

2020 *Draft* Annual Deployment Plan

for Observers and Electronic Monitoring in the Groundfish and Halibut Fisheries off Alaska

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Draft 2020 Annual Deployment Plan

How the National Marine Fisheries Service intends to assign observer and electronic monitoring to vessels fishing partial coverage category in the North Pacific during 2020



Questions to be addressed:

- Methods of selection for fisheries monitoring
- Selection pools
 - How fishing activity is divided into groups
- Allocation strategy
 - How much fisheries monitoring effort is put into each group



Selection method:

Trip selection

Observer Declare and Deploy System
(internet or phone)



Selection pools:

EM trip-selection pool

- **Voluntary participation:** Until Nov. 1, 2019
 - **If funding allows:** 198 vessels
 - **Else:** Target vessels already equipped, wired, 40-57.5 ft. LOA that have difficulty with space, those with past activity that would result in a low probability of causing data gaps, potentially remove vessels which cannot comply with VMP

No-selection pool

- Fixed gear vessels < 40 ft. LOA
- Jig gear
- Volunteers for EM innovation



Selection pools (continued):

Observer trip-selection pool

- Hook and line gear trips \geq 40 ft. LOA
- Pot gear trips \geq 40 ft. LOA
- Trawl gear trips
- Tendered Pot gear trips
- Tendered Trawl gear trips



Deployment Strata

Discussion of rationale in Appendix B

Allocation strategy:

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

- 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
 - Discarded groundfish
 - Chinook Prohibited Species Catch
 - Halibut Prohibited Species Catch
 - Every logged trip in a *stratum* gets same selection probability; probabilities differ among strata.



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Analytical problems

- 1. What will fishing effort be in 2020?**
- 2. What vessels will be participating in EM (2020)?**
- 3. What vessels will be participating in Trawl EFP?**
- 4. What proportion of trips will be in Trawl EFP?**
- 5. Account for variance in ODDS selection rates**
- 6. Don't go over budget**

Allocation schemes and scenarios

Allocation schemes

- Equal rates afforded
- Minimum (15%) plus optimized

Both allocation schemes were evaluated under each 2020 scenario

Scenarios

Pollock trawl EFP

(‘Trawl:No’ or ‘Trawl:Yes’ - EFP trip probability)

- TN : No pollock trawl EFP
- TY-1 : All pelagic pollock trips by listed vessels
- TY-0.5 : 50% of 620/630/640, all 610 in EFP
 - EFP/Non-EFP trips sampled 100 times

Fixed-gear EM expansion

(‘Fixed-gear:No’ or ‘Fixed-gear:Yes’)

- FN : No vessels added to the fixed gear EM pool
- FY : Randomly add 30 fixed-gear vessels to EM Pool
 - List of additional vessels sampled 100 times

TNFN
TNFY
TYFN-1
TYFN-0.5
TYFY-1
TYFY-0.5



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Methods Overview

Core processes are virtually unchanged - **deployment rates**

Notable changes:

- Budget/cost-per-day estimates
- Scenarios

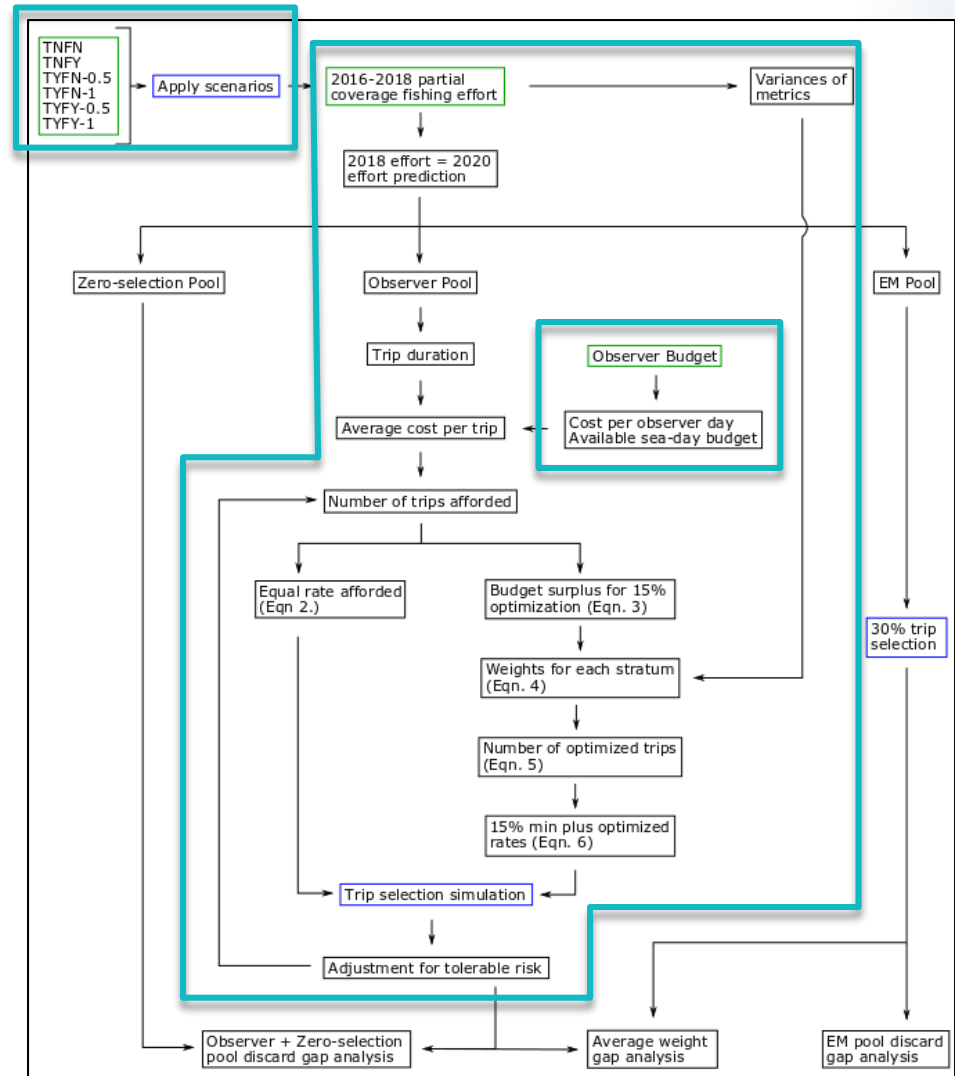


Figure C-1, page 39



Methods - Simulations

Table C-1. Scenarios considered, the number of effort predictions sampled for each scenario, and the number of times each effort prediction went through ODDS trip-selection within the combined observer and zero-selection pools.

Scenario Name	Pollock Trawl EFP	Fixed Gear Expansion	EFP Trip Probability	Effort Iterations	ODDS Iterations	Total Iterations
TNFN	No	No	0.0	1	1,000	1,000
TNFY	No	Yes	0.0	100	1,000	100,000
TYFN-0.5	Yes	No	0.5	100	1,000	100,000
TYFN-1	Yes	No	1.0	1	1,000	1,000
TYFY-0.5	Yes	Yes	0.5	100	1,000	100,000
TYFY-1	Yes	Yes	1.0	100	1,000	100,000



