

# Center for Operational Oceanographic Products and Services (CO-OPS) Navigation & Resilience Accomplishments and Look Forward

Rich Edwing, Director  
September 1, 2021

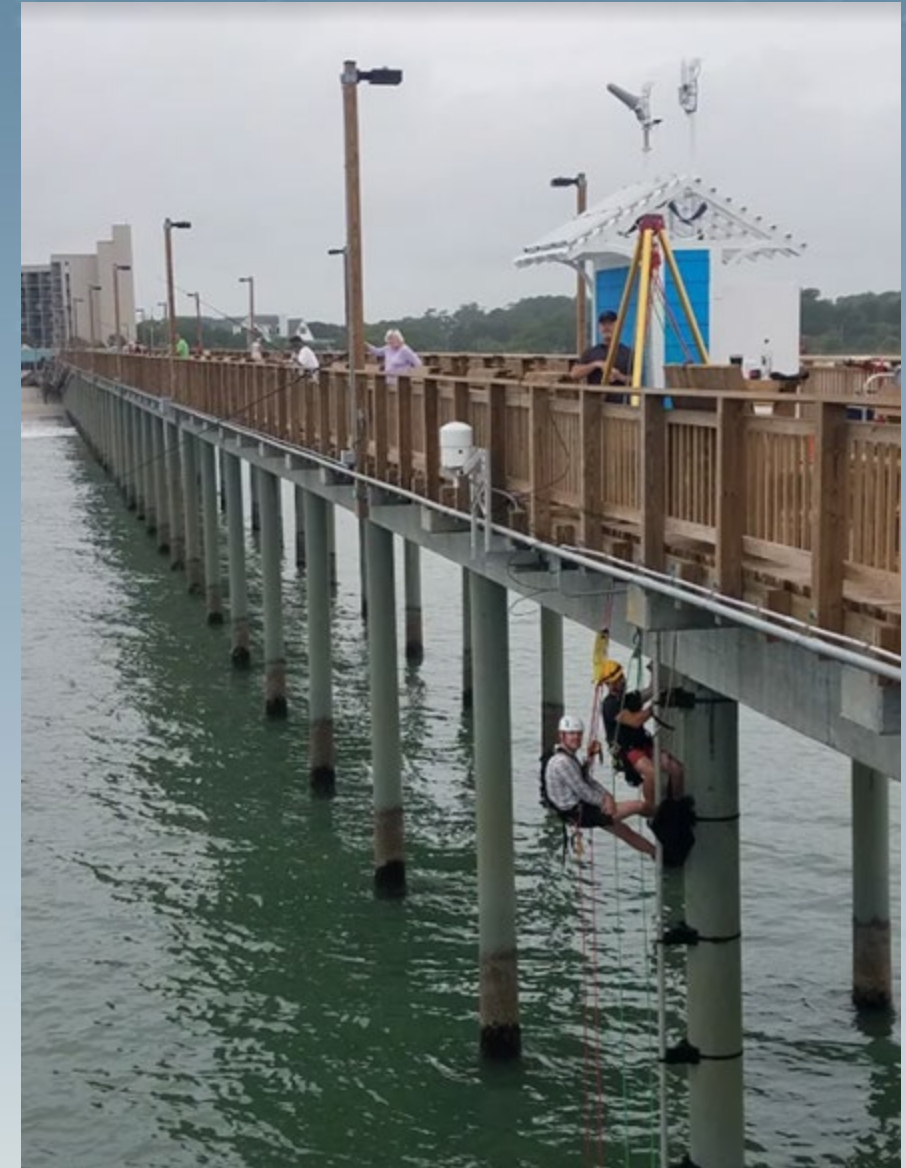
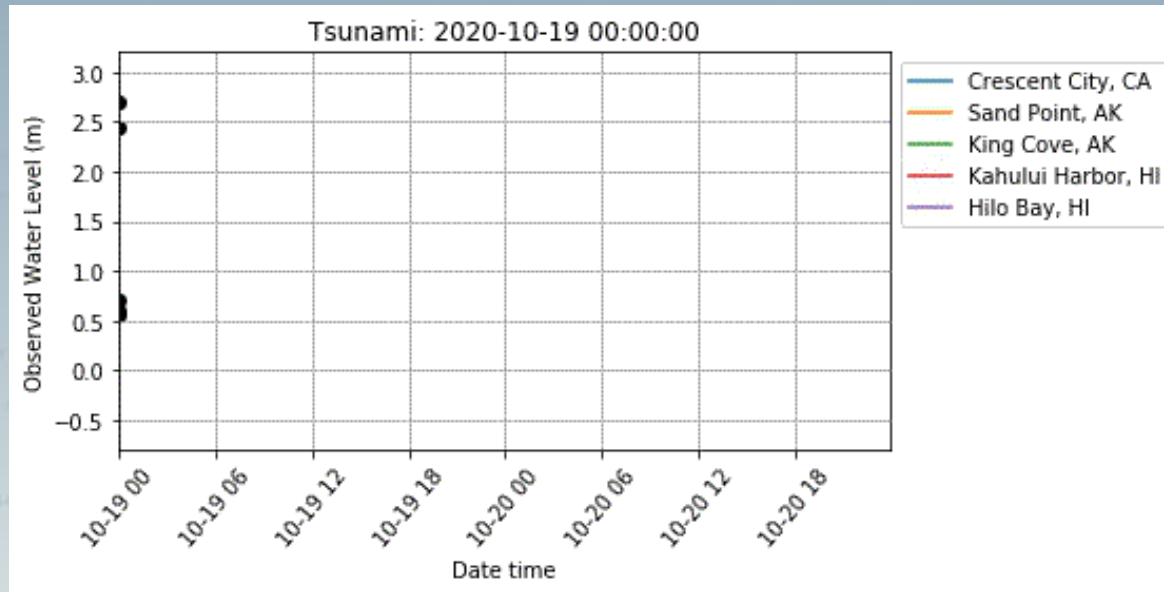
HYDROGRAPHIC SERVICES REVIEW PANEL



