AI and EM in U.S. Fisheries

NOAA FISHERIES

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August 2, 2023

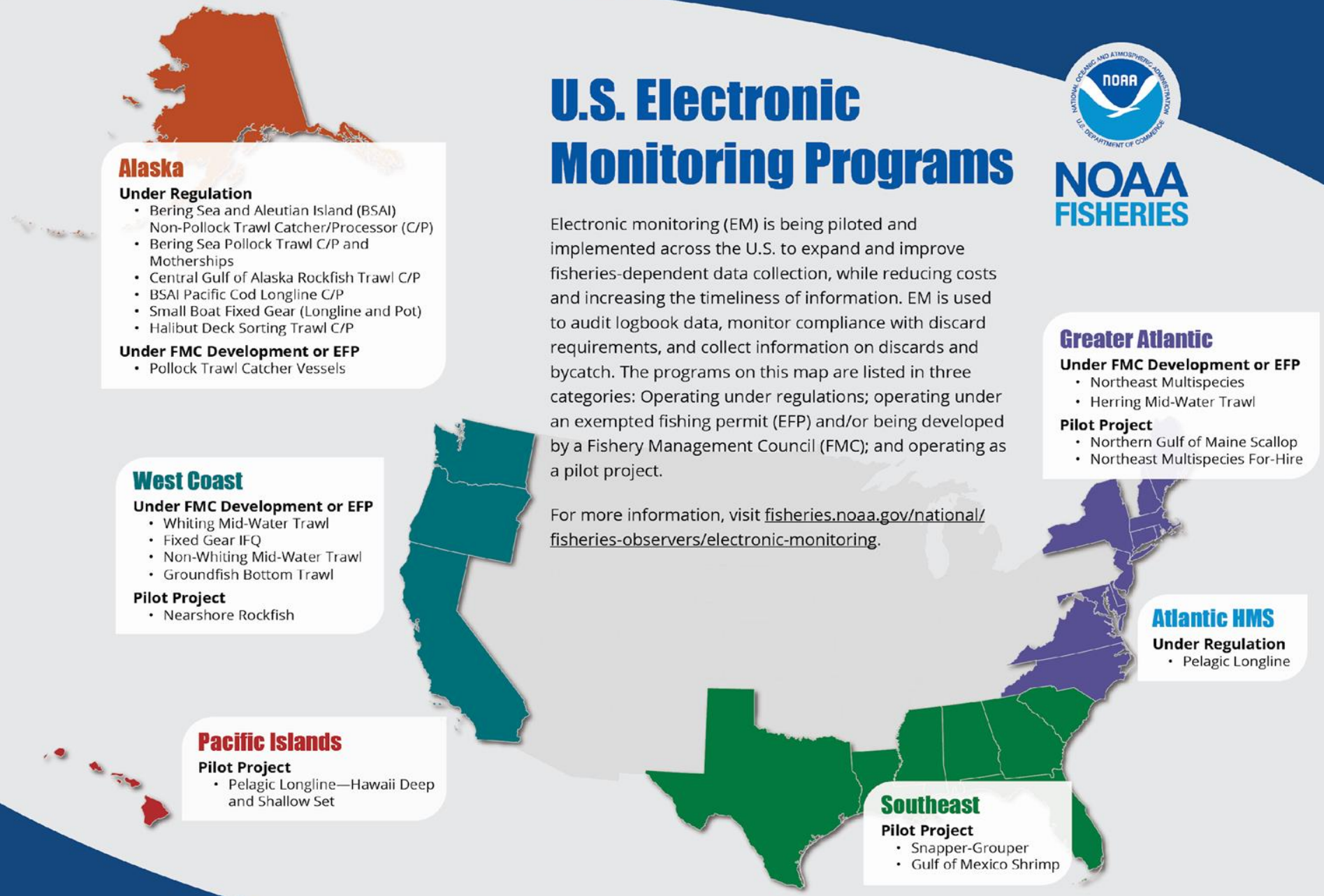
Global Fisheries Enforcement
Training Workshop

U.S. Electronic Monitoring Programs

NOAA FISHERIES

Electronic monitoring (EM) is being piloted and implemented across the U.S. to expand and improve fisheries-dependent data collection, while reducing costs and increasing the timeliness of information. EM is used to audit logbook data, monitor compliance with discard requirements, and collect information on discards and bycatch. The programs on this map are listed in three categories: Operating under regulations; operating under an exempted fishing permit (EFP) and/or being developed by a Fishery Management Council (FMC); and operating as a pilot project.

