



Marine Weather

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Photo: Boat departing Saint Andrews Bay Inlet for the Gulf of Mexico (marinas.com)



Outline

- Marine Economy & Science
- Observations & Forecasts
- Weather Patterns
- Warnings & Reports
- Safety & Preparedness



NWS Mission



Meteorological support to enhance:

- The protection of life and property
- The efficiency of governmental, recreational, and commercial maritime operations.



Importance



The Ten Sectors of the Marine Economy



Fisheries and
Other Bio-Products



Research and
Education



Professional and
Business Services



Dredging, Restoration,
and Other Construction



National Defense
and Public
Administration



Offshore Oil and Gas



Transportation



Shipbuilding



Tourism and Recreation

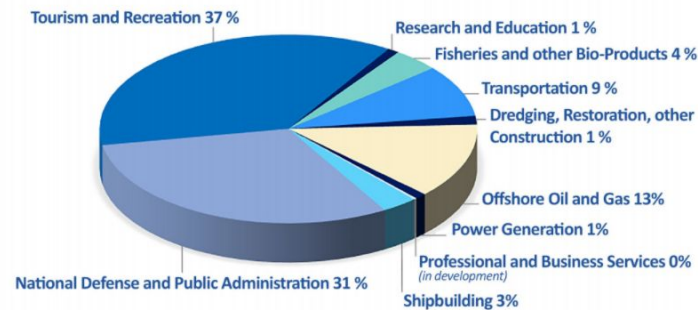


Power Generation



Department of Commerce | National Oceanic and Atmospheric Administration

Ocean Economy Output by Activity



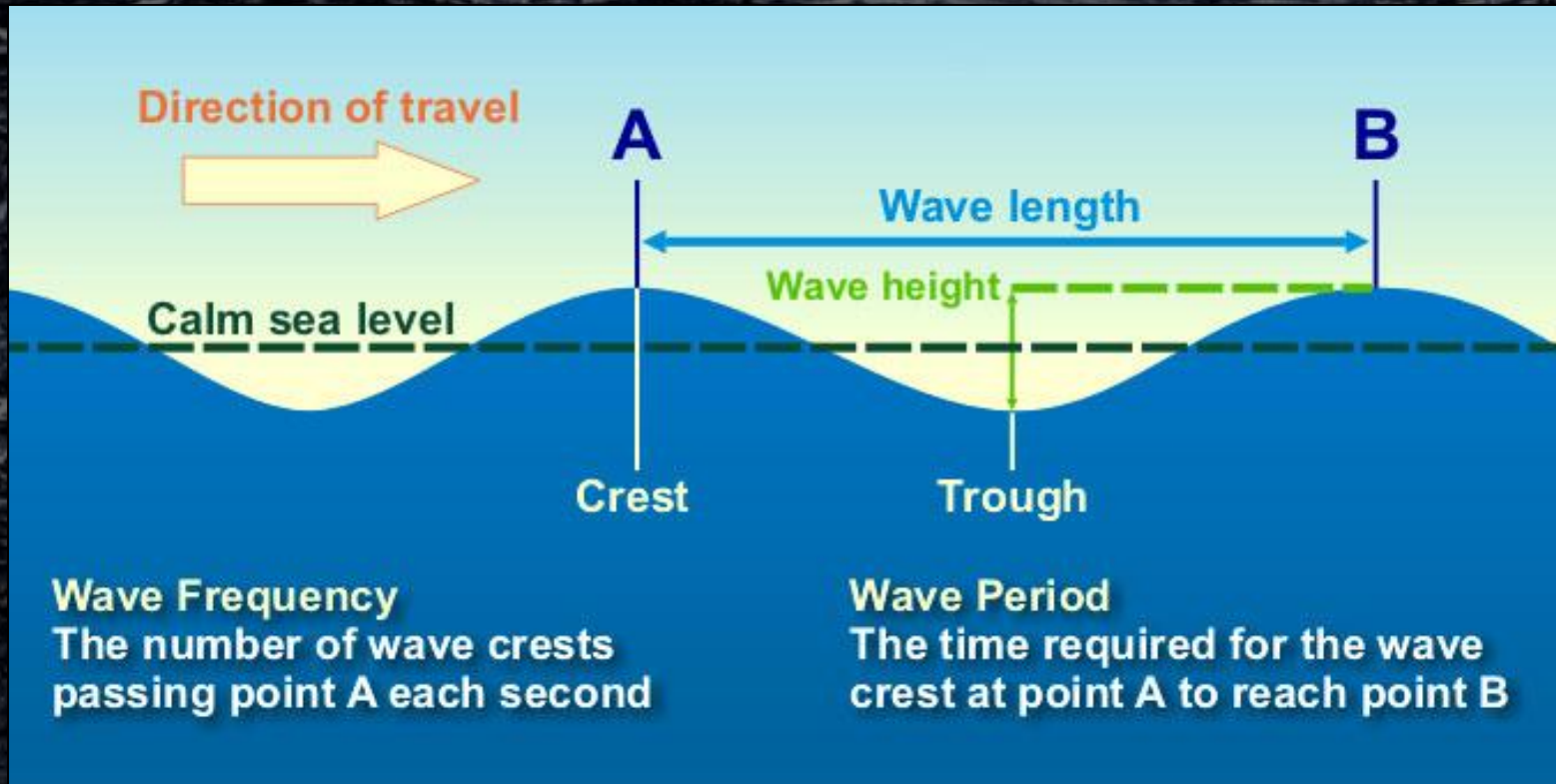
Ocean Economy Statistics, BEA/NOAA, 2018



Department of Commerce | National Oceanic and Atmospheric Administration



Anatomy of a Wave



**THREE THINGS
CONTRIBUTE TO
WAVE GROWTH**

1. Wind speed
2. Wind duration
3. Wind “fetch”



Some Definitions

Wind Waves

- Short period (4-8 seconds) waves generated from the action of the wind on the local water surface.

Swell

- Wind generated waves that have traveled out of their source region. Swells are characterized as having smoother, more uniform crests, and longer periods (8+ seconds) than wind waves.

Seas

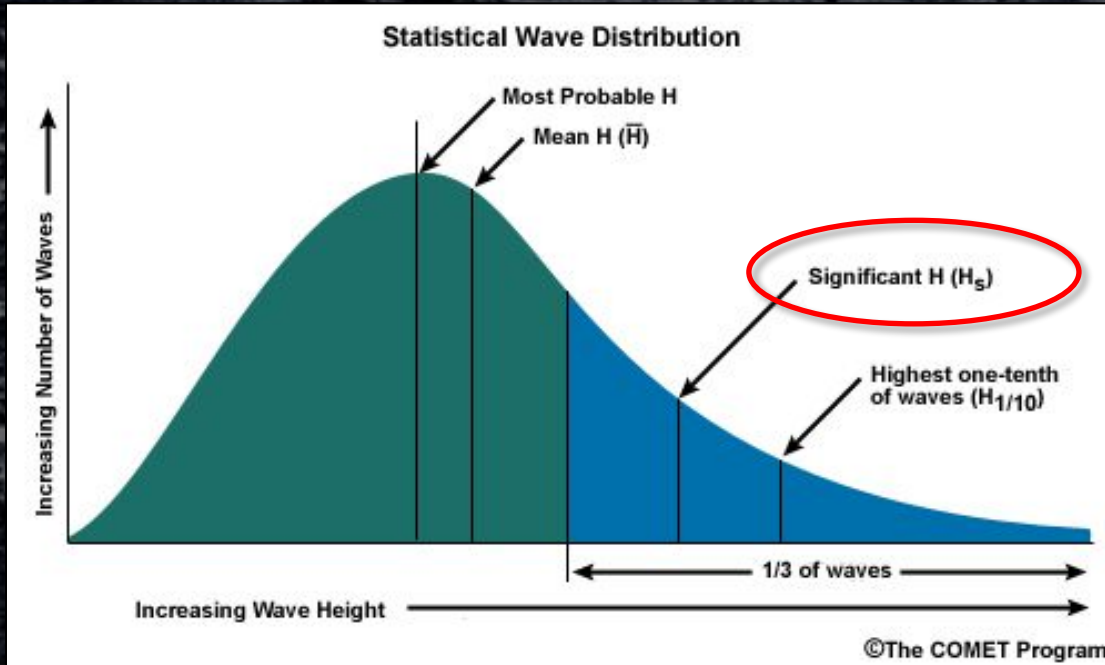
- The combination of wind waves and swell.

Fetch

- An area of uniform wind speed and direction over a water body. Also, the distance over water that a fetch of wind travels.



Wave Spectrum



Mariners should prepare for a range of wave heights, rather than focusing on the one value in the forecast.