# Overview

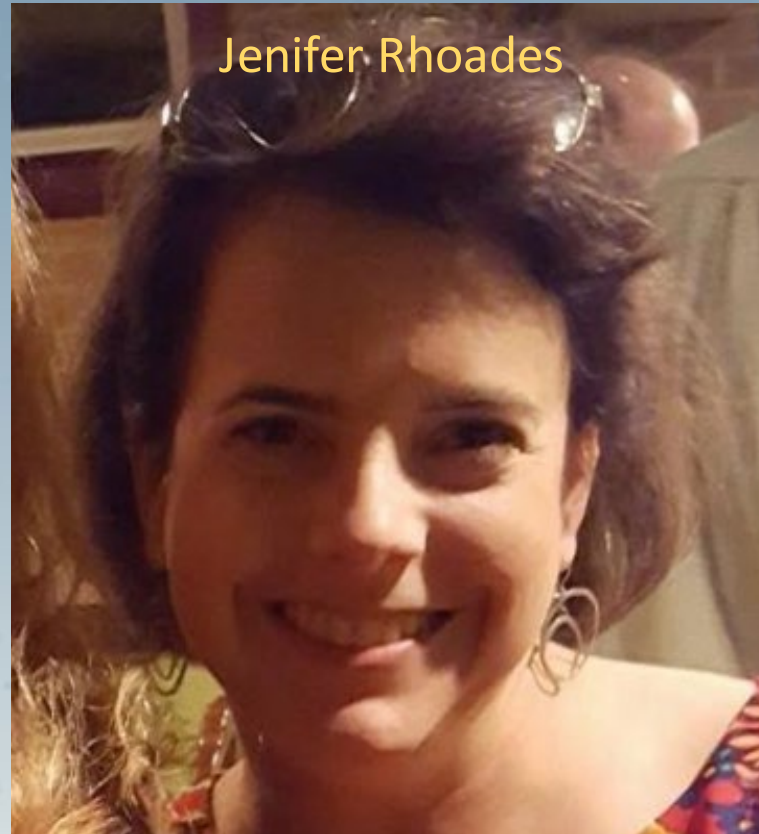
A summary of our work to sustain and advance our end-to-end navigation safety and coastal resilience observing systems/modeling infrastructure and products and services.

- Organizational Changes within CO-OPS
- FY21 Accomplishments
- FY22 Look Forward



# Organizational Evolution

- Created two new branches within the Oceanographic Division
  - Coastal Hazards Branch: Chief, *Audra Luscher*
  - Stakeholder Services Branch: Chief, *Laura Rear McLaughlin*
- Established a Business Operations Division (BOD) - Chief: *Jenifer Rhoades*



