

# Observer and Electronic Monitoring Programs

in the Groundfish and Halibut Fisheries off Alaska

September 2021 – Joint Groundfish Plan Team Meetings

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# Observer and EM Monitoring:

Review of 2020 – How were resources deployed? How did those choices affected the data in use today?

2021 – How are resources being deployed? What can you expect in the data used next year?

2022 –How will resources be deployed?

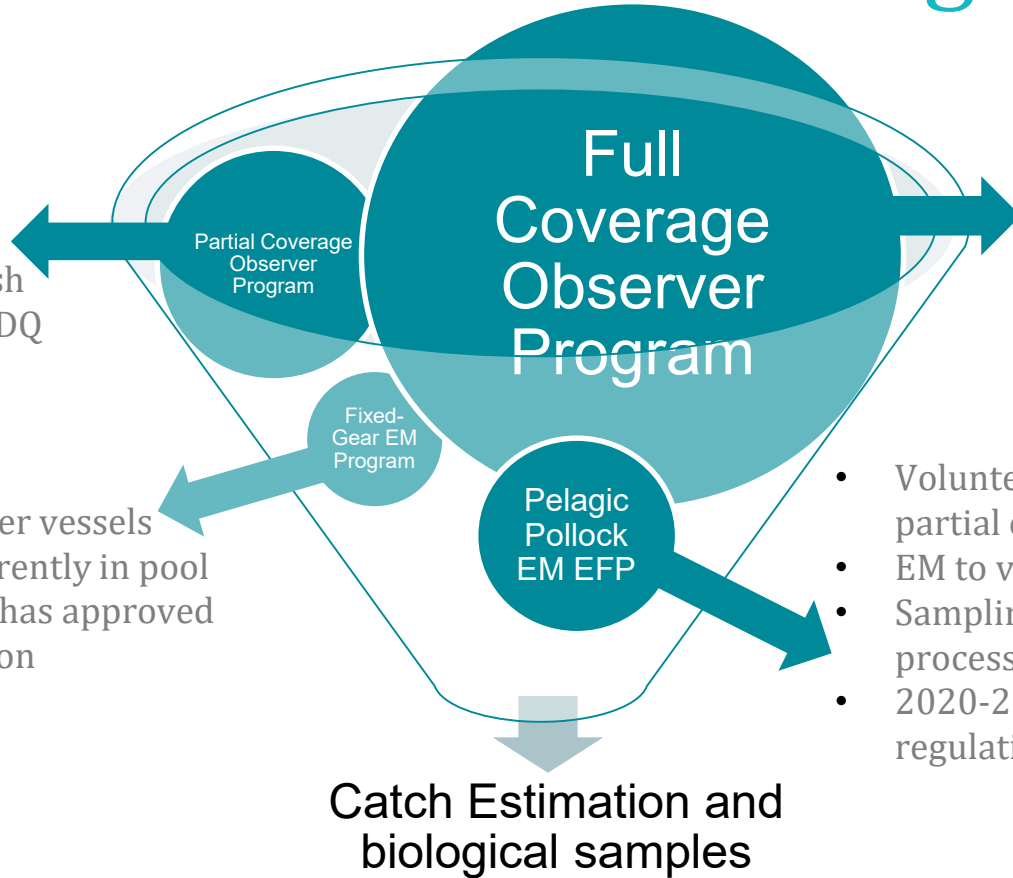
2022 and beyond: How can you affect the data available for use in the future?



# Observer and EM Monitoring

- CVs not in full coverage
- CVs fishing halibut IFQ or CDQ
- CVs fishing sablefish IFQ or fixed gear CDQ
- Few small C/Ps

- Volunteer vessels
- 169 currently in pool
- NPFMC has approved expansion



- Majority of C/Ps
- MS and CVs in AFA or CDQ (unless in EFP)
- CVs in CDQ (except sablefish or pot CVs)
- CV in GOA Rockfish

- Volunteer vessels from full **and** partial coverage
- EM to verify no or low discard
- Sampling of random trips at processing plants
- 2020-2023 under EFP; expect regulation for 2024

Catch Estimation and biological samples

# Annual Deployment Plans for the Partial Coverage Observer and EM Programs

How NOAA Fisheries intends to assign observer and electronic monitoring resources to vessels in the partial coverage category

**The [every year] Draft ADP Analysis is focused on presenting several variants of the partial coverage fishery monitoring program for comparison**

Input on ADP provided by:

- Fishery Monitoring Science Committee (AFSC, AKR, IPHC, PSMFC)
- NPFMC's Partial Coverage Fishery Monitoring Committee
- NPFMC's SSC and AP
- North Pacific Fishery Management Council



# 2020 Deployment Plan

Full coverage – 1 or 2 observers at all times

Partial coverage – Random Trip Selection

- Set by Annual Deployment Plan
  - Trawl – 20%
  - Hook-and-line – 15%
  - Pot – 15%

Fixed Gear EM – 30%

- Set by policy – this has remained unchanged since inception of the program

Pelagic Pollock trawl EM EFP

- 41 vessels in BS and GOA
- Full EM coverage for compliance with low-to-no discard only
- Biological data to be collected at processing plant



