



Photo credit: Ellen Gluckman

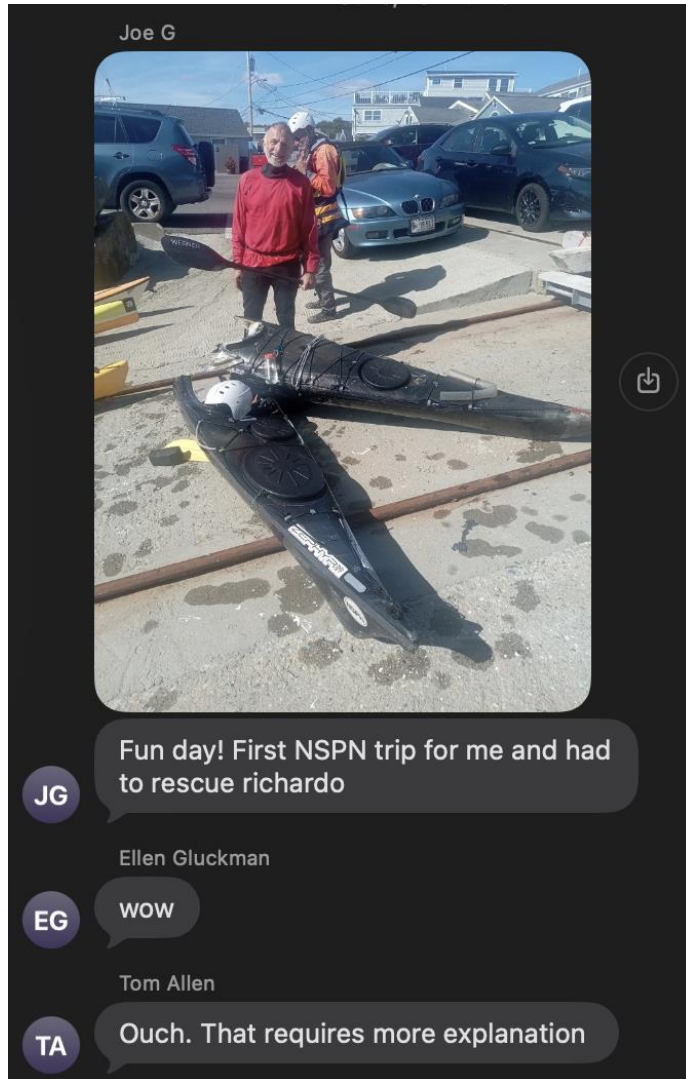
Weather Forecasting Tools for Sea Kayakers

Eric Sofen
21 October 2025

Agenda

- Motivation
- Why listen to me?
- Weather impact on kayaking
- Forecasts
- Apps
- Models
- Surf & Current Models
- Observations
- Final notes

What inspired me to put this talk together?



Ricardo Caivano

Posted 12 hours ago



Paid Member

149

Location:Salem, MA

The group: Joe Guglielmetti, Bill Doucet, Janet Lorang, Stephanie Golmon, Fred Goodman, Ben Partlow and myself.

The place: Perkins Cove, Maine.

Date: October 6, 2024

Actual observations at buoy #44030 - 8 land miles out from Bald Head - between noon and 2 PM):

- Wind: N 9 to 13 Kts. Gusts 11 to 17 Kts.
- WVHT (waves height): 2.3 ft. to 4 ft.
- Wave period: 4 to 8 seconds.
- Water temperature: 60 F
- Air temperature: 54 F

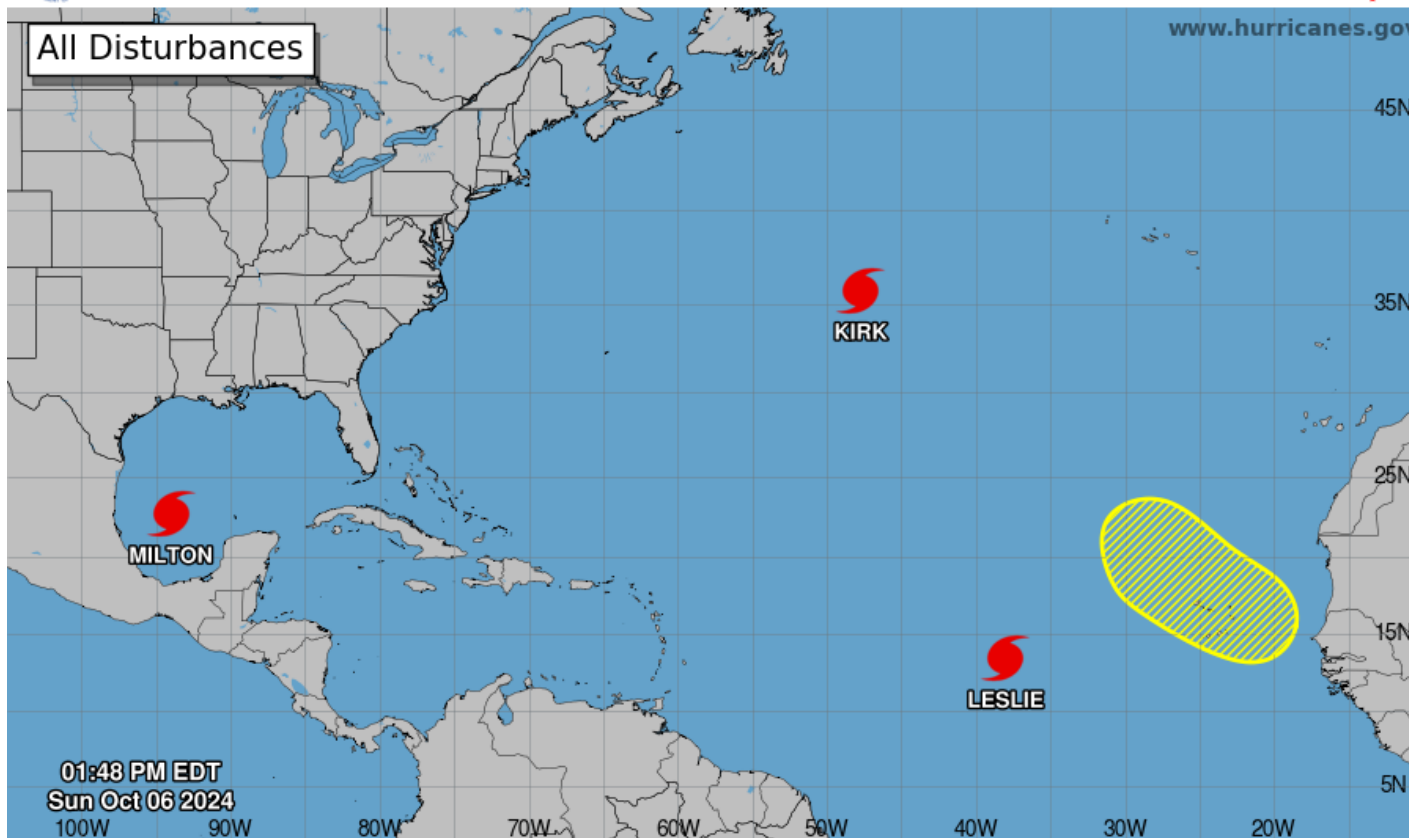
The above were the actual conditions at per the buoy data published by NOAA. However, I remembering it as windy but not too strong, and I saw waves that were higher than 4 feet. The period of the larger waves seemed longer as well. Members of the group counted 14 seconds periods. High Tide at 1:51 PM.

<https://www.nspn.org/forums/topic/15623-perkins-cove-me-death-of-a-kayak/>



Seven-Day Graphical Tropical Weather Outlook

National Hurricane Center Miami, Florida



Current Disturbances and Seven-Day Cyclone Formation Chance: ✕ < 40% ✕ 40-60% ✕ > 60%

Tropical or Sub-Tropical Cyclone: ○ Depression ◉ Storm ◉ Hurricane

⊗ Post-Tropical Cyclone or Remnants

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Would you trust this guy for your weather forecast?

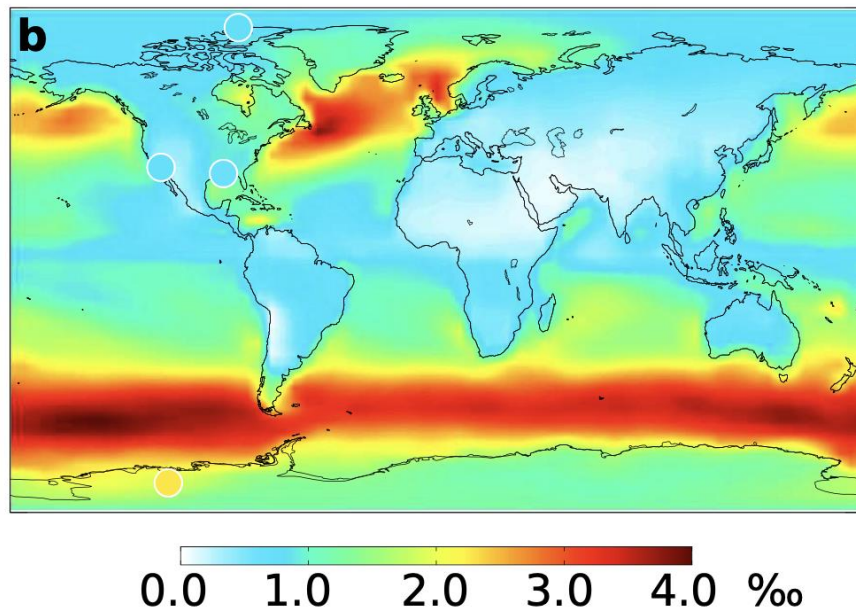


Fog: 200 m visibility

Swell: 3'-4' @ 8s



Measurement $\Delta^{17}\text{O}(\text{SO}_4^{2-})$ [‰]



TLDR...



WEATHER APPS IN THE US MOSTLY
RELY ON NOAA'S GFS MODEL.



TO EVALUATE UNCERTAINTY, SEEK
OUT OTHER MODELS AND
OBSERVATIONS.



WRITTEN FORECASTS FROM HUMAN
FORECASTERS ARE STILL VALUABLE
TOOLS.

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What weather variables are important for sea kayaking?

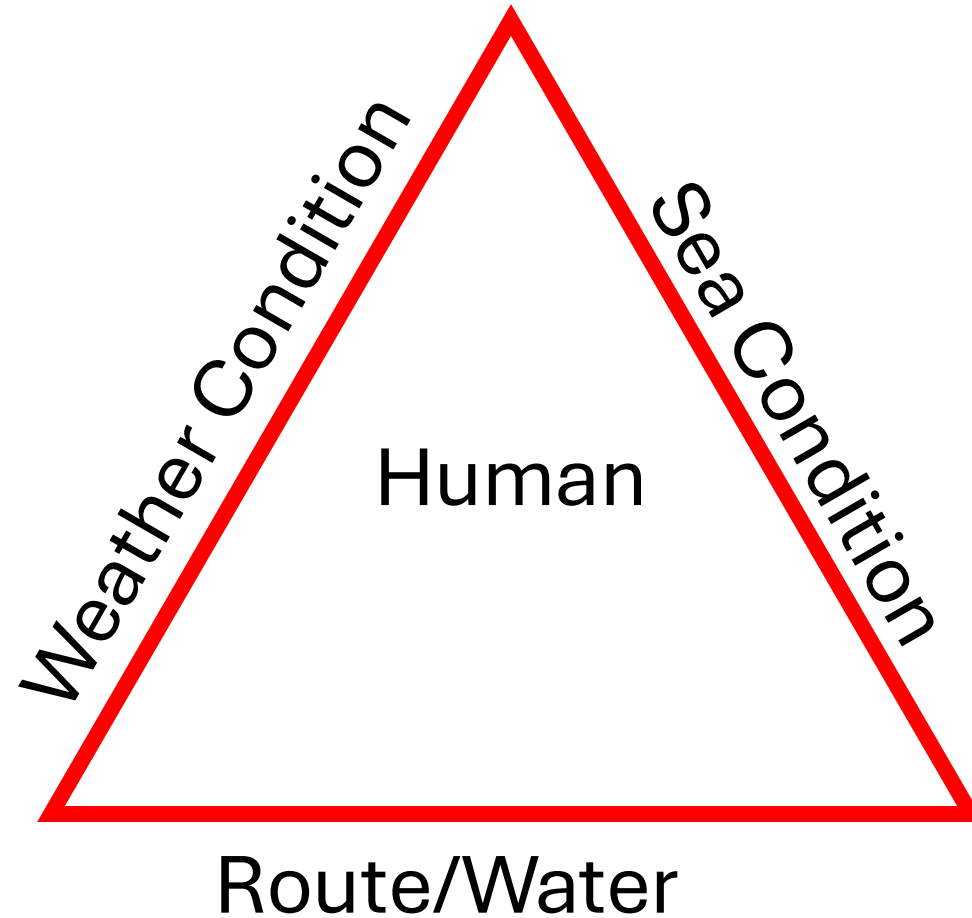
- Wind
 - Sea state – wave height and period
 - Fog/visibility
 - Precipitation
 - Temperature
 - Lightning
 - Dew point/Humidity
 - Pressure tendency
-
- Tides and tidal currents*