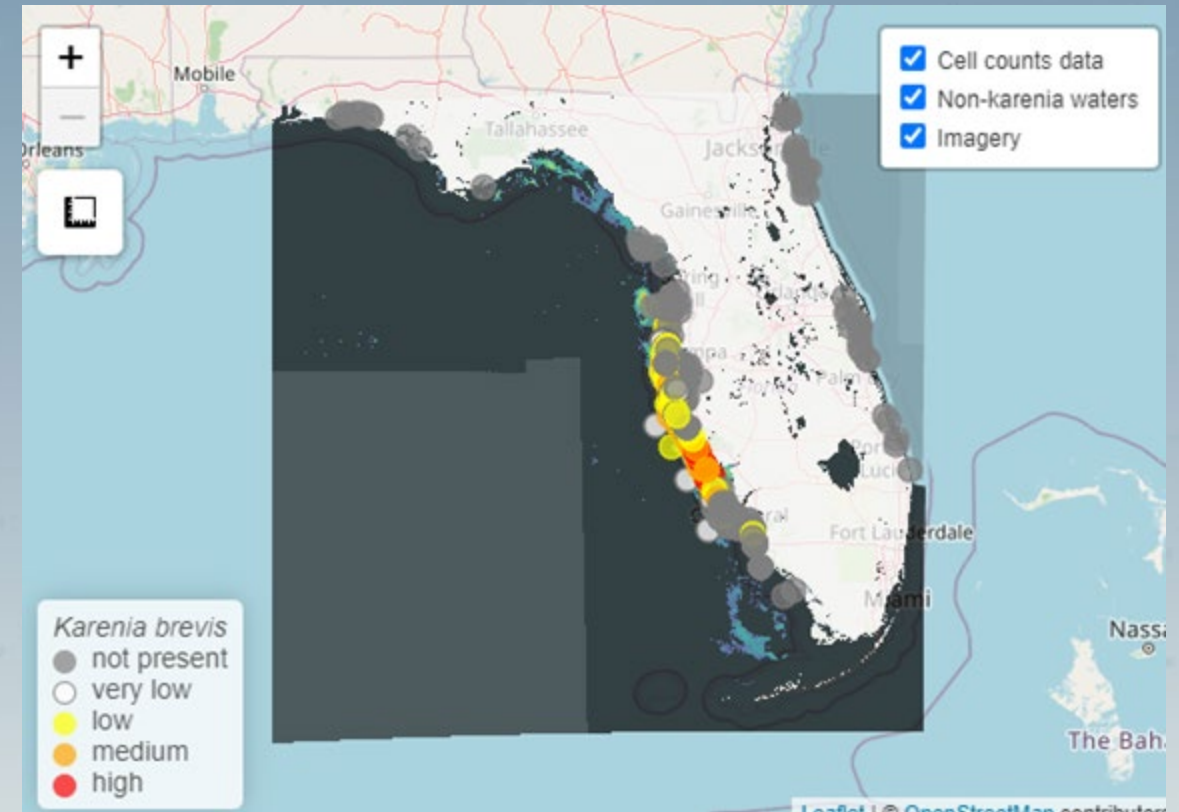
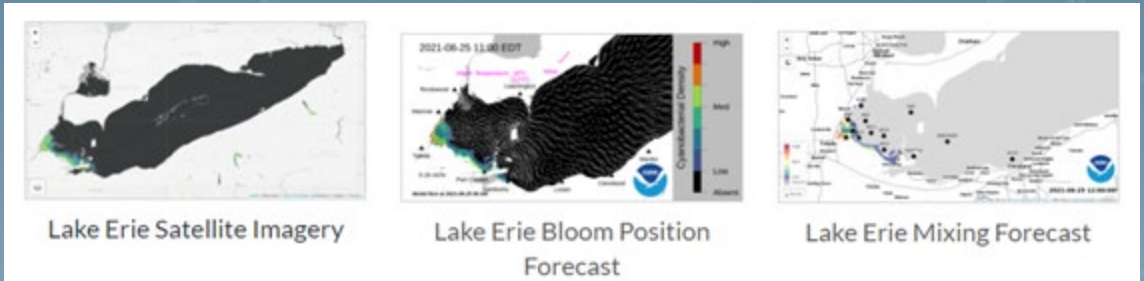


# Organizational Evolution

The Harmful Algal Bloom Operational Forecast System (HAB-OFS) has been transitioned to the National Centers for Coastal Ocean Science (NCCOS).