Description	Percentage of H_s	If $H_s = 5$ feet
Mean wave height	64%	3.2 feet
Significant wave height	---	5 feet
Highest 10% of waves	127%	6.4 feet
Highest 1% of waves	167%	8.4 feet
Theoretical maximum	~190%	9.5 feet



Marine Observations & Forecasts

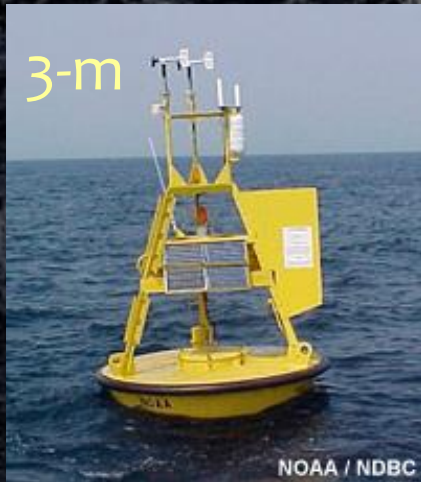
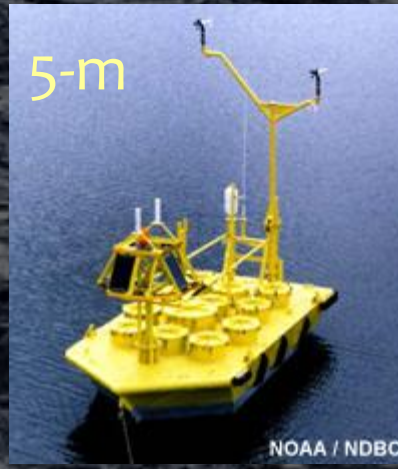
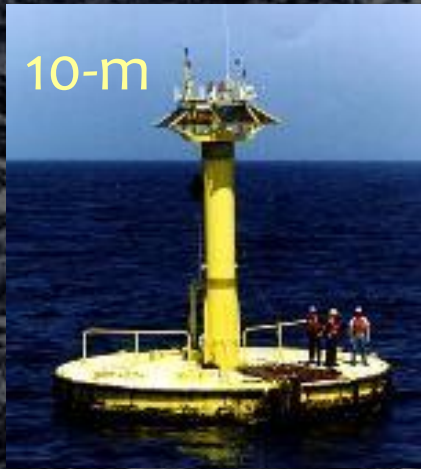


Marine Observing Platforms



Buoys

C-MAN

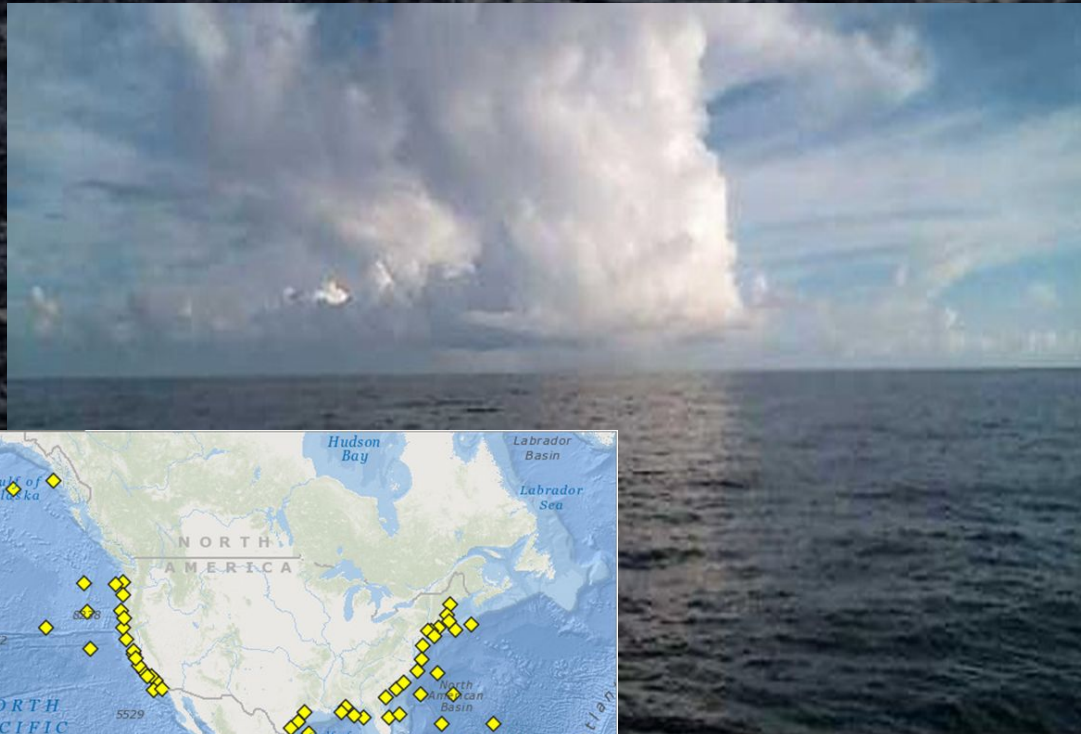


Deep-ocean Assessment
& Reporting of Tsunamis

3m, 6m, 10m? What does that mean? Refers to the diameter of round buoys or length of NOMAD (ship) buoys.