* Not really weather**, but also NOAA's job

** Tides do affect*** the weather!!!

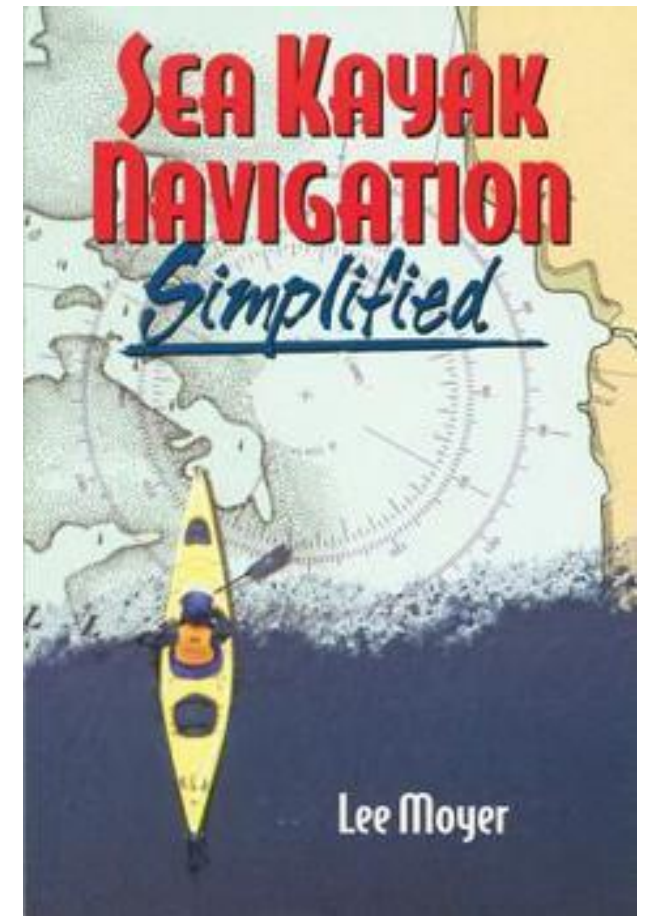
*** A very little bit

What to do with this weather information



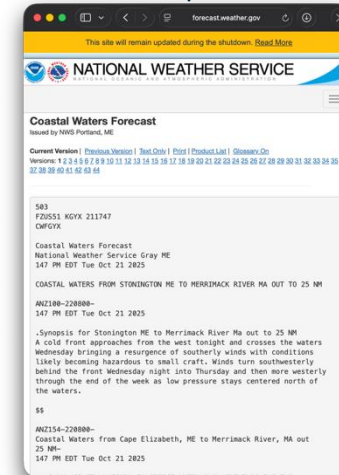
Adapted from SKILS Leadership book
Adapted from Aadland *et al.* "Situation awareness in sea kayaking: towards a practical checklist"
Adapted from NOLS

What to do with this weather information

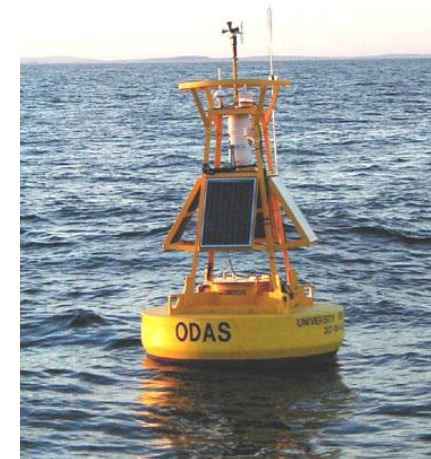


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Surflines4



Marine forecast

weather.gov

NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HOME FORECAST PAST WEATHER SAFETY INFORMATION EDUCATION NEWS SEARCH ABOUT

Local forecast by "City, St" or ZIP code
Enter location ... Go
[Location Help](#)

News Headlines

- Fall 2024 SKYWARN Spotter Talks Schedule. Register Here!
- Northern New England Weather Forecast Office's Experimental Frost Freeze Program
- Click here for event Rain, Snow, Wind or Temperature Observation Summary Report

Marine
Weather.gov > Gray - Portland, ME > Marine

Gray - Portland, ME
Weather Forecast Office

Current Hazards Current Conditions Radar Forecasts Rivers and Lakes Climate and Past Weather Local Programs

Forecasts Observations Warnings and Advisories Forecast Guidance Education and References

Coastal Waters Forecast **Graphical Wave Forecast** **Coastal Point Forecast** **Surf Forecast**

Coastal Waters Forecasts

- North of Stonington (Caribou Area)
- Stonington to Merrimack River (Gray Area)
- Merrimack River to Block Island Sound (Boston Area)
- Marine Text Forecast National Page

Graphical Forecast Products

- Gulf of Maine Wave Graphic Forecast
- Gulf of Maine Wind Graphic Forecast
- Gray Office Weekly View Graphics
- nowCOAST
- Tropical Weather Page

Coastal Waters Point Specific Forecasts

- Point Specific Coastal Water Forecast (User enters Lat/Long)
- Point Specific Coastal Map Interface (User selects location on right side map)

Offshore & High Seas Forecasts

- Ocean Prediction Center Northeast Offshore Waters
- Ocean Prediction Center Offshore Water Zone Forecasts
- Ocean Prediction Center North Atlantic High Seas Forecast
- Ocean Prediction Center Atlantic Page

Coastal Waters Forecast

The screenshot shows a web browser window with the URL `forecast.weather.gov`. A yellow banner at the top states: "This site will remain updated during the shutdown. [Read More](#)". Below this is the National Weather Service logo and the text "NATIONAL WEATHER SERVICE" and "NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION". The main heading is "Coastal Waters Forecast" with a subtext "Issued by NWS Portland, ME". A row of links includes "Current Version", "Previous Version", "Text Only", "Print", "Product List", and "Glossary On". Below these are two rows of numbered links for versions 1 through 44. The main content area contains a forecast for "COASTAL WATERS FROM STONINGTON ME TO MERRIMACK RIVER MA OUT TO 25 NM". It includes a header with "503", "FZUS51 KGYX 211747", and "CWFGYX". The forecast text describes a cold front approaching from the west, bringing a resurgence of southerly winds and hazardous conditions for small craft. It also includes a "SMALL CRAFT ADVISORY IN EFFECT UNTIL 9 PM EDT THIS EVENING" at the bottom.

This site will remain updated during the shutdown. [Read More](#)

NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Coastal Waters Forecast
Issued by NWS Portland, ME

[Current Version](#) | [Previous Version](#) | [Text Only](#) | [Print](#) | [Product List](#) | [Glossary On](#)

Versions: [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) [11](#) [12](#) [13](#) [14](#) [15](#) [16](#) [17](#) [18](#) [19](#) [20](#) [21](#) [22](#) [23](#) [24](#) [25](#) [26](#) [27](#) [28](#) [29](#) [30](#) [31](#) [32](#) [33](#) [34](#) [35](#) [36](#) [37](#) [38](#) [39](#) [40](#) [41](#) [42](#) [43](#) [44](#)

503
FZUS51 KGYX 211747
CWFGYX

Coastal Waters Forecast
National Weather Service Gray ME
147 PM EDT Tue Oct 21 2025

COASTAL WATERS FROM STONINGTON ME TO MERRIMACK RIVER MA OUT TO 25 NM

ANZ100-220800-
147 PM EDT Tue Oct 21 2025

.Synopsis for Stonington ME to Merrimack River Ma out to 25 NM
A cold front approaches from the west tonight and crosses the waters Wednesday bringing a resurgence of southerly winds with conditions likely becoming hazardous to small craft. Winds turn southwesterly behind the front Wednesday night into Thursday and then more westerly through the end of the week as low pressure stays centered north of the waters.

\$\$

ANZ154-220800-
Coastal Waters from Cape Elizabeth, ME to Merrimack River, MA out 25 NM-
147 PM EDT Tue Oct 21 2025

SMALL CRAFT ADVISORY IN EFFECT UNTIL 9 PM EDT THIS EVENING

Coastal Waters Forecast

National Weather Service Gray ME

147 PM EDT Tue Oct 21 2025

COASTAL WATERS FROM STONINGTON ME TO MERRIMACK RIVER MA OUT TO 25 NM

ANZ100-220800-

147 PM EDT Tue Oct 21 2025

.Synopsis for Stonington ME to Merrimack River Ma out to 25 NM

A cold front approaches from the west tonight and crosses the waters

Wednesday bringing a resurgence of southerly winds with conditions

likely becoming hazardous to small craft. Winds turn southwesterly

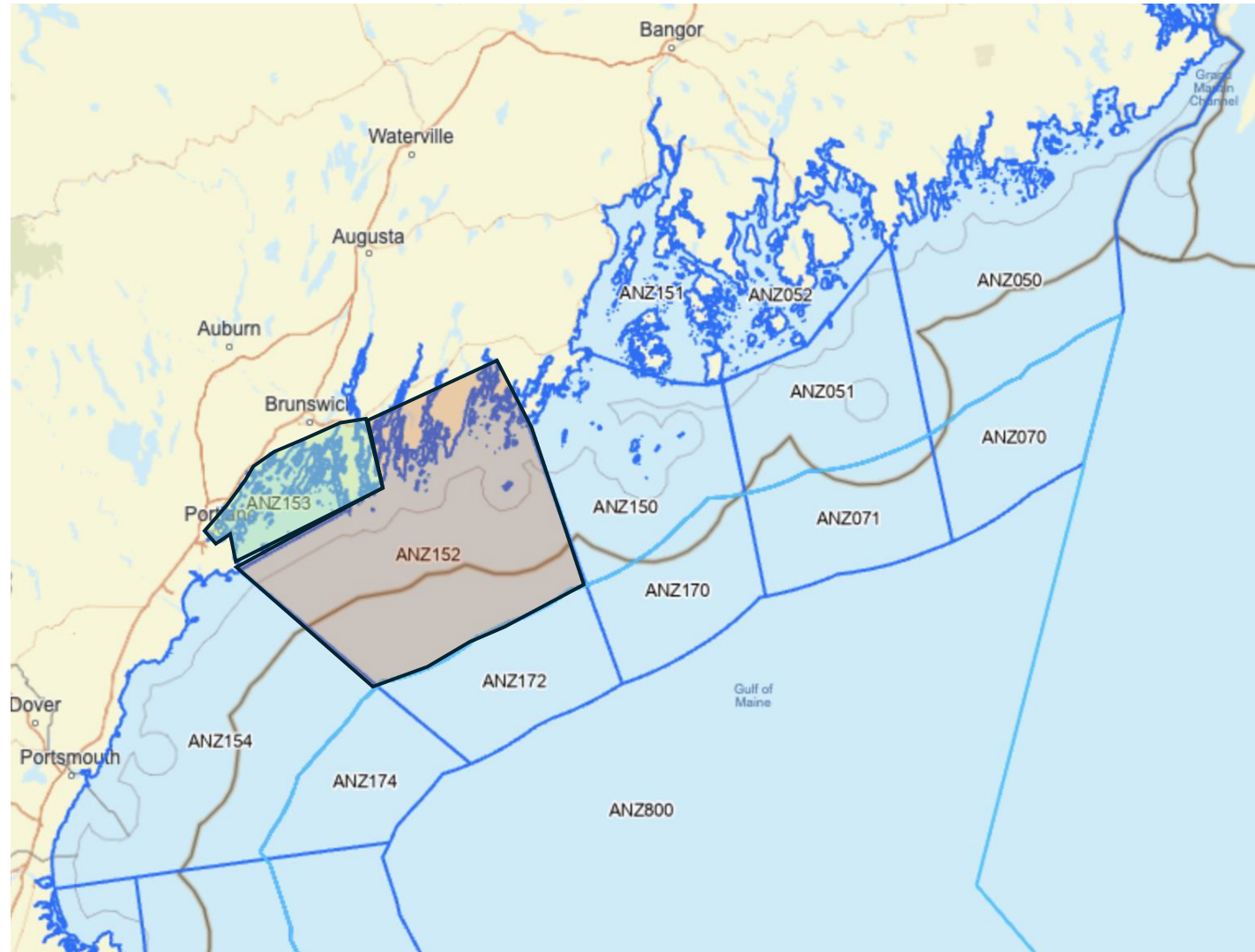
behind the front Wednesday night into Thursday and then more westerly

through the end of the week as low pressure stays centered north of

the waters.