For more information, visit fisheries.noaa.gov/national/fisheries-observers/electronic-monitoring.



Alaska

Under Regulation
- Bering Sea and Aleutian Island (BSAI) Non-Pollock Trawl Catcher/Processor (C/P)
- Bering Sea Pollock Trawl C/P and Motherships
- Central Gulf of Alaska Rockfish Trawl C/P
- BSAI Pacific Cod Longline C/P
- Small Boat Fixed Gear (Longline and Pot)
- Halibut Deck Sorting Trawl C/P

Under FMC Development or EFP
- Pollock Trawl Catcher Vessels

West Coast

Under FMC Development or EFP
- Whiting Mid-Water Trawl
- Fixed Gear IFQ
- Non-Whiting Mid-Water Trawl
- Groundfish Bottom Trawl

Pilot Project
- Nearshore Rockfish

Pacific Islands

Pilot Project
- Pelagic Longline—Hawaii Deep and Shallow Set

Greater Atlantic

Under FMC Development or EFP
- Northeast Multispecies
- Herring Mid-Water Trawl

Pilot Project
- Northern Gulf of Maine Scallop
- Northeast Multispecies For-Hire

Atlantic HMS

Under Regulation
- Pelagic Longline

Southeast

Pilot Project
- Snapper-Grouper
- Gulf of Mexico Shrimp

EM Programs in the U.S.

Video Review

-EM used to validate logbooks, compliance, and direct observations
-Range from ~10% (Atlantic HMS) to 100% (many programs)
-Northeast groundfish audits 3rd party data quality (i.e., second video review)