Buoy Cameras

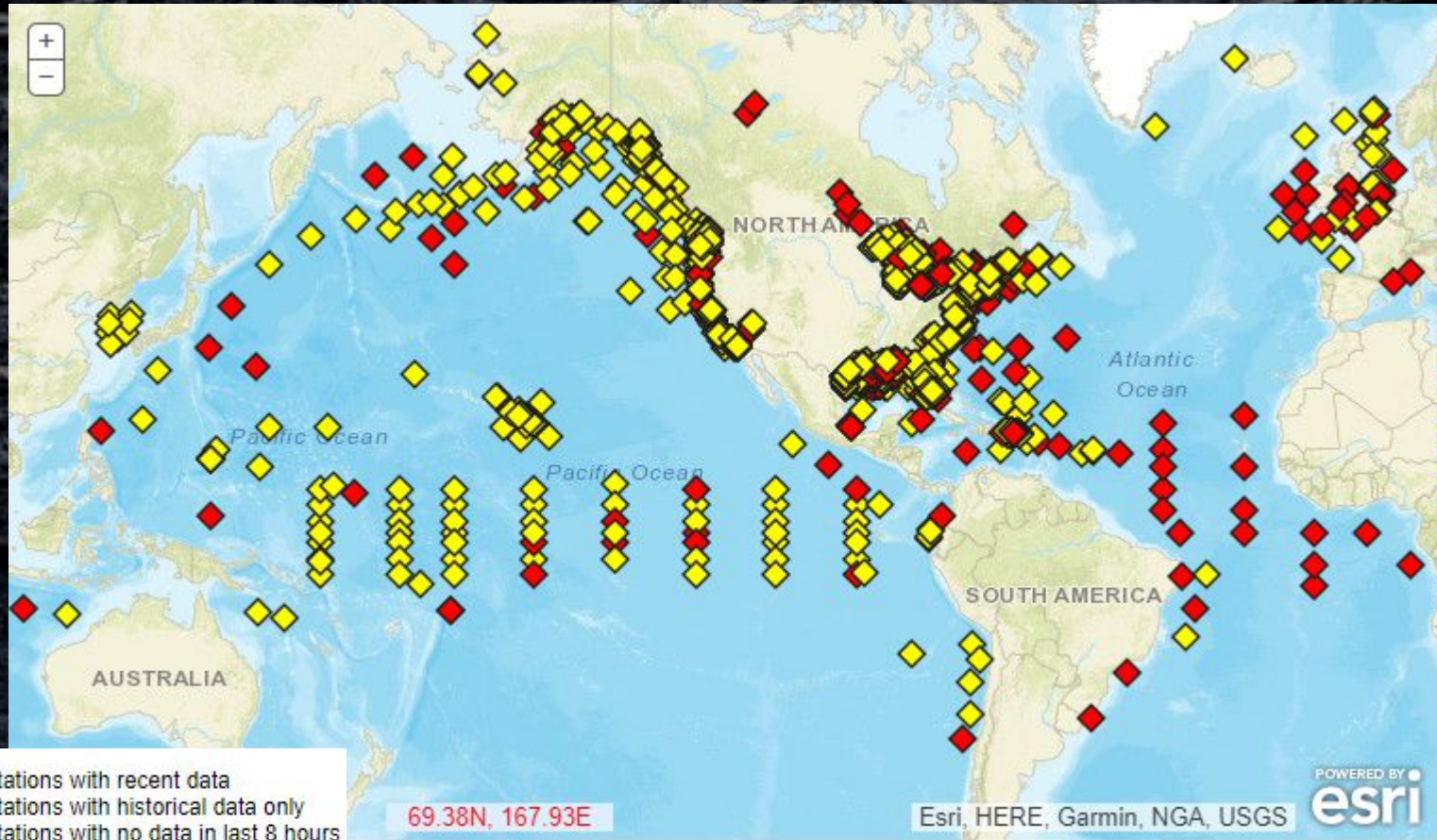


The cameras are photosensitive and not available at night

<https://www.ndbc.noaa.gov/buoycams.shtml>



Marine Observations



<https://www.ndbc.noaa.gov/>

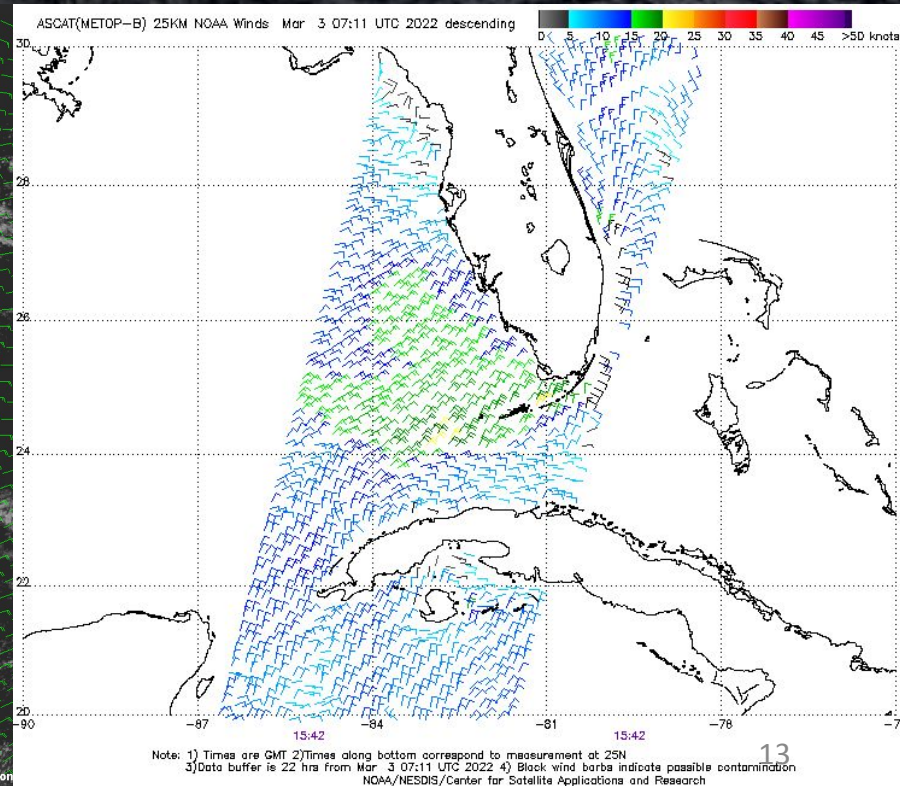
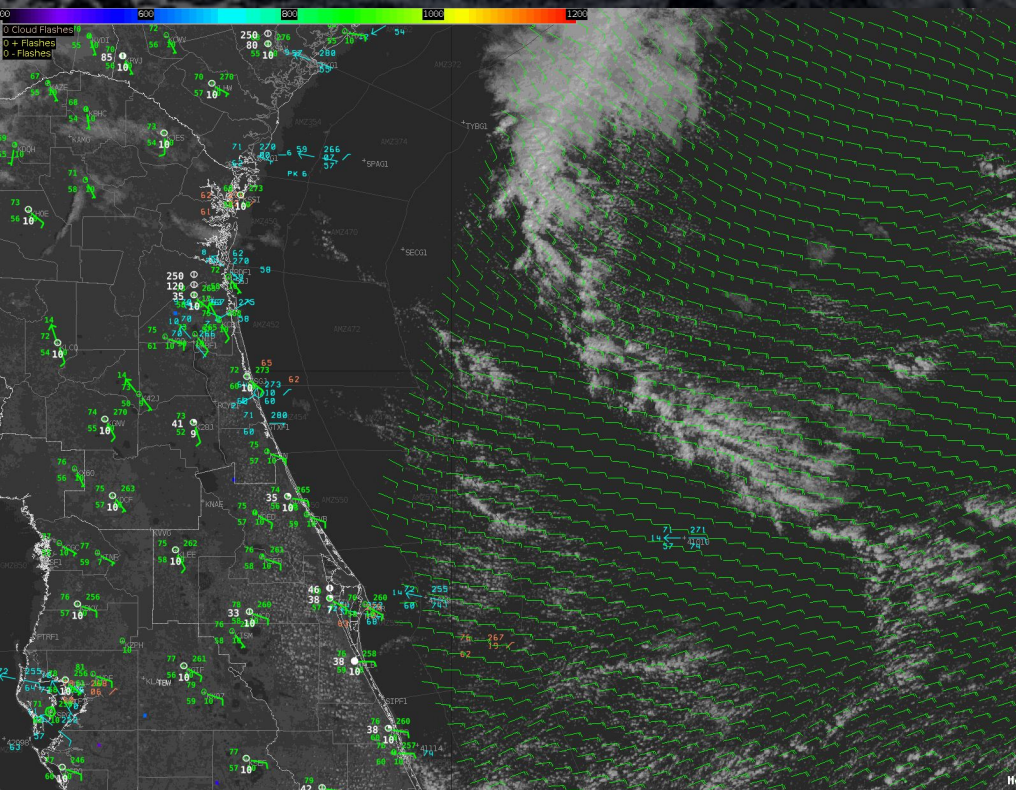
Dial-a-Buoy: 888-701-8992 and then punch in the ID [example: 42039]



ASCAT

<https://manati.star.nesdis.noaa.gov/>

- Satellite-derived winds
- Supplements buoy data



Note: 1) Times are GMT 2) Times along bottom correspond to measurement at 25N
3) Data buffer is 22 hrs from Mar 3 07:11 UTC 2022 4) Black wind barbs indicate possible contamination
NOAA/NESDIS/Center for Satellite Applications and Research



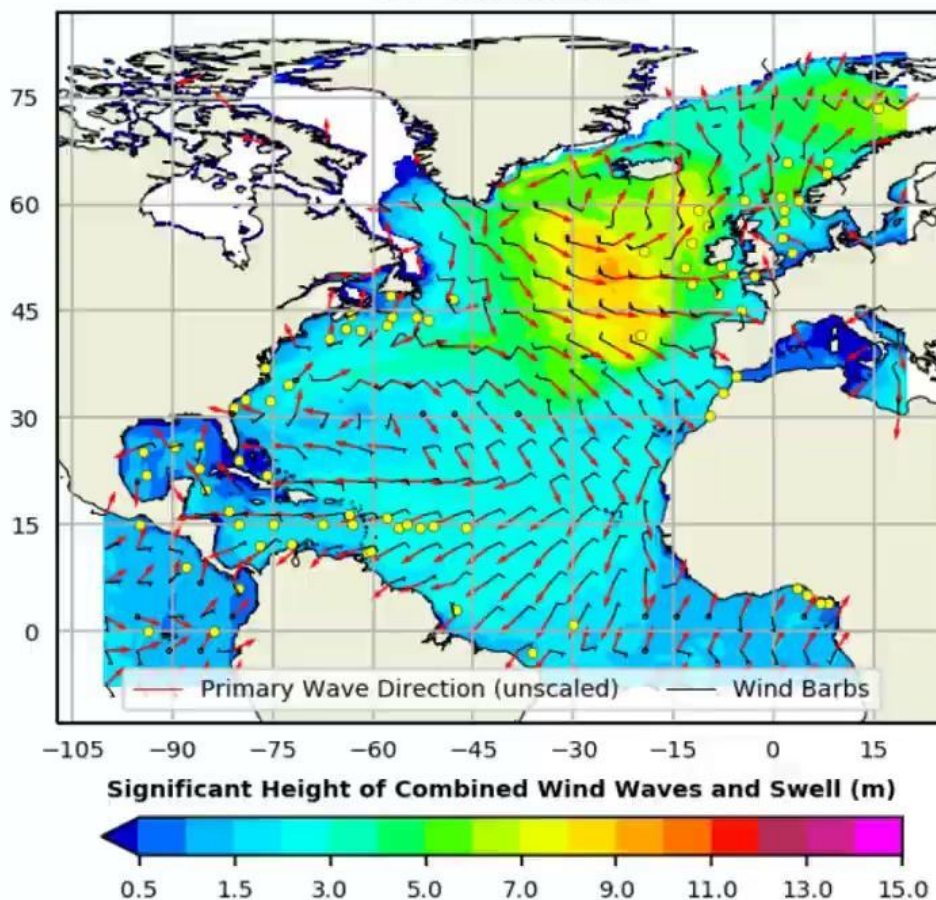
Global Wave Models



NWS primarily uses:

NOAA WAVEWATCH III[®]

