



# NOAA Science Update to the Science Advisory Board

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# Engagements and Partnerships

- Insurance companies webinar
- World Bank discussions
- EPRI MOU
- USAID



# NOAA Research and Development Vision Areas: 2020 - 2026

**Vision Area 1:**  
Reducing  
societal impacts  
from hazardous  
weather and  
other  
environmental  
phenomena

**Vision Area 2:**  
Sustainable use  
and stewardship  
of ocean and  
coastal resources

**Vision Area 3:**  
A robust and  
effective  
research  
development,  
and transition  
enterprise

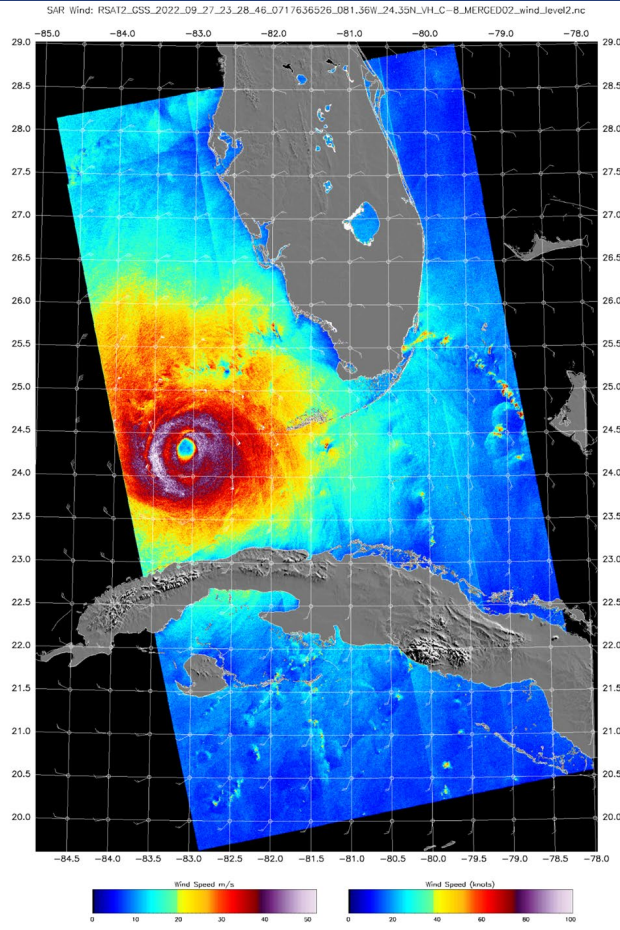
# Vision Area 1:

## Reducing societal impacts from hazardous weather and other environmental phenomena

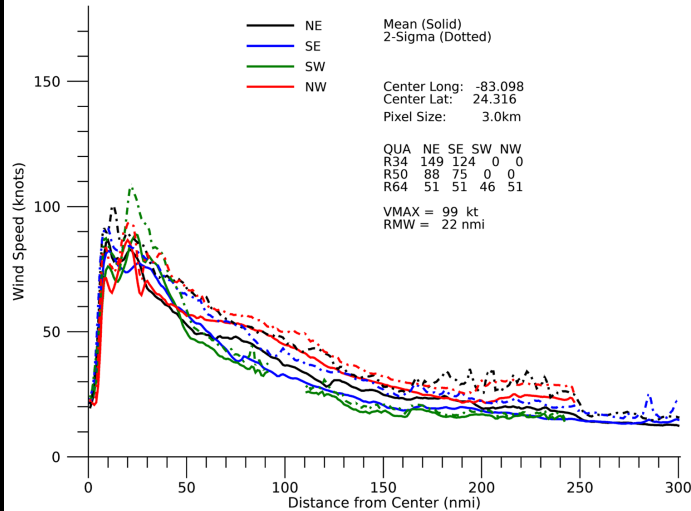


*A radar monitoring severe storms.  
Photo credit: Robin Tanamachi, NOAA/OAR/NSSL*