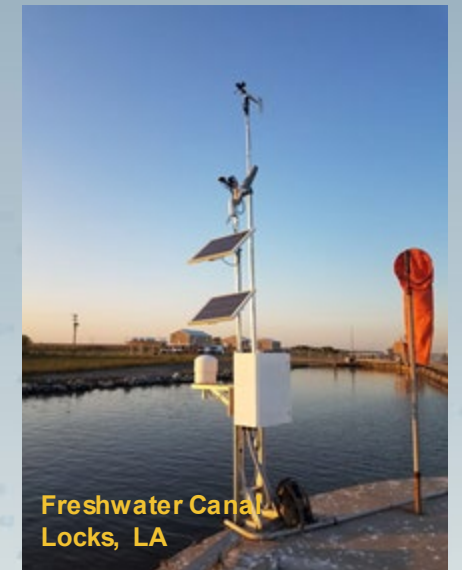
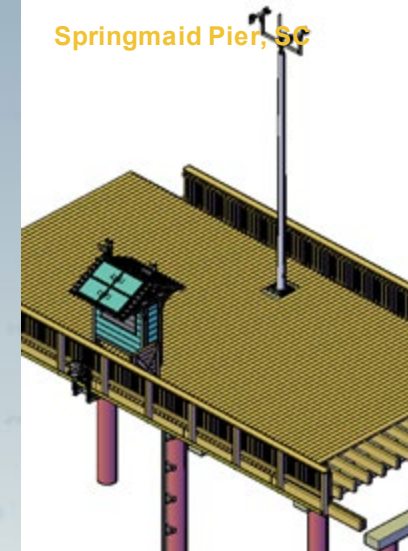
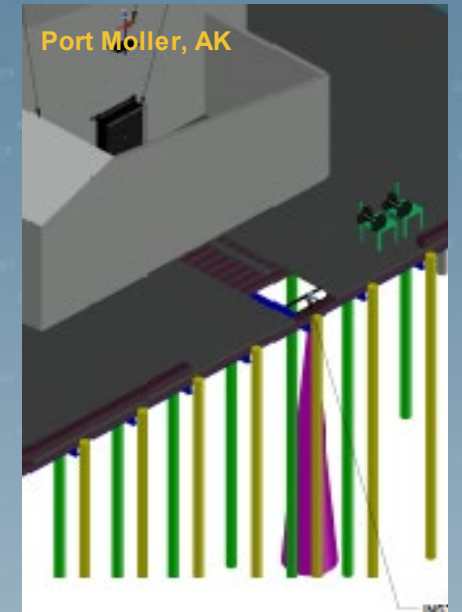
- The [Lake Erie](#) forecast was transitioned earlier this year.
- The [Gulf of Mexico](#) forecasts were transitioned August 2nd.

CO-OPS will continue to support ecological forecasting by providing forecast guidance from its Operational Forecast System models.



# National Water Level Observation Network (NWLON) FY21 Accomplishments

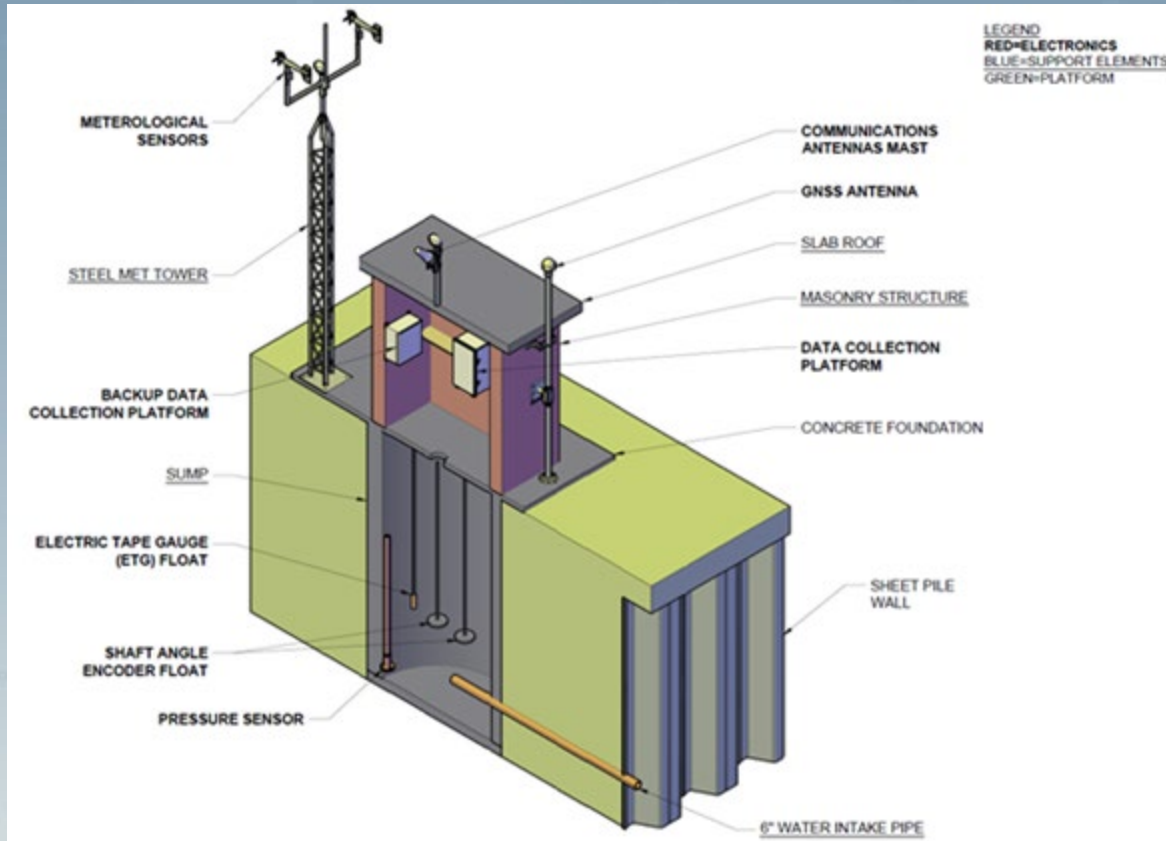
- Developed & published *NWLON Recapitalization Plan*
- Re-established Port Moller, AK and Springmaid Pier, SC, rebuilt Ft. Pulaski, GA and Ogdensburg, NY stations
- Temporary & permanent relocations working with property owners
  - Green Bay, WI
  - New London, CT
  - Pago Pago, American Samoa
  - Santa Barbara, CA
  - Monterey, CA
  - Seattle, WA
  - Freshwater Canal Locks, LA
  - Corpus Christi, Bob Hall Pier, TX
  - Grand Isle, LA