# 2020: Deployment and Disruptions

- March 24: NOAA Fisheries issued an emergency rule allowing observer coverage waivers
  - Although this allowed waiving coverage in all observer programs (full and partial), FMA worked to maintain full coverage uninterrupted
  - Full coverage amounts to ~90% of coverage days
- March 26: Observer coverage for all partial coverage vessels was waived
- April 20: Waiver for vessels operating from the port of Kodiak was lifted and coverage resumed at ADP levels
- June 28: Waiver for vessels operating from 13 additional ports was lifted with a redesigned Deployment Plan
  - Port fidelity with observers completing port-specific 14-day quarantine periods
- Data loss associated with the waiver will impact fisheries harvested by the partial coverage sector
- The Pollock Trawl EM EFP helped mitigate COVID-19 related data loss, but had impacts of its own
- Processing Plants – Vessel observers could not enter most processing plants to collect biological samples; shoreside observers were deployed to ensure COVID-19 protocols can be followed while limiting data loss



# 2021 Deployment Plan

Full coverage – 1 or 2 observers at all times

Partial coverage – Random Trip Selection from Identified Ports Only

- Set by Annual Deployment Plan
  - Trawl – 16%
  - Hook-and-line – 15%
  - Pot – 15%

Fixed Gear EM – 30%

- Set by policy – this has remained unchanged since inception of the program

Pelagic Pollock trawl EM EFP

- 48 Vessels
- Full EM coverage for compliance with low-to-no discard only
- Biological data to be collected at processing plant: 30% in GOA and 100% in BS



# 2021 Annual Deployment Plan - Updated

In response to changes in Alaska's health advisories and widely available vaccinations, Partial Coverage was altered from the initial 2021 ADP to include the following:

- Coverage has been expanded to all ports;
  - Port-specific coverage for COVID protocols introduced bias, created data gaps, and was not cost efficient.
- Trip-specific waivers for reduced travel availability or if no observer is available; and
- Supplemental shoreside observers are no longer being deployed for GOA pollock.

The vast majority of partial coverage observers are fully vaccinated, so the need for quarantine is rare.

[Temporary rule](#) allowing increased flexibility in observer coverage will expire March 26, 2022.

This is our starting point for the Draft 2022 ADP.





# 2022 DRAFT Annual Deployment Plan

Council Recommendations from the June 2021 Motion:

1. Maintain the three gear-based strata (pot, longline, trawl).
2. Evaluate trip-based vs port-based deployment. Evaluation of port-based deployment should maintain the existing 14 ports and reflect updated COVID-19 rules (e.g., vaccination status may alleviate need for 14-day quarantine and allow movement among ports).
3. Maintain the 15% baseline hurdle for each gear type and optimize such that all additional observer days above the baseline coverage level are placed on trawl gear. The Council supports evaluation of the FMAC suggestion to ensure optimization days if funding alone is not sufficient, as practicable.
4. Additional fixed gear electronic monitoring (EM) vessels should be added as possible under existing funds. A vessel's ability to share EM systems in select ports should be considered as an additional criterion to prioritize new candidate EM vessels for the EM pool.

The Council further supports the May 2021 FMAC recommendations including completion of the comprehensive partial coverage cost efficiencies analysis in 2022 for implementation in the 2024 ADP and in time to inform and affect the next Federal observer contract. The Council priorities for cost efficiency in partial coverage remain: 1) completing a regulated program for use of EM for pelagic trawl in the GOA and BSAI; 2) integration of electronic monitoring into the overall monitoring of fixed gear; and 3) evaluation of different criteria to define the 'zero selection' pool for fixed gear. The Council recommends ongoing communication with the Council's PCFMAC during this process.



# Analytical problems

1. What will fishing effort be in 2022?
2. How to allocate afforded samples?
3. What vessels will be participating in fixed gear EM (2022)\*?
4. What vessels will be participating in Trawl EM EFP\*?
5. Account for variance in ODDS selection rates
6. Don't go over budget

\* Unknown until Final ADP.



# Fishing Effort

Methods following the 2021 ADP [Ganz and Faunce (2019; NOAA/AFSC-TM 395) with modification for COVID19]:

- Fishing trends per *sector* (Target + Gear + FMP) in the past are compared to current fishing trends to date.
- Then, for each sector, we determine a suite of years - or single year - to extrapolate the current year's fishing effort for the rest of the year.
- Normally, we would use this value as a guide for 2022 fishing. However, due to the impact of COVID on the market and fishing operations, the past two years may not be predictive of 2022. As was done in the 2021 ADP, we applied some variation in our estimates. This time the number of fishing trips varied  $\pm 11.2\%$ , which is the average % that estimates have differed from realized effort over the past three years.



# Allocation strategies (4 alternatives):

## Equal rates

- Applies relative weightings to the size (effort) within each deployment stratum
  - Fishing trips with gear types that have more trips in the year get proportionally more monitored trips.
  - All logged trips get the same selection probability

## Minimum + Optimization (*Status quo*)

- Applies equal rates algorithm up to a minimum coverage rate and then applies an optimization algorithm for additional monitored trips
  - Minimum coverage set to 15%
  - Optimization by combination of:
    - Discarded groundfish
    - Chinook Prohibited Species Catch
    - Halibut Prohibited Species Catch
  - Every logged trip in a *stratum* gets same selection probability; probabilities differ among strata.



# Allocation strategies

## Minimum + Trawl Optimization

- Applies equal rates algorithm up to a minimum coverage rate and then assigns all additional monitored trips to trawl vessels
  - Minimum coverage set to 15%
  - Every logged trip in a *stratum* gets same selection probability; probabilities differ among strata.