# High Resolution Hurricane Winds - Hurricane Ian



Profile Winds by Quadrant: AL092022 / IAN  
27 Sep 2022 23:28 UTC



HURRICANE CENTER LOCATED NEAR 24.0N 83.2W AT 27/2100Z  
POSITION ACCURATE WITHIN 15 NM

PRESENT MOVEMENT TOWARD THE NORTH OR 10 DEGREES AT 9 KT

ESTIMATED MINIMUM CENTRAL PRESSURE 952 MB

EYE DIAMETER 20 NM

MAX SUSTAINED WINDS 105 KT WITH GUSTS TO 130 KT.

NOAA began production of SAR based Tropical Cyclone products that are provided to NHC and JTWC for improved understanding of storm strength and morphology.

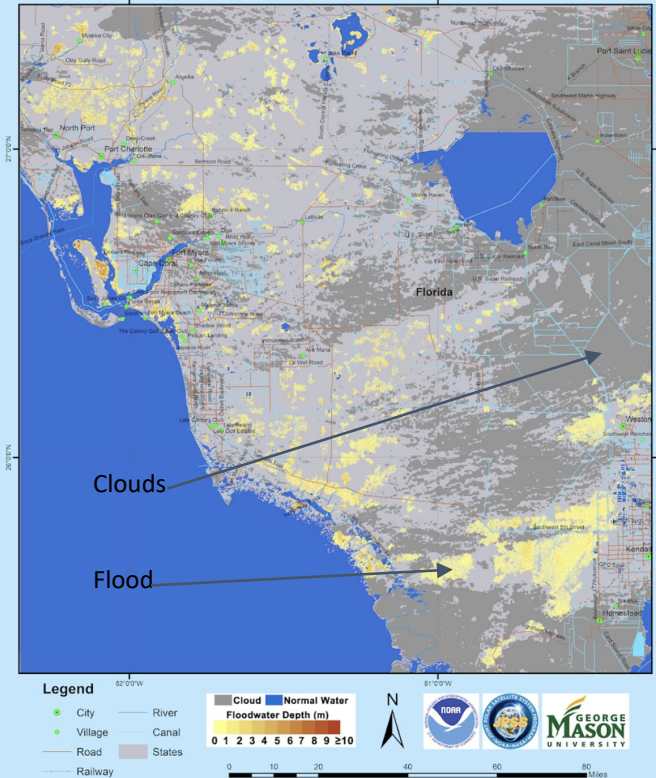
## Key TC information from SAR

- Identifying the center of circulation (when covered).
- Maximum wind speed and Radius of max winds
- Radial wind profiles (per quadrant 3km sampling)
- 34, 50 and 64 knot quadrant fixes

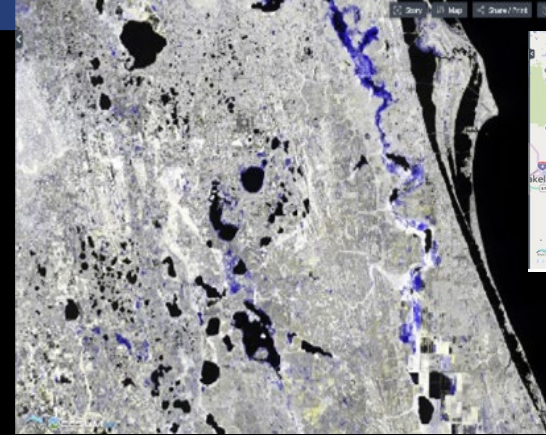


# Hurricane Ian - High Resolution Flood Depth Inundation Maps

Suomi-NPP&NOAA-20/VIIRS 30m Floodwater Depth Map  
in Florida on Sep. 29th, 2022



NESDIS developed a new technique to combine 30 meter digital elevation maps with 375 meter VIIRS flood maps to produce a downscaled 30 meter flood depth product.