# NWLON Look Forward

- Recapitalize NWLON stations and restore comprehensive annual maintenance.
- Expand water level observations/tidal datum products in NWLON gap areas through partnerships.
- Establish wave observation capabilities.



# National Current Observation Program (NCOP)

- NCOP Delaware Bay survey to update [NOAA's tidal current predictions](#) and support USGS [NGWOS Delaware Bay Pilot](#) objectives;
  - Phase 1 of the survey conducted in FY21, deployed 18 ADCP current meters and 4 CTDs (temperature & salinity)
  - First operational use of subsurface ellipsoidal ADCP buoy (SEABY)
- FY22 - Phase 2 of survey will deploy an additional 16 ADCPs and 1 CTD.
  - Begin multiyear Columbia River survey (delayed by COVID).





# PORTS® FY21 Accomplishments & FY22 Plans

- New PORTS® in FY 21: Valdez, AK
- Many enhancements this year
  - Cape Cod, MA
  - Chesapeake Bay, VA
  - Humboldt Bay, CA
  - Jacksonville, FL
  - Mobile Bay, AL
  - Lake Charles, LA
  - Texas: Corpus Christi, Houston/Galveston, Sabine Neches
- FY22 - 6 new sensors are planned to be integrated into existing PORTS, and likely to increase.





# New PORTS® Coming Online in FY22 & FY23

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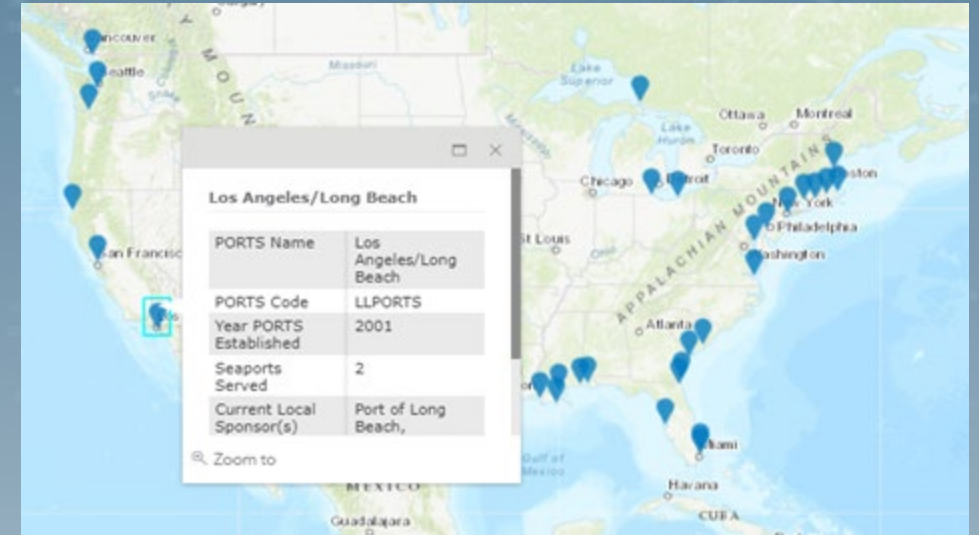
- Kitsap Peninsula, WA (FY22)
  - Partnership with U.S. Navy
  - 1 tide station and 2 current meters
- Freeport, TX (FY22)
  - Emerging partnership with Port Freeport
  - Integrate 1 NWLON, add 2 current meters
- Pearl Harbor, HI (FY23)
  - Emerging partnership with U.S. Navy
  - Integrate 1 NWLON, add 2 current meters



# PORTS® 30th Anniversary Outreach

Celebrating 30 years!

