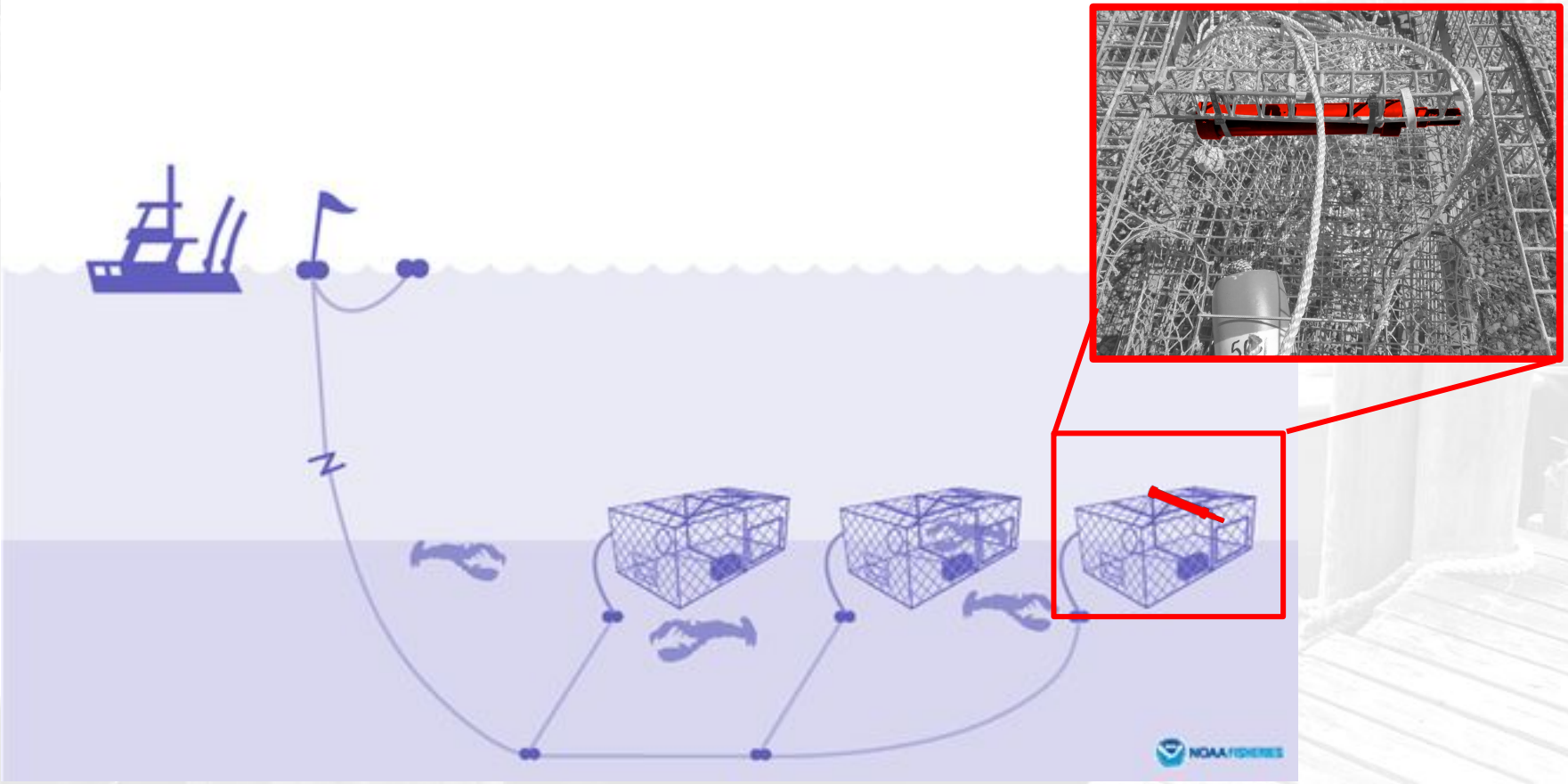
Including the environmental covariate decreased uncertainty, increasing the amount of lobster available to harvest

eMOLT Environmental Monitors on Lobster Traps and Large Trawlers

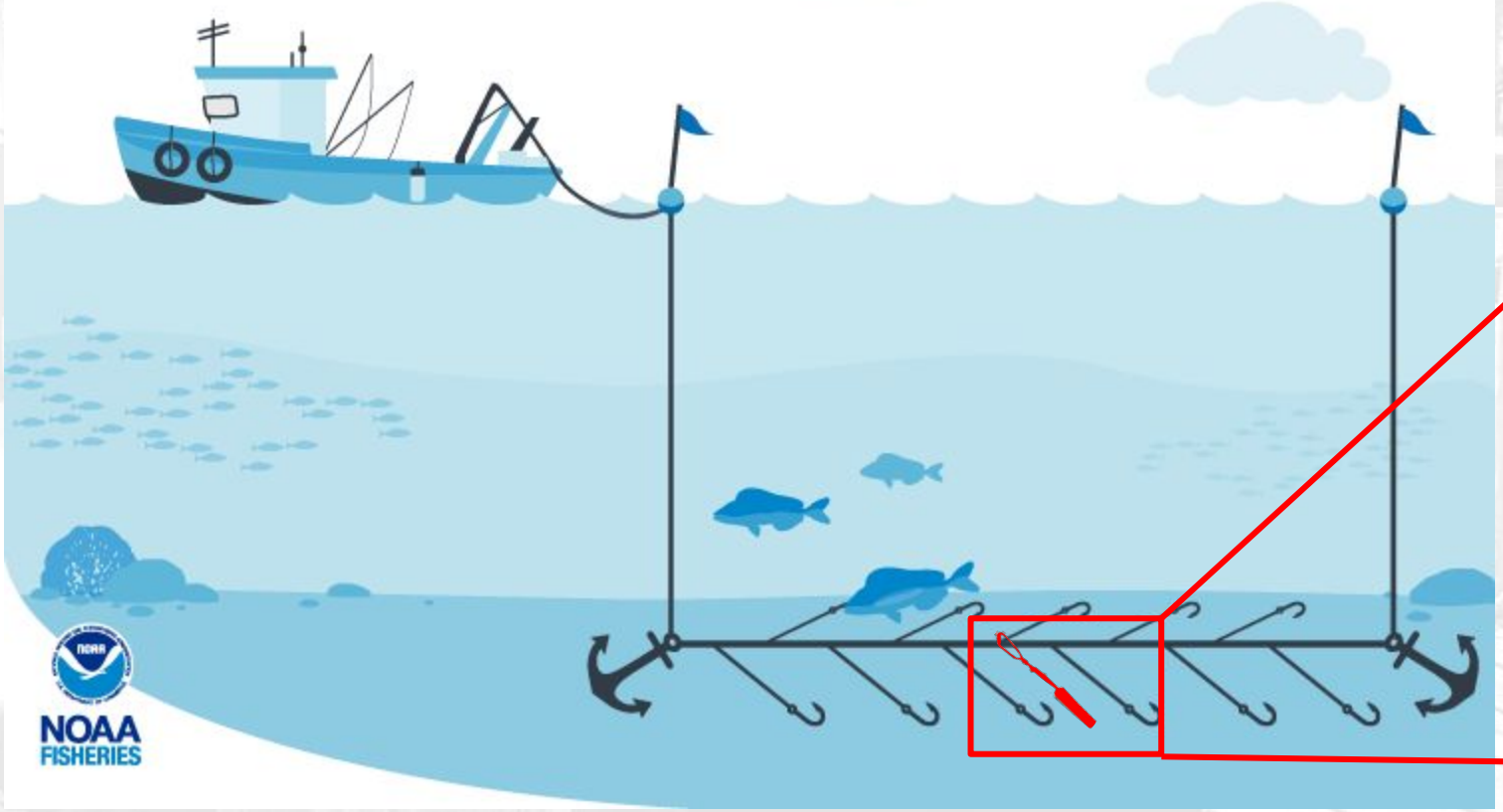
Temperature / Depth Profiling Loggers

Dissolved Oxygen / Temperature Logger (no profiles)