Sentinel-1 from 2323 UTC on 2 October 2022  
over Orlando  
Sentinel-1A/B acquired by ESA/Copernicus,  
Contains modified Copernicus Sentinel data  
2022

SAR Change Detection

Blue = flooding.

Light yellow = wetter than normal areas.

Dark Yellow = Floods in forests or high levels of damage.

NESDIS has also developed all-weather high resolution SAR flood products to ensure flood mapping even during cloudy conditions. NOAA coordinated with FEMA on RadarSAT 2 acquisitions. Unfortunately, SAR imagery the first SAR acquisitions occurred on Oct 2 after Hurricane Ian landfall.

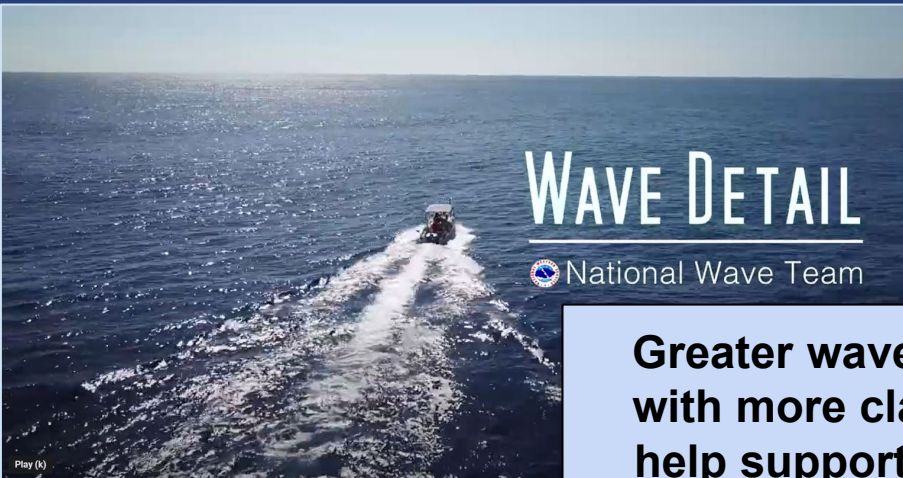
# Study of Precipitation, the Lower Atmosphere and Surface Hydrometeorology (SPLASH)



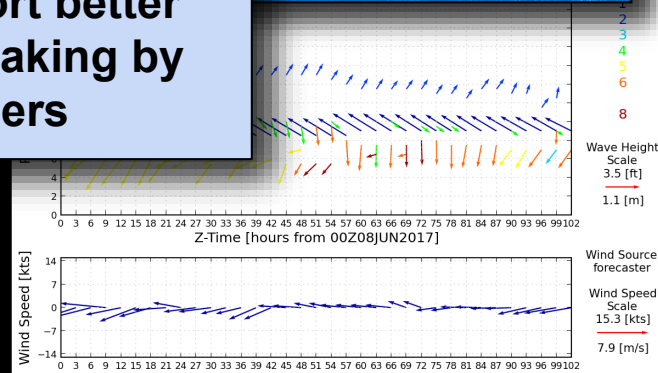
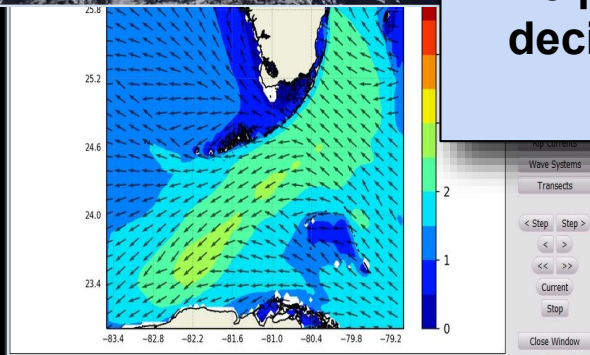
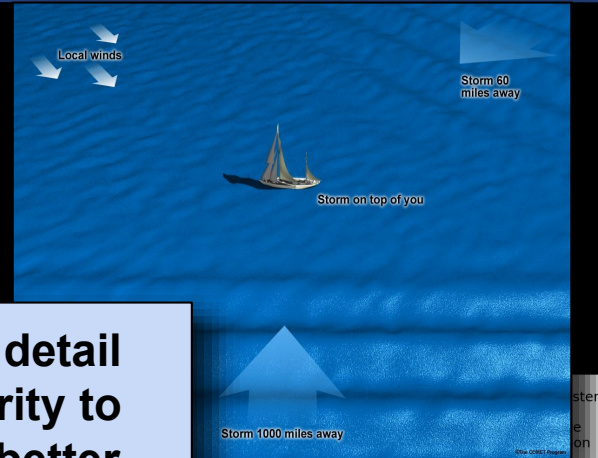
NOAA PSL researchers Janet Intrieri and Chris Cox install an Atmospheric Surface Flux Station for SPLASH. Photo Credit: Gijs de Boer, CIRES/NOAA