- ANZ152-220800-
- Coastal Waters from Port Clyde, ME to Cape Elizabeth, ME out 25 NM-
- 147 PM EDT Tue Oct 21 2025
-
- ...**SMALL CRAFT ADVISORY** IN EFFECT UNTIL 8 PM EDT THIS EVENING...
-
- .THIS AFTERNOON...SW winds 15 to 20 kt, diminishing to 10 to 15 kt
- late. Seas 4 to 6 ft. Wave Detail: SE 5 ft at 7 seconds.
- .TONIGHT...S winds 10 to 15 kt with gusts up to 20 kt. Seas 3 to
- 5 ft. Wave Detail: SE 4 ft at 7 seconds. Patchy fog after midnight
- with vsby 1 to 3 NM.
- .WED...S winds 10 to 15 kt with gusts up to 25 kt. Seas 4 to 6 ft.
- Wave Detail: S 5 ft at 6 seconds. Patchy fog in the morning.
- Showers. Vsby 1 to 3 NM.
- .WED NIGHT...SW winds 10 to 15 kt with gusts up to 25 kt. Seas 4 to
- 6 ft. Wave Detail: S 5 ft at 7 seconds.
- .THU...SW winds 15 to 20 kt with gusts up to 25 kt. Seas 3 to 5 ft.
- Wave Detail: S 4 ft at 7 seconds. A change of showers in the

Look at "Casco Bay" not "Coastal Waters from Port Clyde, ME to Cape Elizabeth, ME out to 25 NM"



ANZ153-220800-

Casco Bay-

147 PM EDT Tue Oct 21 2025

.THIS AFTERNOON...SW winds 10 to 15 kt with gusts up to 20 kt. Seas 2 to 4 ft.

.TONIGHT...S winds 5 to 10 kt. Seas 2 to 4 ft. Patchy fog after midnight with vsby 1 to 3 NM.

.WED...S winds 10 to 15 kt with gusts up to 25 kt. Seas 2 to 4 ft. Patchy fog in the morning. Showers. Vsby 1 to 3 NM in the morning.

.WED NIGHT...SW winds 10 to 15 kt with gusts up to 20 kt. Seas 2 to 4 ft.

.THU...SW winds 10 to 15 kt with gusts up to 20 kt. Seas 2 to 4 ft.

.THU NIGHT...SW winds 5 to 10 kt. Seas 2 to 3 ft.

.FRI...W winds 5 to 10 kt. Seas 2 to 3 ft. A chance of showers in the afternoon.

Marine forecast

weather.gov

NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HOME FORECAST PAST WEATHER SAFETY INFORMATION EDUCATION NEWS SEARCH ABOUT

Local forecast by "City, St" or ZIP code
Enter location ...
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Marine
Weather.gov > Gray - Portland, ME > Marine

Gray - Portland, ME
Weather Forecast Office

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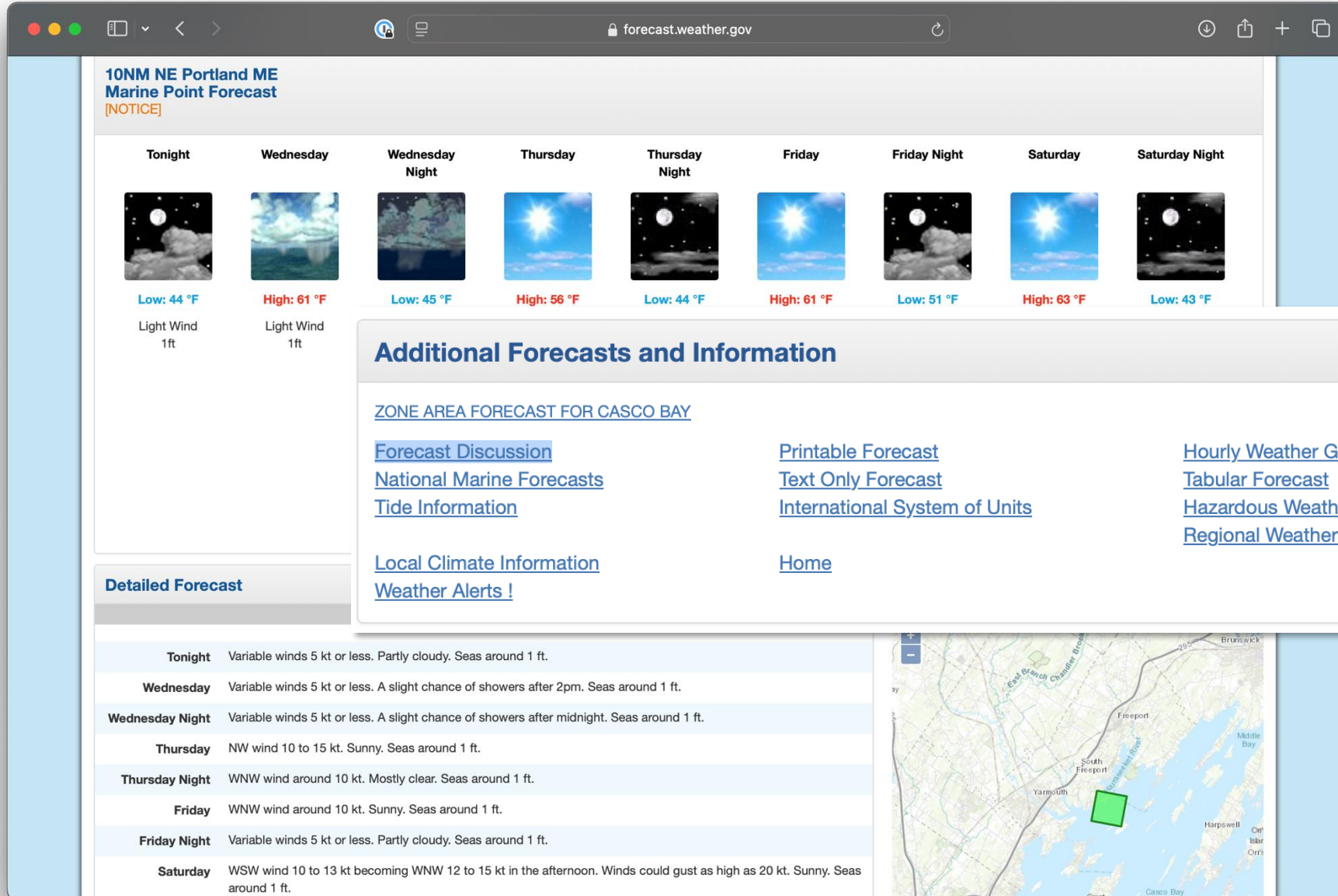
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Coastal Point Forecast



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Apps



Windy
Windy.com



WeatherBug®



WINDY.APP

Surfline4 

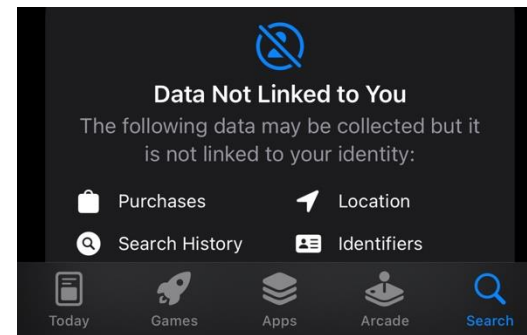
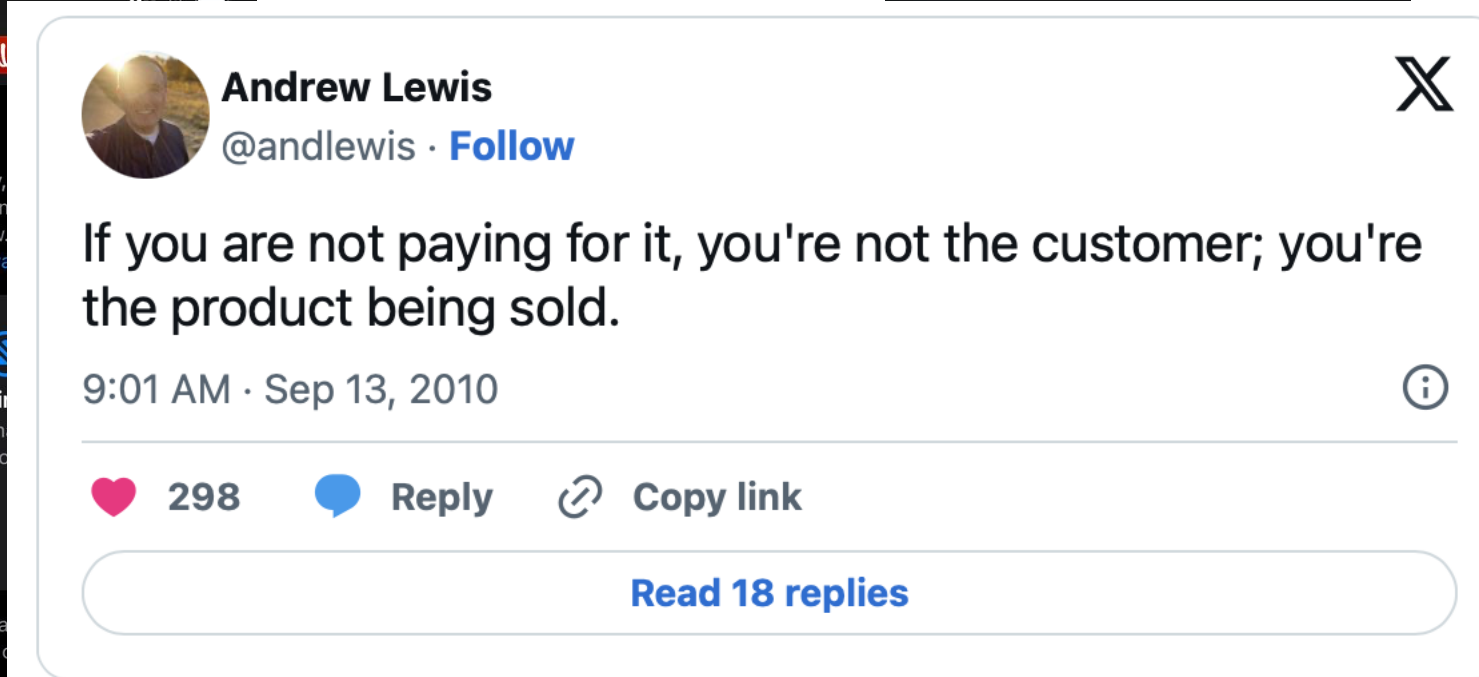
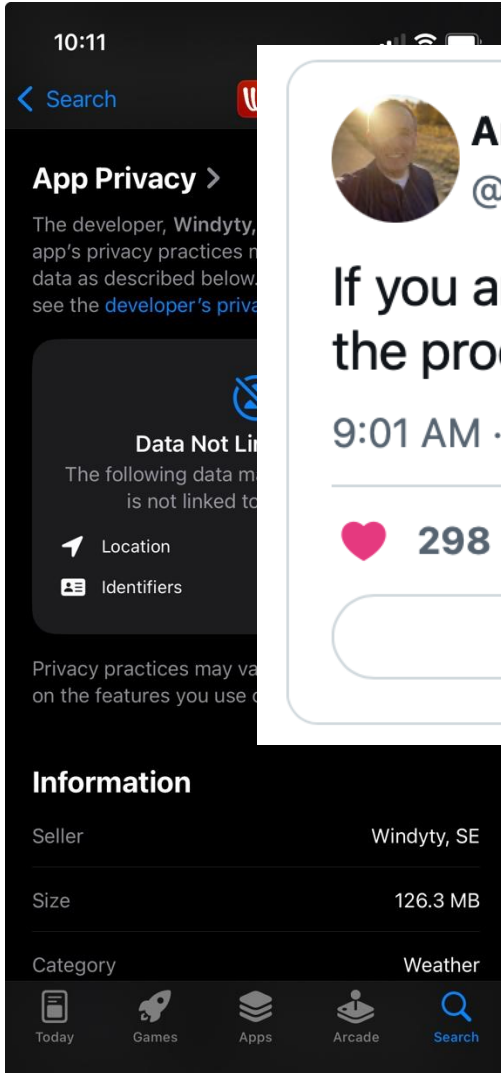
Buoyweather

WINDFINDER 

Tropical Tidbits



WINDY.APP



Apps



NOAA (GFS?)

The Weather Channel

Others in different countries



NWS + Proprietary



Windy
Windy.com

ECMWF

GFS

ICON

NAM, HRRR

HRDPS



WINDY.APP

ECMWF

GFS

ICON

AROME

OPENSKIRON

OpenWRF

NAM, HRRR

HRDPS

UKMET2

Surfline4

Buoweather

LOTUS swell model

GFS

NAM

WINDFINDER

GFS

Tropical Tidbits

GFS

ECMWF

CMC

NAVGEM

ICON

NAM

HRRR

WRF

RGEM

JMA

Agenda

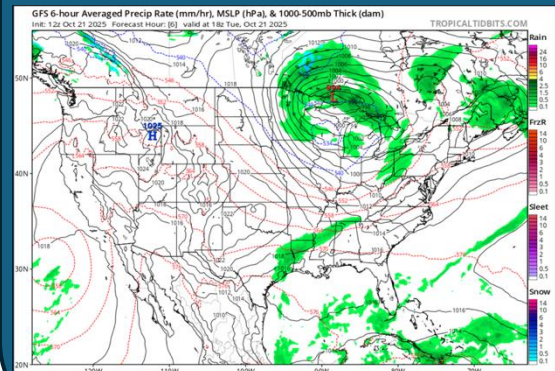
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How does a weather model work?