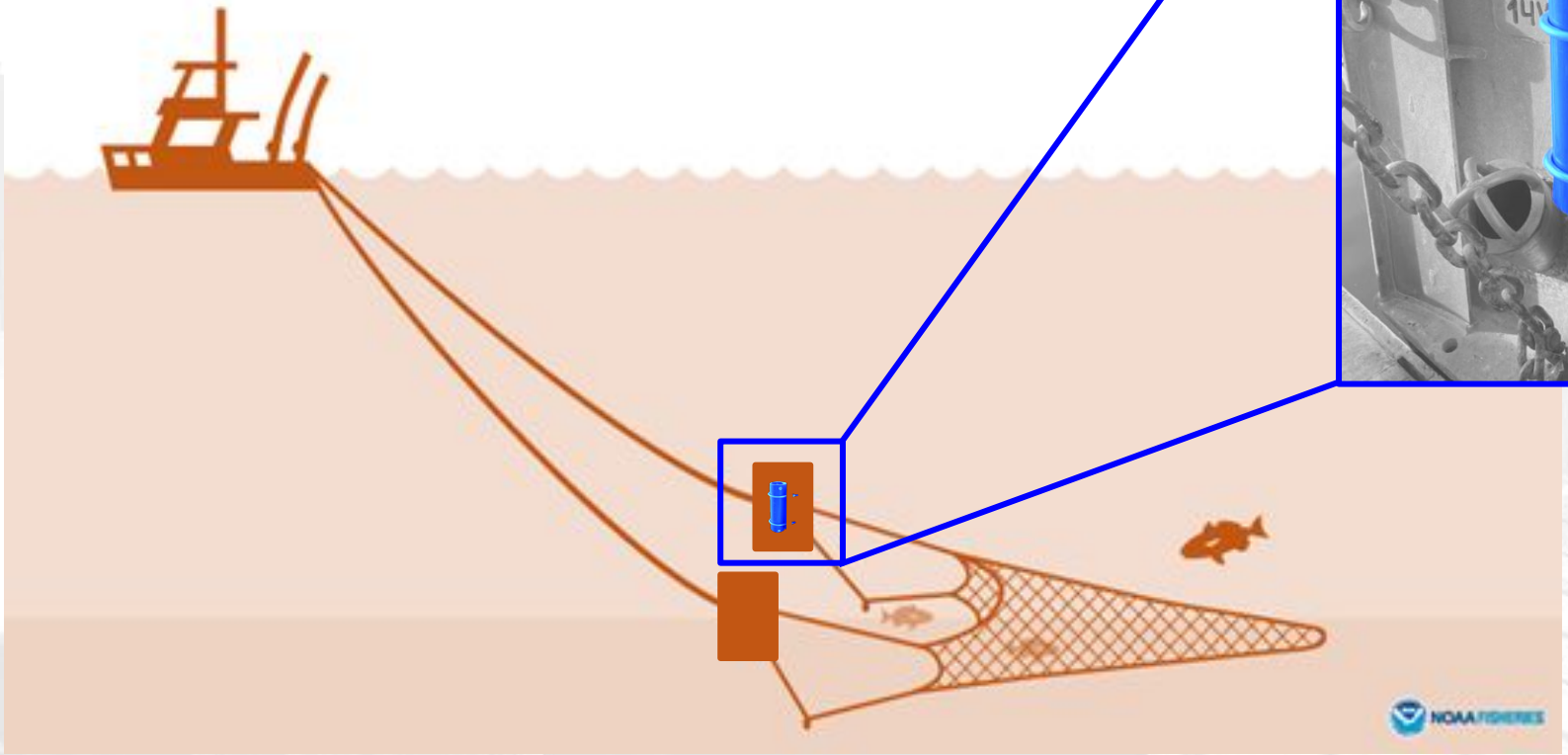
Traps / Pots (lobster, black sea bass, scup, tautog, whelk)

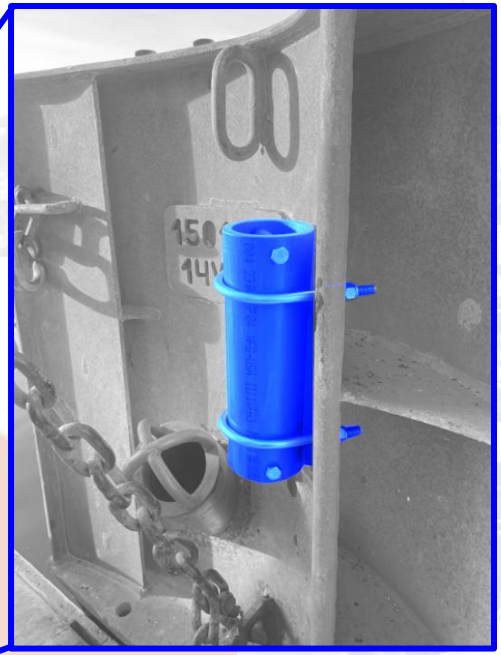


Bottom Longline (groundfish, tilefish)



Bottom Trawl (groundfish, squid, flats, mackerel)





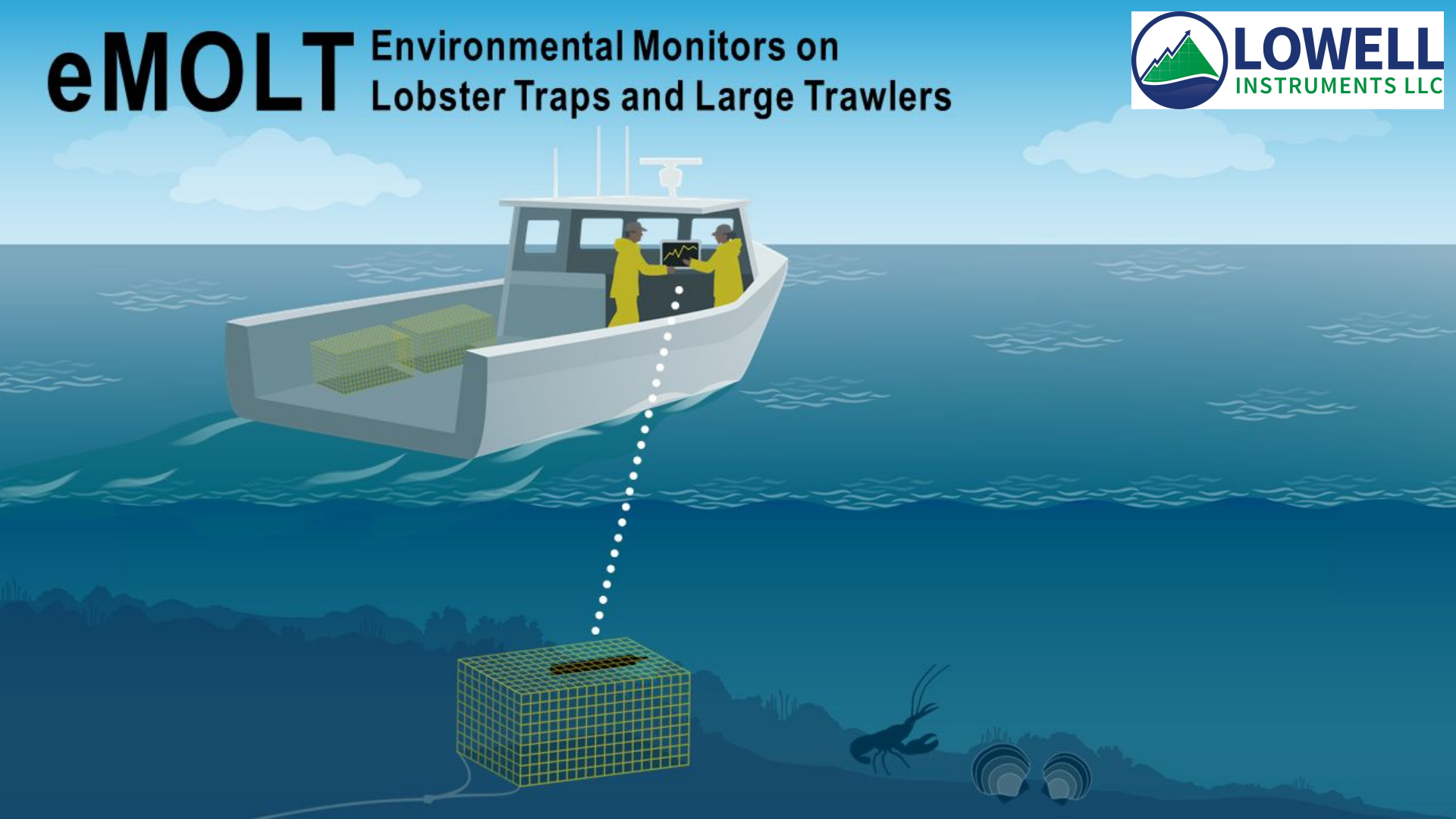
Dredges (scallops, clams)

F/V Midnight Our

Huanxin aboard the F/V Atlantic

eMOLT Environmental Monitors on Lobster Traps and Large Trawlers

LOWELL INSTRUMENTS LLC



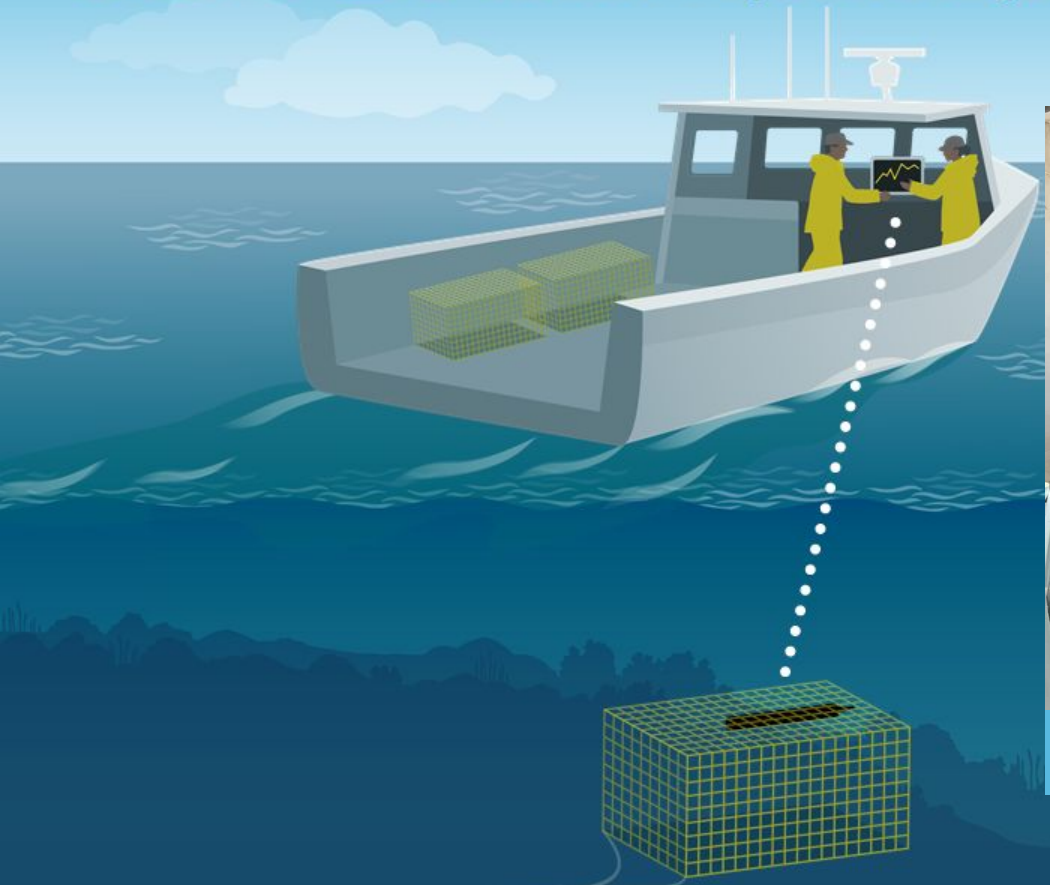
eMOLT Environmental Monitors on Lobster Traps and Large Trawlers

