



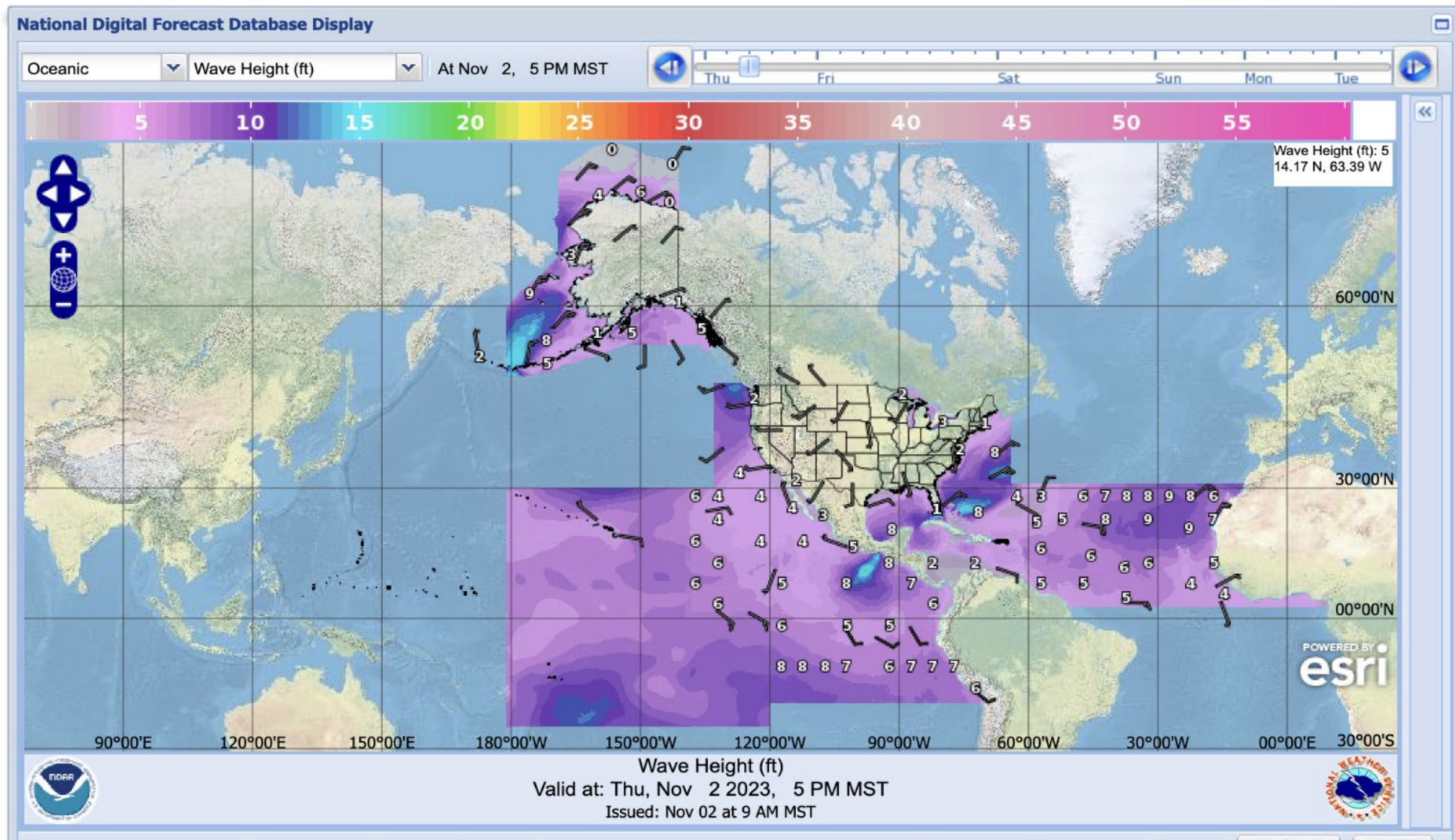
SCIENCE ADVISORY BOARD

Climate Working Group (CWG) Organizing US Civilian Operational Oceanography Forecasting Services

**Joellen Russell, CWG Co-Chair
Susan Wijffels, CWG Member**

Supporting science, service, and stewardship

NOAA's "Global" Forecast Model



Global Shipping (June 1-15, 2012)

Note:
No Arctic transport in 2012

Averages:

Containers (yellow, 14.3M)