- A 20-year drought caused by climate change has significantly impacted water availability in the Colorado River Basin, resulting in water shortages for 40 million people.
- In order to better manage water resources in the future, we need to better understand the physical processes impacting the watershed and how much water ends up in the Colorado River.
- The SPLASH campaign will measure temperature, precipitation, soil moisture, snowpack properties, and other variables through the use of radars, instrumented towers, individual sensors, piloted instrumented aircraft, and uncrewed research aircraft.

# Adding Wave Detail to the NWS Marine Forecast



**Greater wave detail  
with more clarity to  
help support better  
decision making by  
mariners**

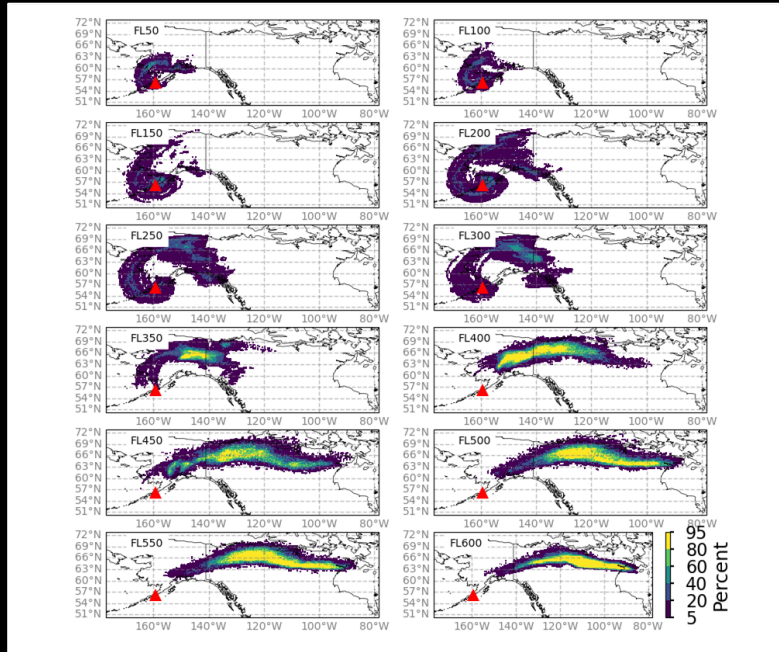


With the use of the new Nearshore Wave Prediction System, NWS can now provide height, period, and direction of the significant wave systems that make up the significant wave height



# Volcanic Ash Ensemble Forecast

HYbrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT) transport and dispersion model



Ensemble Relative Frequency of Exceedance of  $0.2 \text{ mg/m}^3$   
using 31 member NWS Global Ensemble Forecast Capability  
(GEFS) to drive the dispersion.