GFS-Wave North Atlantic 20220311 t00z 000h fcst
valid 20220311 00Z



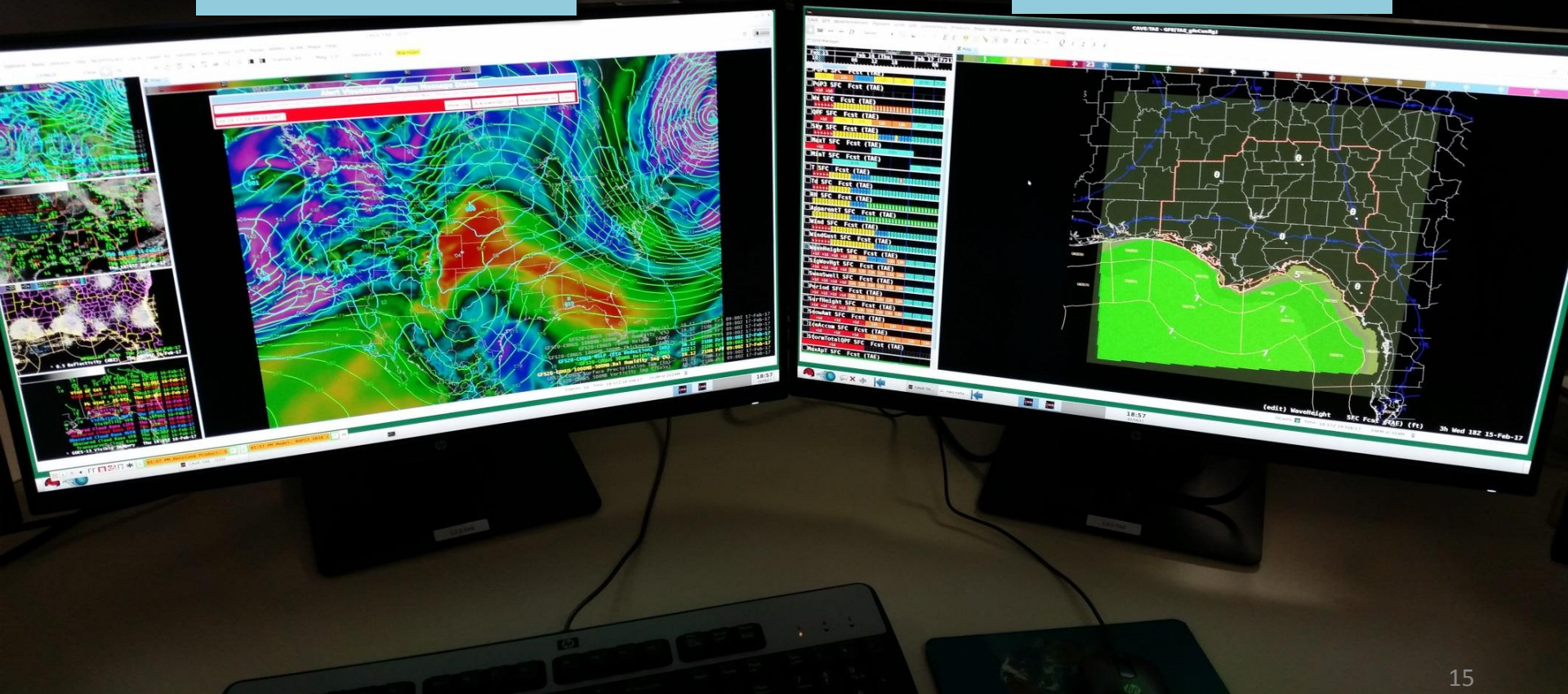


AWIPS Workstation



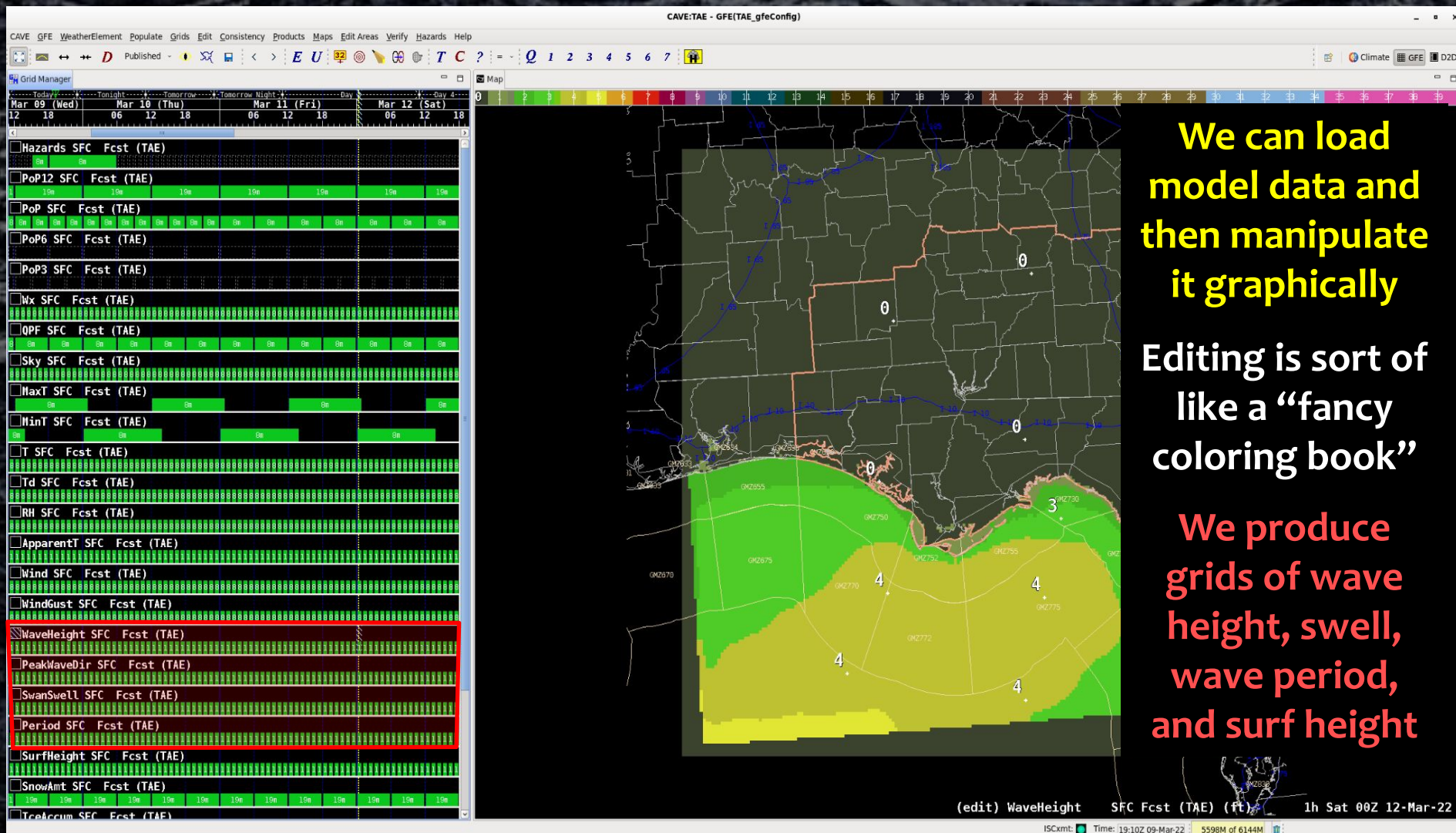
Computer model
forecast data

Graphical Forecast
Editor





Graphical Forecast Editor



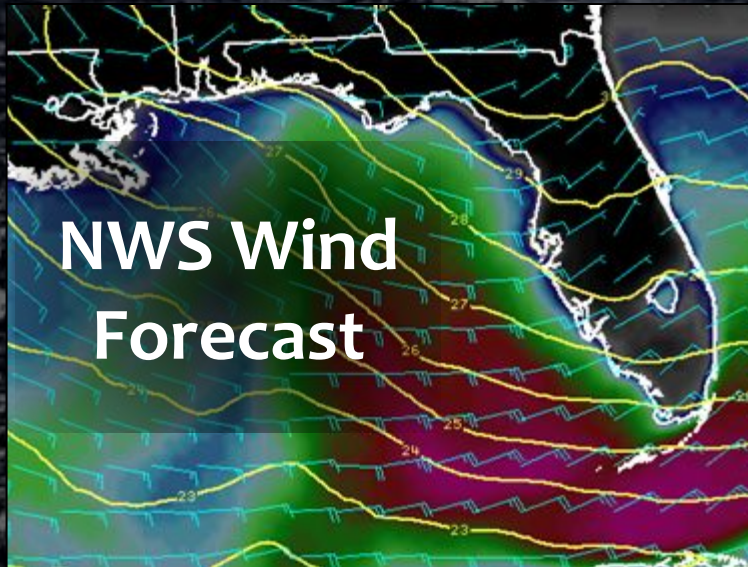
We can load model data and then manipulate it graphically

Editing is sort of like a “fancy coloring book”

We produce grids of wave height, swell, wave period, and surf height



Nearshore Wave Prediction System



Generates waves by wind stress, propagation, shoaling, refraction, bottom friction, and breaking.

Produces forecasts of...