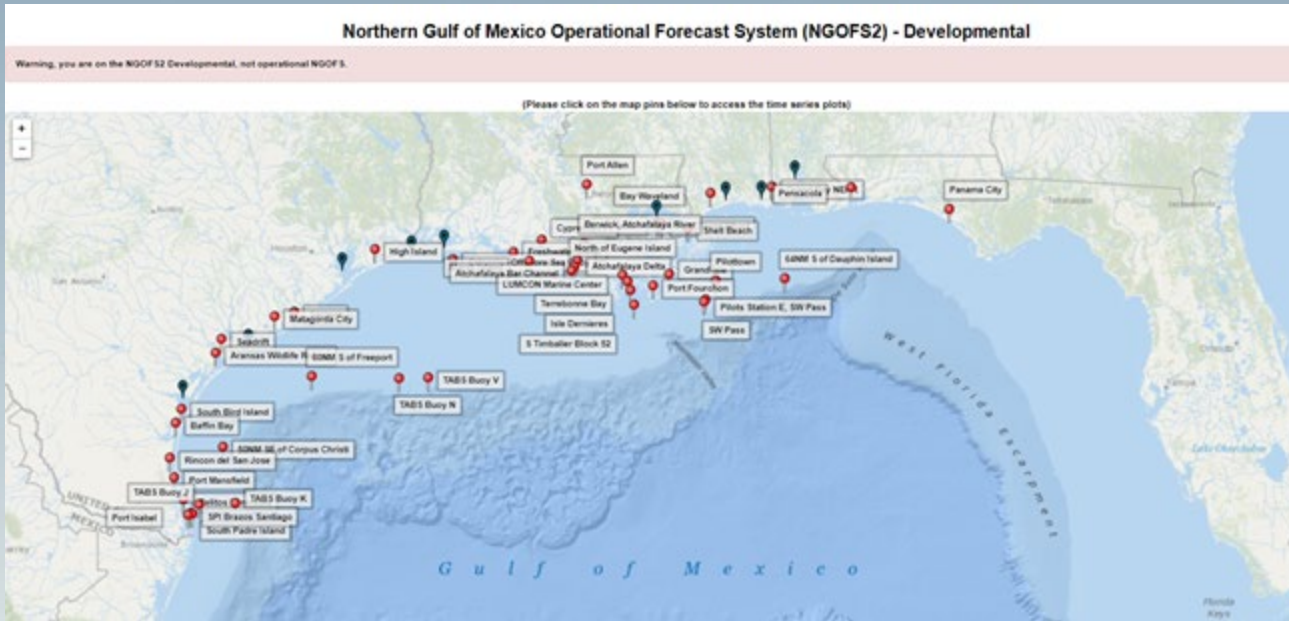
- [Anniversary Video](#)
- [New PORTS® Landing Page](#)
- Congressional Briefings, web stories, & new infographics!





# Operational Forecast System (OFS) Model Accomplishments

- New West Coast OFS (WCOFS)
  - Collaborative effort with IOOS, OCS and NESDIS
  - First model to use real time data assimilation
- Northern Gulf of Mexico OFS upgrade (NGOFS2)
  - Consolidated 3 separate models,
  - Higher resolution output.
  - Expanded coverage to Mexican border and up major rivers/estuaries
- FY22 - conduct demo project with Mobile Bay WFO for probability of visibility forecasts.

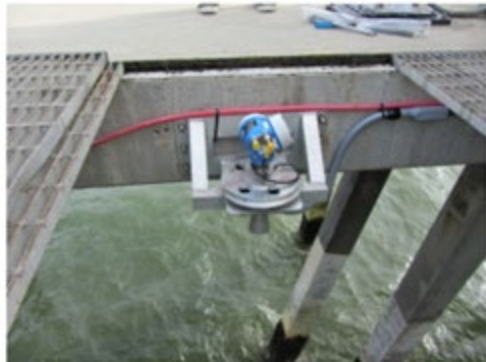


# FY21 Technology Transitions to Operations

- Microwave water level sensors installed at 19 NWLON stations, reaching **100 total!**
- Spherical Ellipsoidal ADCP Buoys (SEABY) deployed in Delaware Bay Survey
- Collaborative effort with Office of Response and Restoration (OR&R) Disaster Response Center.
  - Slated for transition to OR&R this week for operational use in FY22.
  - CURBY buoys can be quickly deployed to aid incident responders in predicting the fate & trajectory of spilled pollutants.
  - Additional capability for NCOP surveys.