Observations



Past model state



Radiative transfer

Cloud
microphysics +
precipitation

Land/ocean model

Model
Weather forecast modeling
Timestep 5–10 minutes
Grid spacing 10–20 km

Boundary layer

Atmospheric
dynamics

Atmospheric
chemistry

Variables at
the surface:

Temperature
Humidity
Pressure
Moisture fluxes
Heat fluxes
Radiation fluxes

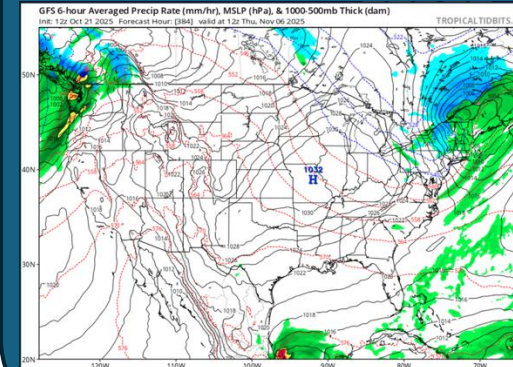
Vertical exchange
between levels

Horizontal exchange
between columns

Variables in the
atmospheric column:

Wind vectors
Humidity
Clouds
Temperature
Height
Precipitation
Aerosols

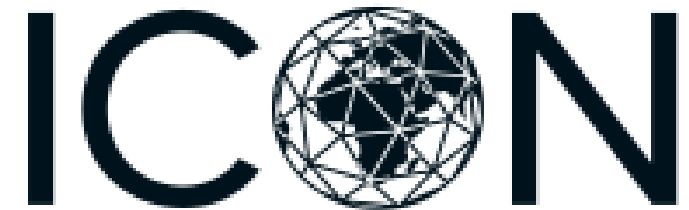
Forecast



Weather models



NAM, HRRR



Weather models

National Blend of Models

A nationally consistent and skillful suite of calibrated forecast guidance based on a blend of both National Weather Service and external numerical weather prediction model data and post-processed model guidance.

A highly accurate, skillful and consistent starting point for the gridded forecast.

Probabilistic and bias-corrected weather elements across several service areas.

Providing forecasters with a suite of information to use for their forecasts.

An important part of the efforts to evolve NWS capabilities to achieve a Weather-Ready Nation.

NBM Inputs

WRF MEM2
WRF ARW
RAP
RAPX
HRRR
HRRRX
GFS GMOS
NAM GMOS
EKDMOS/BMOS
GLMP
WW3D (0.5)
WW3E (0.5)
WW3D-Regional
GLW
HWRF
HMON
wTCM

GEFS
GFS
NAM-Parent
SREF
NAM-Nest
NEMS NMMB
WRF ARW
CMC GDPS
CMC RDPS
CMC REPS
CMC GEPS
ECMWFD
ECMWFE
NAVGENM
NAVGENE
FNMOC
ACCESS-G

▶ NOAA

▶ Canadian Meteorological Centre

▶ European Centre for Medium-Range Weather Forecasts

▶ U.S. Navy Fleet Numerical Meteorology and Oceanography Center

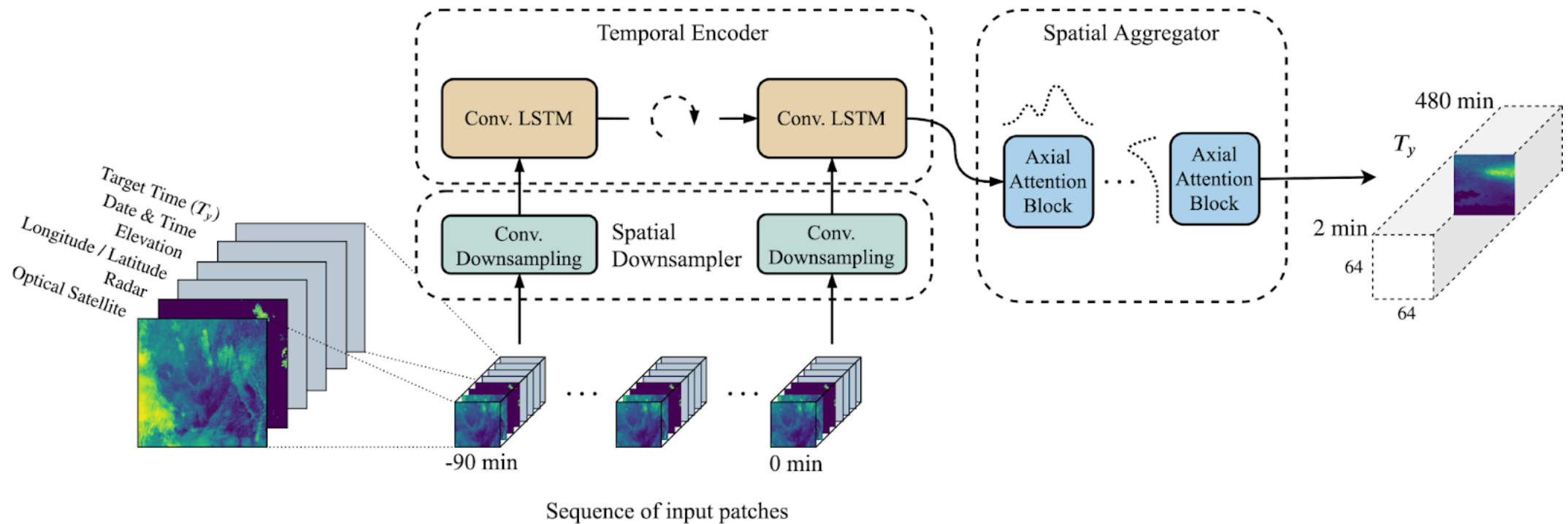
▶ Australia Bureau of Meteorology



Weather models

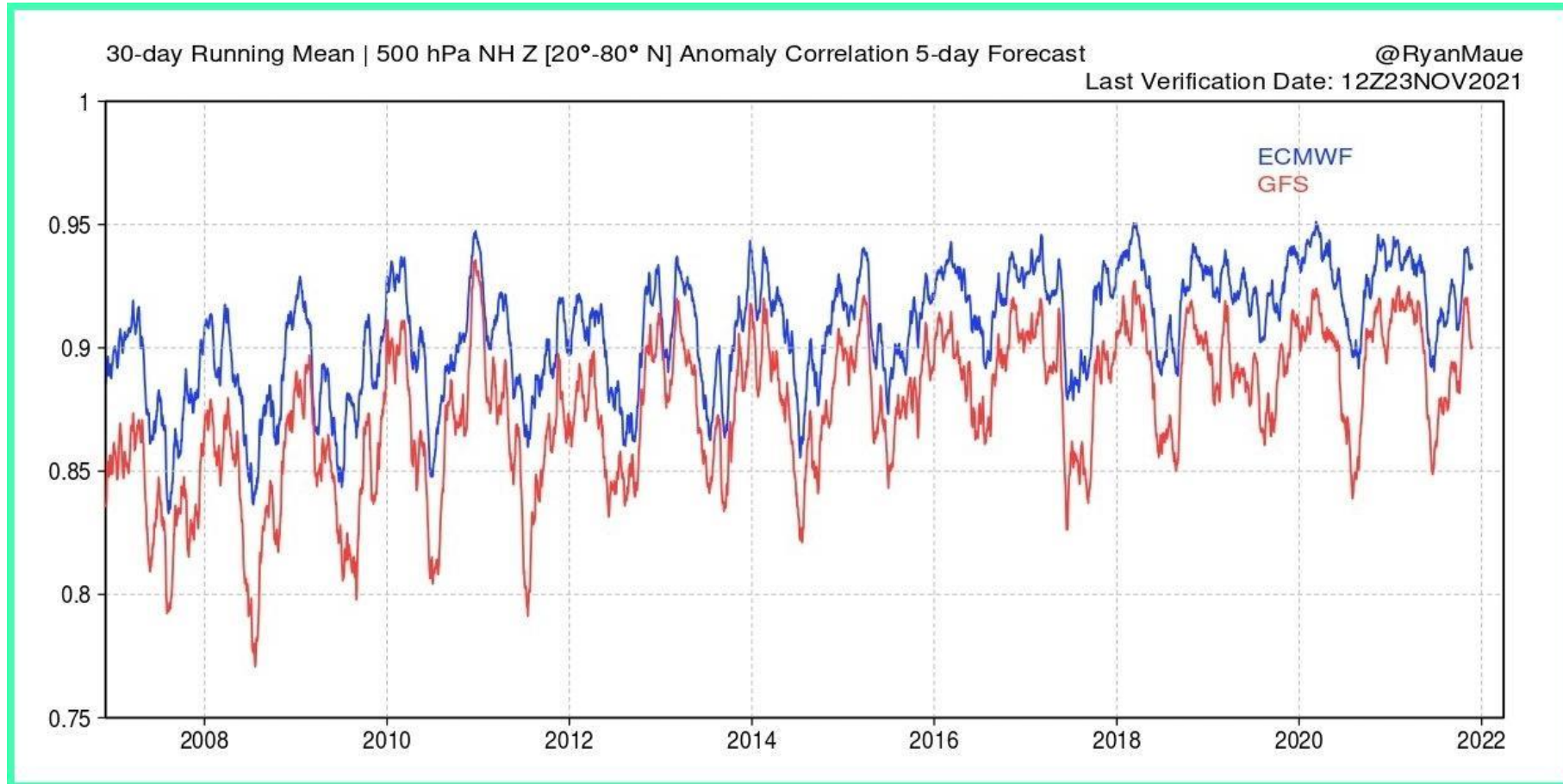


What about The Weather Channel, Apple Weather, AccuWeather, Darksky, ...?



Who does best? <https://www.forecastadvisor.com/Maine/Freeport/04032/>

ECMWF has been beating GFS for years 😞



Apps



NOAA (GFS?)
The Weather Channel
Others in different countries



NWS + Proprietary



Windy
Windy.com

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ICON
NAM, HRRR
HRDPS



WINDY.APP

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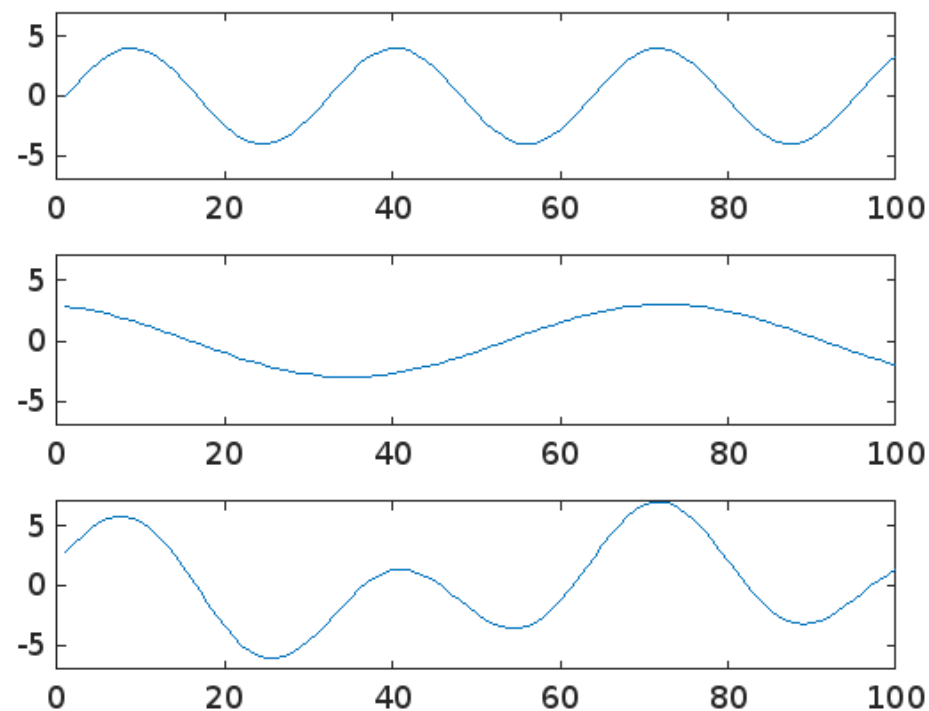
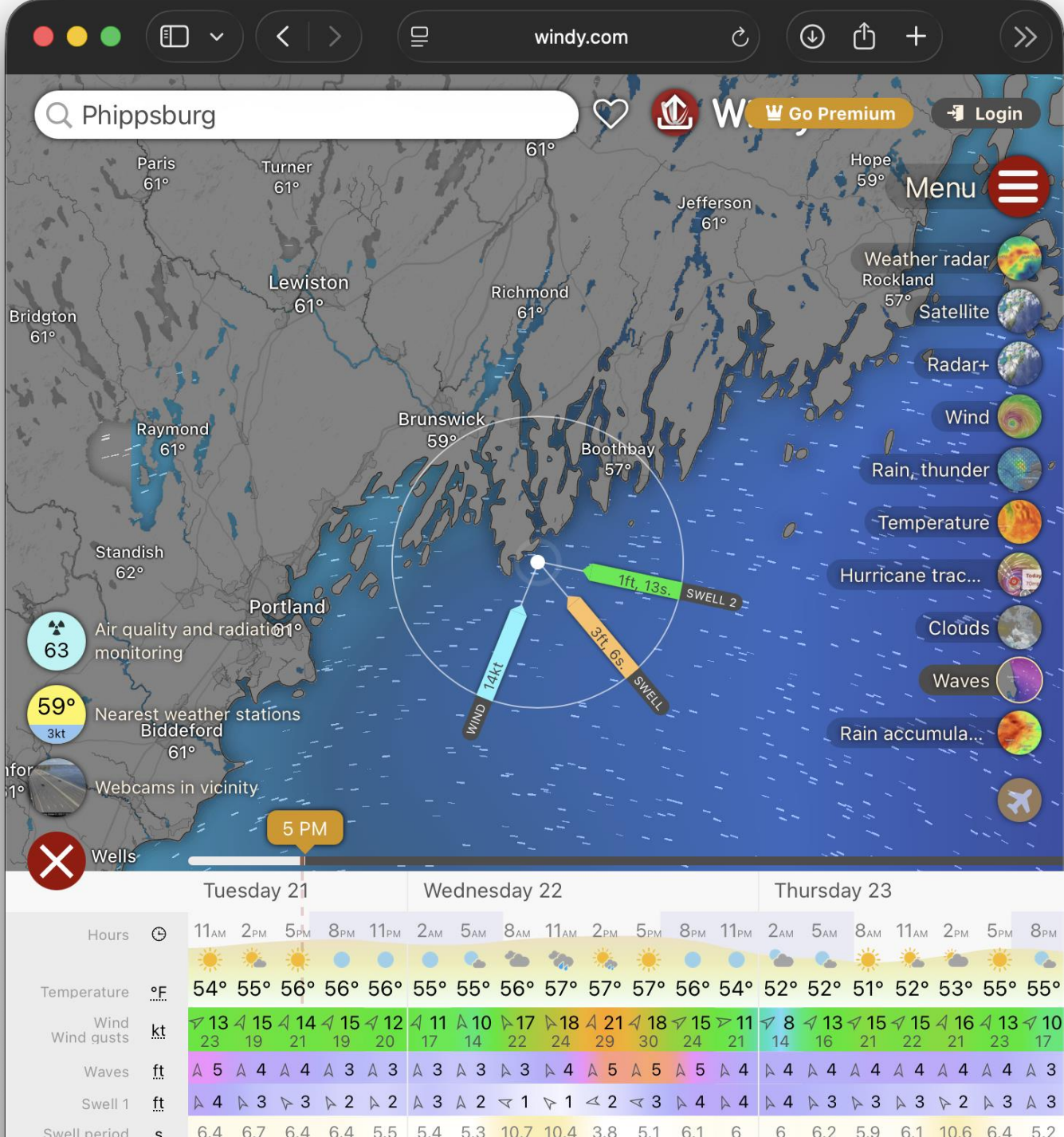
GFS