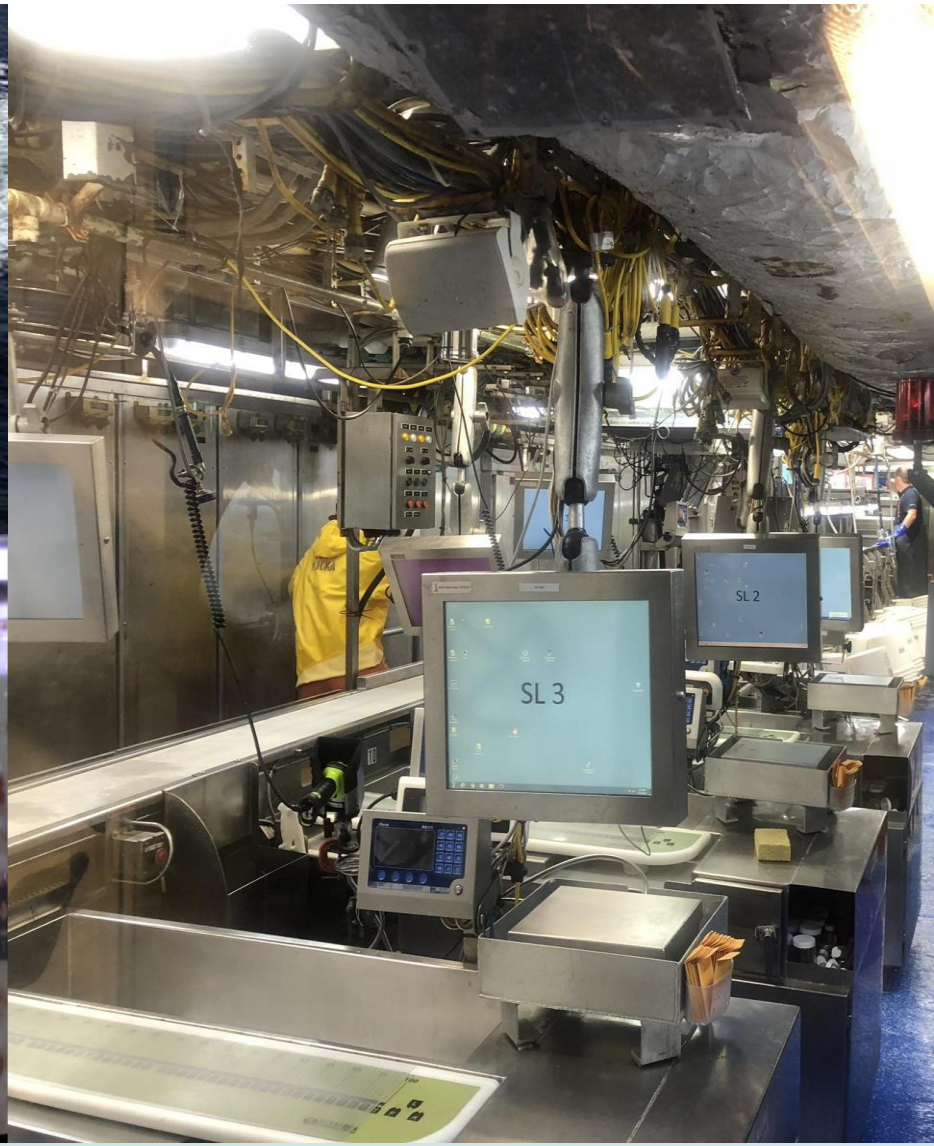
Data Quality

-Timely feedback reports to captains and EM service providers is critical
-Alaska Fixed Gear program sends letters to participants due to poor quality
-Northeast programs have a dynamic API for receiving and validating data

Artificial Intelligence and Machine Learning

-Almost every program or project is annotating imagery for AI models
-Testing EM system configuration, chutes for discards
-Models for species ID, object detection (crew, fishing gear, catch on deck)
-Leveraging imagery from other programs (observers, dealers, survey vessels)
-National EM imagery library under development to centralize annotated data

Leveraging Survey Data



Leveraging Survey Data

1622

Total hours of video w/activity

363

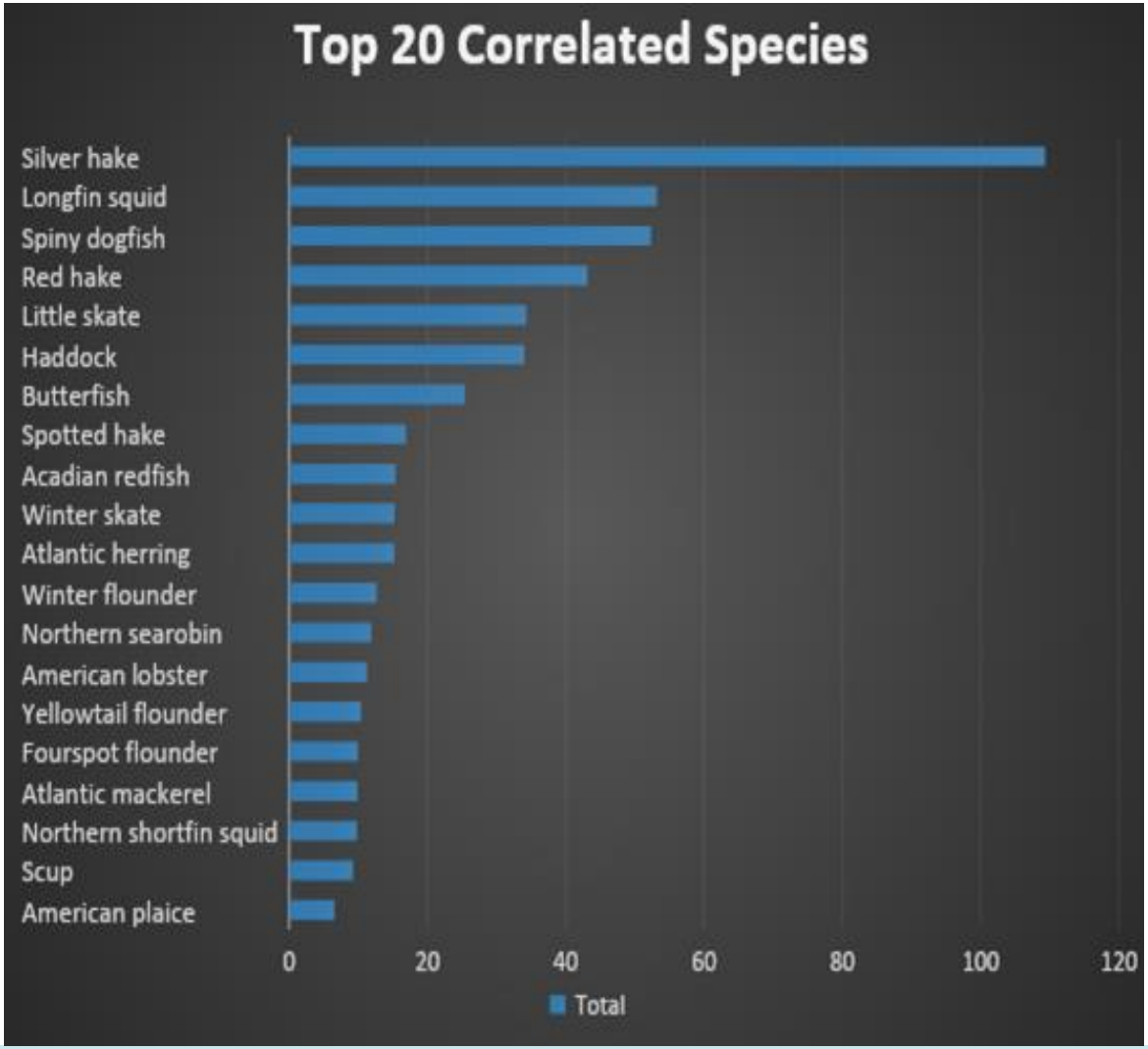
Species represented

657k

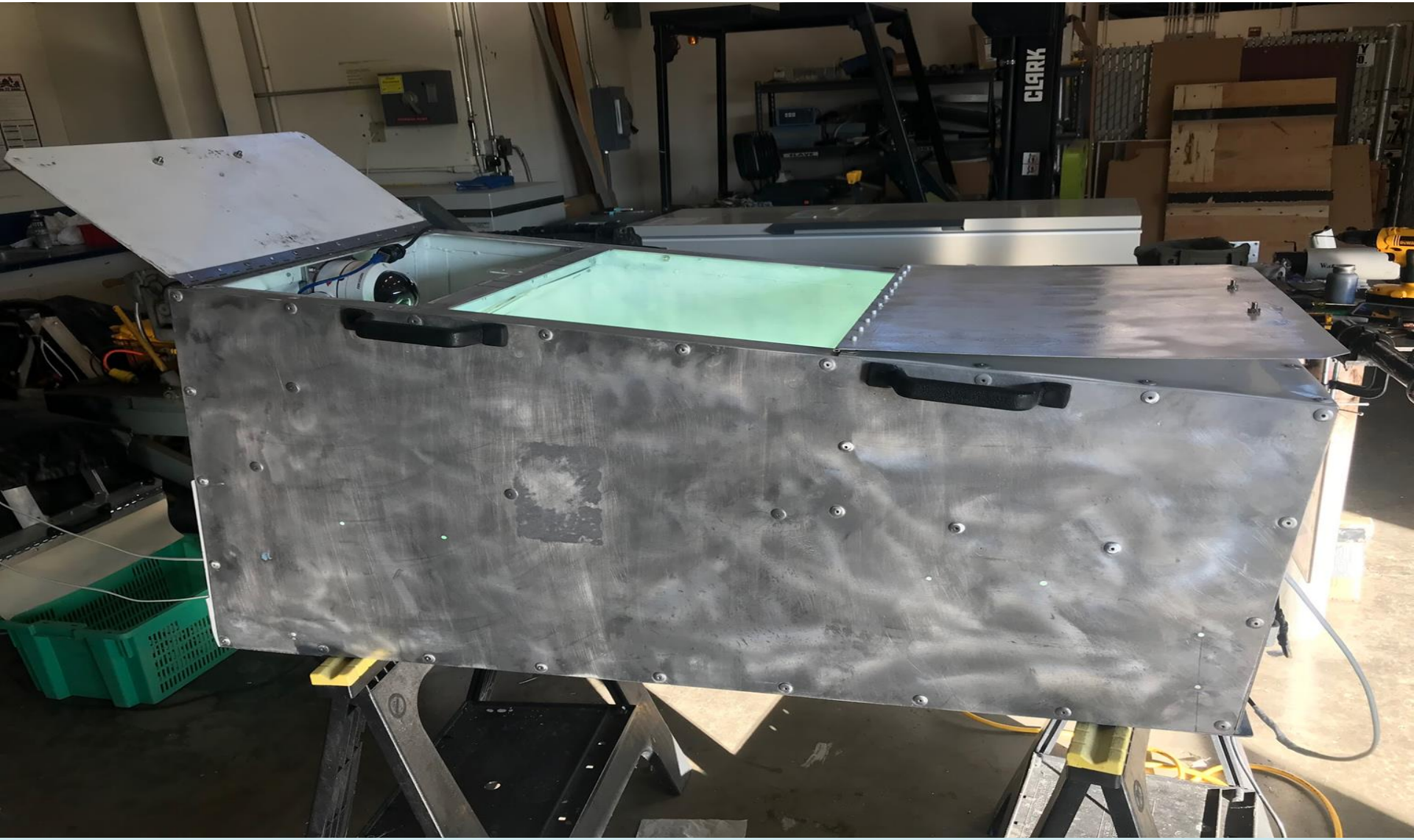
Correlated measurement events

34

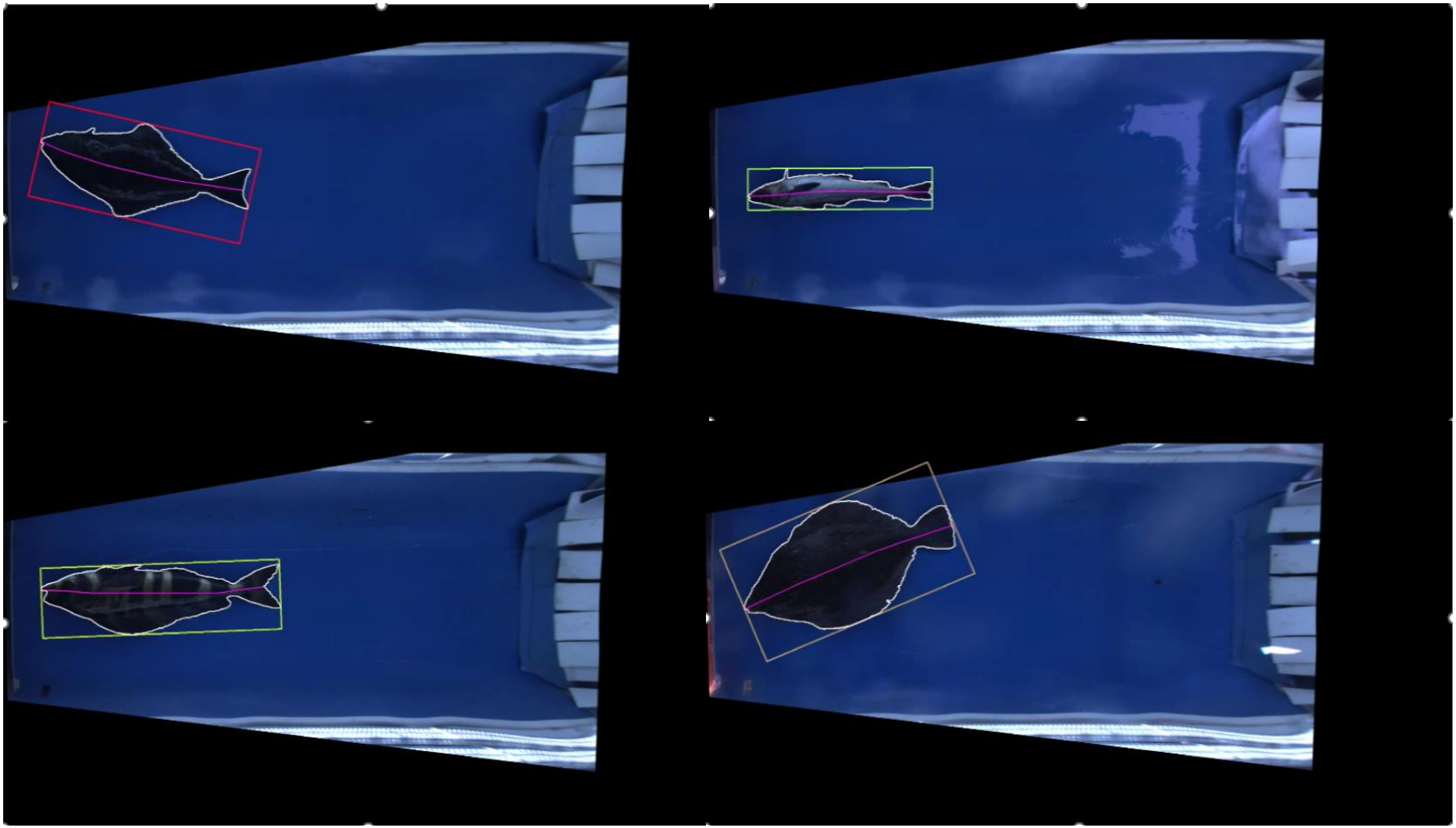
Prioritized species



Discard Chute System

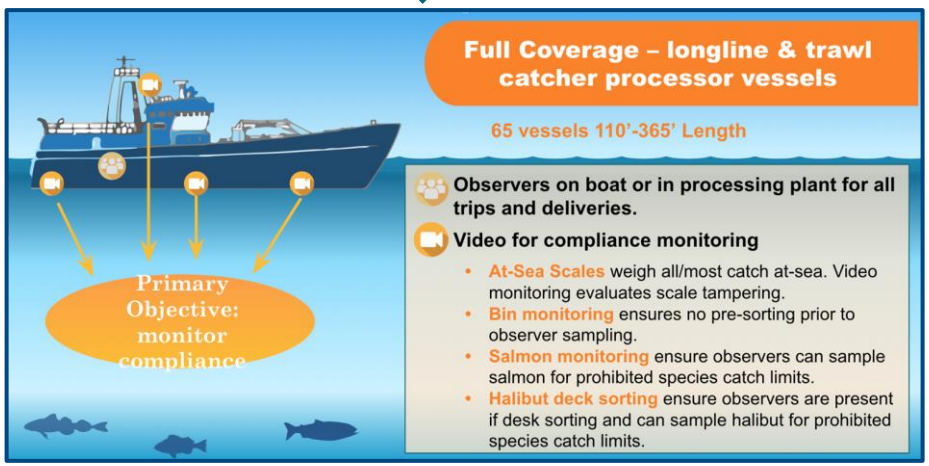


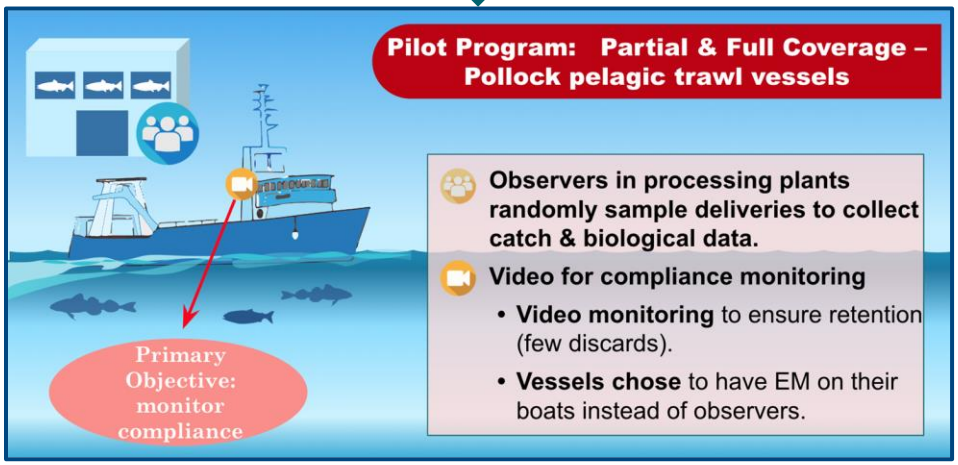
Discard Chute System

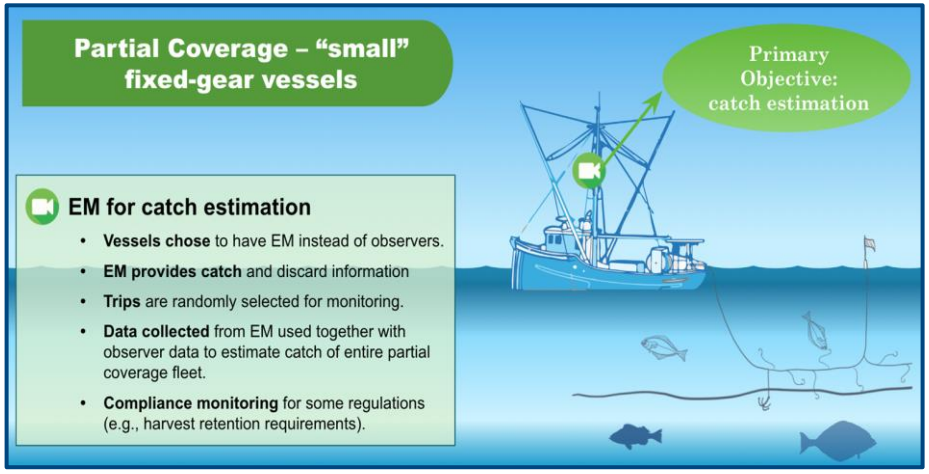


EM in Alaska

Compliance monitoring is the primary objective of most EM programs in Alaska. EM and observers are deployed together, EM ensures observers have access to unsorted catch and all areas of the vessel.







Compliance monitoring is a secondary objective in other Alaska EM programs, and can document potential violations of retention requirements, seabird avoidance measures, and species mishandling.