## Adjusted Minimum + Optimization

- Applies strata-specific minimum coverage rates and then applies an optimization algorithm for additional monitored trips
  - Strata-specific minimum rates ensure a 95% probability of achieving the 15% threshold. Strata with fewer trips require a higher minimum rate.
  - Optimization by combination of:
    - Discarded groundfish
    - Chinook Prohibited Species Catch
    - Halibut Prohibited Species Catch
  - Every logged trip in a *stratum* gets same selection probability; probabilities differ among strata.

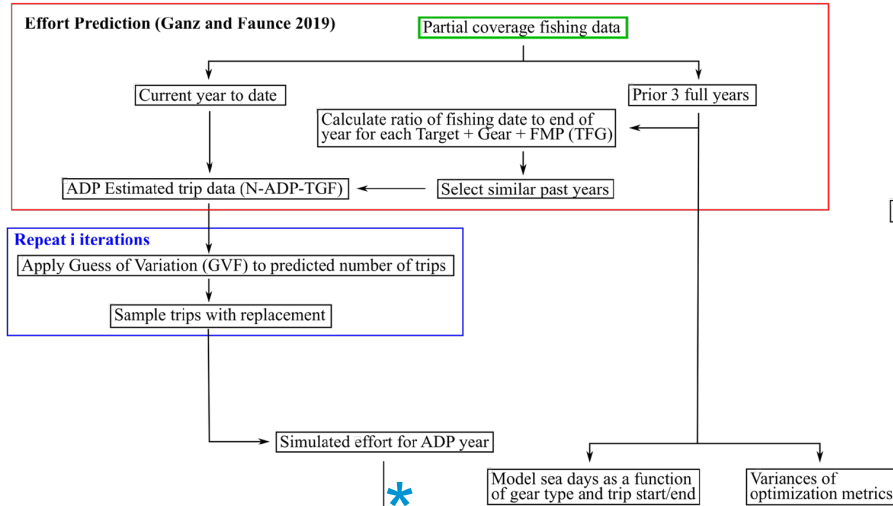


# Methods Overview

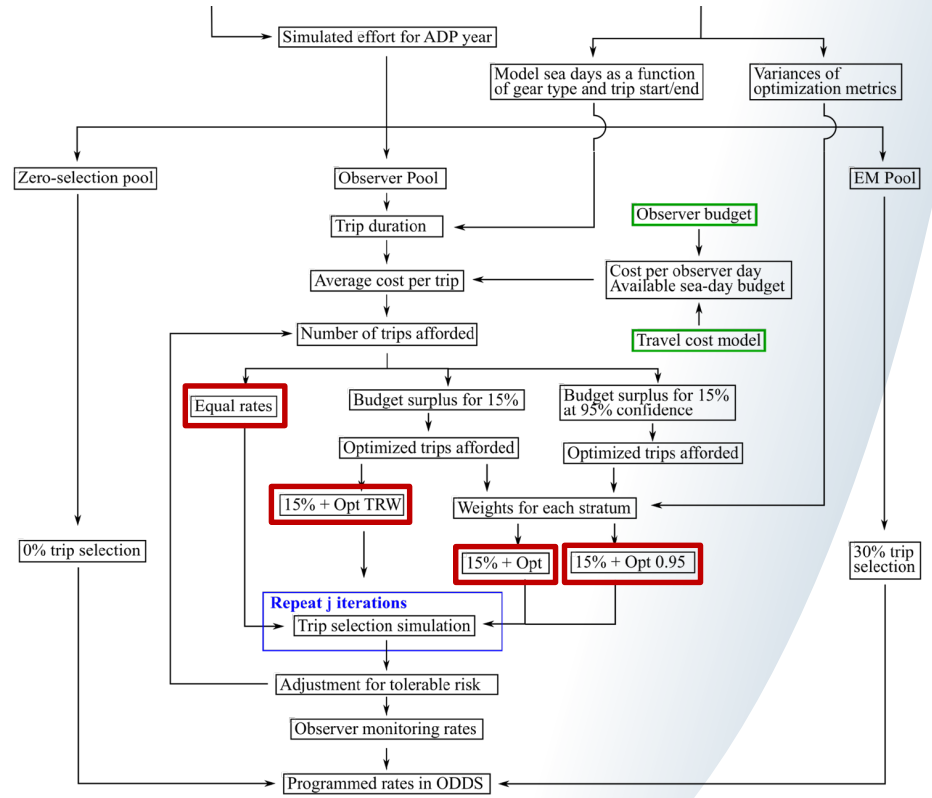
Simulate 500 fishing effort 'populations' (versions of 2022 fishing)

For each population:

- Estimate afforded rates for each allocation method, simulating ODDS trip selections 1000 times (500,000 total)
- Evaluate allocation strategies (next slide)



\* Figure B-1



# Methods – Evaluation

The allocation strategies were evaluated by comparing similarity indices (as in prior draft ADPs), which evaluate the expected proximity of monitored trips to similar unmonitored trips in both time and space.

Higher coverage rates lead to higher indices, but the concentration of fishing effort in time and space influence whether differences in indices are meaningful.

Similarity indices were compared for major domains, defined by gear type, FMP, and target species.

Allocation strategies do not affect EM, so there were no EM-EM comparisons.