Tropical Tidbits

GFS	NAM
ECMWF	HRRR
CMC	WRF
NAVGEN	RGEM
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Surfline

The screenshot displays the Surfline website interface. At the top, the navigation bar includes the Surfline logo, links for 'Cams & Forecasts', 'Stories', and 'Travel', a search bar, and buttons for 'Start Free Trial' and 'Sign In'. Below this, a multi-camera status bar shows various beach locations with their current surf heights: Higgins Beach (0-1ft), Kettle Cove (0-1ft), Scarborough Beach State Park (1-2ft), Pine Point Beach (0-1ft), Old Orchard Beach (1-2ft), and Fortunes Rock (1-2ft).

The main content area is titled 'Maine' with a 'Regional Forecast' subtitle. It features tabs for 'Report & Forecast', 'Analysis' (which is selected), 'Charts', and 'Guide'. The 'Analysis' tab contains a section titled 'New England Forecast' by Tim Kent, an expert forecast updated 1 hour ago. This section includes a 'The Bottom Line' summary with four bullet points:

- Best Surf Through Next Seven Days:** Small clean windows through the weekend — watching Monday
- Prospects This Week:** Kirk swell fading late week but still clean windows
- Weekend Outlook:** Watching tropics but smaller surf expected with clean windows
- Beginners and Newer Surfers:** Look to late week/weekend for more manageable size

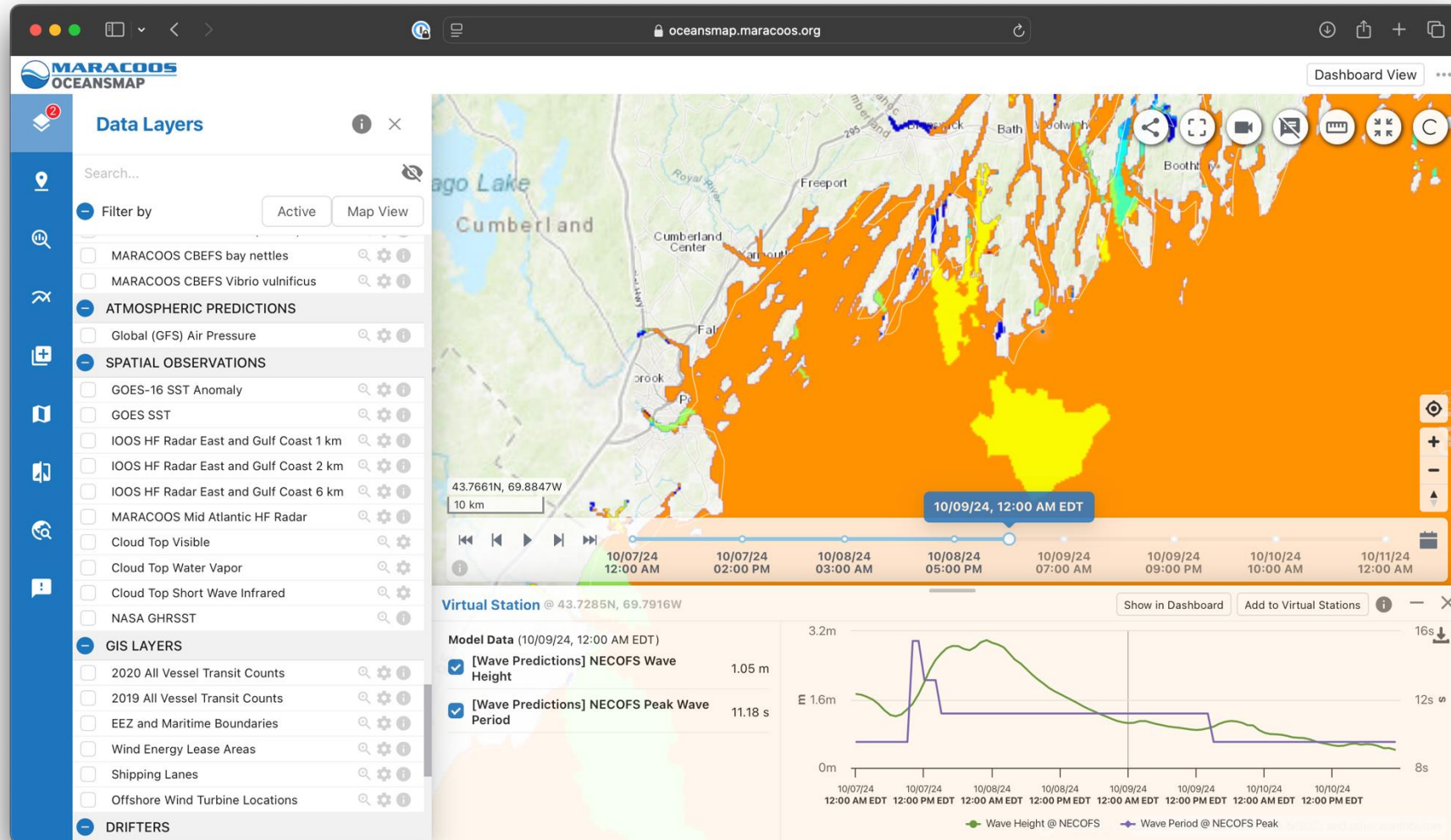
Below the summary, there are two paragraphs of text. The first, labeled 'Today:', discusses the leftover ESE swell from Kirk and the potential for Leslie swell. The second, labeled 'The Weekend:', discusses the Milton and front running low systems. A 'Long Term Forecast Analysis' section follows, covering Monday, October 14th and beyond.

At the bottom of the main content area, there is a 'Summary & NHC 7-Day Formation Outlook' map showing the Atlantic Ocean with latitude and longitude markers. The map is valid for 13 UTC 11 Oct 2024.

The footer features a promotional banner for 'STRONG FEET = WORLD TITLES' by Vividarefoot, featuring a 3x WSL Champion, John John Florence, and a 'SHOP NOW' button.