- First HYSPLIT ensemble dispersion capability to predict and quantify Volcanic Ash plume uncertainty for serving both public and private sectors, especially the aviation industry
- Scheduled for NWS implementation in Dec. 2022

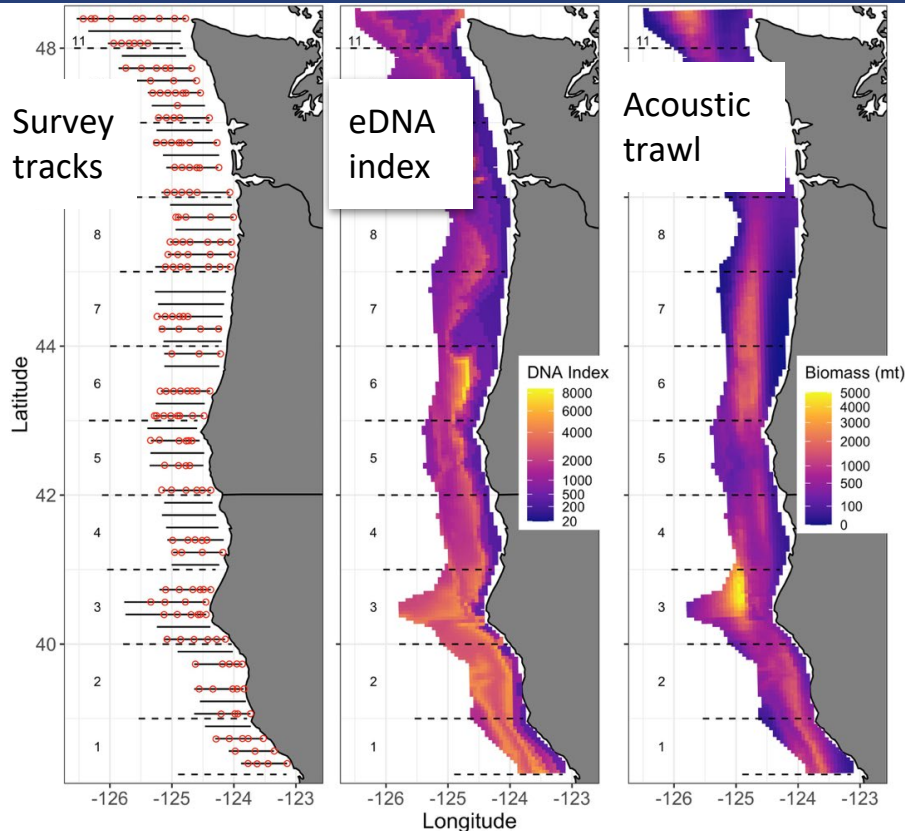
Photo credit: Dr. Igor Smolyar (NODC), NOAA Photo Library,  
<https://photolib.noaa.gov/Collections/Its-A-Small-World/Other/emodule/683/eitem/22623>

# Vision Area 2: Sustainable use and stewardship of ocean and coastal resources



*South entrance of Detroit River to the right and northeast corner of Lake Erie to the left. Photo credit: NOAA/OAR/GLERL*