MWWL Sensor Installed at Wrightsville Beach, NC



SEABY



CURBY



# FY21 Enhancements to the Coastal Inundation Dashboard

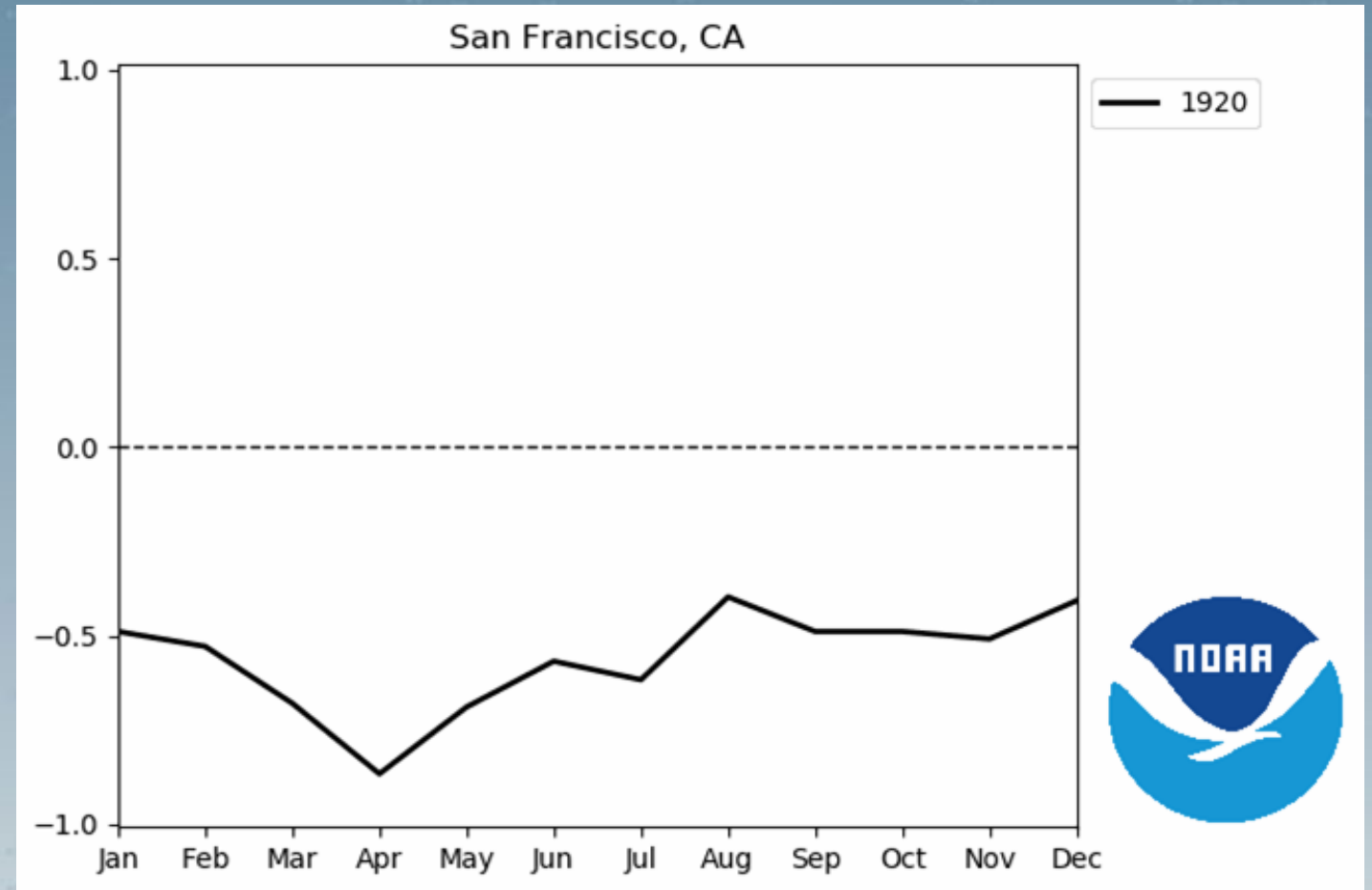
- New multi-station view feature allowing you to generate a page displaying multiple water level stations
- Improved display of annual and seasonal High Tide Flood statistics, showing the number of past “flood days” at many stations.



- Tropical Storm Claudette
  - June 17-21 (11 QuickLooks)
- Tropical Depression 06W (Guam)
  - June 21 (1 QuickLook)
- Tropical Storm Danny
  - June 28 (2 QuickLooks)
- Tropical Storm Elsa
  - July 3-9 (19 QuickLooks)
- Tropical Storm Fred
  - August 9 - 16 (23 QuickLooks)
- Tropical Storm Grace
  - August 13 - 15 (7 QuickLooks)
- Tropical Storm 16W (Guam)
  - August 14 - 15 (4 QuickLooks)
- Tropical Storm/Hurricane Henri
  - August 20 - 22 (8 QuickLooks)

# FY22 Coastal Resilience: Looking Forward

- Improve statistics for the annual High Tide Flooding Outlook.
- Build climate outlook capabilities into the Coastal Inundation Dashboard & integrate Great Lakes NWLON stations.
- Collaborative multi-year project to conduct a 40-year reanalysis of water level data to build a national assessment of contemporary and future flooding.
- Integrate updated Sea Level Rise graphics into the NOAA Climate.Gov Coastal Resilience ToolKit.
- Support the 5th [National Climate Assessment Report](#) (NCA5) & data services with GlobalChange.Gov.