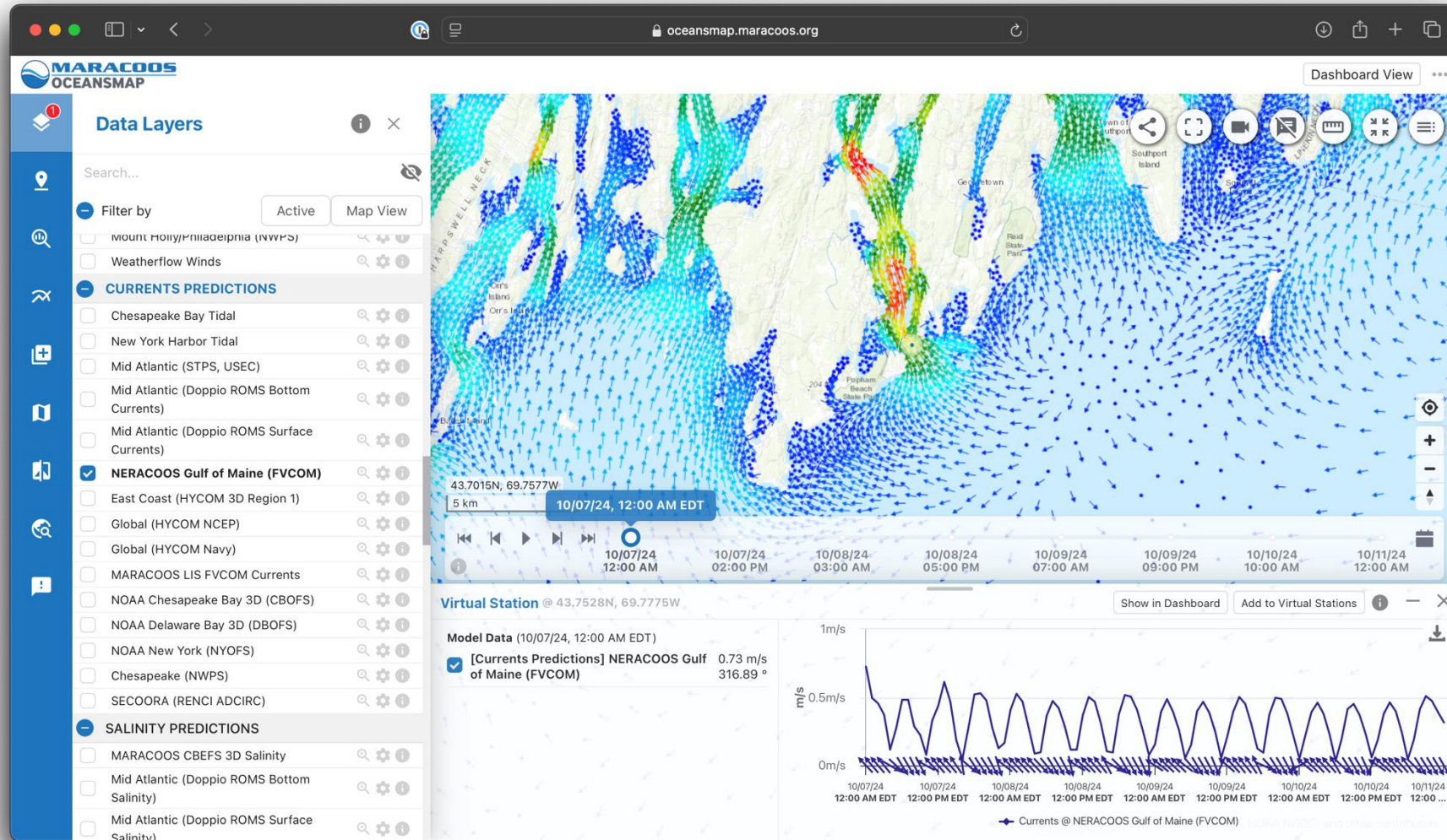
Very high resolution ocean models

NECOFS and FVCOM



Very high resolution ocean models

NECOFS and FVCOM



"All models are wrong, but some are useful."
- George Box



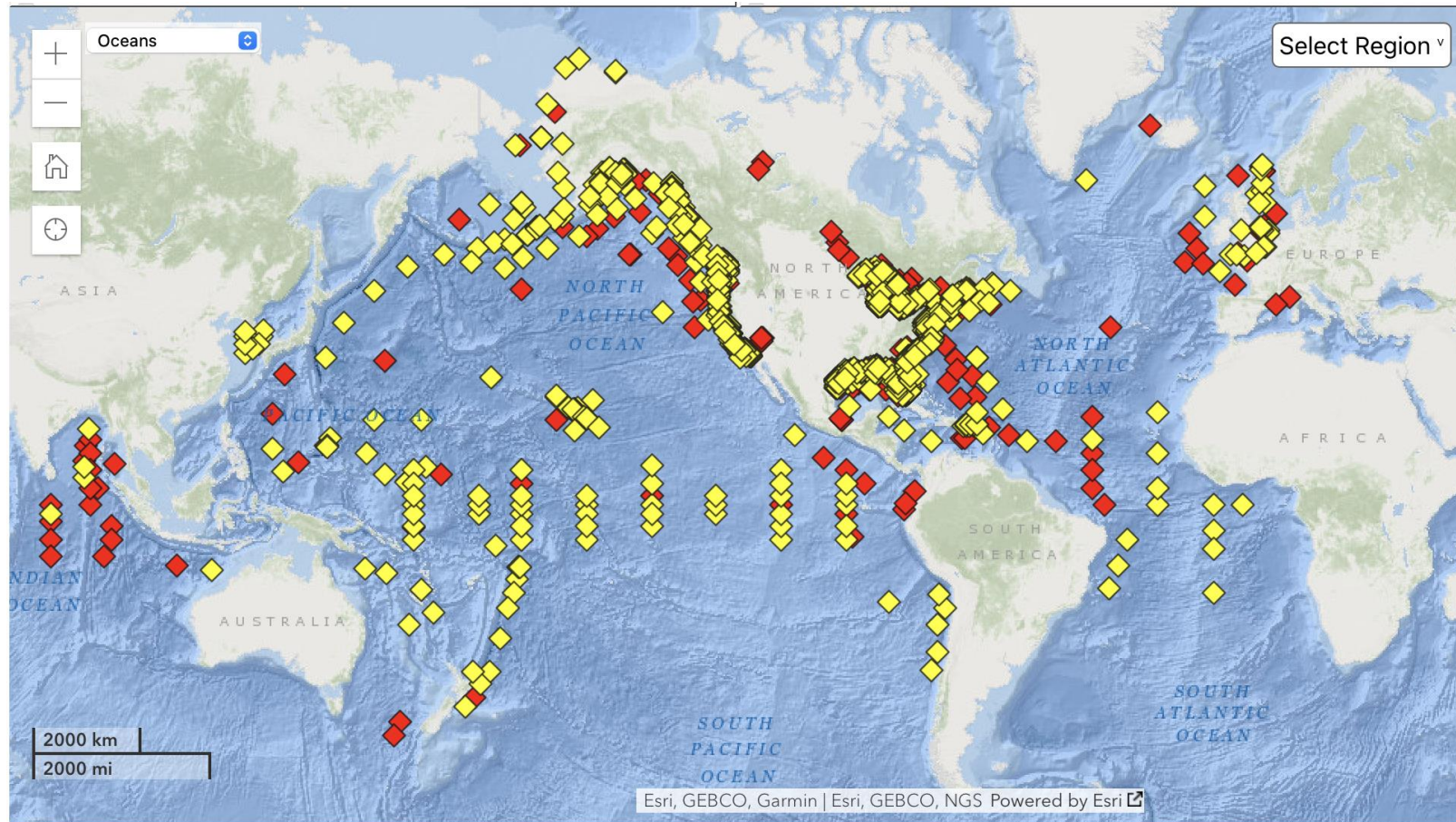
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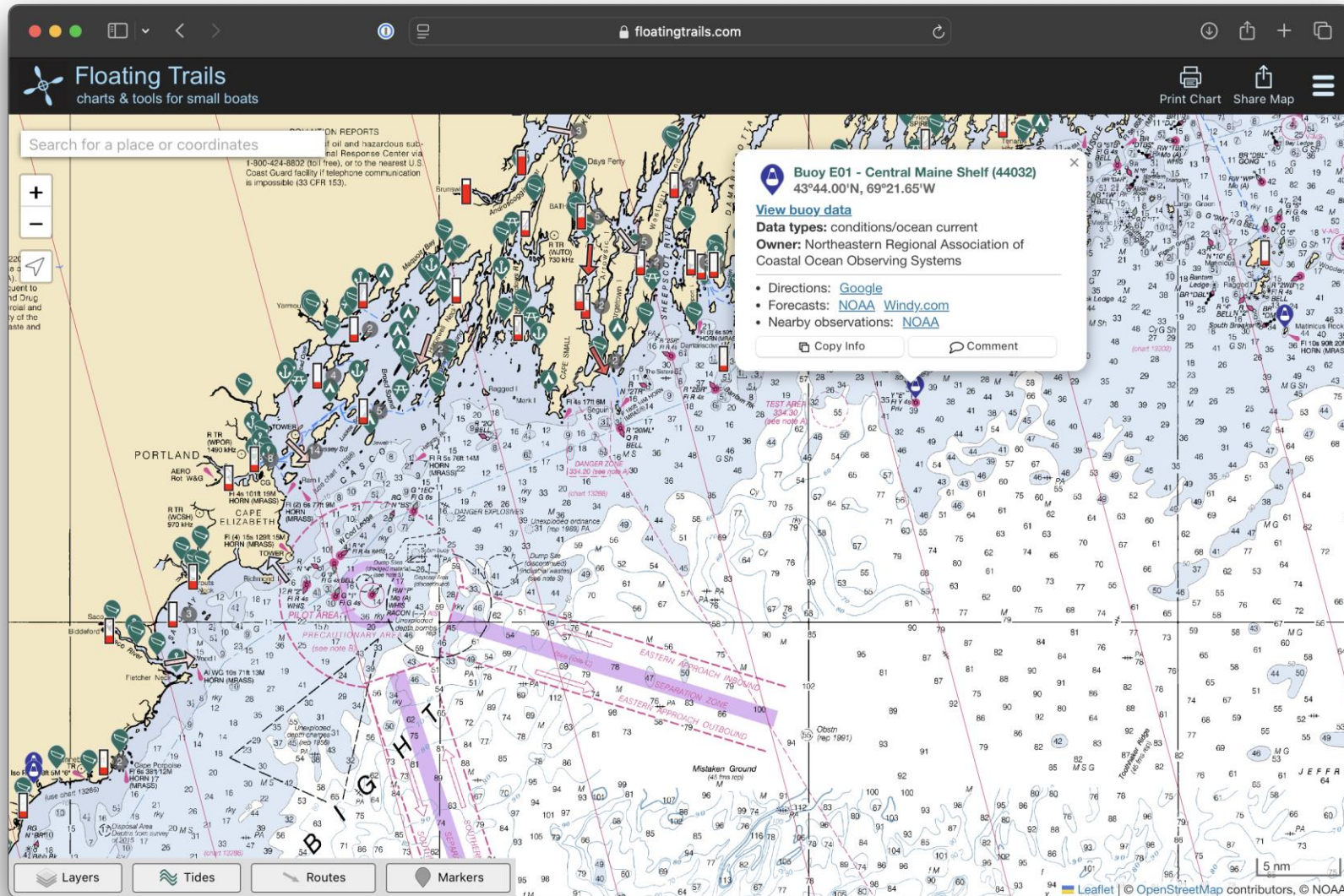
Data buoys



1347 buoys in a global network



Surface data: Buoys



Surface data: Buoys

https://www.ndbc.noaa.gov/station_page.php?station=44032

Floating Trails - 43°36.85'N, 69°40.44'W

NDBC - Station 44032 Recent Data

Previous observations

TIME (EDT)	WDIR	WSPD kts	GST kts	WVHT ft	DPD sec	APD sec	MWD	PRES in	PTDY in	ATMP °F	WTMP °F	DEWP °F	SAL psu	VIS nmi	TIDE ft
2024-10-08 09:04 pm	W	5.8	9.7	-	-	-	-	29.87	-	56.5	-	-	-	1.6	-
2024-10-08 08:04 pm	W	9.7	13.6	5.6	11	-	-	29.85	-	55.9	-	-	-	1.6	-
2024-10-08 07:04 pm	WSW	7.8	9.7	5.9	11	-	-	29.83	-	55.8	-	-	-	1.6	-
2024-10-08 06:04 pm	W	9.7	15.5	5.2	11	-	-	29.82	-	56.3	-	-	-	1.6	-
2024-10-08 05:04 pm	WSW	5.8	7.8	5.6	11	-	-	29.80	-	56.8	-	-	-	1.6	-
2024-10-08 04:04 pm	WSW	7.8	9.7	6.6	11	-	-	29.79	-	56.7	-	-	-	1.6	-
2024-10-08 03:04 pm	W	5.8	7.8	5.2	11	-	-	29.78	-	56.8	-	-	-	1.6	-
2024-10-08 02:04 pm	W	7.8	9.7	5.6	11	-	-	29.79	-	55.9	-	-	-	1.6	-
2024-10-08 01:04 pm	WNW	7.8	11.7	-	-	-	-	29.79	-	55.0	-	-	-	1.6	-
2024-10-08 12:04 pm	WNW	5.8	9.7	1.0	3	-	-	29.81	-	54.7	-	-	-	1.6	-
2024-10-08 11:04 am	NW	9.7	11.7	1.3	3	-	-	29.82	-	54.3	-	-	-	1.6	-
2024-10-08 10:04 am	NNW	9.7	13.6	1.3	3	-	-	29.81	-	54.3	-	-	-	1.6	-
2024-10-08 09:04 am	NW	9.7	13.6	2.3	5	-	-	29.81	-	54.0	-	-	-	1.6	-
2024-10-08 08:04 am	NNW	11.7	15.5	-	-	-	-	29.80	-	54.3	-	-	-	1.6	-
2024-10-08 07:04 am	NNW	13.6	17.5	-	-	-	-	29.78	-	55.0	-	-	-	1.6	-
2024-10-08 06:04 am	NW	15.5	19.4	3.3	6	-	-	29.77	-	54.9	-	-	-	1.6	-
2024-10-08 05:04 am	NNW	11.7	13.6	3.3	6	-	-	29.76	-	54.9	-	-	-	1.6	-
2024-10-08 04:04 am	NW	9.7	13.6	-	-	-	-	29.76	-	54.7	-	-	-	1.6	-
2024-10-08 03:04 am	NNW	11.7	13.6	9.8	16	-	-	29.74	-	55.0	-	-	-	1.6	-
2024-10-08 02:04 am	N	7.8	11.7	4.9	6	-	-	29.75	-	55.2	-	-	-	1.6	-
2024-10-08 01:04 am	W	5.8	7.8	4.9	6	-	-	29.76	-	55.6	-	-	-	0.4	-
2024-10-08 12:04 am	SW	7.8	9.7	4.9	6	-	-	29.76	-	55.8	-	-	-	1.6	-
2024-10-07 11:04 pm	ESE	11.7	15.5	-	-	-	-	29.77	-	54.7	-	-	-	1.6	-

Disclaimer: Ocean current directions are reported to the nearest 10 degrees and speeds are measured to the nearest whole