- significant wave height
- primary swell height and direction
- primary period

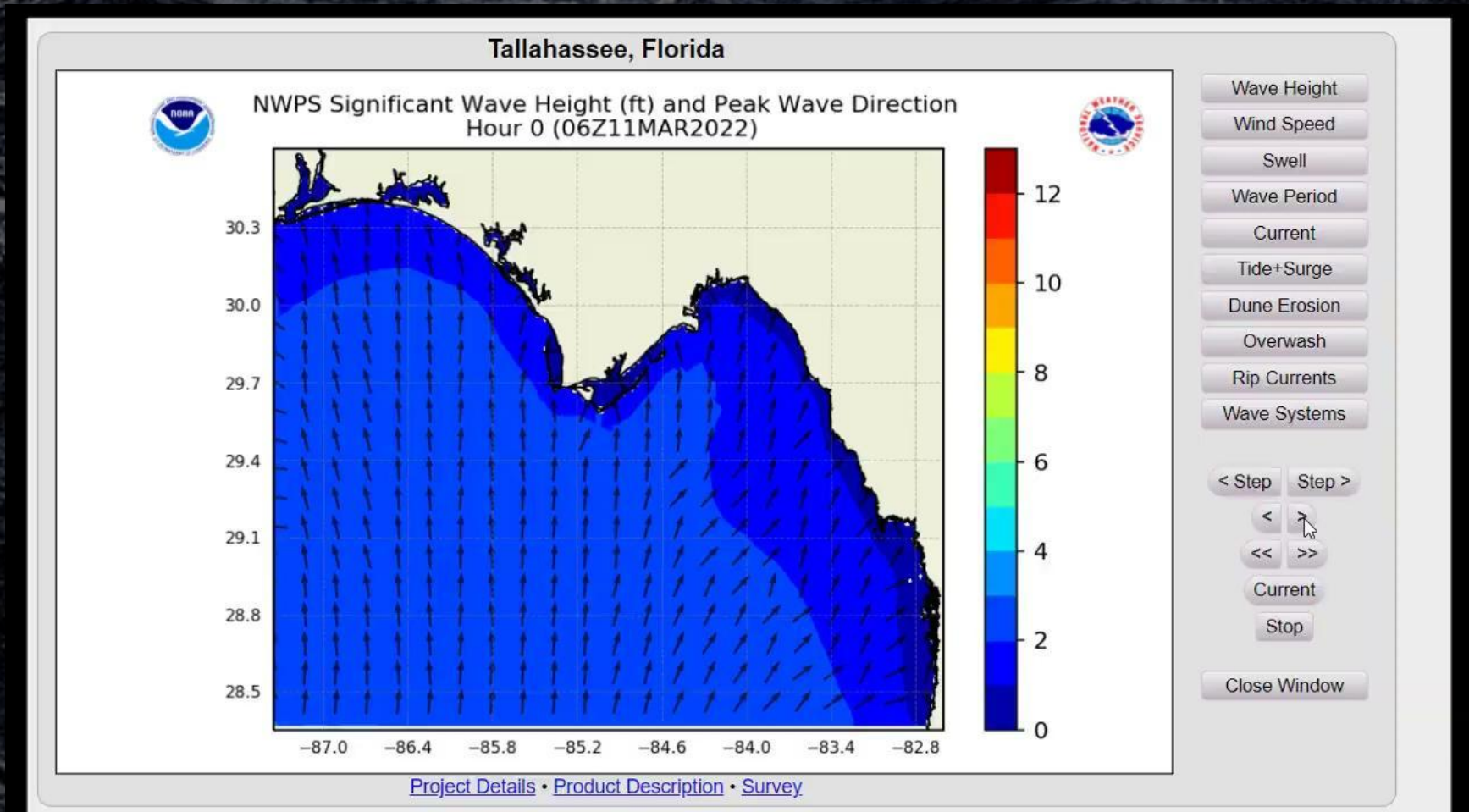
Surf heights are then calculated and used to assess rip current risk



Nearshore Wave Prediction System

<https://polar.ncep.noaa.gov/nwps/viewer.shtml>

Zoom in and select a domain for model field animations





Rip Currents

<https://www.weather.gov/tae/ripcurrentawareness>



Rip Currents: Forecasting

What Do Forecasters Look at to Predict the Rip Current Risk? SCIENCE!

Wind Direction, Speed, and Persistence



Strong onshore wind favors the generation of wave sets that move toward the beach, which results in strong and numerous rip currents

Swell Height, Period, and Direction of Propagation



Swell sets with higher wave heights and a longer period result in a greater potential for strong rip currents

Tide Cycle



A large range between high tide and low tide favors a greater potential for rip current development (*especially during outgoing tide*)



Risk Level

Low

Moderate

High



National Weather Service



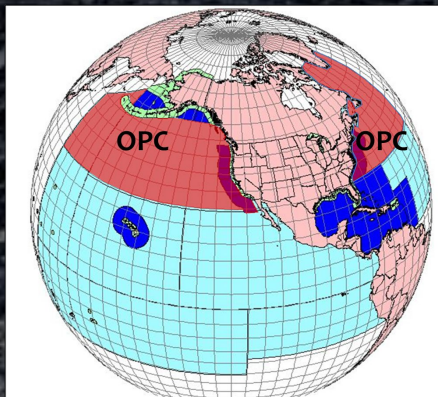
[weather.gov/beach](https://www.weather.gov/beach)