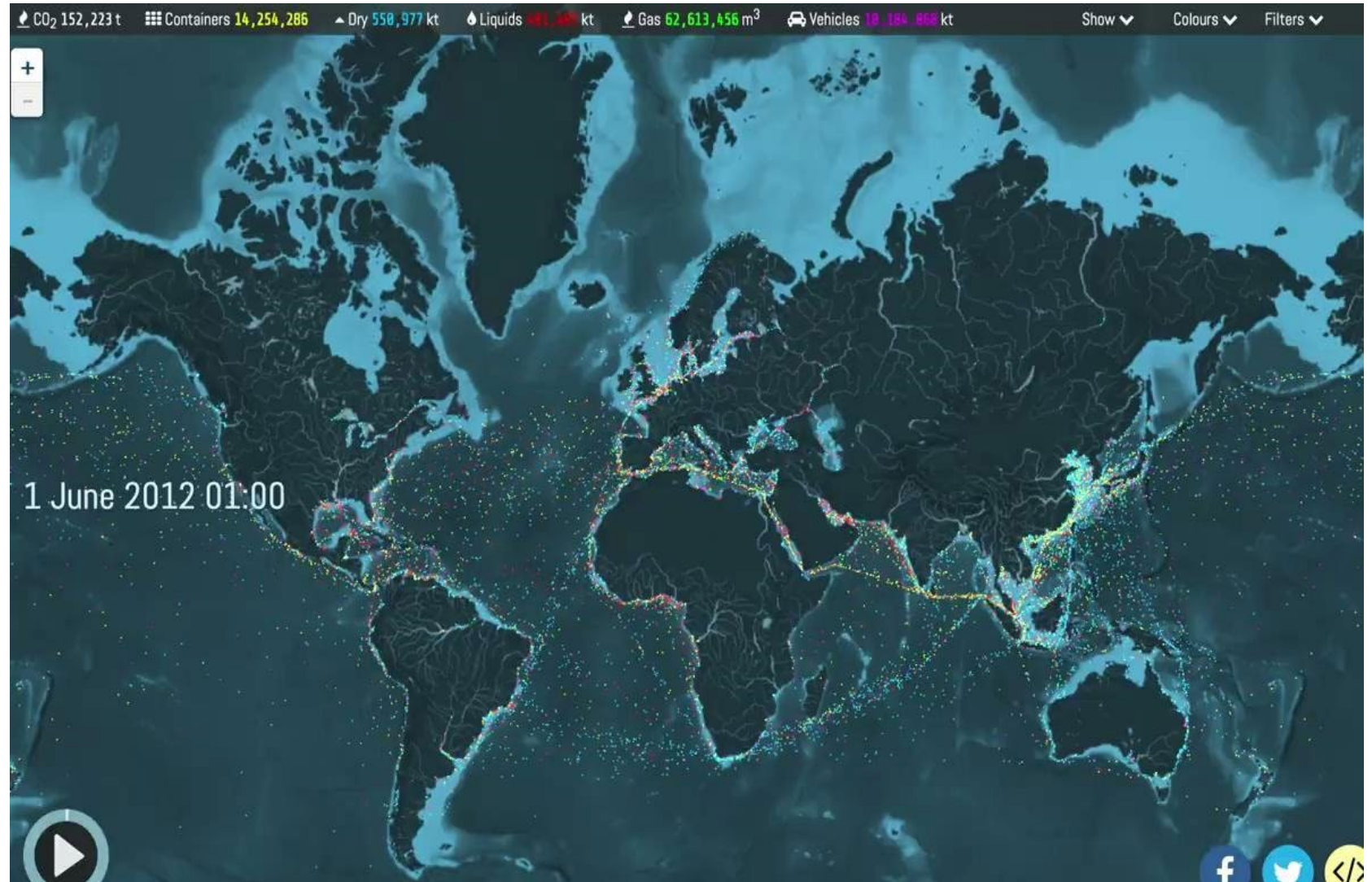
Dry goods (blue, 0.5M kt)

Liquids (red, 0.4M kt)

Gas (green, 62M m³)

Vehicles (pink, 10M)