WVHT = Significant Wave height

DPD = Dominant period

APD = Average period

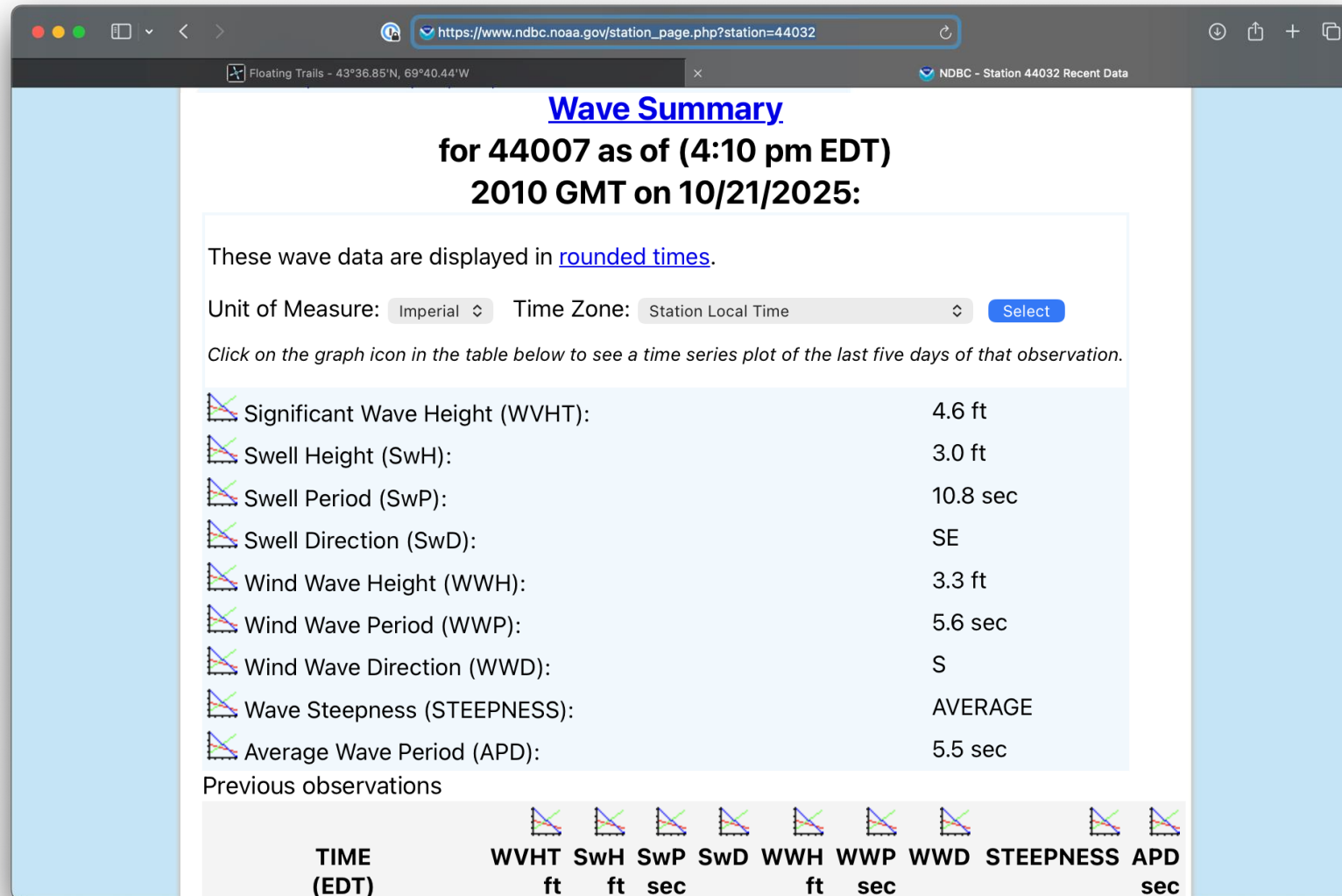
SwH = Swell Height

SwP = Swell Period

WWH = Wind wave height

WWP = Wind wave period

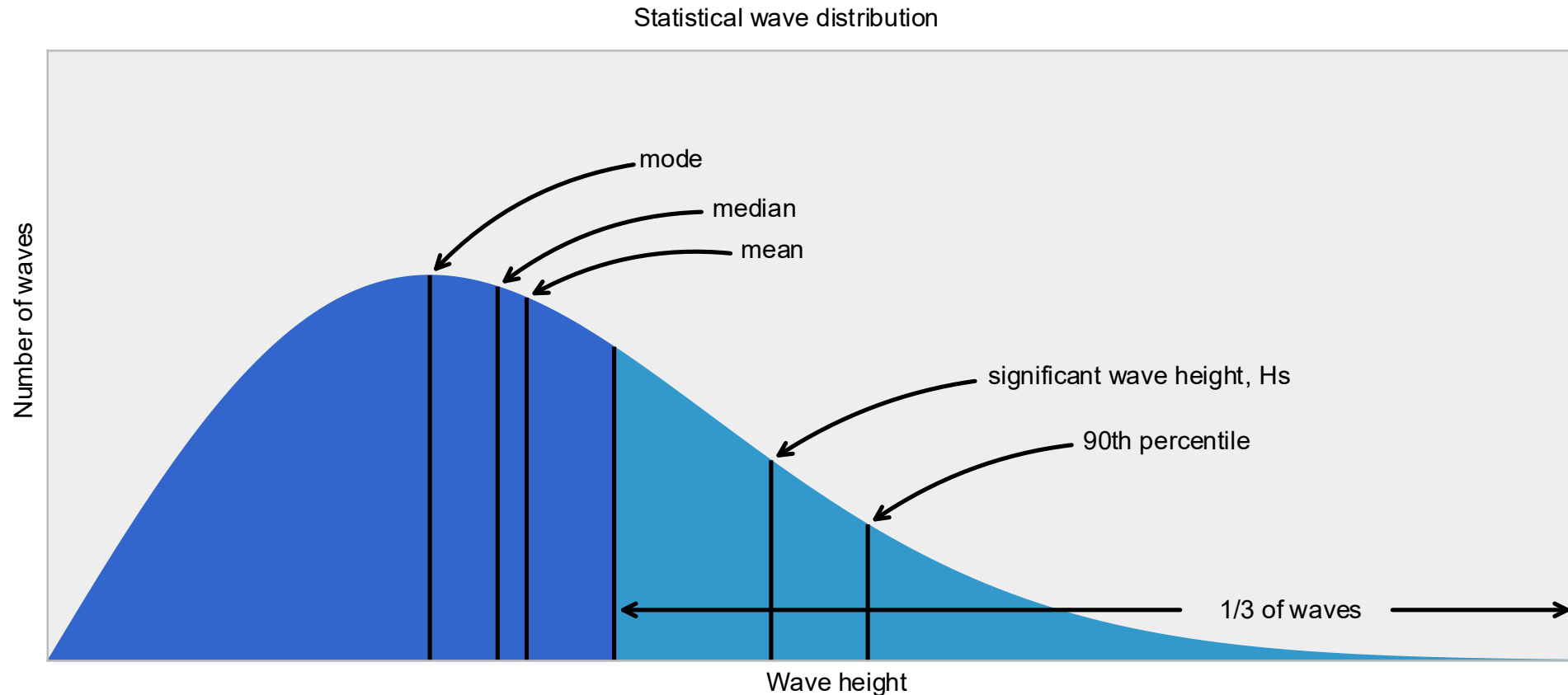
Surface data: Buoys



WVGT = Significant Wave height
DPD = Dominant period
APD = Average period
SwH = Swell Height
SwP = Swell Period
WWH = Wind wave height
WWP = Wind wave period

A note on **significant wave height**

"average of the *highest one-third* of the respective wave type"



More on wave height distributions

In the book *Oceanography and Seamanship*, William G. Van Dorn provided an example of what the wave heights would be if a steady **30 knot** (33 mph/53 km/h) wind blew for **24 hours** over a fetch of **340 miles**.

- 10% of all waves will be less than 3.6 ft. (1 m).
- The most frequent wave height will be 8½ ft. (2½ m).
- The average wave height will be 11 ft. (3 m).
- The **significant wave height** will be 17 ft. (5 m).
- 10% of all waves will be higher than 18 ft. (5 m).
- The average wave height of the highest 10% of all waves will be 22 ft. (7 m).
- A 5% chance of encountering a single wave higher than 35 ft. (11 m) among every 200 waves that pass in about 30 minutes.
- A 5% chance of encountering a single wave higher than 40 ft. (12 m) among every 2,600 waves that pass in about five hours.

More on wave height distributions

In the book *Oceanography and Coastal Engineering*, Dorn provided an example of what the wave heights would be if a 53 km/h (33 mph) wind blew for 24 hours over a fetch of 340 miles.

- 10% of all waves will be less than 1.5 ft. (0.46 m).
- The most frequent wave height will be 2.5 ft. (0.76 m).
- The average wave height will be 3.5 ft. (1.07 m).
- The **significant wave height** will be 4.5 ft. (1.37 m).
- 10% of all waves will be higher than 11.5 ft. (3.51 m).
- The average wave height of the tallest 10% of waves will be 12.5 ft. (3.81 m).
- A 5% chance of encountering waves that pass in about 30 s will be 13.5 ft. (4.11 m).
- A 5% chance of encountering waves that pass in about five s will be 14.5 ft. (4.42 m).



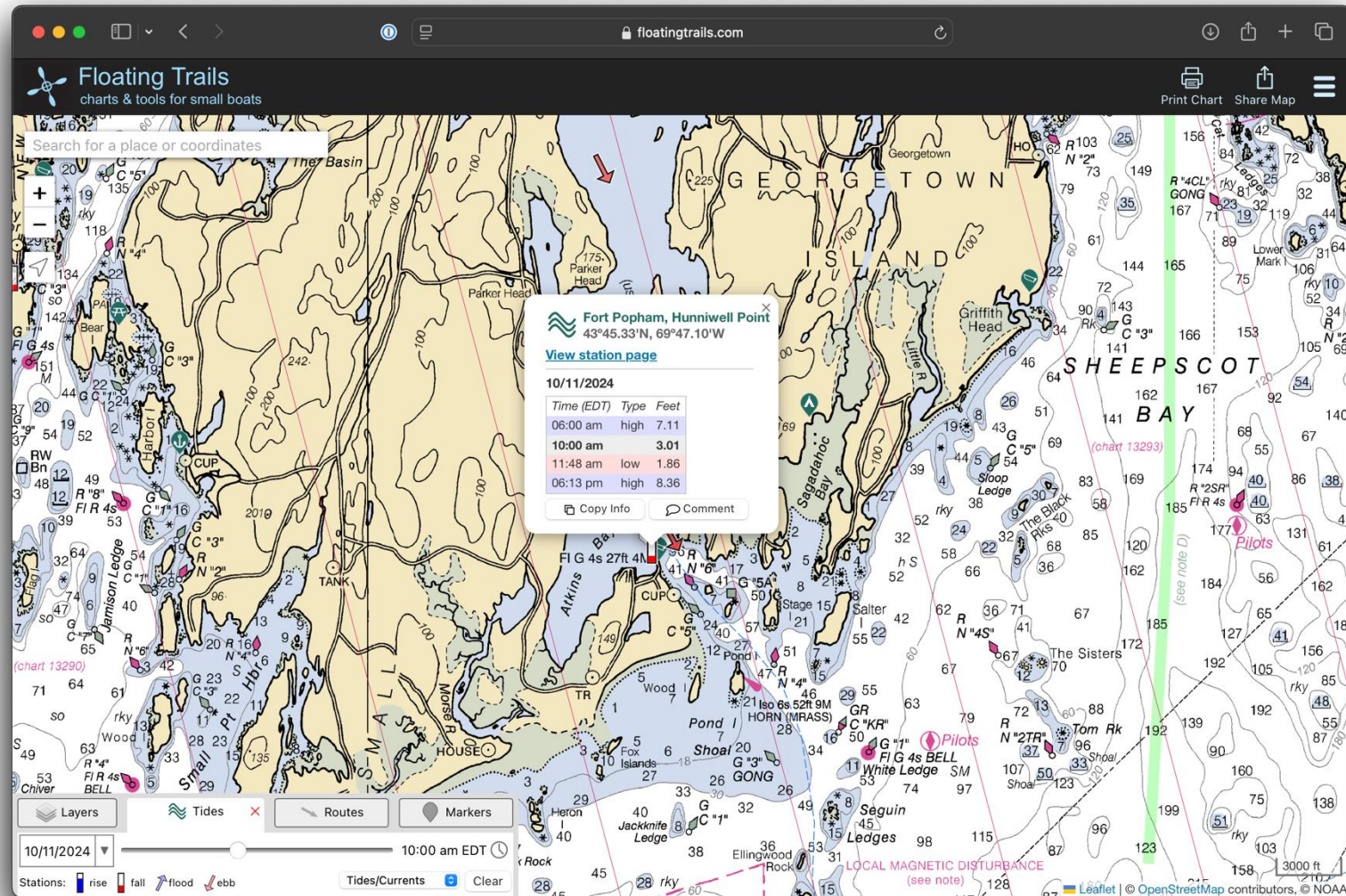
Dorn provided an example of what the wave heights would be if a 53 km/h (33 mph) wind blew for 24 hours over a fetch of 340 miles.

will be 22 ft. (7 m).