# eDNA provides an affordable alternative to measure fish populations

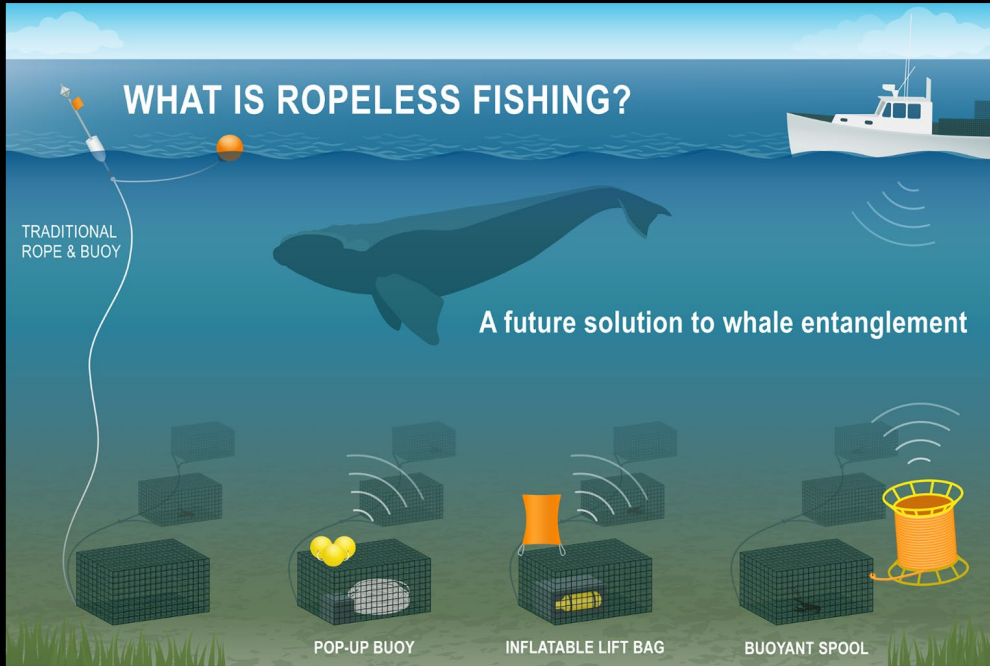


NMFS research published in *Proc. Roy. Soc. B* demonstrates for the first time that environmental DNA (eDNA), offers a less-expensive means of measuring populations of fish such as Pacific hake which supports the largest commercial fishery off the West Coast.

Figure shows:

- DNA information integrated for entire water column (50-500m)
- Contrast with estimated biomass from acoustic trawl survey
- Center of gravity for biomass estimated by acoustics and eDNA is the same.

# Ropeless Roadmap: A Draft Strategy to Develop On-Demand Fishing Available for Public Input



The Roadmap is an important step in a series of actions NOAA Fisheries is taking to protect and conserve North Atlantic right whales.

It describes the current state of “ropeless” fishing and outlines a path for increasing adoption of this alternative technology in commercial fisheries (e.g., lobster) in the NW Atlantic Ocean.

The future of this technology is based on ongoing gear development, evolving regulations, and continued demand for risk-reduction of entanglement under the ESA and MMPA.



# Vision Area 3:

## A robust and effective research, development, and transition enterprise



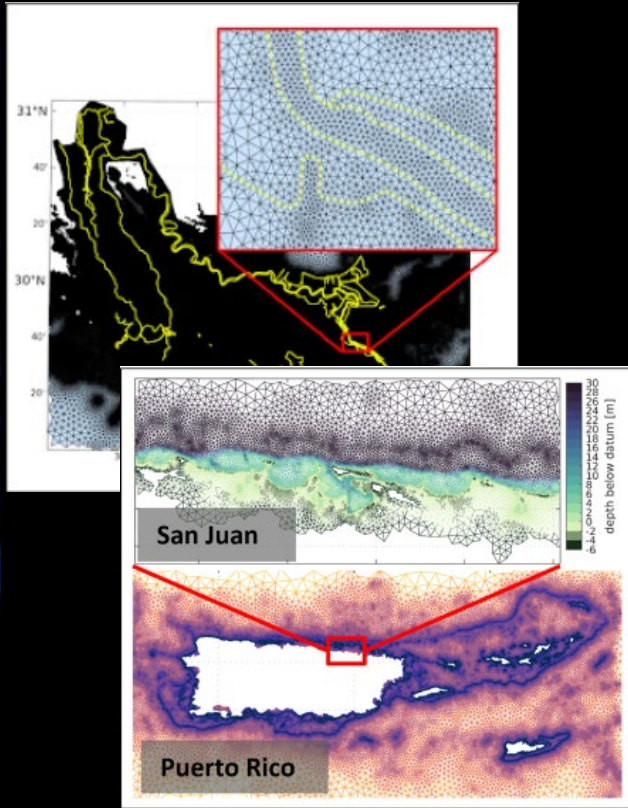
*The GOES-17 satellite above the thermal vacuum chamber.  
Photo credit: Lockheed Martin.*