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## Analyses

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Observer/Observer pool discards **(OB-OB)**

Observer/Zero pool discards **(OB-ZE)**

Average weight **(OB-EM)**

EM pool discards **(EM-EM)**



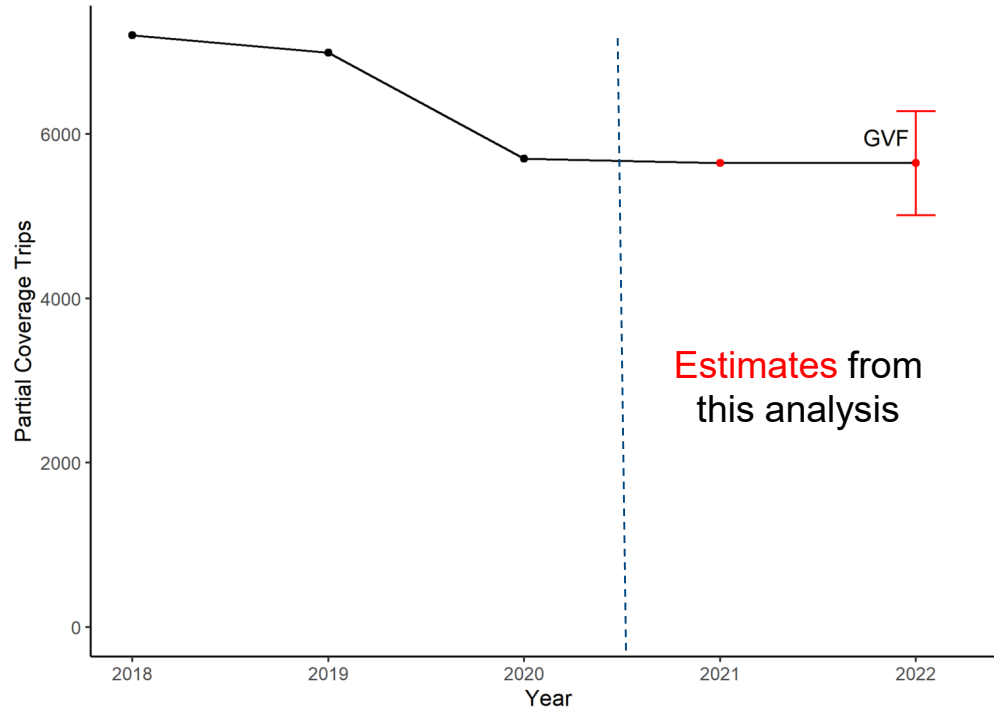
# Results





# Results - Fishing Effort

Figure B-2



# Results – Selection Rates

Table B-3

Allocation scheme	Strata	N	$W_{h_{opt}}$	Confidence		Days			Rate		
				Level	Rate Reqd	Hurdle	Opt	Total	Lower	Median	Upper
Equal Rates	HAL	1,178				922	271	1,193	17.56	<b>19.44</b>	21.76
	POT	990				851	251	1,101	17.56	<b>19.44</b>	21.76
	TRW	681				330	97	428	17.56	<b>19.44</b>	21.76
15% + Opt	HAL	1,178	0.2410	0.50	15.00	922	142	1,064	16.45	<b>17.47</b>	18.73
	POT	990	0.0747	0.50	15.00	851	44	895	15.48	<b>15.83</b>	16.25
	TRW	681	0.6842	0.50	15.00	330	404	734	26.40	<b>34.59</b>	44.50
15% + Opt 0.95	HAL	1,178	0.2421	0.95	16.86	1,036	188	1,110	17.12	<b>18.21</b>	19.54
	POT	990	0.0749	0.95	17.04	967	139	990	17.06	<b>17.48</b>	18.04
	TRW	681	0.6831	0.95	17.52	386	258	594	20.24	<b>28.10</b>	37.79
15% Opt TRW	HAL	1,178				922	0	922	15.00	<b>15.00</b>	15.00
	POT	990				851	0	851	15.00	<b>15.00</b>	15.00
	TRW	681				330	641	971	32.18	<b>44.09</b>	59.06



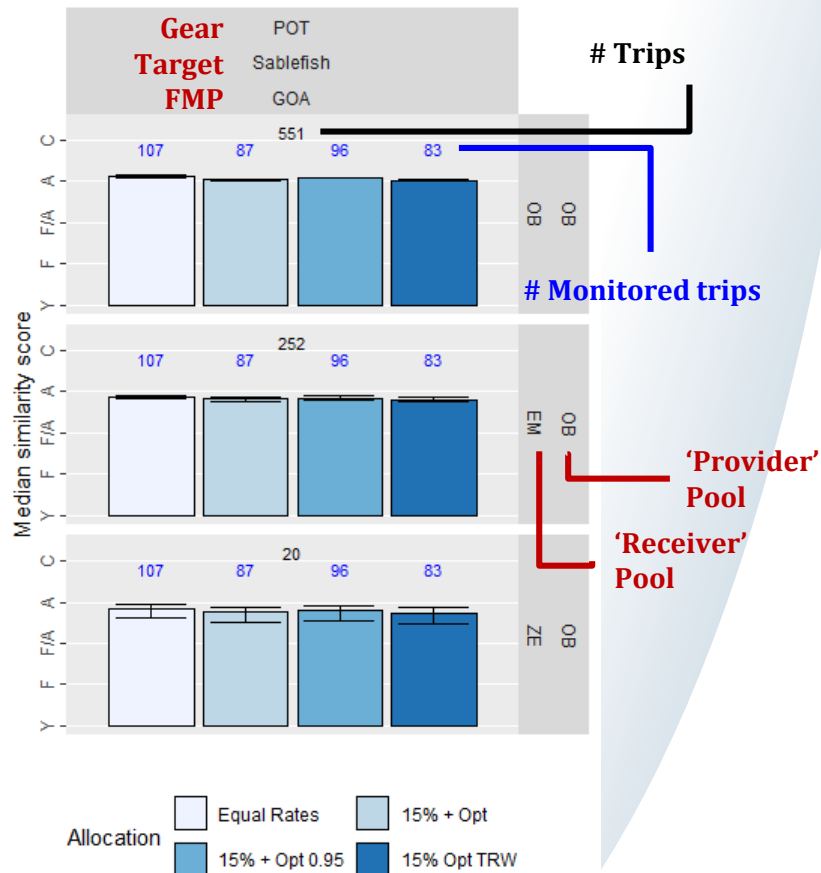
# Results – Similarity Analyses

Similarity indices are scaled between 0 and 1 and describe the average proximity of monitored trips to unmonitored trips.