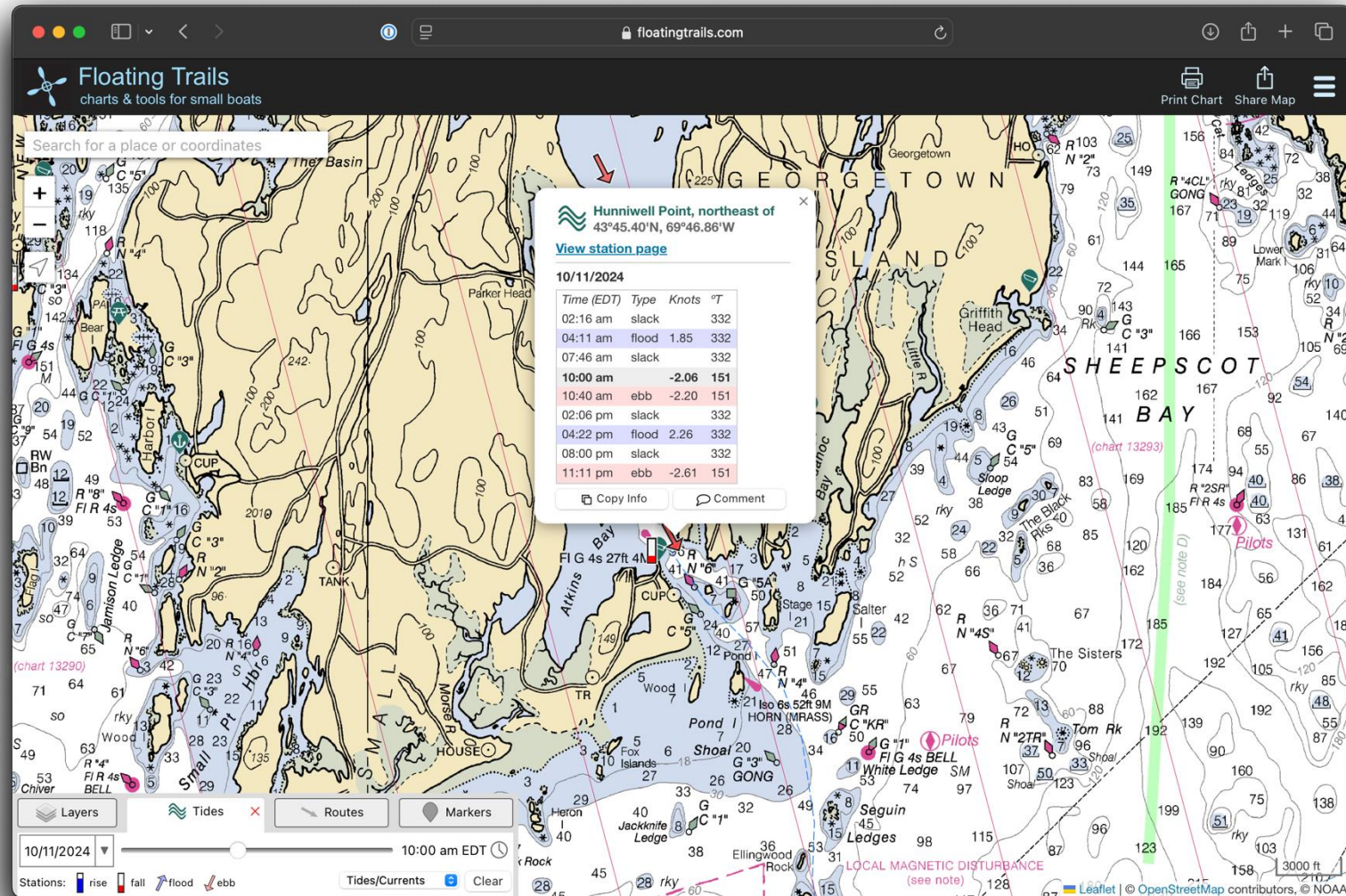
5 ft. (11 m) among every 200

0 ft. (12 m) among every 2,600

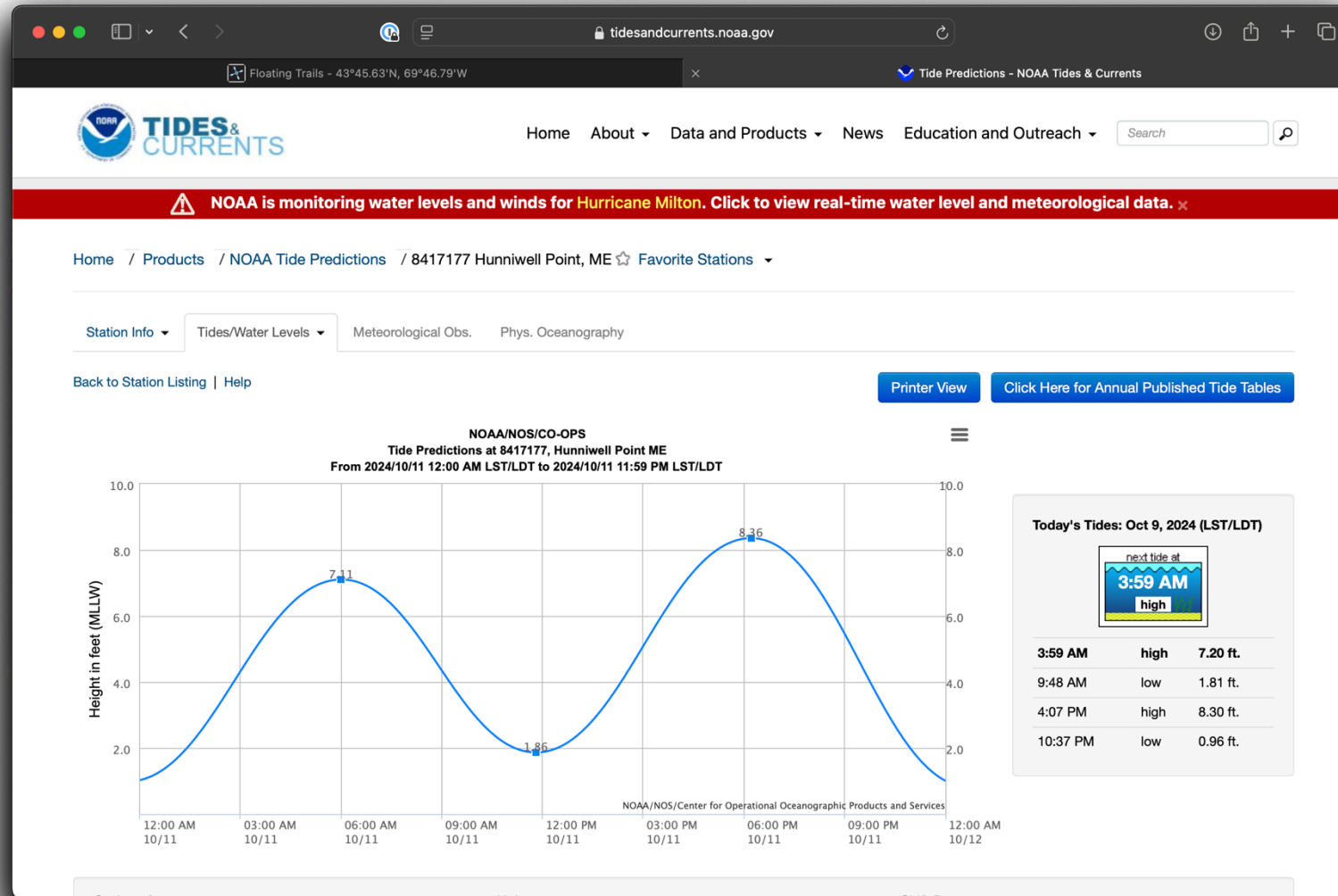
Tide and tidal current



Tide and tidal current



Tide and tidal current



Tide and tidal current



Notice: The U.S. government is closed. However, because the information this website provides is necessary to protect life and property, this site will be updated and maintained during the federal government shutdown.

For the latest forecasts and critical weather information, visit [weather.gov](https://www.weather.gov).

To learn more, visit [commerce.gov/news/blog](https://www.commerce.gov/news/blog)

Home / Products / Water Levels / 8418150 Portland, ME ☆ Favorite Stations ▾

Station Info ▾

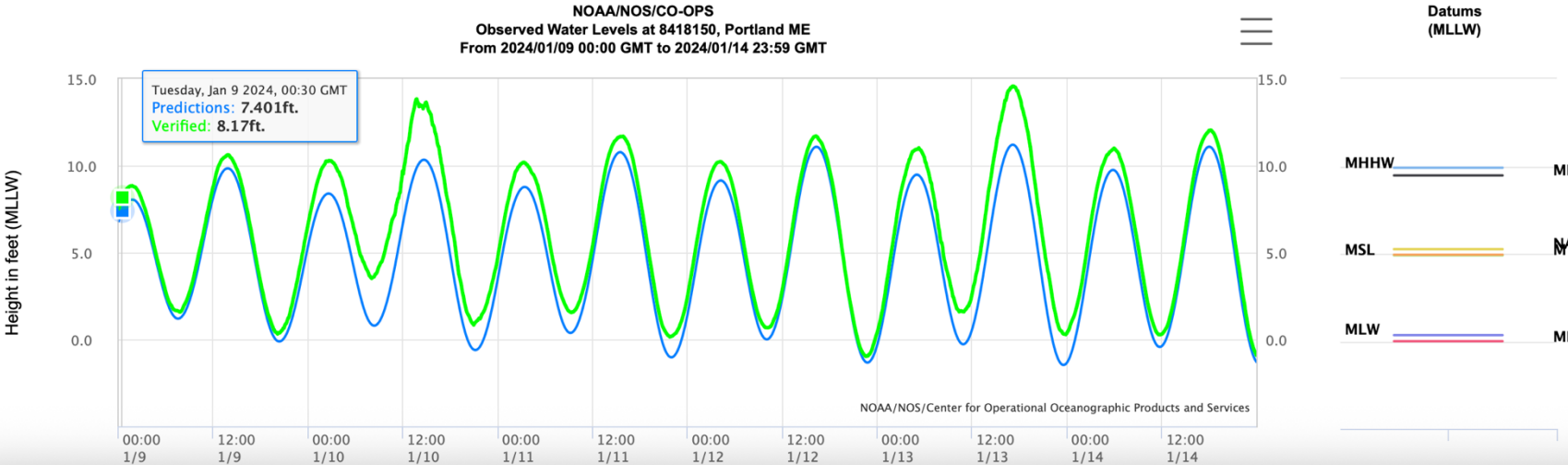
Tides/Water Levels ▾

Sea Level/Coastal Flooding ▾

Meteorological Obs.

Phys. Oceanography

OFS



Agenda

- Motivation
- Why listen to me?
- Weather impact on kayaking
- Forecasts
- Apps
- Models
- Surf & Current Models
- Observations
- **Final notes**

A final note on tides and AI



Google

freeport high tide time

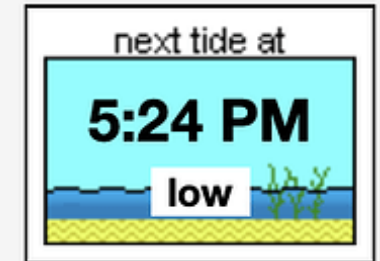
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Today's tide charts show that the first low Tide will be at 03:49 am with a water level of 0.56 ft. It is then followed by a high tide at 10:05 am with a maximum water level of 8.63 ft.

 Fishingreminder
<https://www.fishingreminder.com> > charts > South_Freep...
Tide Times for South Freeport, Maine - Fishingreminder

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Today's Tides: Oct 1, 2024 (LST/LDT)



5:09 AM	low	0.50 ft.
11:21 AM	high	9.15 ft.
5:24 PM	low	0.64 ft.
11:37 PM	high	9.36 ft.

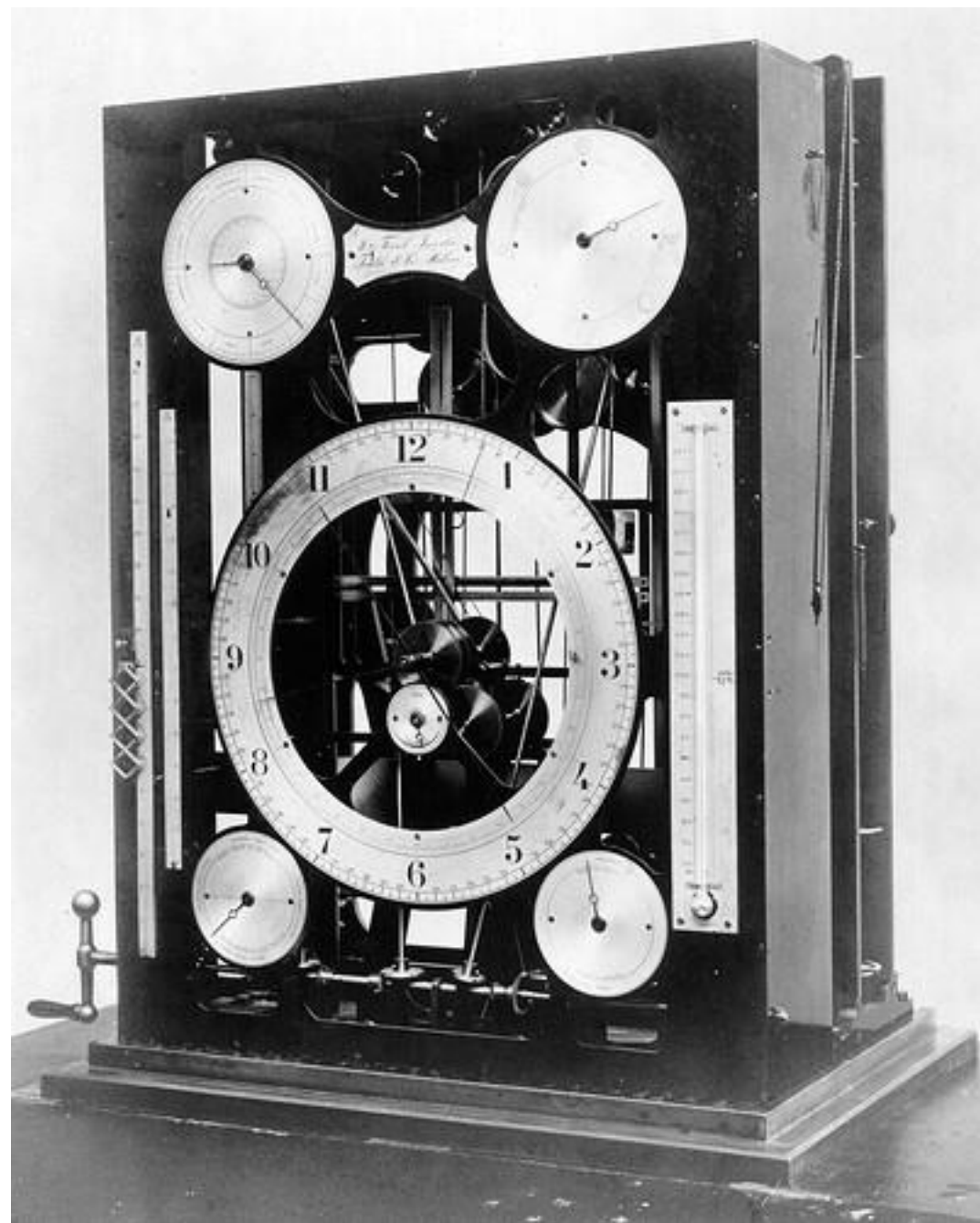




Photo credit: Ellen Gluckman

Weather Forecasting Tools for Sea Kayakers

Eric Sofen