NWS Marine Forecast Areas

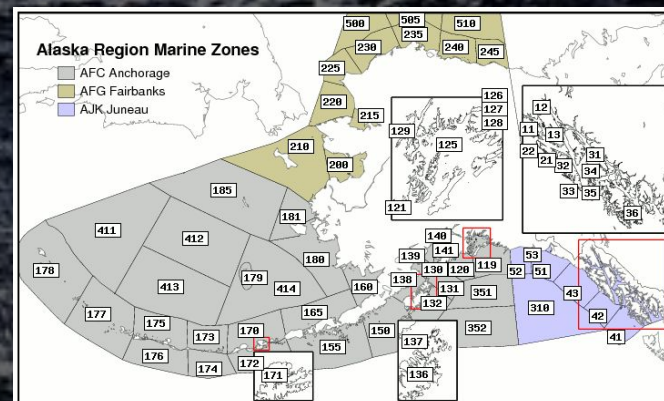


Ocean Prediction Center



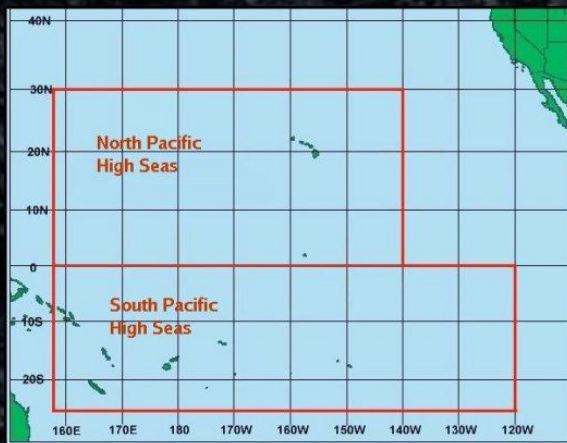
<https://ocean.weather.gov/>

Alaska Region



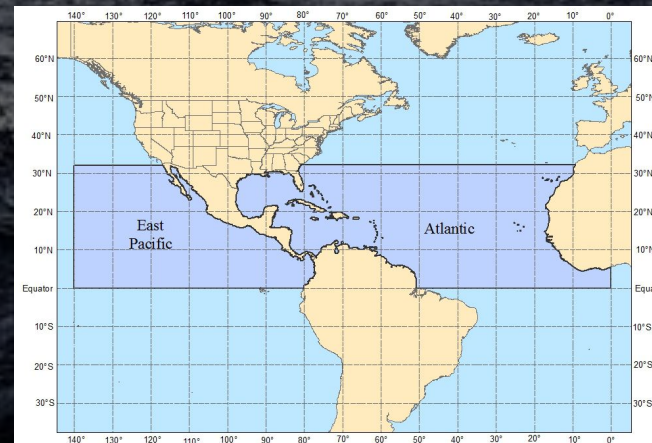
<https://www.weather.gov/afc/marine>

Hawaiian Marine Products



<https://www.weather.gov/hfo/marine>

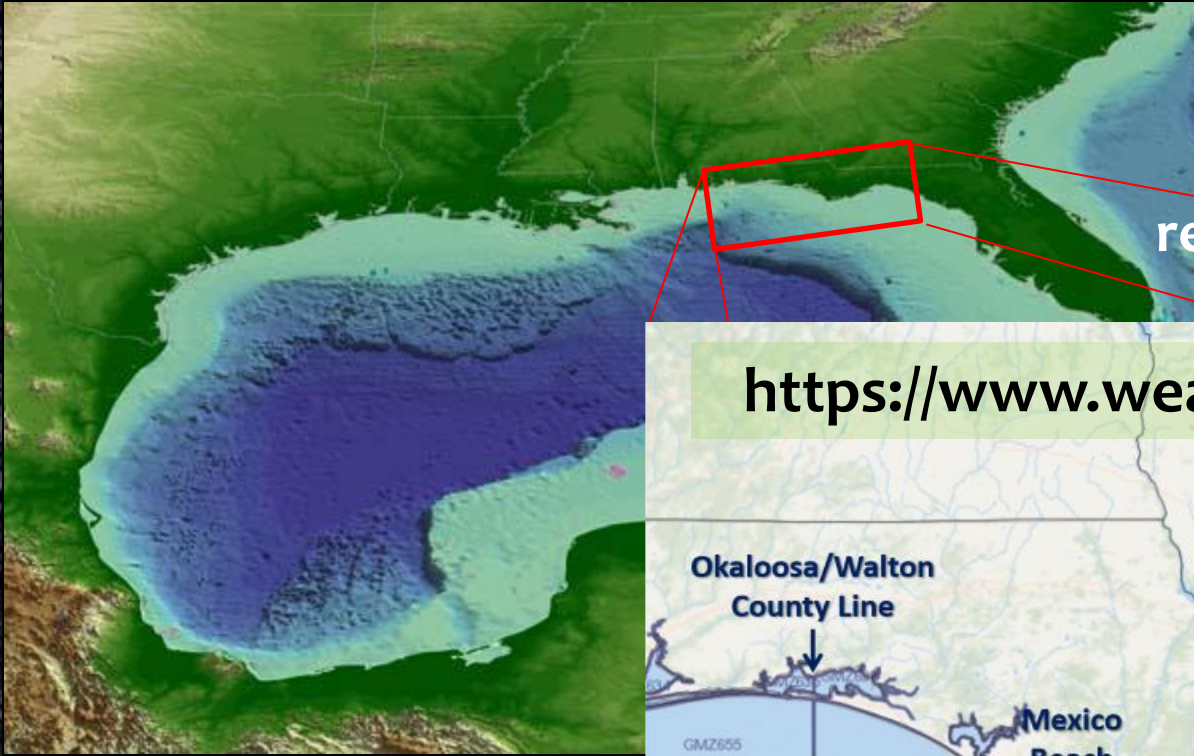
Tropical Analysis & Forecast Branch



<https://www.nhc.noaa.gov/marine/>

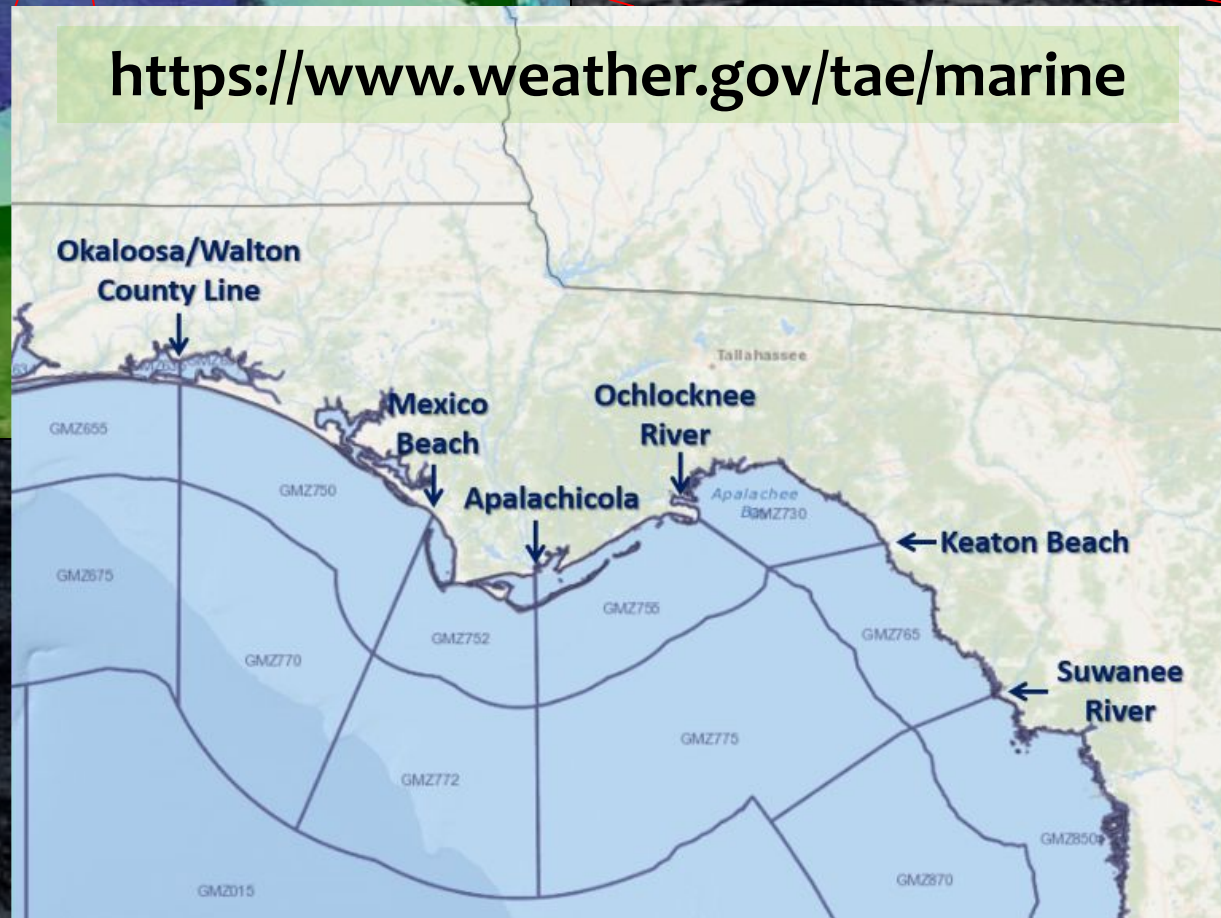


NWS Tallahassee Area



One of 46 NWS offices with local marine responsibility (out of 122)

<https://www.weather.gov/tae/marine>



37% of NWS offices have marine responsibility.



From the national website...

<https://www.weather.gov/tae/marine>

Welcome to the new Marine Website for NWS Tallahassee! The legacy marine website can be found by clicking [here](#).

Send us your marine storm reports via our [online form](#). Help us keep everyone safe by being our eyes and ears on the water!

Current
Conditions

Zone
Forecasts

Point
Forecasts

Beach
Forecasts

NWPS
Output

Tides / SST's

Marine
Program

Click the map below for a detailed, zone based Coastal Waters Forecast





Coastal Waters Forecast



A text product issued by all coastal NWS offices to explicitly state expected weather conditions within their marine forecast area of responsibility through Day 5. Primarily used for planning purposes to support and promote safe transportation across the waters.

- Contains a synopsis with a brief description of surface weather features which cause significant winds and seas.
- Any headlines in effect, e.g., Small Craft Advisory
- Wind speed and direction.
- Wave height and swell period.



Coastal Waters Forecast



NWS Tallahassee Example:

.SYNOPSIS...

Strong northerly winds will become moderate and northeasterly on Saturday. A Small Craft Advisory is in effect until Saturday morning. Moderate winds will be easterly on Sunday. Mainly dry weather is expected this weekend and next week with the exception of a few showers possible on Monday.

...SMALL CRAFT ADVISORY IN EFFECT UNTIL 7 AM EST /6 AM CST/
SATURDAY...

.REST OF TONIGHT...North winds 20 knots. Seas 3 to 5 feet with occasional seas up to 6 feet. Dominant period 6 seconds. Protected waters choppy.

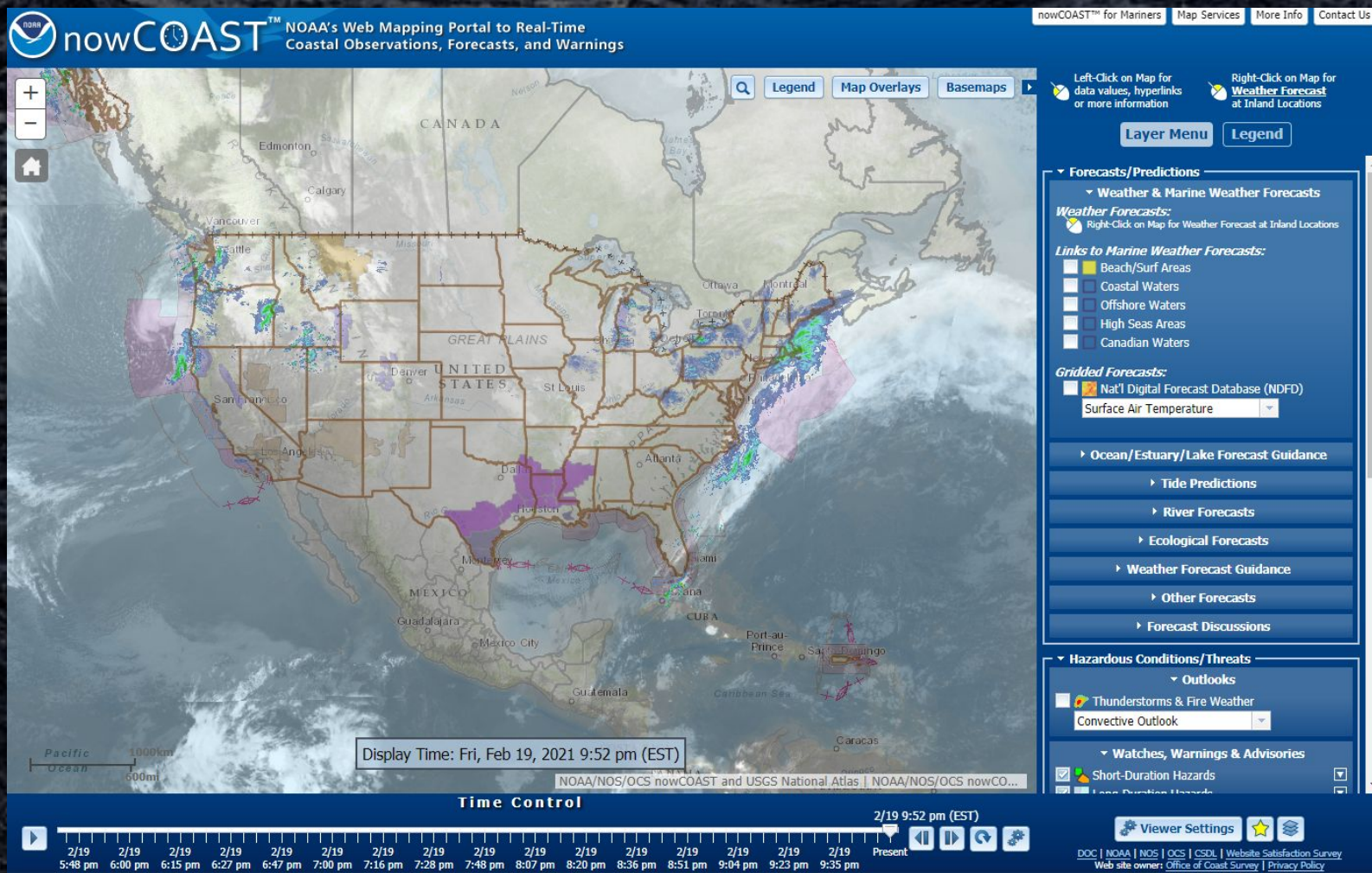
.SATURDAY...Northeast winds 15 knots. Seas 3 to 5 feet with occasional seas up to 6 feet subsiding to 2 to 3 feet. Dominant period 5 seconds in the afternoon. Protected waters a moderate chop.