CO₂ emissions - ~150 kt

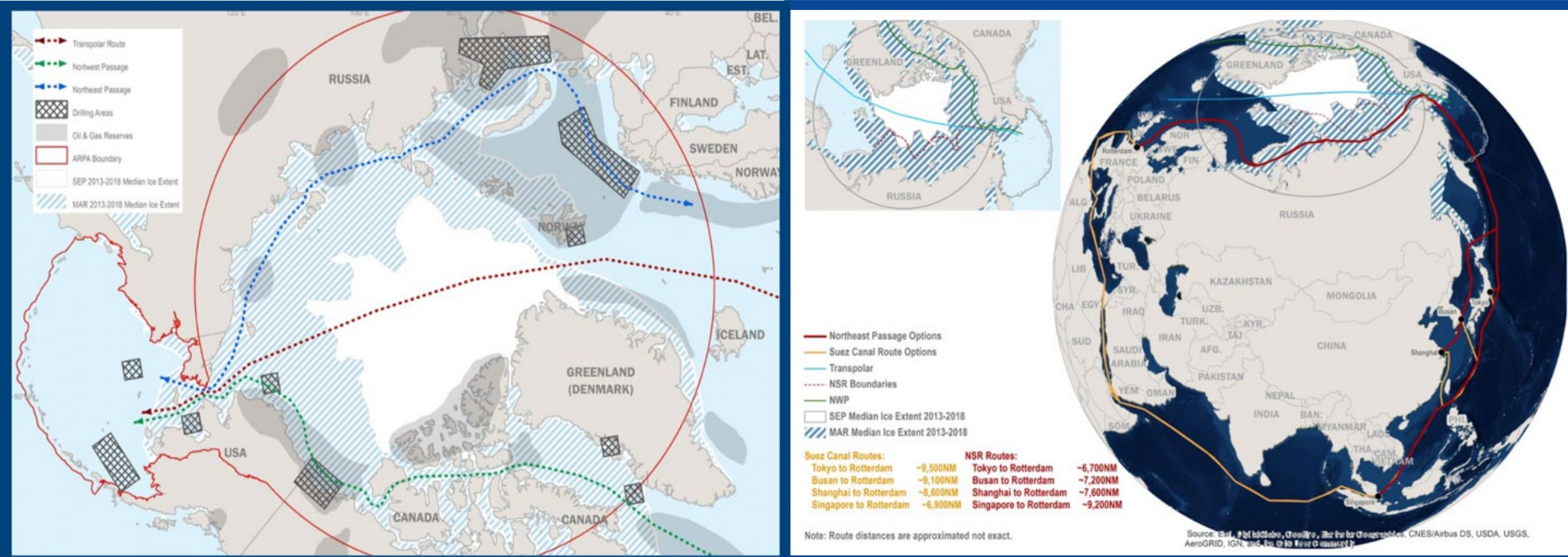


<https://www.shipmap.org>



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Shipping through an ice-free Arctic requires sea ice prediction

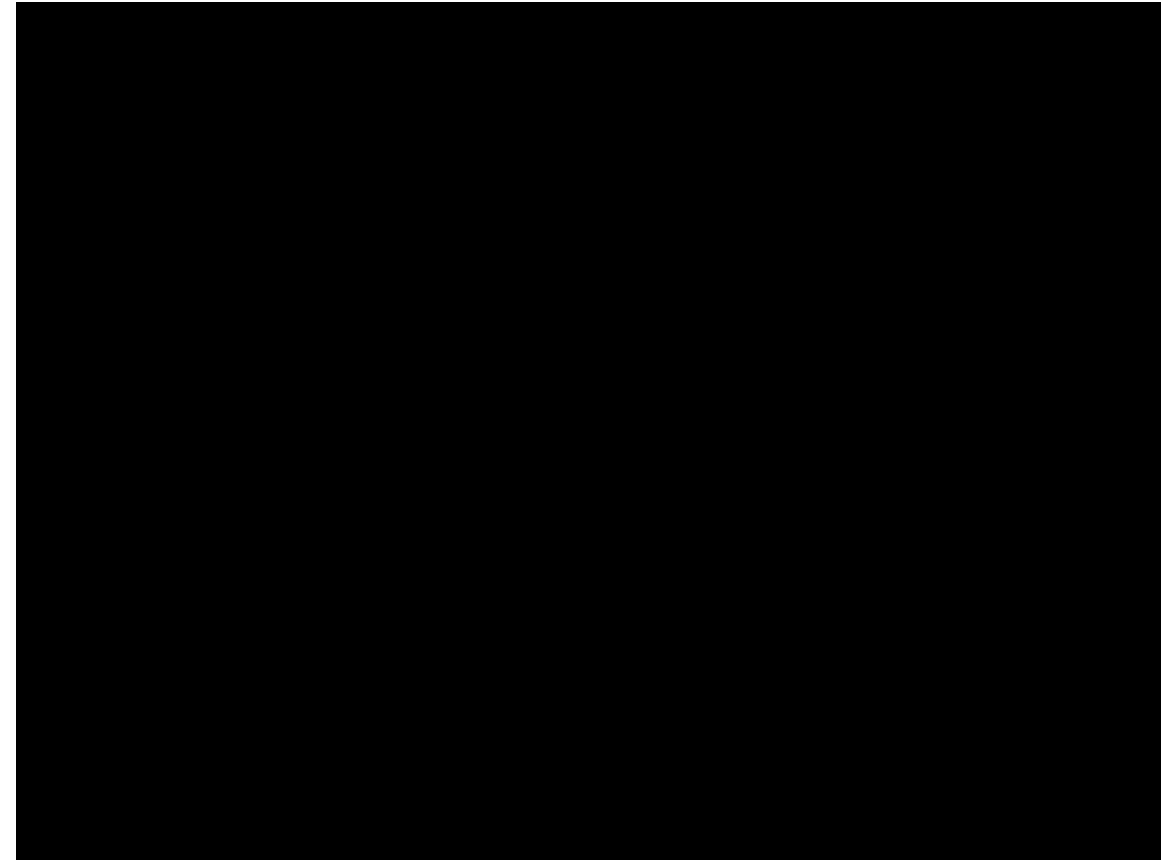


From: US Coast Guard Arctic Strategy Book (2019):
https://www.uscg.mil/Portals/0/Images/arctic/Arctic_Strategy_Book_APR_2019.pdf#page=14

China: Arctic Power and Fishing Around the Globe



“China seeks to become a “polar great power” but downplays this goal publicly, suggesting a desire to calibrate external perceptions about its Arctic ambitions, particularly as its Arctic activities become the focus of greater international attention.”



<https://www.brookings.edu/research/northern-expedition-chinas-arctic-activities-and-ambitions/>

<https://www.nytimes.com/interactive/2022/09/26/world/asia/china-fishing-south-america.html>

Wreck of the Kulluk

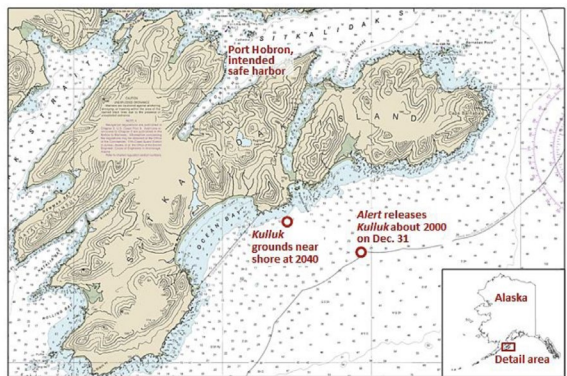
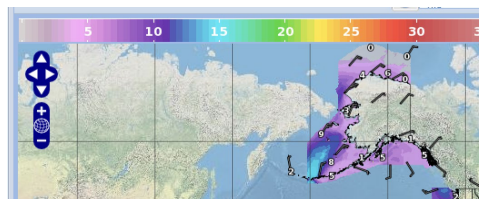
“...recorded winds reached 40-55 knots, with seas more than 20 feet”



National Transportation Safety Board Marine Accident Brief

Grounding of Mobile Offshore Drilling Unit *Kulluk*

Accident no.	DCA13NM012
Accident type	Grounding
Vessel	Mobile offshore drilling unit <i>Kulluk</i>
Location	Near Ocean Bay, Sitkalidak Island, Alaska
Date, time	December 31, 2012 2040 Alaska standard time (coordinated universal time - 9 hou
Damage	Substantial
Injuries	Four minor
Environmental damage	None
Weather and sea conditions	At departure, moderate winds and seas with scattered precipitation, expected to continue during first days of voyage; several days later, low pressure moved into Gulf of Alaska area. By December 31, recorded winds reached 40-55 knots, with seas more than 20 feet.
Waterway information	Gulf of Alaska lies south of the state of Alaska in the northern Pacific Ocean



Vessel positions when the *Alert* released the *Kulluk* and location of the *Kulluk* grounding about 40 minutes later on December 31, 2012, near Ocean Bay, Sitkalidak Island, Alaska. (Excerpt from NOAA chart 16592)



Collapse of Bering Snow Crab Fishery

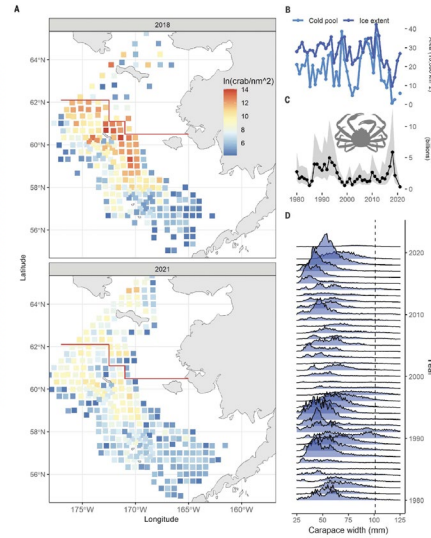
MARINE HEATWAVES

The collapse of eastern Bering Sea snow crab

Cody S. Szuwalski^{1*}, Kerim Aydin¹, Erin J. Fedewa², Brian Garber-Yonts¹, Michael A. Litzow²

The snow crab is an iconic species in the Bering Sea that supports an economically important fishery and undergoes extensive monitoring and management. Since 2018, more than 10 billion snow crab have disappeared from the eastern Bering Sea, and the population collapsed to historical lows in 2021. We link this collapse to a marine heatwave in the eastern Bering Sea during 2018 and 2019. Calculated caloric requirements, reduced spatial distribution, and observed body conditions suggest that starvation played a role in the collapse. The mortality event appears to be one of the largest reported losses of motile marine macrofauna to marine heatwaves globally.

Szuwalski et al., 2023; doi: 10.1126/science.adf6035



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Advisory Announcement
For Immediate Release: 10/6/2023

CONTACT:
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907-581-1239

2023/24 Bering Sea Snow Crab Season Closed

The Alaska Department of Fish and Game (ADF&G) and National Marine Fisheries Service (NMFS) have completed analysis of 2023 NMFS trawl survey results for Bering Sea snow crab. The stock is estimated to be below the ADF&G regulatory threshold for opening a fishery. Therefore, Bering Sea snow crab will remain closed for the 2023/24 season.



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Recommendation #1:

Recognize that **operational oceanography is essential to the development and maintenance of a global environmental intelligence network in a changing climate.**

Clarify the goals, objectives and products that a **civilian operational oceanographic and prediction service** should provide.

Frame these goals, objectives and products in the context of **global environmental intelligence** for a changing climate and **organize as a cross-NOAA team** tasked with its delivery.

Organize a multi-office work team to develop goals, objectives, and actions for **preparing and providing the global ocean forecast products and services** to support **commerce, fisheries and climate** needs.



Recommendation #1:

Recognize that **operational oceanography is essential to the development and maintenance of a global environmental intelligence network in a changing climate.**

To rectify the current weakness of global operational oceanography in the US, “**global environmental intelligence**” should be adopted as core business for NOAA with clear lines of oversight on goals and progress, and clarity on which part of the organization has responsibility for which elements of the products and services, and the strategy to deliver a more streamlined and efficient system.



Recommendation #2:

Develop a **cost-effective, targeted list of ocean products and services**, both at global and regional scales, that are needed to **maximize the reduction of uncertainty** for the multiple applications within NOAA and for the larger community (commerce, fisheries and climate). Observing System Simulation Experiments (OSSE's) should guide this development.

This list should include:

- global ocean reanalyses and predictions at 10 km or better of temperature, salinity, velocity, surface waves, sea level, sea ice, biogeochemical parameters and carbon;
- predictions out to 10 days or more;
- high resolution global reanalyses to cover the altimetric period (1993 - present).
- reanalyses should be capable of driving higher resolution regional and coastal models and services, building on and extending those already operated by the NOS.



Recommendation #3:

Reconfigure the model and prediction development plans to ensure that as much of the needed suite of ocean products and services are **developed, tested and operationalized as soon as possible.**

Identify opportunities for early implementation to achieve early successes in product delivery. Delaying implementation until ‘full coupling’ is in our view a mistake, though this should remain the long-term goal.

Research-to-Operations is not integrated across NOAA well enough – more of this model development should rest at EMC. EMC is the connective tissue between ocean research modeling and weather service prediction.

The National Ocean Service will want to parallel these efforts so that NOAA gets all the wealth and benefit from NOS’s past experience in regional wave, inundation and current forecasting.

Tracking parallel skill metrics, side-by-side for the developing global system and the present regional systems is required to guide implementation and transition strategies.



Recommendation #4:

Gather links to products into a single '**ocean portal**'

Products should be easily locatable and/or discoverable (from the NOAA home page), accessible and downloadable (with machine-to-machine services) and including the input observations.

An **ocean product portal** facilitates accessibility and value of both observations and model related products which better serves US interests.



Thank You!