EM in the Northeast

Audit		Maximized Retention
EM validates captain's reported groundfish discards.	Goal	EM confirms vessel retained all allocated groundfish for dockside monitor to observe.
Measure groundfish discards within camera view.	Changes to How You Fish	Retain and land all allocated groundfish, regardless of size, for sampling by a dockside monitor.
Record all catch using eVTR.		Record all catch using eVTR.
Use sub-sampling protocols for faster processing of high volumes of groundfish.		Meet dockside monitor upon landing to observe offload. All landed fish may be sold.
Submit the video footage from the trip to your EM service provider.		Submit the video footage from the trip to your EM service provider.
Reviews video from randomly selected trips and provides NOAA Fisheries with a summary report documenting the groundfish discards.	What Your EM Provider Does	Reviews the video from trips and provides NOAA Fisheries with a summary report verifying discard compliance.
Compares your eVTR report to the EM provider's summary report for quota accounting.	What NOAA Fisheries Does	No allocated groundfish discards are attributed to the trip, but all landed groundfish counts against the sector's quota.
Provides feedback to you explaining whether the eVTR and EM summary report matched to help you improve your reporting and groundfish discard estimates.		Reviews EM provider's summary report to ensure compliance with retention requirements.
Reviews a subset of trips to monitor the EM provider's performance.		Uses catch data collected by the dockside monitor for science.
		Reviews a subset of trips to monitor the EM provider's performance.

EM in the Northeast

EM videos and the full NOAA Story Map are available here

Man-on-deck

Available Resources on EM

Electronic Technologies Policies

- National Electronic Technologies Policy Directive (04-115)
- EM Cost Allocation Procedural Directive (04-115-02)
- EM 3rd-Party Data Retention Procedural Directive (04-115-03)
- Procedural Directive on Applying Information Law to EM Data (04-115-04)

National EM Workshops (2019 and 2020)

- Report and video recordings from workshops

ICES Working Group to Integrate Technology in Fisheries (WGTIFD)

- Reports from 2019 - 2021; TORs approved 2022 - 2024

Regional EM Programs

- Alaska
- West Coast
- Northeast

Public Websites

- NOAA Website and EM Story Map
- EM4Fish
- SAFET

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Thank you!