The following figures show the distribution of the average similarity indices from each of the 500 simulated populations.

Error bars represent then 0.025 and 0.975 quantiles (middle 95% of outcomes).

Score	Category	Description
1.00	C	All trips monitored (“ <b>C</b> covered”)
0.75	A	Within 15 days of monitored trip in same NMFS <b>A</b> rea
0.25	F	Within 45 days of monitored trip in same <b>F</b> MP
0.00	Y	<b>Y</b> ear-to-Date’, i.e. > 45 days and/or FMP



# Results – Summary

Figure B-7

For each domain, scale the allocation schemes relative to the allocation strategy with the highest average similarity score.

**Darker** = lower score (want high scores)

## Equal Rates

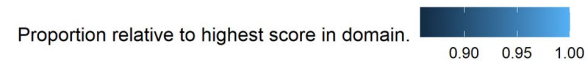
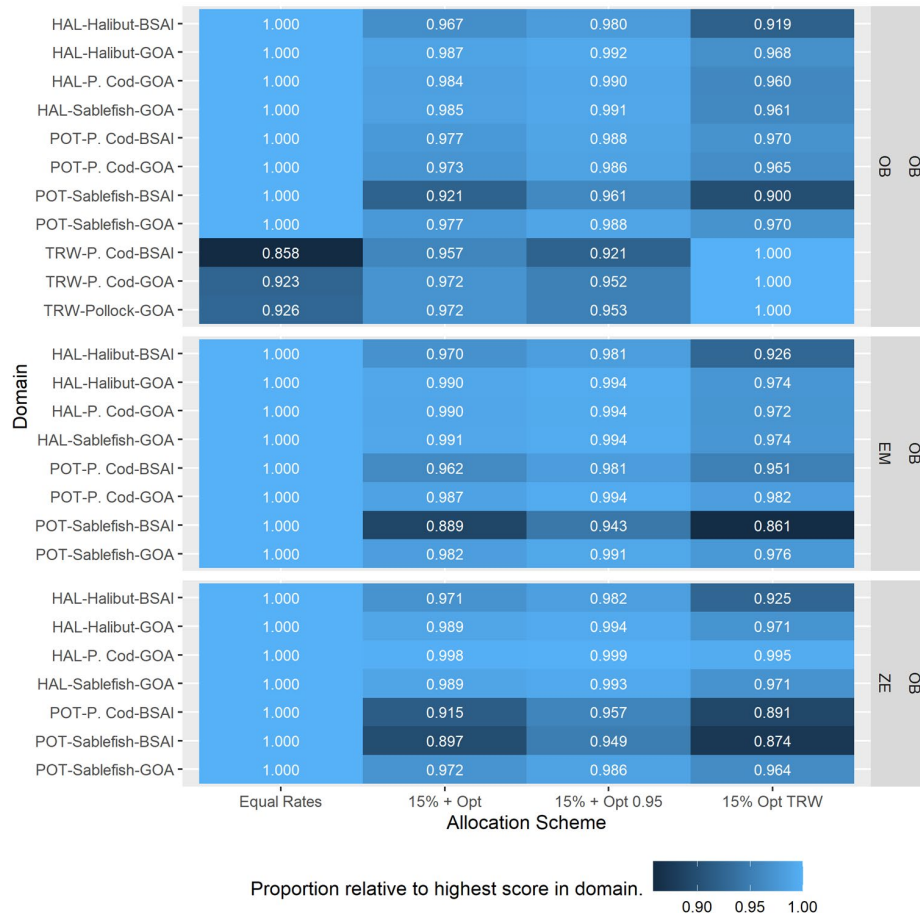
highest scores for the fixed-gear strata,

## 15% + Opt TRW

highest scores for the Trawl stratum.

## 15% + Opt is similar to 15% + Opt TRW

15% + Opt 0.95 is intermediate to Equal Rates and 15% + Opt TRW, with the added benefit of a high probability of meeting the 15% minimum rate.



# NMFS Recommendations - EM

## Fixed Gear EM trip-selection pool:

- Requests to opt in (or out) of the EM selection pool for 2022 must be received by November 1, 2021.
- NMFS will inform operators as to adherence to approved VMP; vessels which do not adhere to their VMP may not be eligible to participate in the following year.
- Expect the EM pool size to be maintained from 2021. If funding is insufficient to accommodate all the vessels that request to participate in the EM selection pool, NMFS will prioritize placement in the EM selection pool as follows:
  - vessels that are already equipped with EM systems;
  - vessels that are cost effective for EM and unlikely to introduce large data gaps; and
  - vessels 40-57.5 ft LOA where carrying an observer is problematic due to bunk space or life raft limitations.

## Trawl EM Trip-Selection Pool

- NMFS will continue to support the Trawl EM EFP.
- NMFS has offered to supplement shore-based observer coverage in the GOA, if needed.