Results I – Estimated Rates and Cost

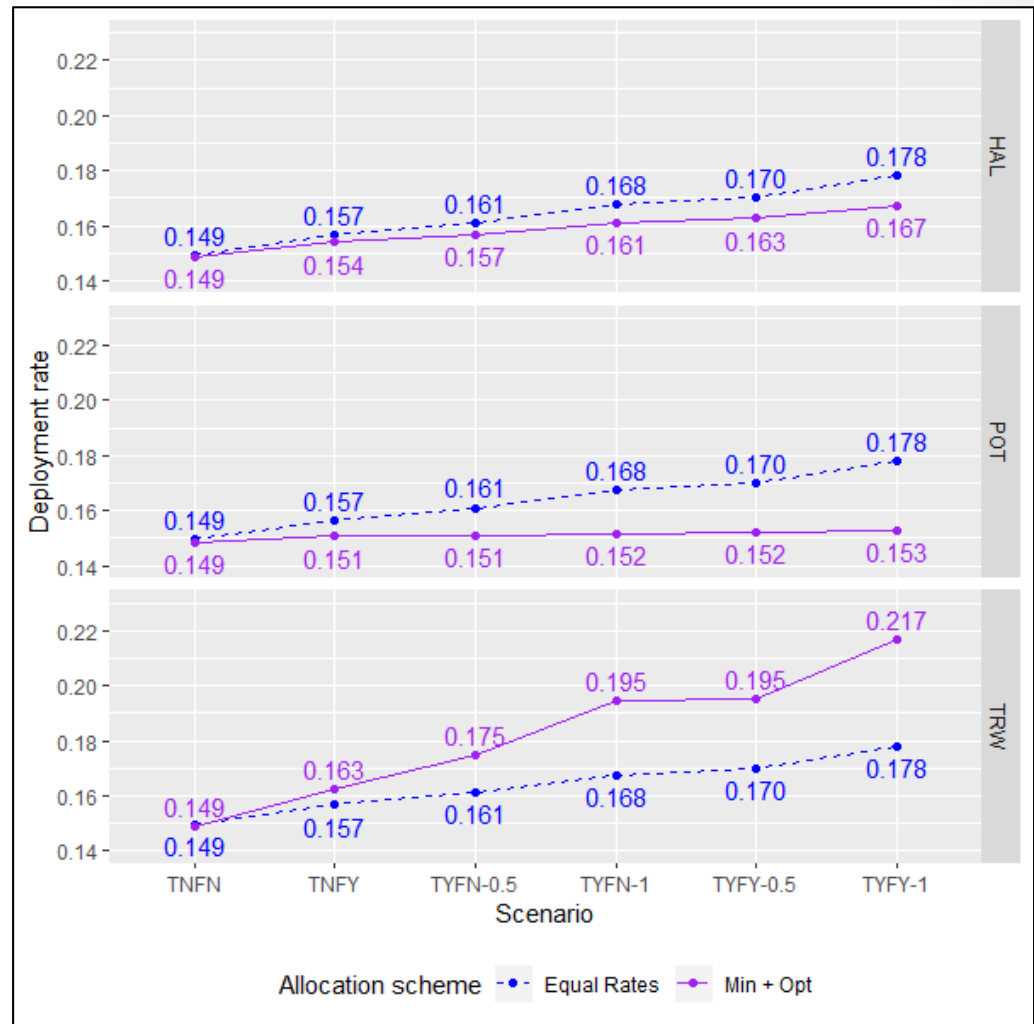
\$4.15 M to purchase 2,866 observer days

\$0 to monitor EM.

Scenarios with the pollock trawl EFP and/or fixed gear EM expansion reduce the total expected number of trips within the observer pool, resulting in higher deployment rates.

These rates will change for the final ADP as the effort prediction/budget changes.

See tables C-3 and C-4 for expected number of trips in each stratum and expected number of trips/days observed.



Methods – Gaps

Core processes are virtually unchanged

Notable changes:

- Budget/cost-per-day estimates
- Scenarios
- Multiple gap analyses:

Discard estimates for observer and zero-selection pools

Discard estimates for EM pool

Average weight estimates for EM Pool

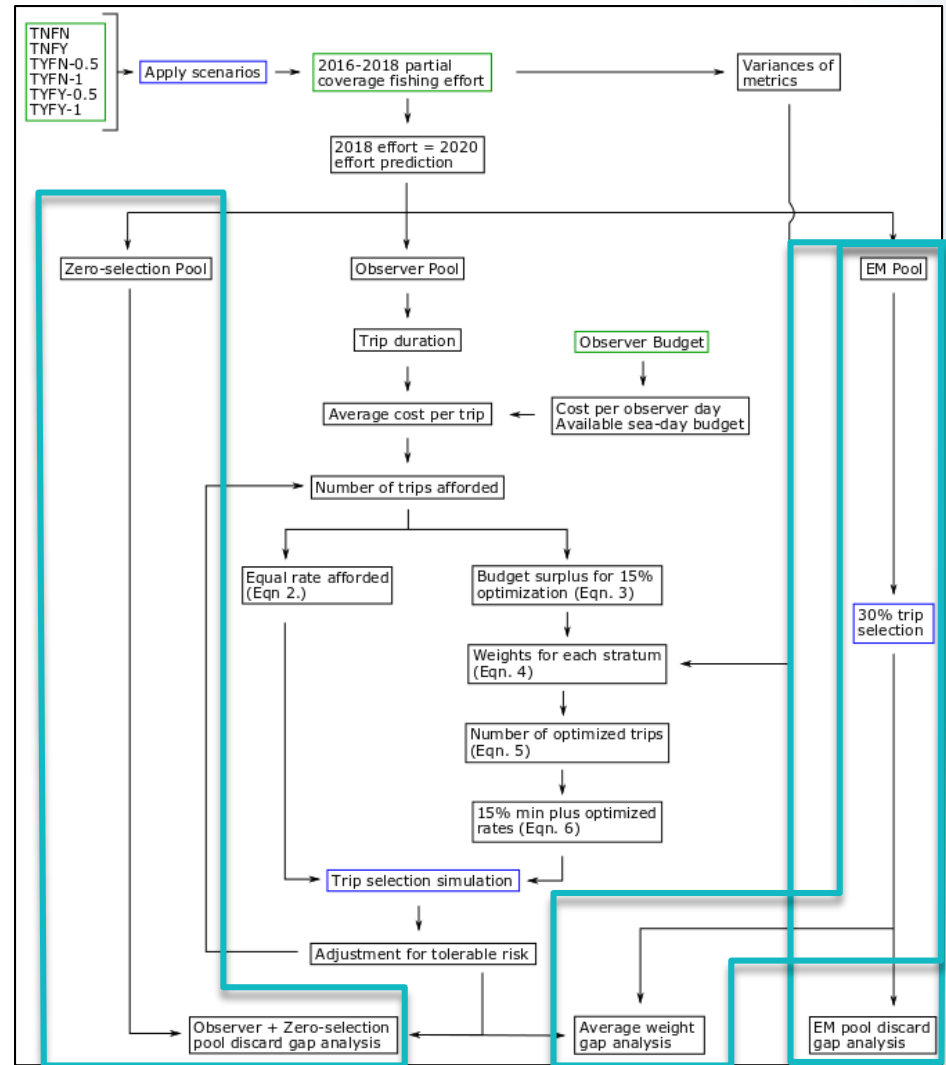


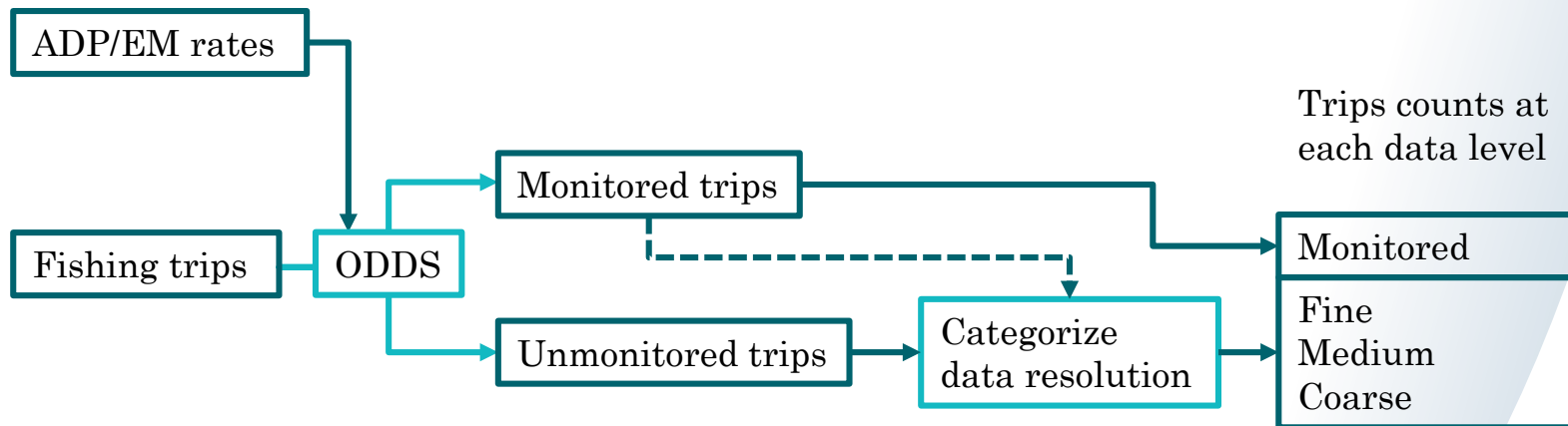
Figure C-1, page 39



Methods – Gap Analyses

All three gap analyses were performed with the same methodology (~ CAS)

Gap analyses	Monitored trips	Selected using:	Applied to:
Observer/Zero pool discards	Observer	Equal rates/ 15% + Opt	Unobserved observer/zero trips
EM pool discards	EM	30%	Unmonitored EM pool trips
Average weight	Observer	Equal rates/ 15% + Opt	All EM pool trips



Methods – Gap Analyses (cont.)

Separate fishing into **domains**:

Strata/Gear	Post-strata	Trip Target	FMP
Hook-and-line	Tender	Halibut	GOA
POT	Non-tender	Sablefish	BSAI
Trawl		Pollock, etc.	

Within each domain, categorize each trip with the following definitions:

COVER – