



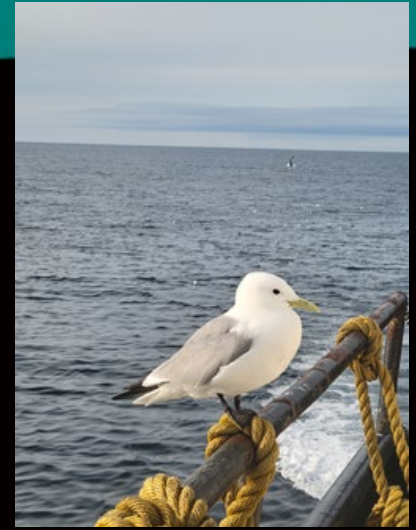
# Updating long-standing fisheries-independent bottom trawl surveys

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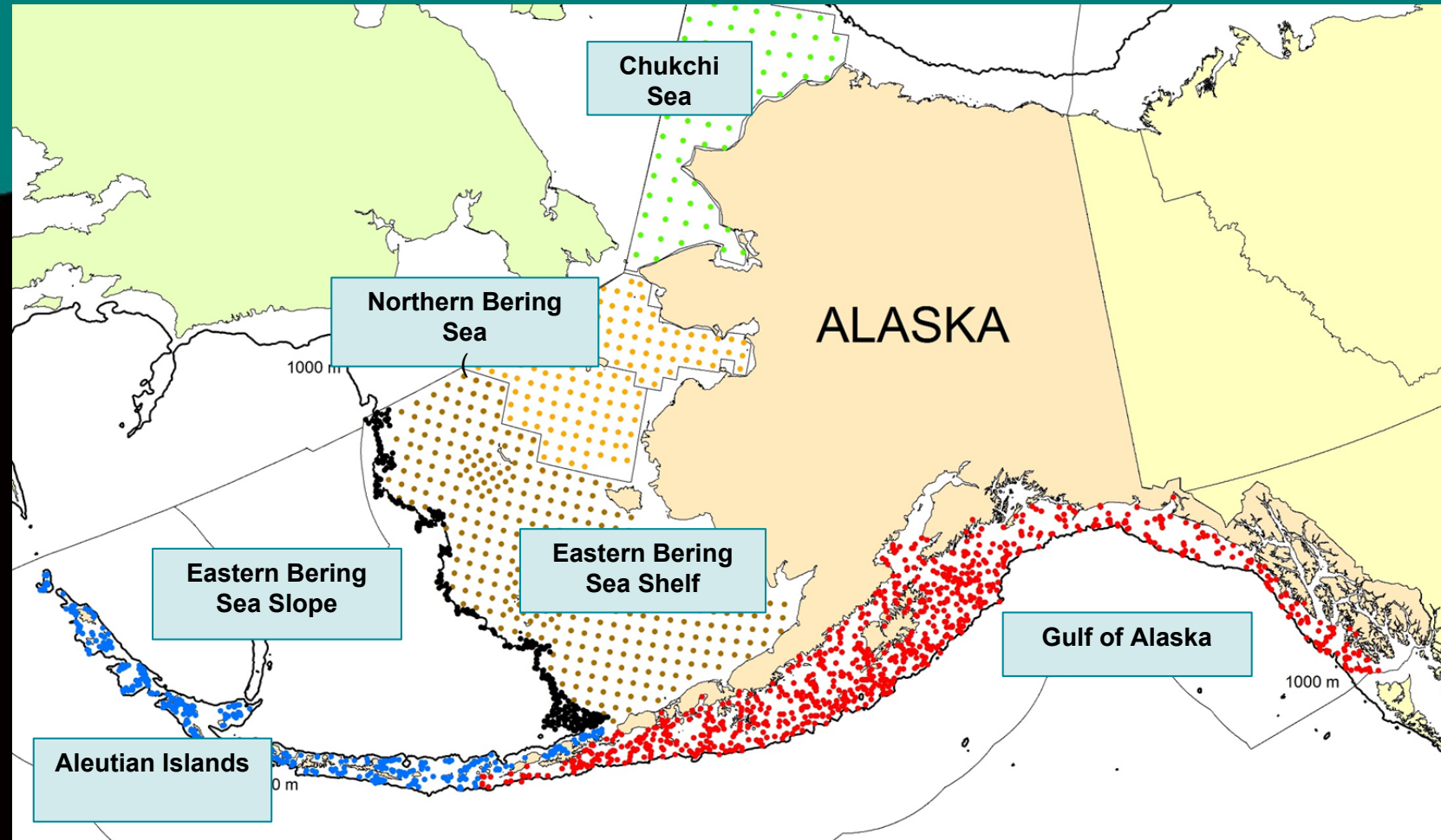


“Slow is smooth, smooth is fast”

-U.S. Navy SEALs

“What then, is the true  
Gospel of consistency? Change.”

-Mark Twain



- AFSC GAP surveys: Since 1975
- Surveys differ by design, gear, frequency
- We must protect the TIME SERIES

## Why Change?

- Changes in funding levels
  - 5 boat model -> 4 boat model
  - increasing expenses - must maximize efficiency
- Obsolescence of gear and trawl design (\$\$\$\$)
  - raw materials availability dwindling
  - maintaining multiple gear types inefficient
- Obligation to provide the best available science
  - legacy gear design and trawl protocols suboptimal
  - species distributions are changing



*F/V Dorothy, 1940-1941*  
Alaska king crab exploration



## Change is inevitable, so how do we maintain consistency?

**Option A:** Continue to use current gear, protocols, and survey design until we are forced into immediate change (Reactive: crisis mgmt)

**Pros:** no additional costs, no changes in data products

**Cons:** inflexible, consistency ultimately compromised

**Option B:** Prepare for change by anticipating crises, researching and testing updated gear, protocols, and survey designs

**Pros:** flexible, consistency maintained through research and calibration

**Cons:** significant short-term costs, discomfort among data users



## How do we implement Option B?

- Begin with research into various facets of survey design and implementation (WKUSER I in 2019 and II in 2022)
- Acquire and test modern gear
- Begin transition with extensive calibration experiments
- Examples in progress: GoA, Bering Sea

## Gulf of Alaska Bottom Trawl Survey



- Long standing, standardized survey (1990 - present)
- Stratified random design: 59 subjectively designated strata
- Since 1990 there have been,  
9 surveys  $\leq$  1,000 m (3 trawlers)  
6 surveys  $\leq$  700 m (2 trawlers)
- Future expectation: 2-boat surveys to 700 m... & more changes



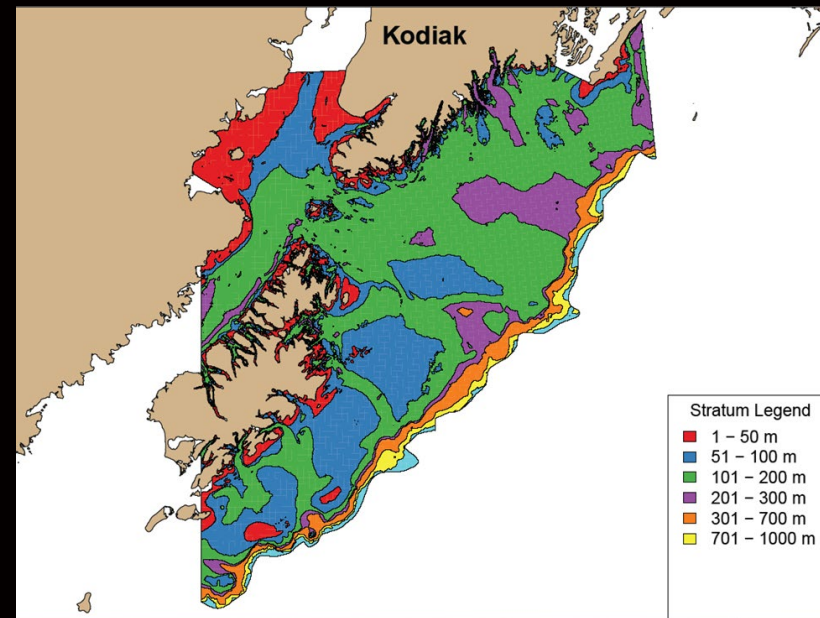
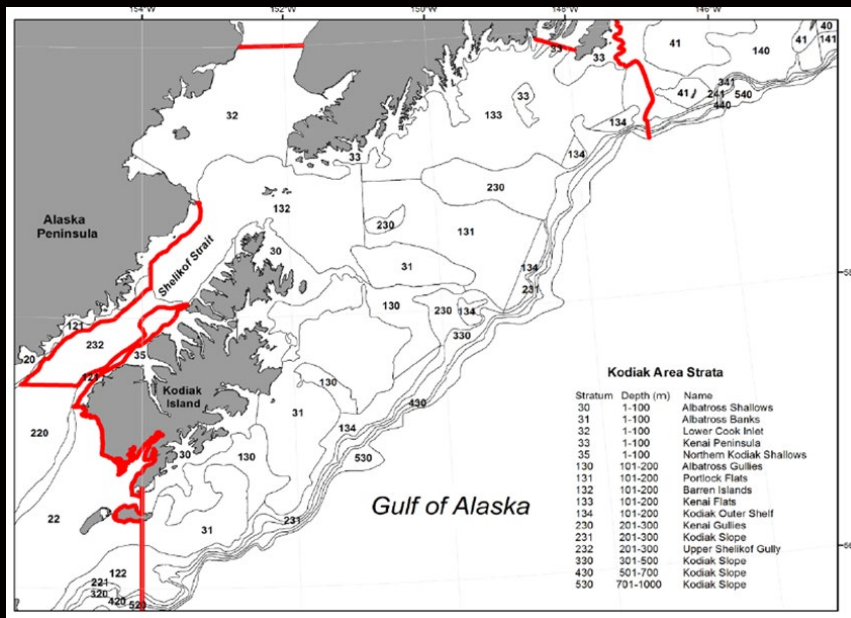
## Updating the GoA Trawl Survey: Restratication

- Optimization strategy used spatiotemporal distribution info from historical surveys
- 14 species of groundfishes included
- one boat, two boat, three boat models
- criterion was to minimize CV in biomass estimates across species set





## Summary of GOA Restructuring



- Historical Strata (N = 59)
- IPNFC Areas
- Neyman allocation

- 2025 Strata (N = 30)
- NMFS Areas
- Bethel algorithm allocation
- More flexible, minimized CV



## Bering Sea Bottom Trawl Survey(s)

- Design one survey for all 3 historical regions
  - EBS shelf (1982-present)
  - NBS shelf (2010, 2017-2022)
  - EBS slope (sporadic, last in 2016)
- Optimize, expand, flexible(ize) effort allocation
- Update and replace obsolete gear, protocols



## Timeline for Bering Sea Survey Redesign



2023: New door testing

2024-2025: New net testing

2021-2024: 15/30 min calibration

2023-2025: Slope/Shelf gear calibration and  
standardization

2025-2026: Standardization of new methods and  
testing new survey design

2026-2027: Inter survey calibration



# Updating the Data Delivery Model

- Public data interfaces: (FOSS, DisMAP)
- Tracking data requests in Github
- Optimizing AKFIN data delivery
- Optimizing internal database structures
- Design-based -> Model-based

**NOAA Fisheries Alaska Bottom Trawl Survey Public Data Products**

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**Fisheries One Stop Shop (FOSS) Data Portal**  
Interact with user-friendly tables or pull data dynamically through our API.  
• Modernized data accessibility  
• Descriptive user metadata and documentation  
• Welcomed collaboration  
How can these data best serve you?

**Data Reports, Community Highlights, and Presentations**  
<https://www.fisheries.noaa.gov/about/groundfish-assessment-program>  
Find official catch estimates, environmental summaries, and other survey findings.  
• Data Reports  
• North Pacific Groundfish Plan Team  
• Strait Science Talks and Community Highlights through Alaska Sea Grant and the University of Alaska Fairbanks

**Request Data From Us**  
<https://github.com/afsc-gap-products/data-requests>  
Request data that are not available from our other standard data products.  
• Email our team: [afsc-gap.metadata@noaa.gov](mailto:afsc-gap.metadata@noaa.gov)  
• Request data through our GitHub Repository by submitting an issue

**Follow Us During the Survey!**  
<https://www.fisheries.noaa.gov/database/science-datal>  
Stay up-to-date on survey progress, planned stations, and bottom temperatures at each station during the survey. Plots are updated every business day.

**Work With Our Tools: Open-Source R Packages**  
<https://github.com/afsc-gap-products>  
R packages to produce survey data products and visualizations.  
• **[akgmaps]** bottom trawl survey map layers and plotting examples  
• **[coldpool]** cold pool area and temperature data for the Bering Sea  
• **[akfishcondition]** groundfish morphometric condition indicators for fish in the Bering Sea, Aleutian Islands, and Gulf of Alaska

**Distribution Mapping and Analysis Portal (DisMAP)**  
<https://maps.afsc.fisheries.noaa.gov/dismap/>  
Explore species distribution, other metrics, and time series for many surveys conducted by NOAA Fisheries.  
• Single species analyses  
• Regional analyses  
• Port Availability (coming soon!)  
• Multispecies analyses (coming soon!)

**tool development**  
**collaboration**  
**transparency**  
**product standardization**  
**flexibility**  
**efficiency**  
**open science**

Sunrise on the eastern Bering Sea aboard the F/V Alaska Knight in 2022. Credit: NOAA Fisheries



## So What's the Downside?

- Testing and calibration activities are \$\$\$\$
- Testing and calibration activities consume time and effort (need to drop something)
- Concerns of data users; continuity of results

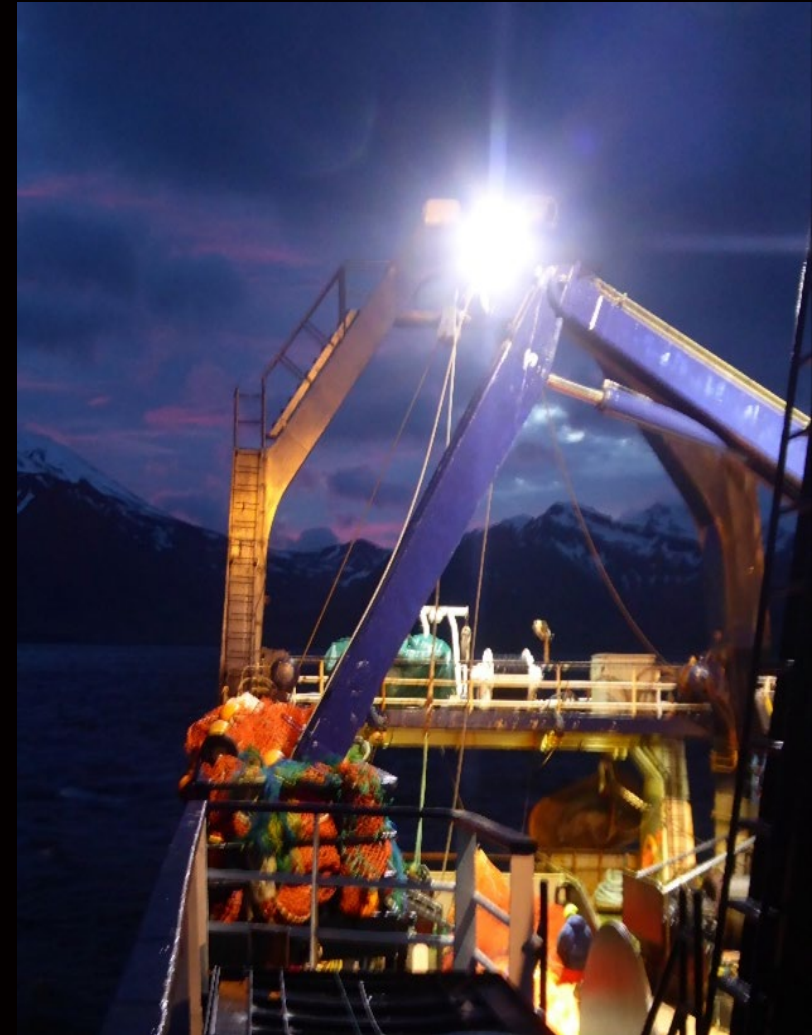




## Summary

- Change is inevitable – we need to prepare in order to provide consistently high-quality data
- Thoughtful survey redesign is expensive!
  - Simulation studies
  - Gear development, testing
  - Calibration studies
- Comprehensive redesign of AFSC trawl surveys in Alaska is well underway

Slow is smooth, smooth is fast





Thank you!