# NMFS Recommendations - EM

## **Support Fixed Gear Mobile EM System Testing:**

- Phase 1 currently being conducted and results are pending
- Phase 2 will test the effectiveness of the mobile EM systems with 12 vessels that are either in the zero selection pool or in the Observer Trip Selection pool.
  - If a Phase 2 vessel is selected for observer coverage, NMFS could waive the observer coverage on that trip.

## **Support EM Projects that Receive NFWF Funding:**

- NMFS will support projects that receive NFWF funding to test EM innovations in 2022. The expectation is that these projects will known in time to be incorporated in the final ADP.



# NMFS Recommendations - Observer Coverage

## No-selection pool

As in previous deployment plans, NMFS recommends the no-selection pool continue to be composed of fixed-gear vessels less than 40 ft LOA and vessels fishing with jig gear, which includes handline, jig, troll, and dinglebar troll gear.

## Observer trip-selection pool

NMFS recommends 3 sampling strata for the deployment of observers into partial coverage for 2022:

- Hook-and-line vessels greater than or equal to 40 ft LOA,
- Pot vessels greater than or equal to 40 ft LOA, and
- Trawl vessels

## Waivers

NMFS may release trips from observer coverage on a trip-by-trip basis consistent with the June 17, 2021 [updated NOAA Fisheries observer waiver policy](#).



# NMFS Recommendations - Observer Coverage

NMFS recommends an observer deployment allocation strategy of an adjusted 15% plus optimization based on discarded groundfish, halibut PSC, and Chinook PSC.

As a preliminary budget for the draft ADP, NMFS estimated total expenditures in 2022 of \$5.119M resulting in estimated coverage rates of:

- Hook-and-line – 18.21%
- Pot – 17.48%
- Trawl – 28.10%
- Fixed Gear EM – 30%
- Trawl EM EFP – 100% EM (plus shoreside monitoring of 30% GOA and 100% in BS)

*These coverage rates are preliminary estimates and will differ from rates determined in the final ADP.*





# NMFS Recommendations

For 2023, NMFS recommends maintaining current **stratification scheme** (e.g. observer strata defined by gear) and **allocation strategy** of an adjusted 15% plus optimization based on discarded groundfish, halibut PSC, and Chinook PSC.

- This approach would allow staff time to conduct the integrated analysis for the 2024 Draft ADP.
- NMFS would not evaluate new stratification scenarios nor allocation strategies for 2023.
- NMFS would provide the PCFMAC and the Council with an update on the expected budget and coverage rates for 2023.



# Meeting Data Needs

## Pressures on Fishery Monitoring:

- Budgets have not been stable – all monitoring in Alaska’s groundfish and halibut fisheries is industry funded
- Electronic monitoring is expanding
  - Reducing biological samples from species discarded at sea
  - Reducing spatial and temporal specificity from retained catch
- Only data users on monitoring committees represent industry
- Not all fisheries are equally impacted by changes in partial coverage monitoring plans
- Once monitoring has been changed or reduced, it is hard to reverse course



# Questions?



# Supplemental Information



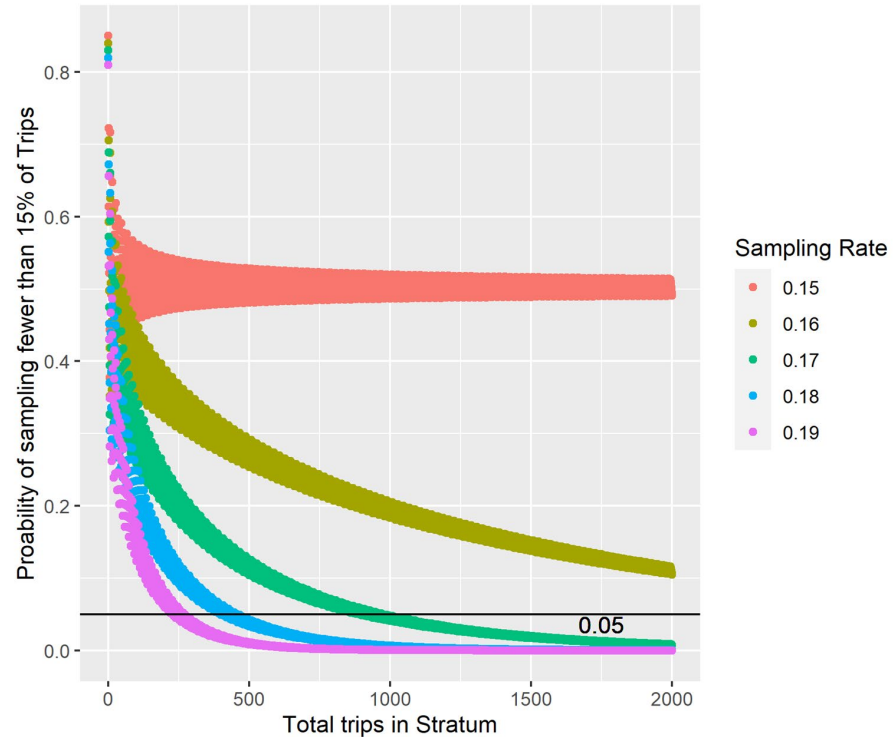
# Adjusted 15% + Opt

Strata with fewer trips require a higher rate to provide the same probability of realizing the 15% hurdle.

To have a 95% probability of selecting at least 15% of trips:

1000 trips require 17%

500 trips require 18%



# Results – Hook-and-Line

Figure B-4

## OB-OB

**GOA Halibut** and **GOA Sablefish**.

Equal rates & 15% + Opt 0.95 > 15% Opt TRW

## **BSAI Halibut**

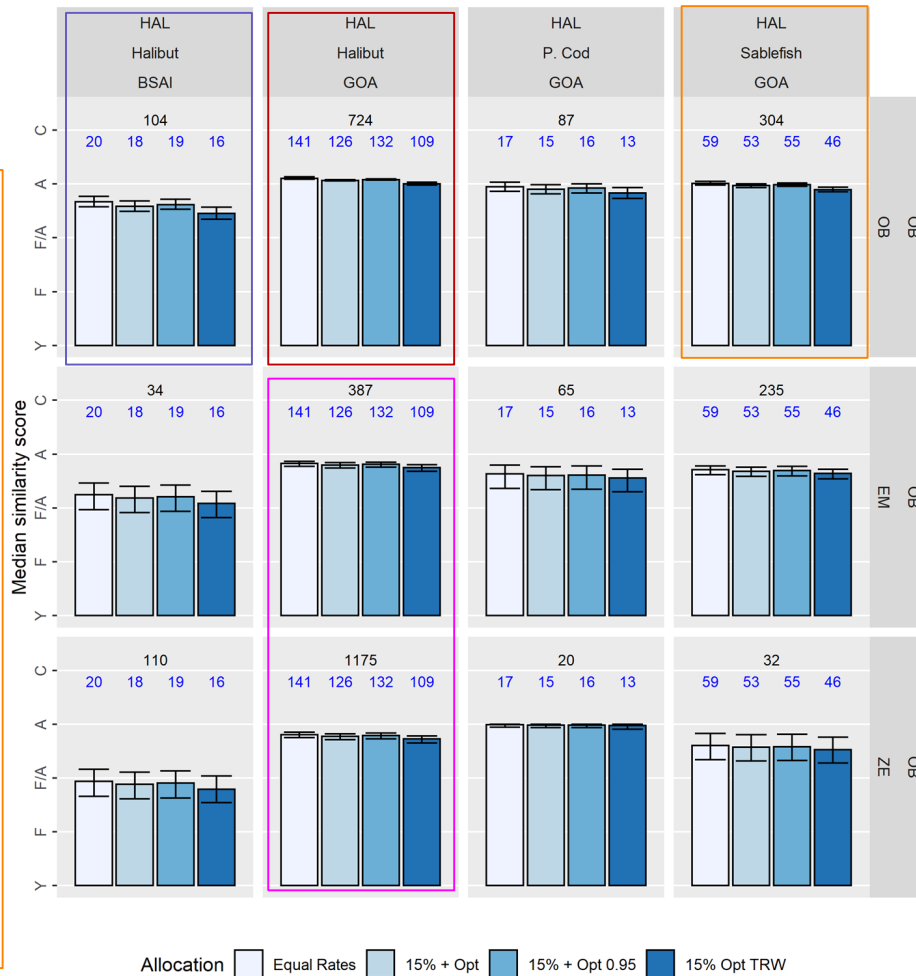
Equal rates > 15% Opt TRW

15% + Opt & 15% + Opt 0.95 were similar to 15% + Opt TRW.

## OB-EM and OB-ZE

**GOA Halibut**

Equal rates > 15% + Opt TRW



# Results – Pot

Figure B-5

## OB-OB

### **BSAI P. Cod**

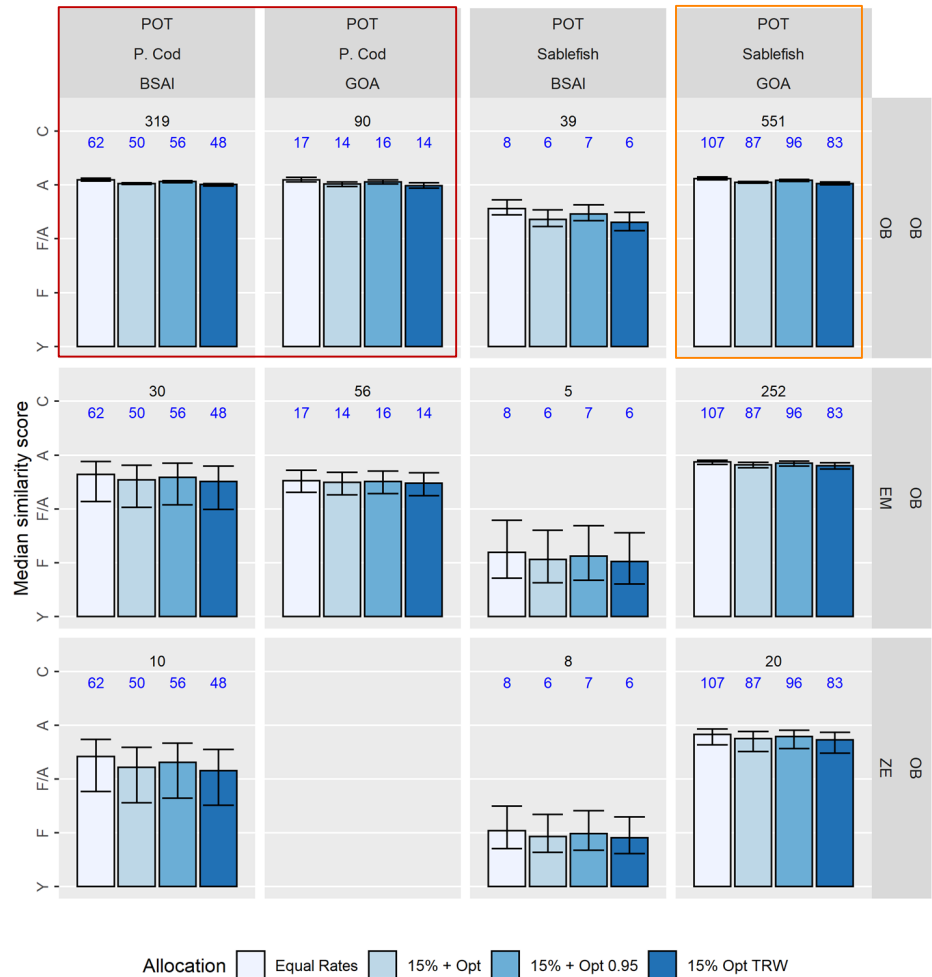
Equal rates & 15% + Opt 0.95 > 15% Opt TRW