NOAA nowCOAST

<https://nowcoast.noaa.gov/>

Display observational data and forecasts





Hazardous Weather: Winds/Seas

Small Craft Advisory

- Conditions hazardous to small craft. Criteria varies by NWS region, and even by NWS office. Other considerations: experience of the vessel operator; type, overall size, and sea worthiness of the vessel.

Higher End Wind Threat

- Gale Warning: winds of 34 to 47 knots expected.
- Storm Warning: winds of 48 to 63 knots expected.

Tropical Cyclone Watches and Warnings



Other Hazardous Weather



Special Marine Warning

- Thunderstorms with wind gusts of at least 34 knots, hail of at least $\frac{3}{4}$ inch in diameter, or waterspouts.

Dense Fog Advisory

- Visibility in fog one nautical mile or less.

Freezing Spray Advisory/Warning

- Hazardous ice accumulations due to a combination of air and sea temperatures, wind speeds, and wave heights.

June 1, 2019 Waterspout



A little treat for our [#firstdayofhurricaneseason](#) coverage off Mexico Beach, FL this morning. Large waterspout just offshore.



21

↕ 152

♡ 960





Weather Patterns That Favor Hazardous Marine Conditions

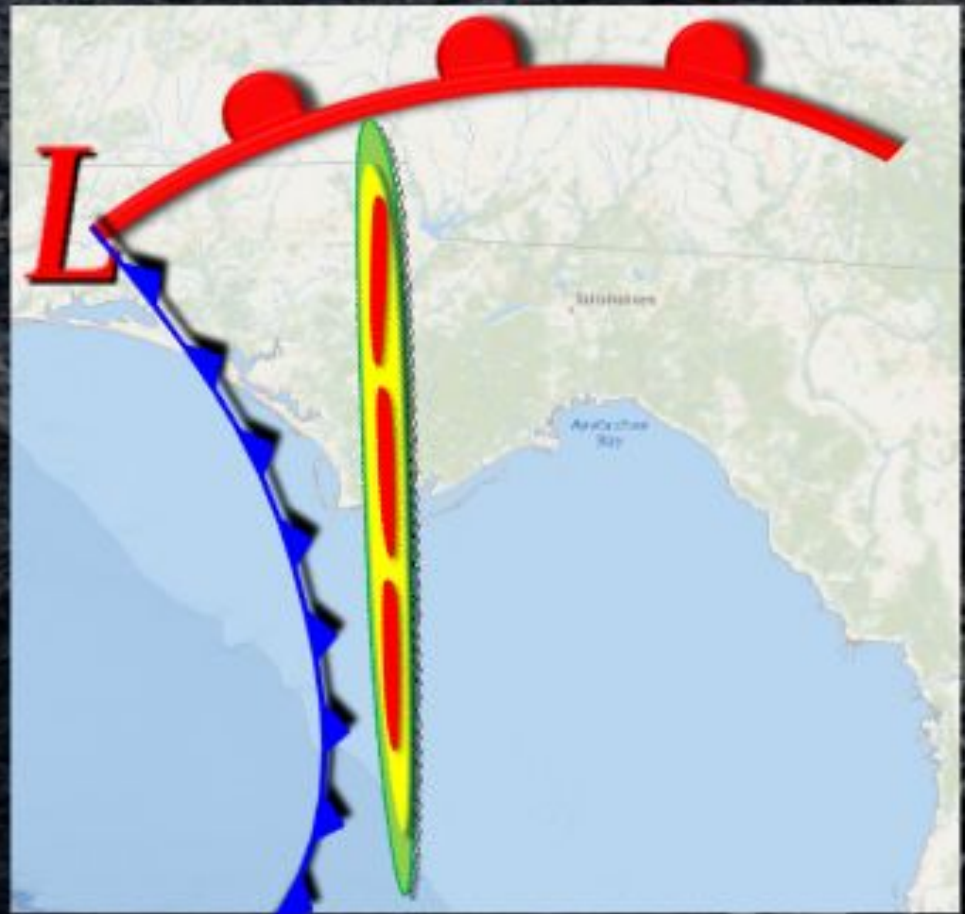
Frontal Passage

South/East flow ahead of the front becomes North/West behind the front.



Frontal Passage

Squall line ahead of the cold front.



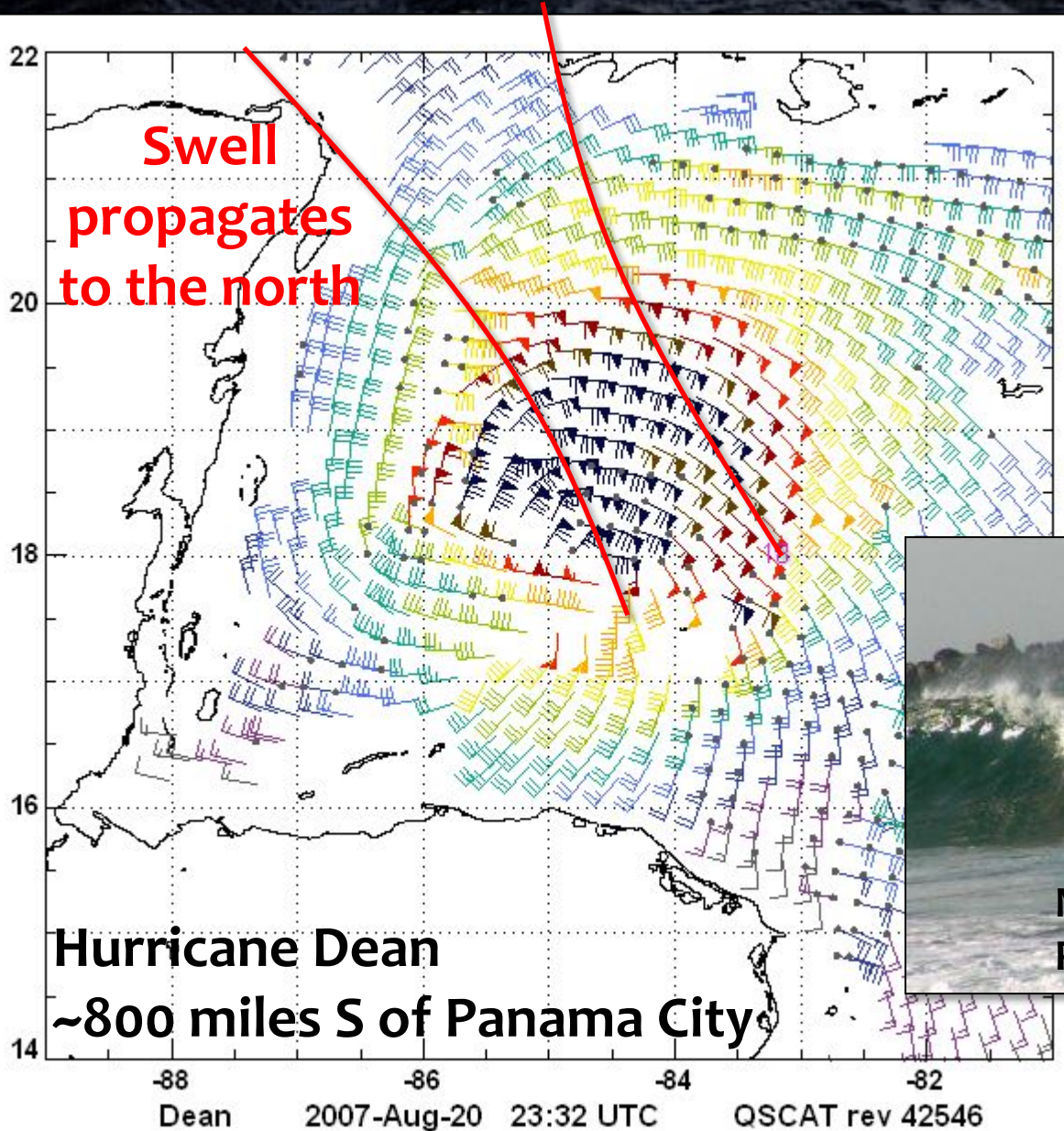
Dense Fog Advisory

Low visibility is at least as great a hazard as elevated winds & seas. Typically issued for visibility 1 NM or less.





Tropical Cyclones



Swells from tropical cyclones can travel far from the source leading to hazardous seas with otherwise fair weather.