# IGLD & NTDE Outreach


## International Great Lakes Datum (IGLD) & National Tidal Datum Epoch (NTDE) Updates - Accomplishments and Next Steps:

- **Presenting at conferences/seminars**
  - Join existing NOS sister-office efforts. Example: 07/15 joint NGS-CO-OPS webinar. 660+ attendees. Future targets: individual spring 2022 mini summits for NTDE and IGLD
  - Presented NTDE at 04/15 USACE Climate Preparedness & Resilience Community of Practice
  - Conference presentations target different stakeholder groups (e.g. surveying community). Upcoming CY 2021 presentations: National Coastal Conference (NTDE), US Hydro 2021 hosted by THSOA (NTDE), Lakebed 2030 (IGLD)
- **Developing NTDE/IGLD Videos**
  - NTDE video is currently under development with our COMET partner. Storyboard is complete. IGLD video to be developed following NTDE video completion
  - Build a CO-OPS video library/repository
- **Engaging in conversations with non-federal partners**
  - Example: state agencies to discuss regulatory impacts
- **Publishing articles in industry newsletters via channels identified during the outreach scoping phase**
  - Examples: *The Waterways Journal*, *Shipwatcher News*, Duluth Seaway Port Authority's *North Star Port*, *USACE Survey & Mapping* community newsletter.

### Factsheet

## National Tidal Datum Epoch


Moving from NTDE 1983-2001 to NTDE 2002-2020





NOAA uses the National Tidal Datum Epoch (NTDE) to inform vital datums inform vital datums inform vital datums including ship navigation, hazard mitigation, engineering, marine determination, and renourishment.

#### What is NTDE?

The NTDE is a 19-year time period used by NOAA to collect water level observation tidal datums. The period represents one full rotation of the Earth's longest (18 cycle, which influences the world's tides. NOAA rounds to 19 years to account and environmental trends (e.g. sea level change), and determines the truest a conditions. By using a common cycle for the country's tidal datums, NOAA ensure consistent tidal datum network from Maine to Hawaii. The NTDE is managed by for Operational Oceanographic Products & Services (CO-OPS).

**National System**  
23 States & 14 Territories

**130 Primary Stations**  
Permanent Water Level Gauges

**Updates Required**  
Accounts for Change in Relative Sea Level

#### Is NTDE Regularly Updated?


Yes. An NTDE update is triggered when the change in Mean Sea Level at the National gauges averages above 0.10ft (0.03m). Historically, this has resulted in the NTDE every 25-30 years. However, long-term sea level trends have shown accelerating level rise in many regions (but not all) of the country. This indicates that the current schedule may need to be accelerated. A more frequent review of the NTDE would sea levels change over time NTDE datums continue to accurately represent conditions. For modified datums procedures, which are distinct from NTDE, please visit [tidaldatum.noaa.gov/press/tidaldatum](https://noaa.gov/press/tidaldatum).


NOAA's Center for Operational Oceanographic Products and Services


### Factsheet

## International Great Lakes Datum

Moving from IGLD (1985) to IGLD (2020)

**Bi-National System**  
8 States & 2 Provinces

**230 Water Level Gauges**  
Permanent & Seasonal

**25-35 Year Update Cycle**  
To Account for Land Movement

**2026**  
Release Date for next IGLD  
Referred to as IGLD (2020)

#### WHAT IS IGLD?

The International Great Lakes Datum (IGLD) is a common vertical reference used throughout the Great Lakes - St. Lawrence River system to measure water levels. IGLD was first released in 1955 by the Coordinating Committee on Great Lakes Basic Hydraulic and Hydrologic Data, a bi-national committee dedicated to joint water resource management. IGLD (1955) was updated to IGLD (1985) in 1992. IGLD (1985) is slated to be replaced by IGLD (2020) in 2026. To maintain consistency with national datums, IGLD (2020) will align with the new geoid-based North American Geopotential Datum of 2022 that is expected to be adopted in the US by 2025. This datum will also be compatible with the Canadian Vertical Datum of 2013, which is already in use in Canada.

#### WHY IS IGLD UPDATED?

IGLD needs to be revised every 25-35 years to account for Glacial Isostatic Adjustment (GIA), or the ongoing "rebounding" of land caused by the retreat of glaciers that covered the region during the last ice age (circa 12,000 years ago). Over time, GIA tilting of the region led to changes in water levels relative to the rising or subsiding shorelines. IGLD (2020) will also utilize new advanced surveying technology to correct systematic leveling errors.

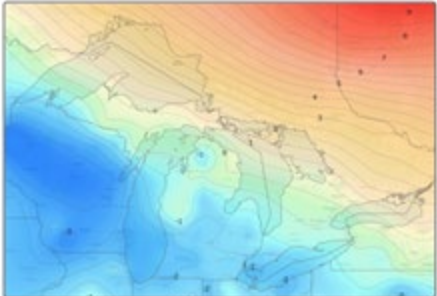



Fig. 1-3: Process of Glacial Isostatic Adjustment (left) and the resulting tilting of the entire Great Lakes region as determined by high accuracy GPS measurements in units of mm/year (right).

Coordinating Committee on Great Lakes Basic Hydraulic and Hydrologic Data

Questions?