### **GOA Sablefish**

Equal rates & 15% + Opt 0.95 >  
15% + Opt & 15% Opt TRW

## OB-EM and OB-ZE

No major differences



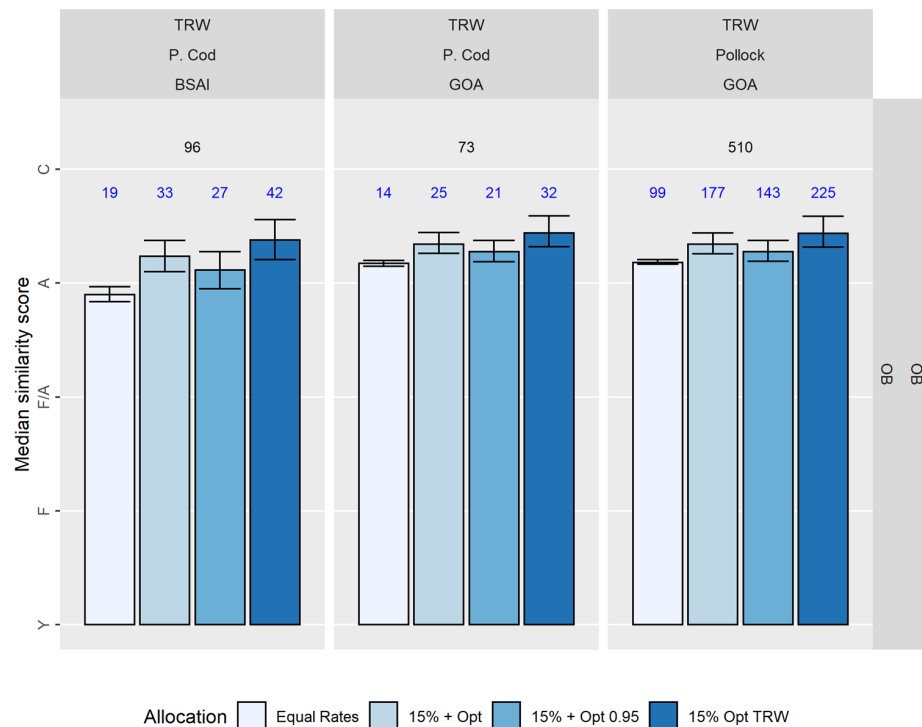
# Results – Trawl

Figure B-6

## OB-OB

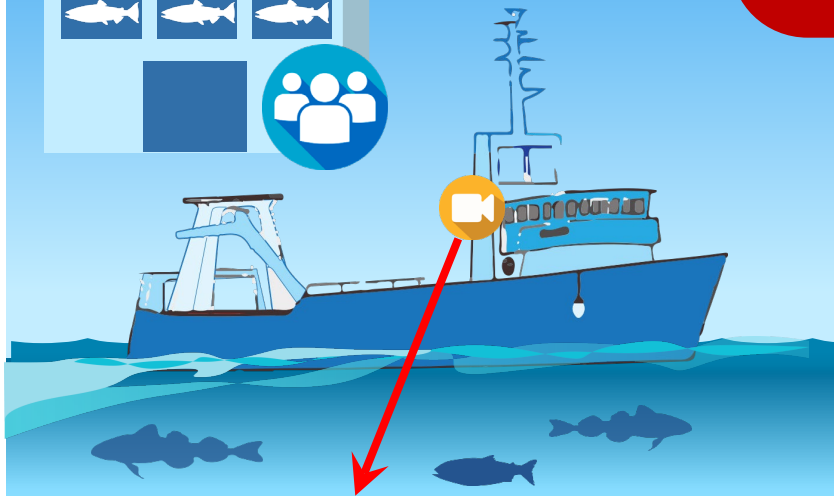
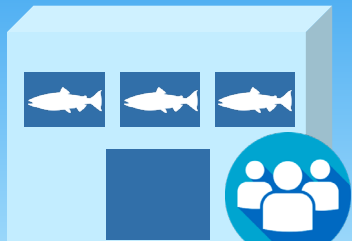
BSAI P. Cod, GOA P. Cod and GOA Pollock  
 15% Opt TRW & 15% + Opt > Equal rates

15% + Opt 0.95 overlapped with all other  
 allocation strategies





## Pilot Program: Partial & Full Coverage – Pollock pelagic trawl vessels



**Primary Objective:  
monitor compliance**



**Observers in processing plants randomly sample deliveries to collect catch & biological data.**



**Video for compliance monitoring**

- **Video monitoring** to ensure retention (few discards).
- **Vessels chose** to have EM on their boats instead of observers.



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