Near Panama City, 8/22/2007
Photo: mrsurfs.com



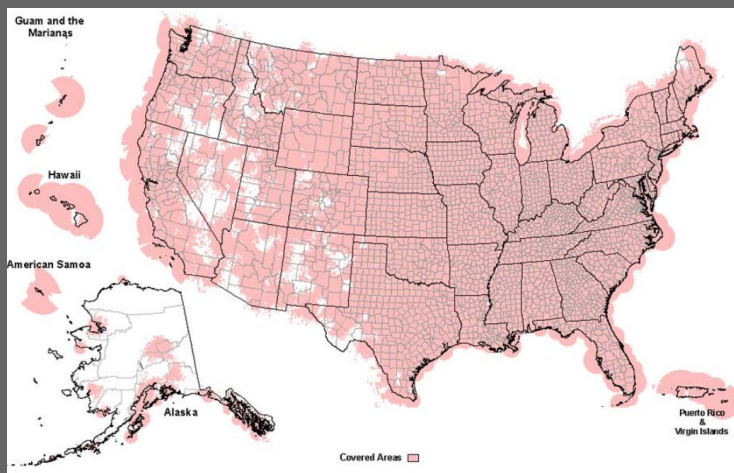
Marine Warnings & Reports



How to get warnings

<https://www.weather.gov/nwr>

To receive marine weather statements and special marine warnings, turn VHF to WX channel



NOAA Weather Radio Frequencies

162.400 MHz (WX2)

162.425 MHz (WX4)

162.450 MHz (WX5)

162.475 MHz (WX3)

162.500 MHz (WX6)

162.525 MHz (WX7)

162.550 MHz (WX1)

Wireless Emergency Alerts

- Most smartphones set up, make sure under settings
- Alarms: tornado, hurricane and storm surge warnings

2:23

Sunday, October 14

Emergency Alert

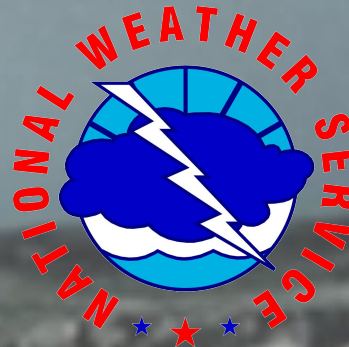
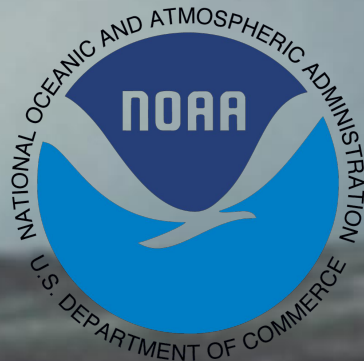


Tornado Warning in this area til
3:00 PM CDT. Take shelter now.
Check local media. -NWS

SKYWARN

<https://www.weather.gov/skywarn/>

- National Weather Service program ~ dating to 1970s
- Trained, dedicated, volunteer amateur weather enthusiasts
- **Safely identify and effectively report adverse weather**
- Help promote public safety and minimize property damage





How to send Storm Reports

<https://www.weather.gov/SocialMedia>

Social Media

[Weather.gov](https://www.weather.gov) > Social Media

NWS is using social media tools to educate the public and share critical information related to our mission. Engaging the public and our partners in effective conversation around important weather, water, and climate issues is part of our effort to build a Weather-Ready Nation.

Connect with us online! Use the interface below to discover social media accounts for office across the NWS and join the conversation. Questions related to NWS social media should be directed to: nws.social.media@noaa.gov.

Please note: Links below [will lead to third party social networking/social media services](#).



There are 122 NWS Weather Forecast Offices across the nation serving areas that typically consist of 20 to 50 counties ([more info](#)). Each office has its own social media accounts to keep you informed and up-to-date on the latest forecasts, watches and warnings for the local area.

Use the search box below to find the office that serves you and then follow them on social media to ensure that you're weather-ready.

Q Panama City, FL

Go!

Panama City, Florida is served by:

NWS Tallahassee, FL

Website: <https://www.weather.gov/tae>

E-mail: sr-tae.webmaster@noaa.gov

Phone Number: 850-942-8833 (person) or 850-942-8851 (recording)



@NWSTallahassee



fb.com/NWSTallahassee



NWSTallahassee

Send storm reports via Social Media



How to send Storm Reports



<http://mping.nssl.noaa.gov/>



- Free app created by the National Severe Storms Lab
- Available in the Apple App store and Google Play
- Reports from boaters like you helps us keep everyone safe by being our eyes and ears on the water!



Boating Safety & Preparedness



Boating Safety

Boating Accidents and Fatalities Statistics*

*Accidents happen too fast to reach and put on a stowed life jacket.
Always wear your life jacket.*

**The lowest number of boating fatalities on record was in 2013.*



8 out of 10 people who died were not wearing a life jacket.



8 out of 10 people who drowned were not wearing a life jacket.



5 out of 10 people who died from trauma were not wearing a life jacket.



Reported Boating Accidents

Most Common Vessels in Accidents*

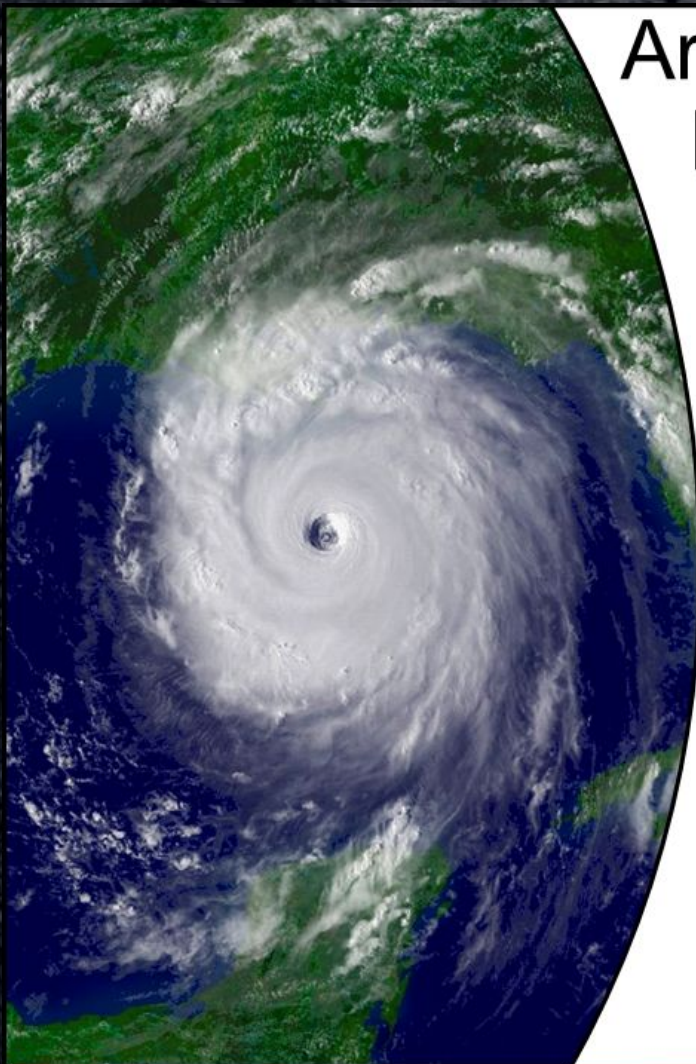
1. Open motorboats (46%)
2. Personal watercraft (19%)
3. Cabin motorboats (15%)
4. Other (20%)

Top 5 Factors in Boating Accidents and Deaths*

1. Operator inattention
2. Improper lookout
3. Operator inexperience
4. Machinery failure
5. Excessive speed



Hurricane Preparedness



Are you Prepared for Hurricane Season?



...know your evacuation zone



...have an insurance check-up



...build a disaster supply kit



...strengthen your home



...help your neighbor

learn more at
flash.org/hurricanesstrong



Weather-Ready Nation

National Oceanic and Atmospheric Administration

National Weather Service
weather.gov/hurricanesafety



Hurricane Preparedness

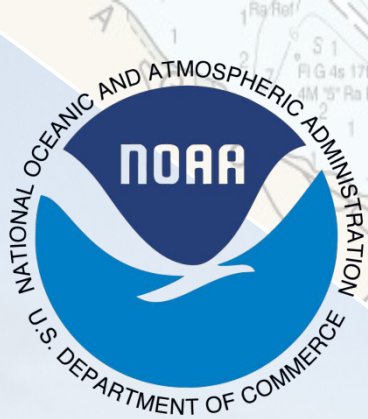


Don't wait to secure your boat

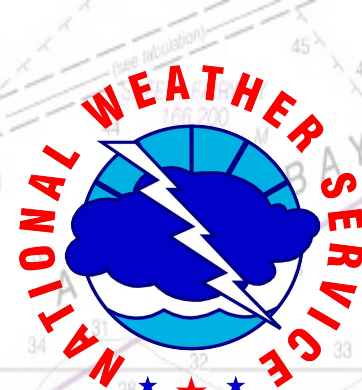
- ⌘ Storm surge can carry your boat onshore
- ⌘ Secure your boat before the storm hits
- ⌘ Add additional lines as soon as a Watch is issued

weather.gov/hurricanesafety





NOAA/NWS Weather & Navigation Virtual Seminar



Thank You!

Presenters

Lance Franck – NOAA/NWS Tallahassee

Tim Osborn – NOAA Office of Coast Survey

Questions? Contact lance.franck@noaa.gov or tim.osborn@noaa.gov