LOWELL INSTRUMENTS LLC

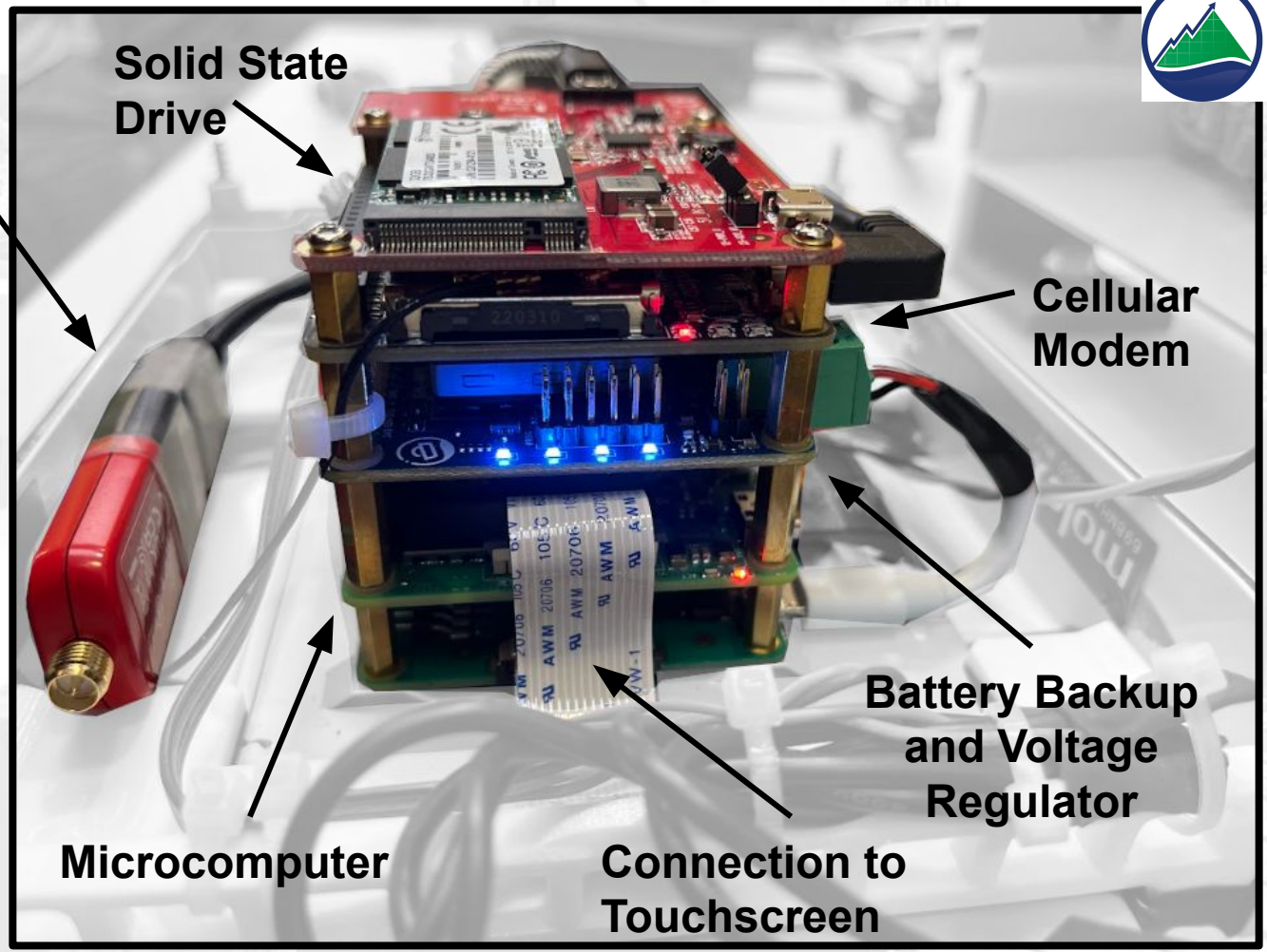
Photo Credit: Stephanie Sykes, F/V Dawn T, Chatham, MA

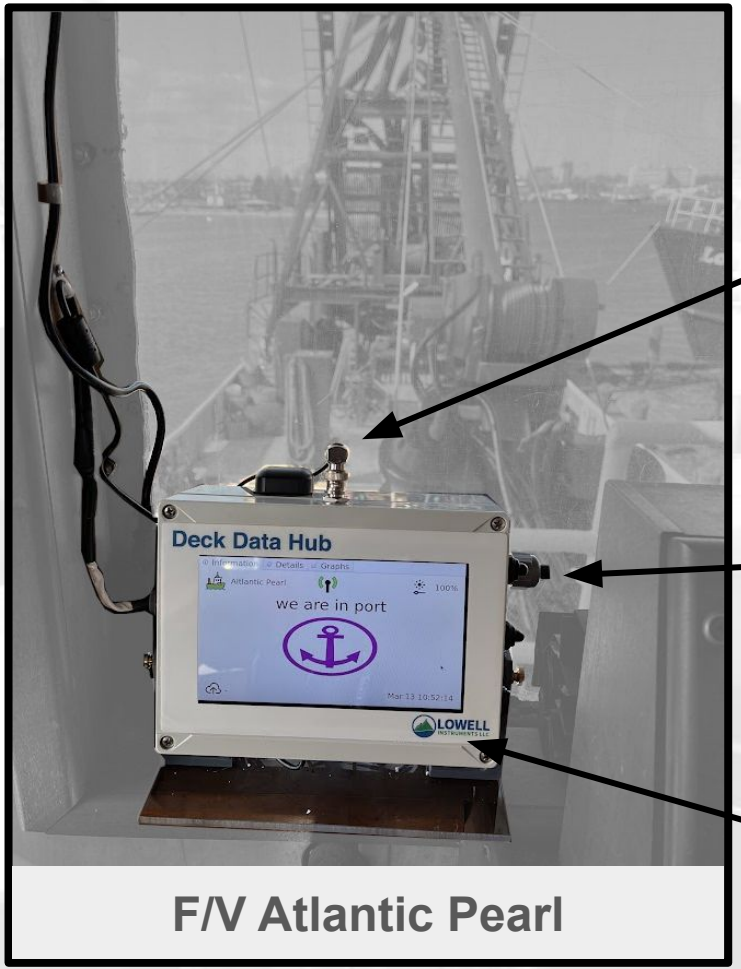
eMOLT Environmental Monitors on Lobster Traps and Large Trawlers

LOWELL INSTRUMENTS LLC



Captain Nick, F/V Dawn T


Solid State Drive
Bluetooth Antenna
Cellular Modem
Battery Backup and Voltage Regulator
Microcomputer
Connection to Touchscreen