# New NOAA Partnership with Viking Expeditions



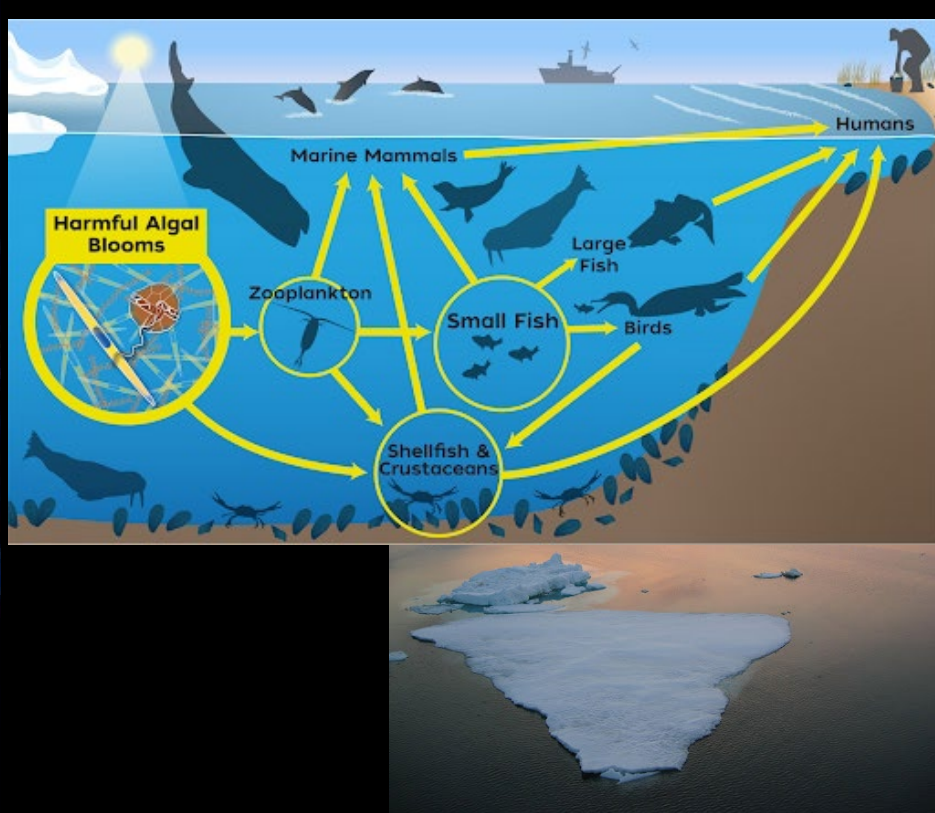
- As of May 2022, NOAA scientists are partnering with Viking Expeditions to expand their research in the Great Lakes.
- Teams of scientists aboard state-of-the-art Viking ships will work on a variety of studies that focus on changes in the weather, climate, ecosystems, and maritime heritage resources of the Great Lakes regions.
- Ships will also continuously collect observations on water quality, oxygen content, plankton composition, and more.

# World's Highest Resolution Operational Global Storm Surge Model



- A new 3-D component, enhancing the Surge and Tide Operational Forecast System (STOFS) with information about water conditions in the Atlantic Ocean, will be operational by December 2022.
- STOFS is developed by NOS/OCS in collaboration with academic partners and the NWS.
- STOFS is a global ocean modeling system that provides forecast guidance for combined water levels caused by storm surge and tides.

# Trophic Transfer and Effects of HAB toxins in Alaskan Food Webs



- NOAA Fisheries-led effort (funded by NCCOS ECOHAB program) to investigate HABs in Alaskan Arctic & Subarctic waters.
- Resting benthic cysts of HAB species lay dormant in cool Arctic waters, but as waters warm due to climate change, conditions support blooms and their associated toxins.
- Observed PSP toxin transfer to zooplankton, shellfish, finfish, marine mammals (walrus/bowhead whales), with risks to subsistence communities.



# Questions?