F/V Atlantic Pearl

GPS Receiver

Optional
Bluetooth
Extension

Touchscreen
Deck Box

Information | Details | Graphs | Models

Miss Linus

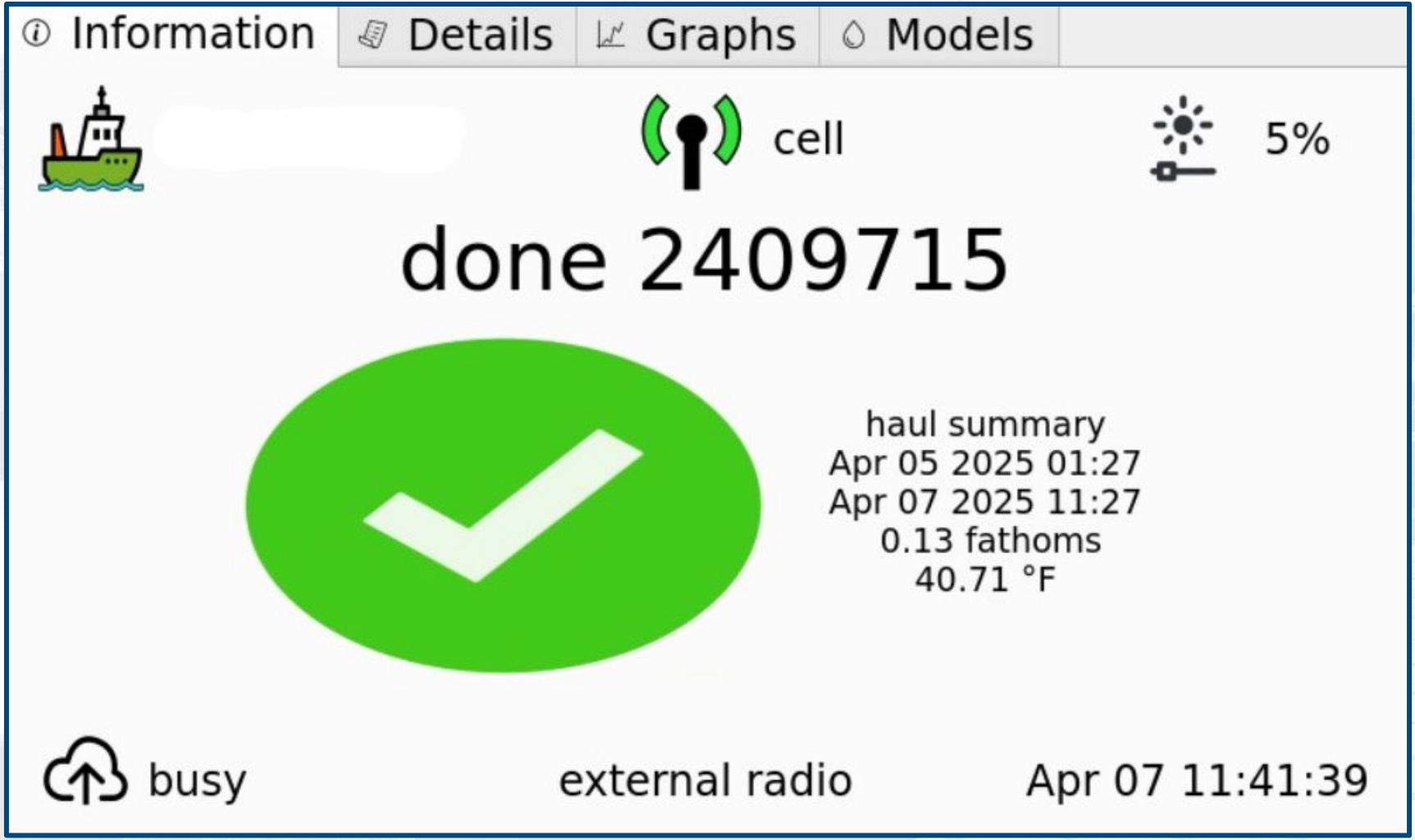
100%

searching for loggers

checking

internal radio

Apr 10 09:07:32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Details
Graphs
Models
cell
5%
done 2409715
haul summary
Apr 05 2025 01:27
Apr 07 2025 11:27
0.13 fathoms
40.71 °F
busy
external radio
Apr 07 11:41:39

Information | Details | Graphs | Models

	logger	result	rerun
1	2406607	ok TDO Apr 09 16:06 at +0.0000, +0.0000	True
2	2406614	success Jul 29 22:28 at +41.7138, -70.6053	True
3			
4			
5			
6			
7			
8			

-
-

DDH 9999999

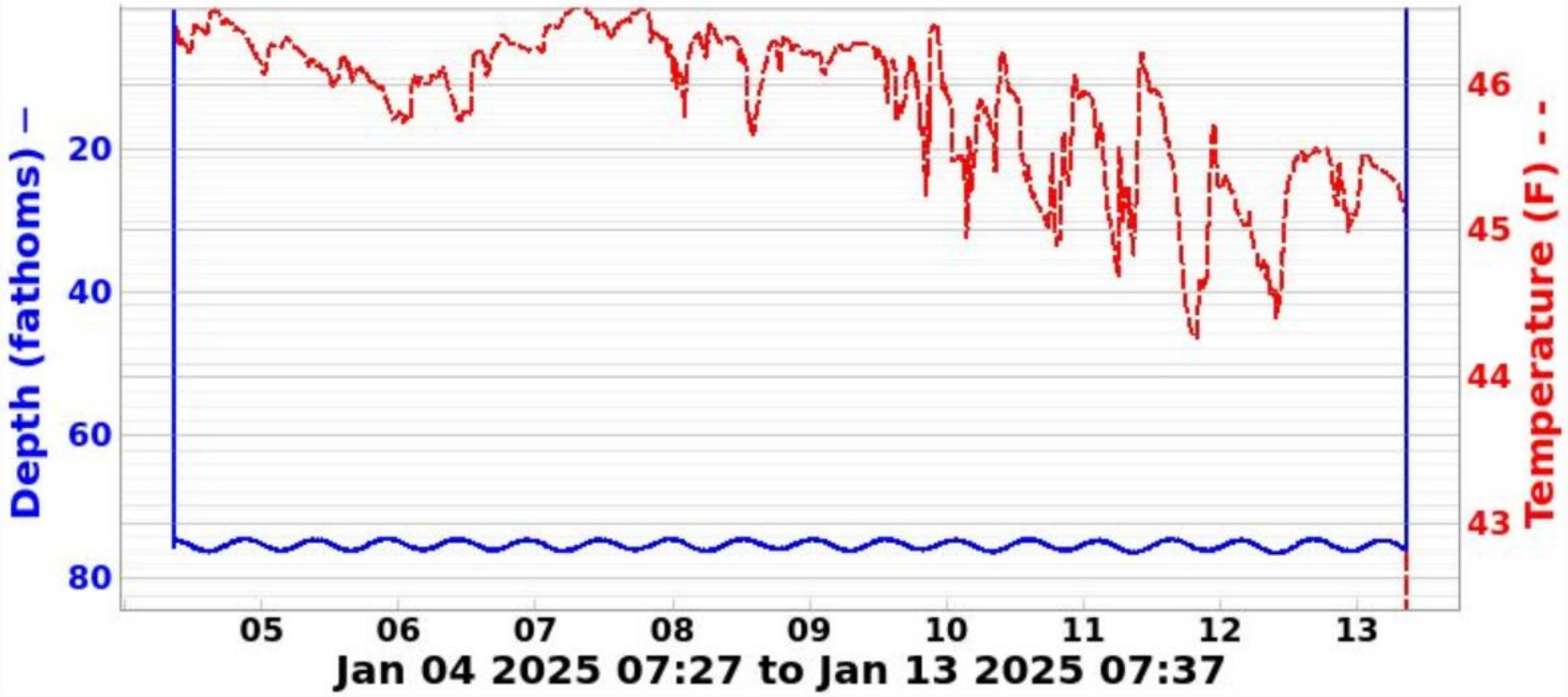
uptime 0:02:08

tech support

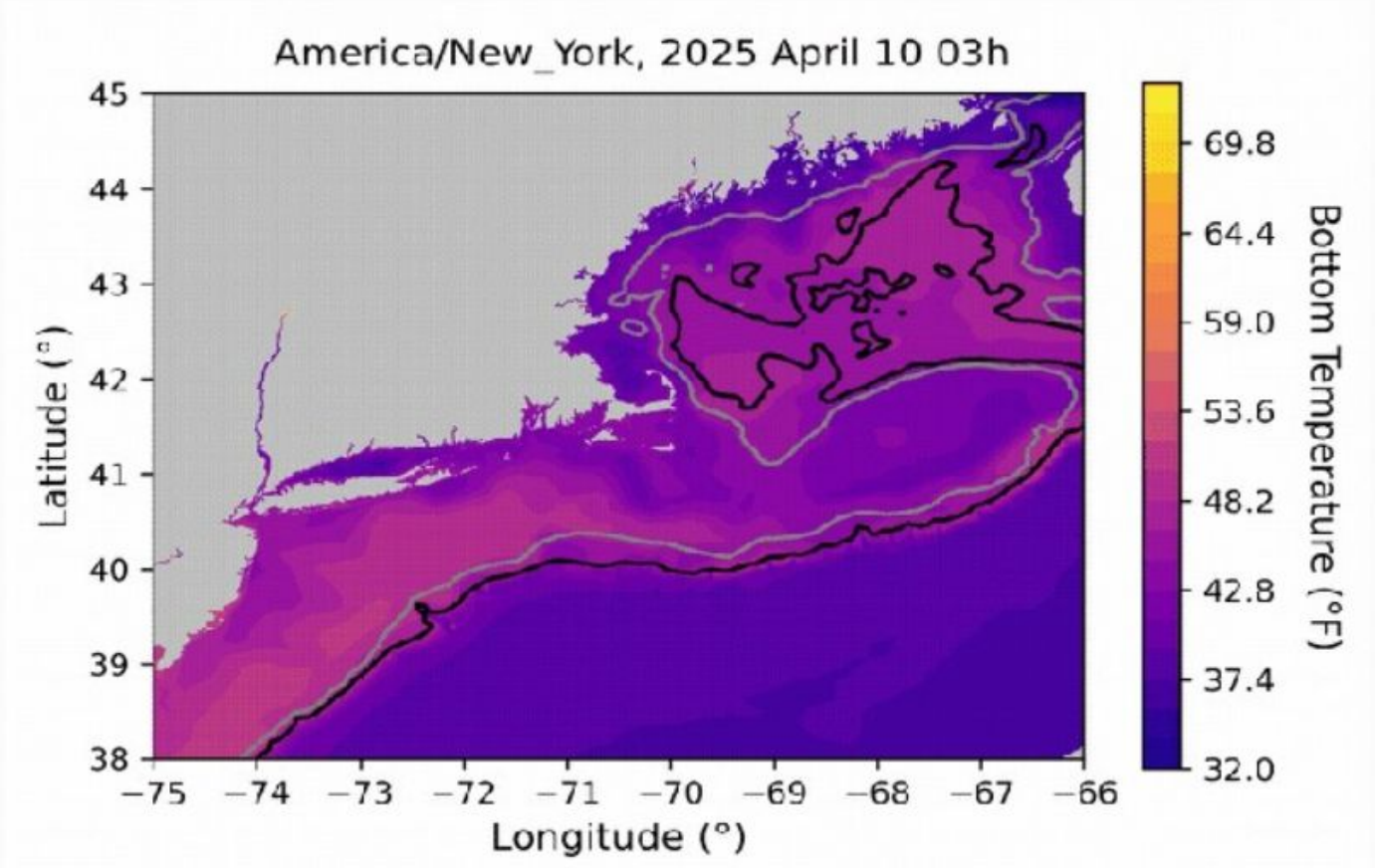
v. 4.0.88

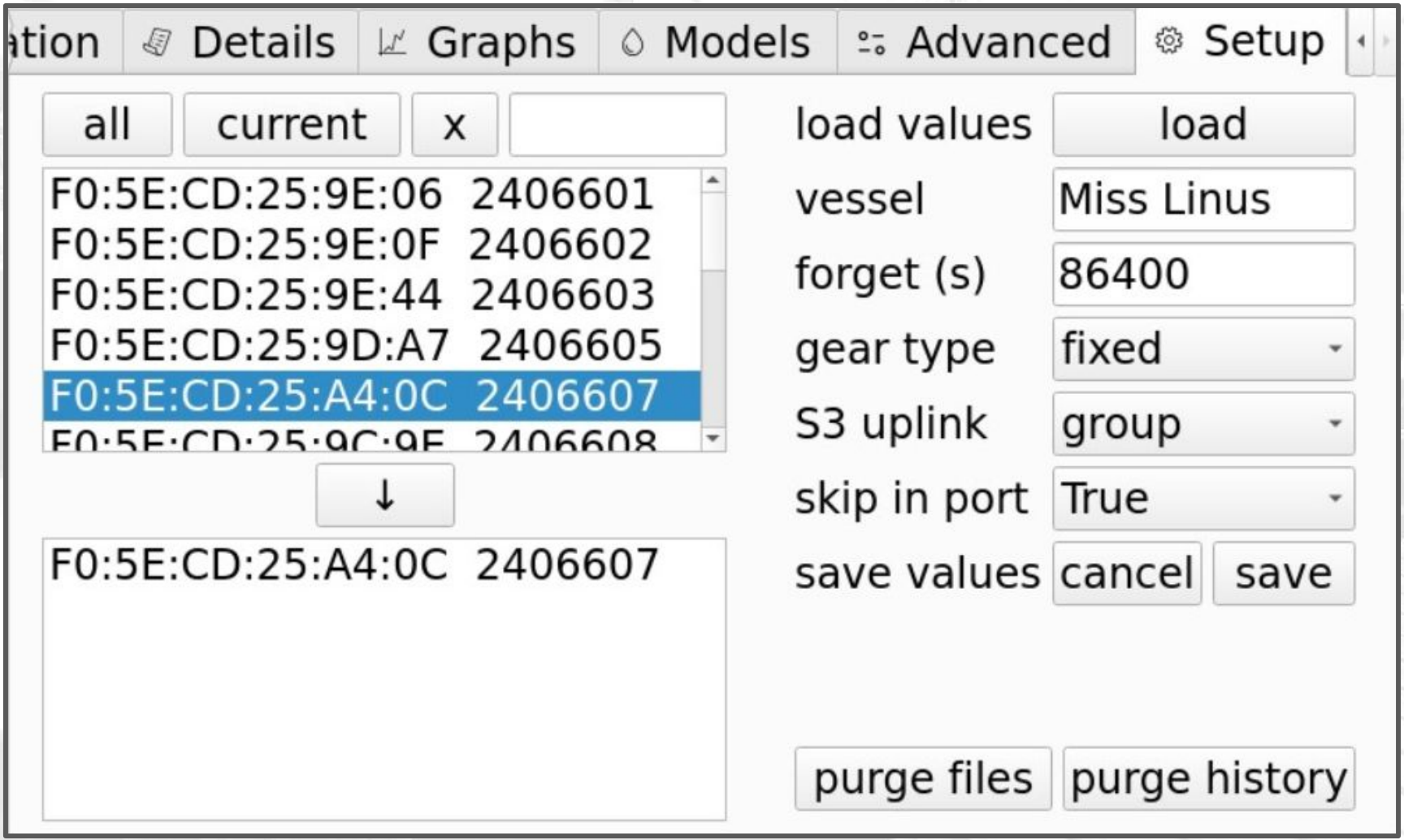
Information | Details | Graphs | Models

reset | 11111aa | hauls | last



Information | Details | Graphs | Models




ation
Details
Graphs
Models
Advanced
Setup
all
current
x
F0:5E:CD:25:9E:06 2406601
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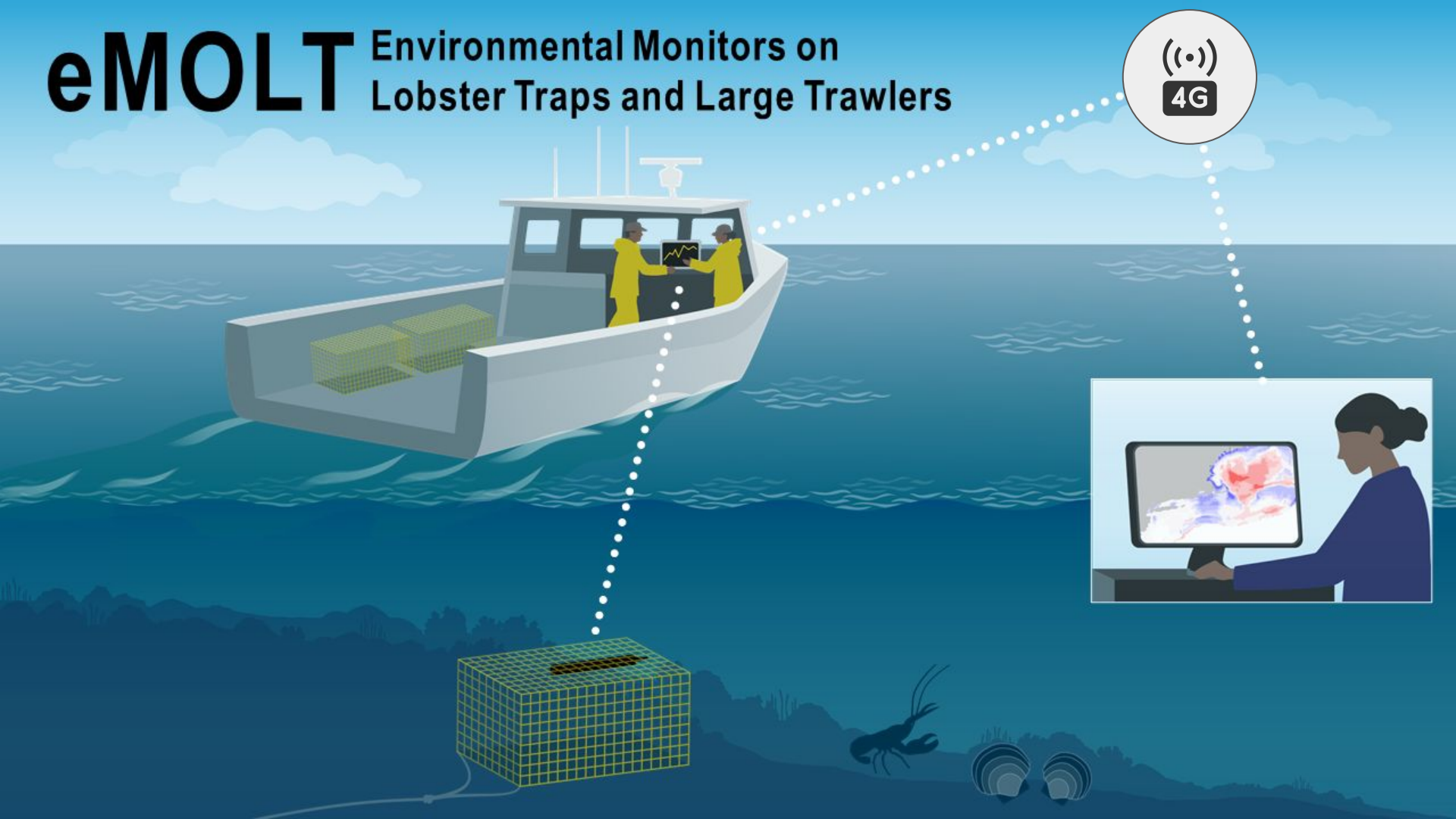
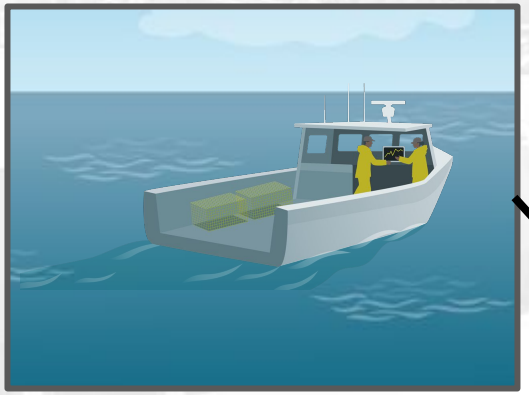
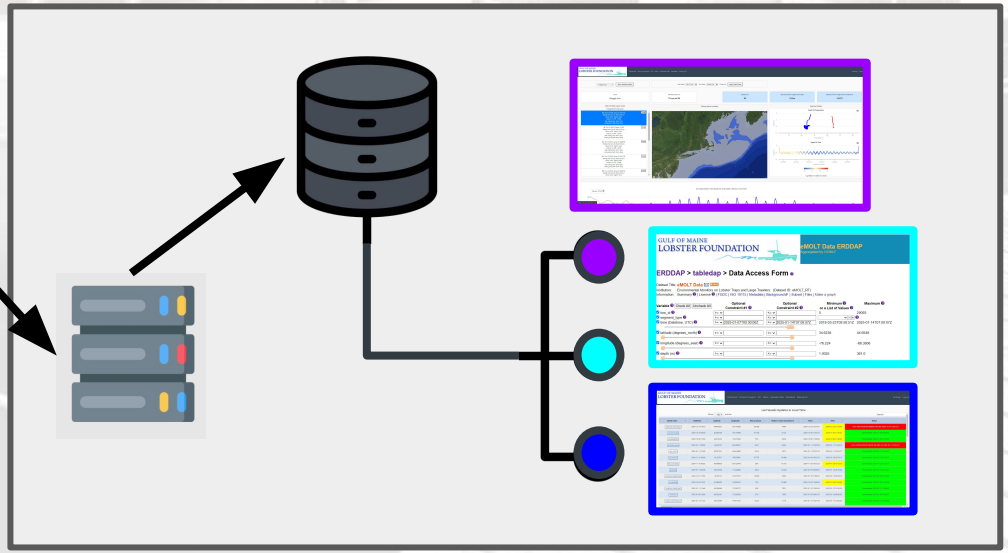
F0:5E:CD:25:A4:0C 2406607
↓
F0:5E:CD:25:A4:0C 2406607
load values
load
vessel
Miss Linus
forget (s)
86400
gear type
fixed
S3 uplink
group
skip in port
True
save values
cancel
save
purge files
purge history


eMOLT
Environmental Monitors on
Lobster Traps and Large Trawlers
4G

GULF OF MAINE LOBSTER FOUNDATION

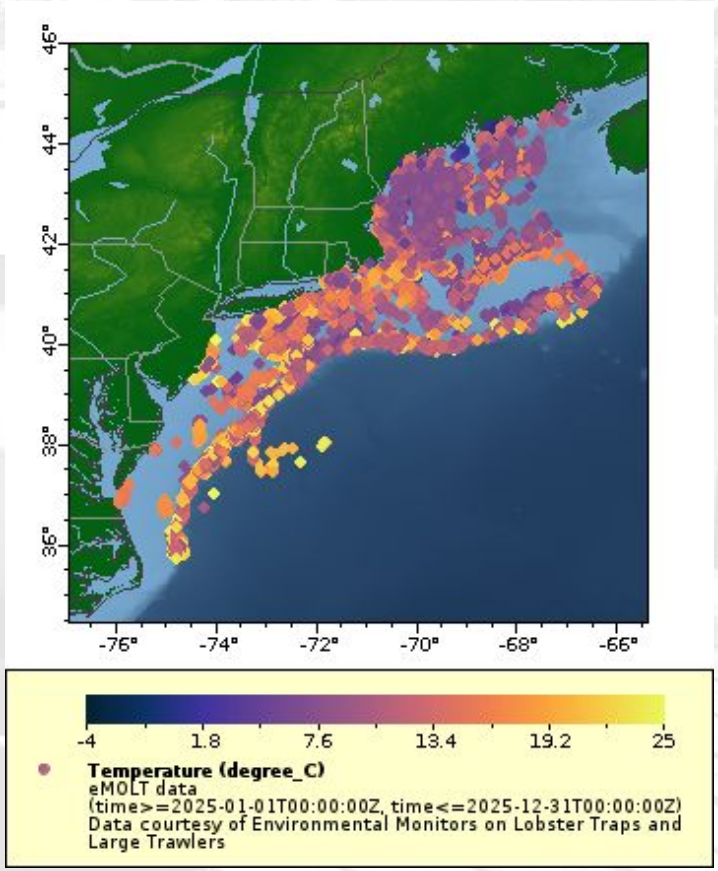


OCEAN DATA NETWORK



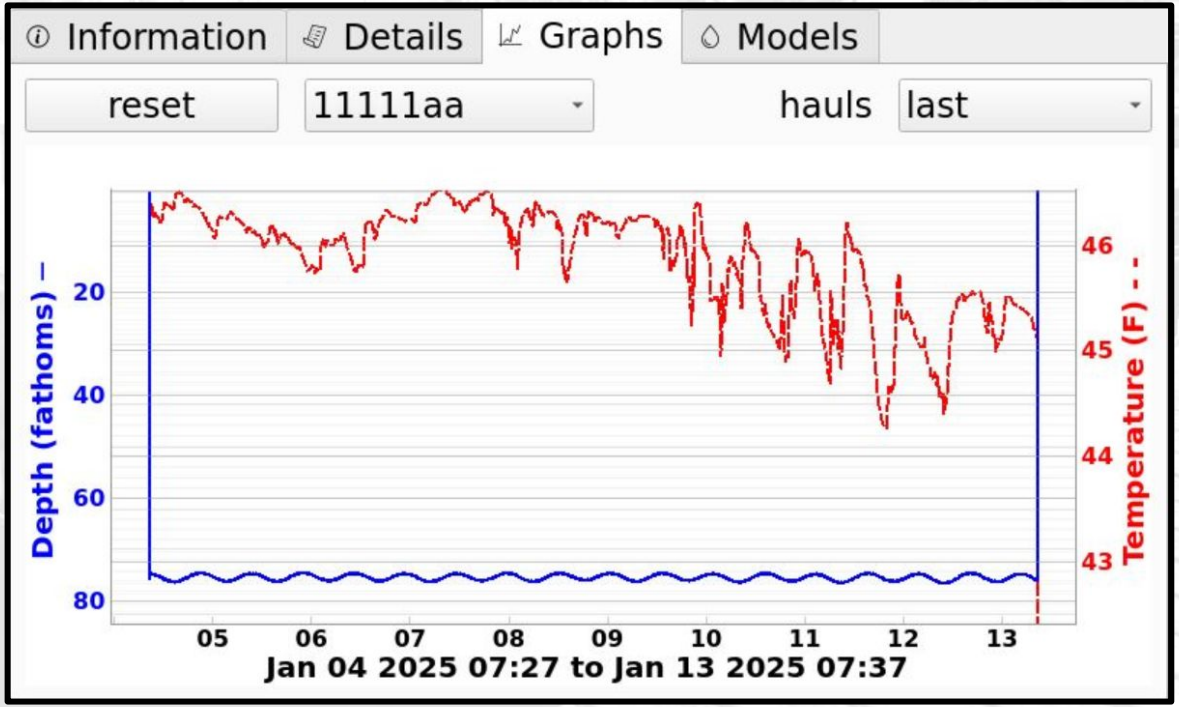
2025 eMOLT Data

- 145 vessels contributed data last year
- Home ports from Maine to North Carolina
- Nearly every commercial fishery in the Northeast is represented
  - Lobster
  - Gillnet
  - Longline (tub-trawl, tilefish, pelagic)
  - Fish pots
  - Bottom trawl
  - Scallop dredge
  - Clam dredge
- Nearly 22 million individual data points and 46,000 instrumented tows since 2018



DATA INTERPRETATION ACTIVITY

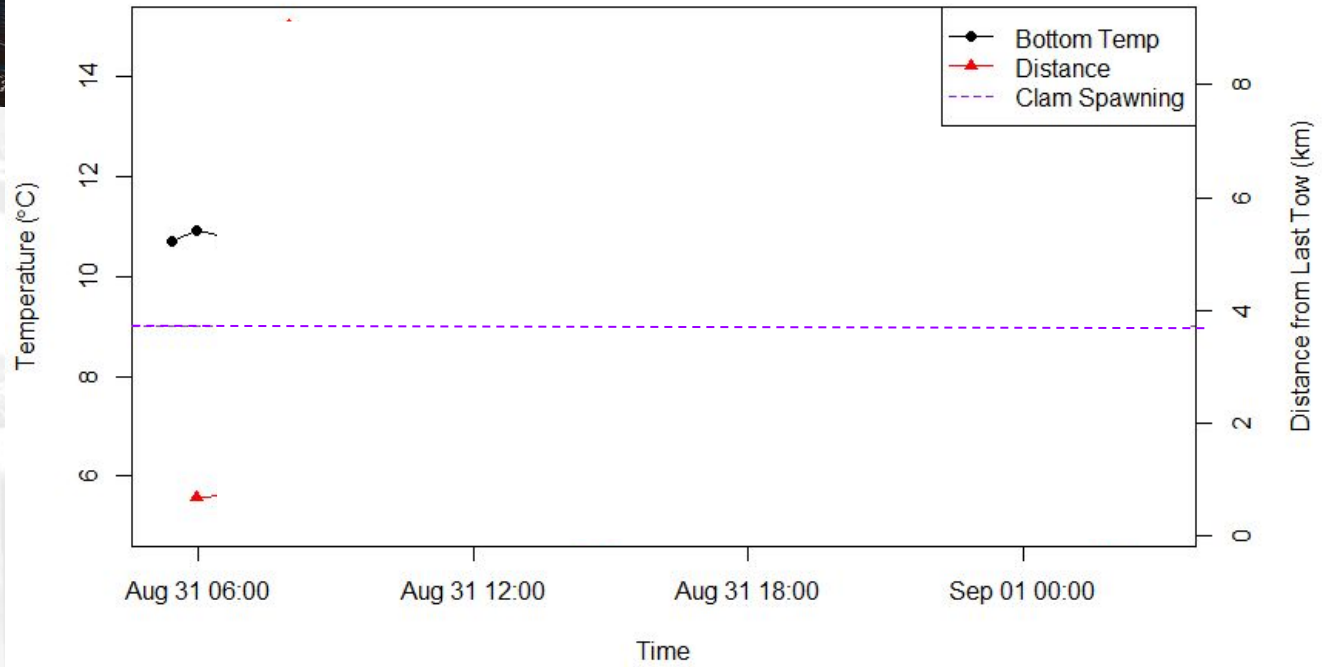
- Break into 6 groups of 4 or 5
- Turn on your DDH
- Review the screens on the DDH to see what the fishermen see after hauling gear.
- Go to “Graphs” and Identify Bottom Temperature and Thermocline
- How do you know if you’re looking at mobile or fixed gear?
- Go to “Models” to see regional predictions



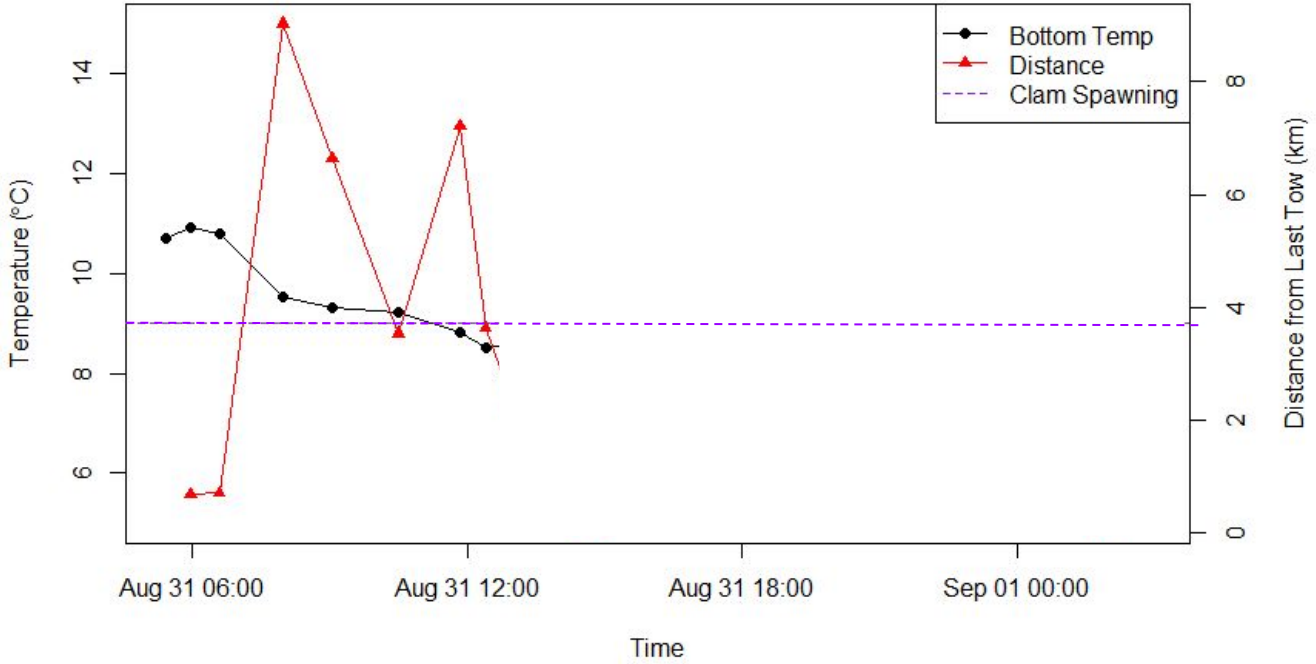
Do fishermen use the data?

JiM and Capt. Tony aboard the scalloper, F/V Kathryn Marie

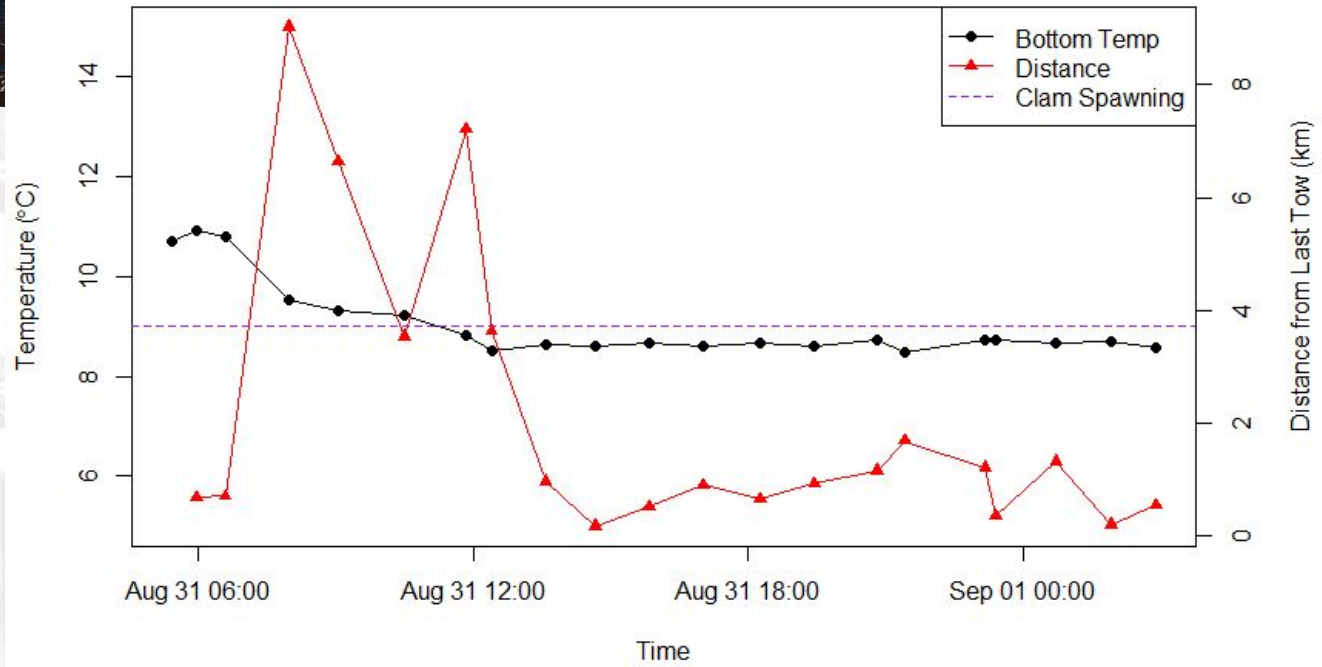
CHRISTI CAROLINE


Bottom Temp
Distance
Clam Spawning
Temperature (°C)
6
8
10
12
14
Aug 31 06:00
Aug 31 12:00
Aug 31 18:00
Sep 01 00:00
Time
Distance from Last Tow (km)
0
2
4
6
8

CHRISTI CAROLINE

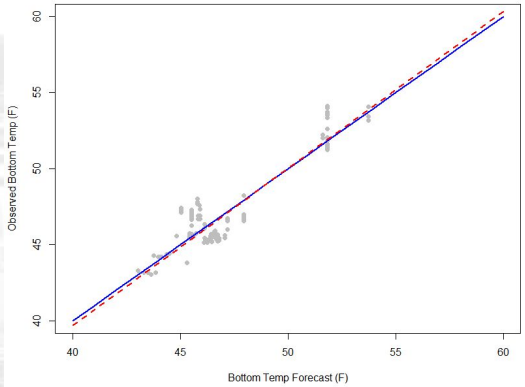

Bottom Temp
Distance
Clam Spawning
Temperature (°C)
6
8
10
12
14
Distance from Last Tow (km)
0
2
4
6
8
Aug 31 06:00
Aug 31 12:00
Aug 31 18:00
Sep 01 00:00
Time

CHRISTI CAROLINE

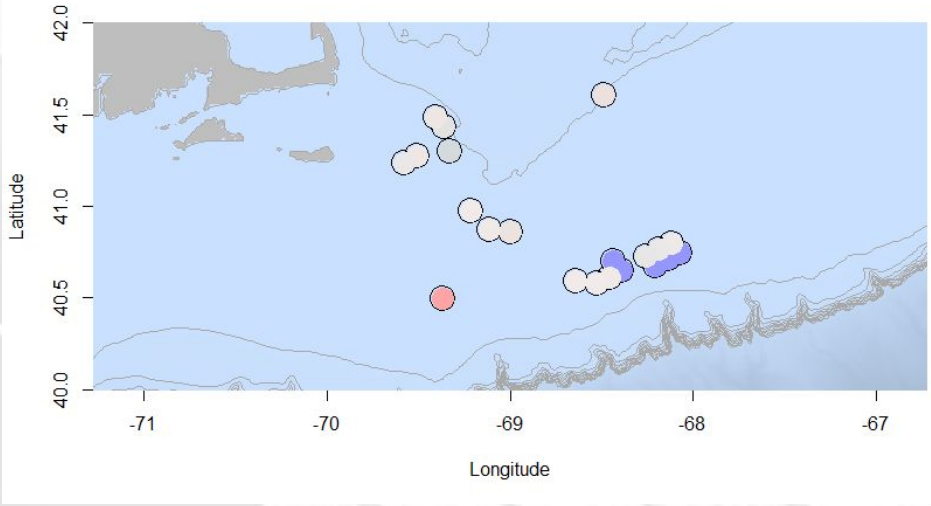

Bottom Temp
Distance
Clam Spawning
Temperature (°C)
6
8
10
12
14
Distance from Last Tow (km)
0
2
4
6
8
Aug 31 06:00
Aug 31 12:00
Aug 31 18:00
Sep 01 00:00
Time

F/V Illusion

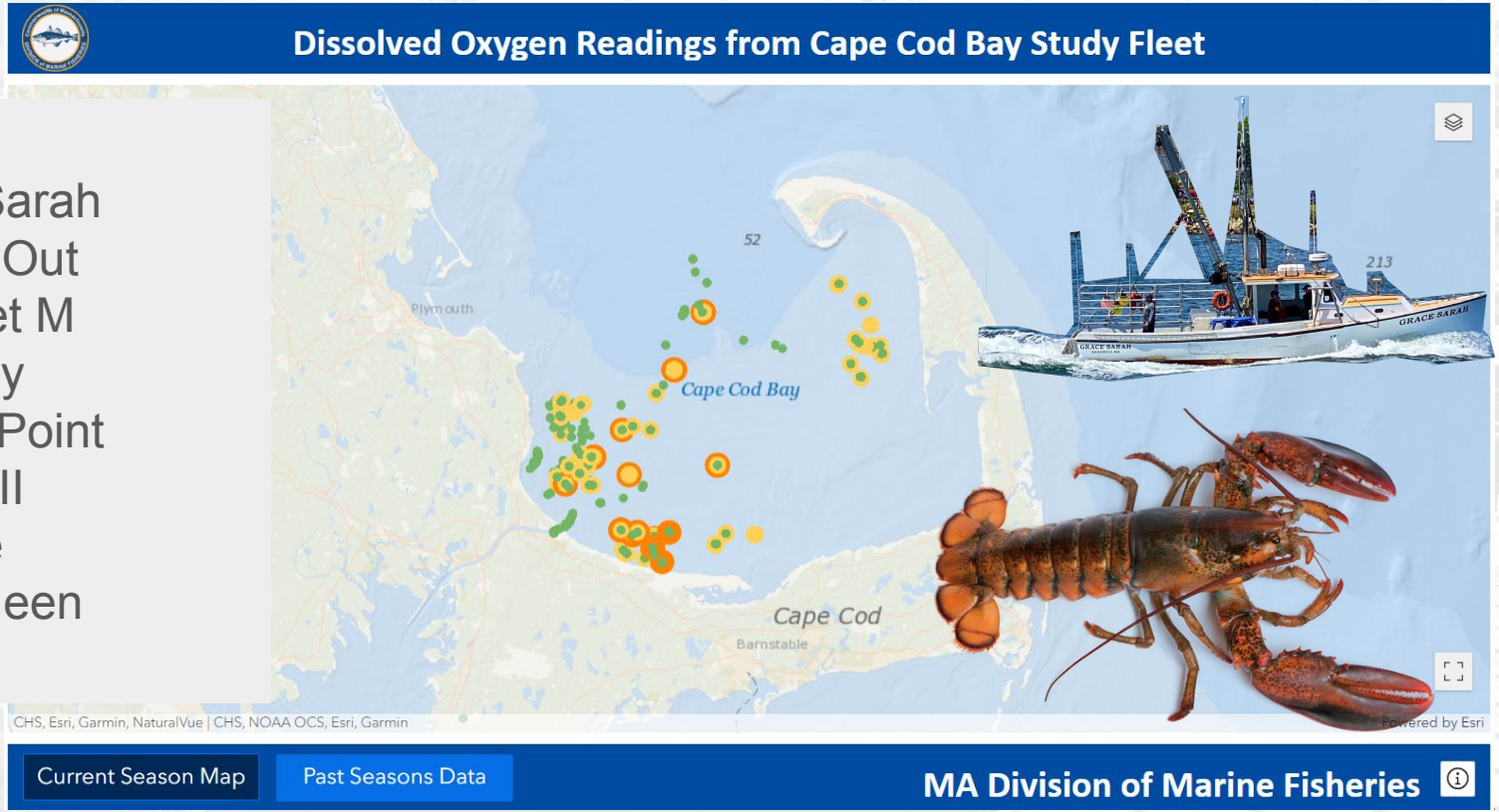
LOWELL
TDO Data Logger
PORT BRAKE PRESSURE
CASE PRESSURE
SPAN
DOWN
UP
TAKE OUT WINCH
STBD OUTRIGGER WINCH
PAYOUT


Observed Bottom Temp (F)
Bottom Temp Forecast (F)
40
45
50
55
60

EAGLE


Latitude
Longitude
42.0
41.5
41.0
40.5
40.0
-71
-70
-69
-68
-67

- F/V Grace Sarah
- F/V Buggin' Out
- F/V Margaret M
- F/V Miss Lilly
- F/V Mussel Point
- F/V Raider III
- F/V Resolve
- F/V Trap Queen



eMOLT is a Team Effort

Capt. Therese
F/V Sea Anchor

Capt. Jim, JiM, and Aubrey
F/V Excalibur

Capt. Rodman
F/V Virginia Marise

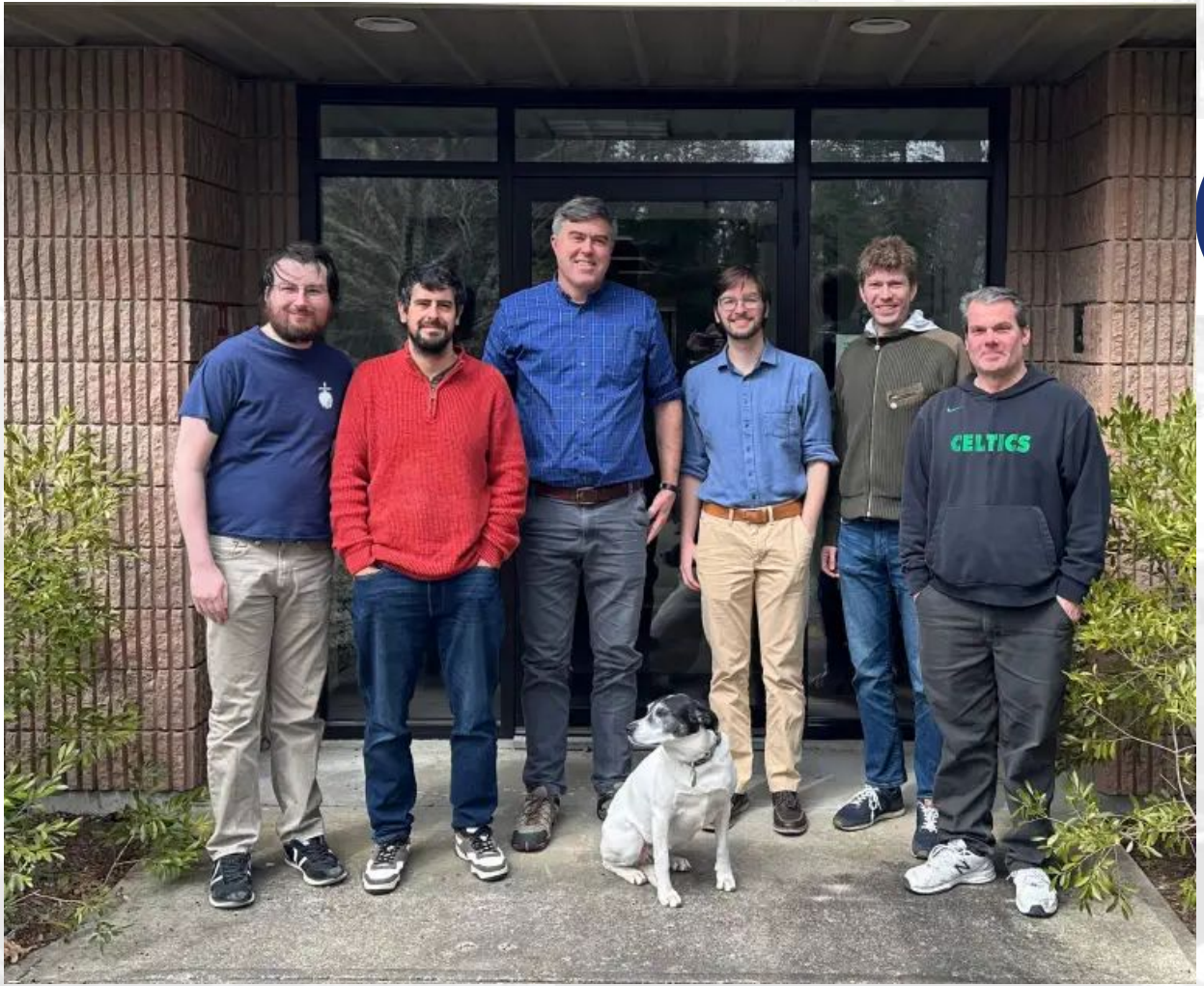
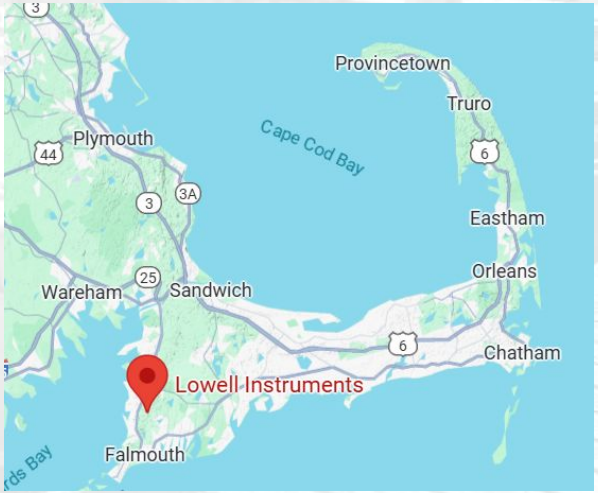
George and Capt. Dominic
F/V Tyrant

Capt. Antonio
F/V Sao Paulo

Crew of the F/V Nathaniel Lee

Capt. Andrew
F/V Miss Emma

Huanxin and Emma
F/V Sea Watcher II



LOWELL INSTRUMENTS LLC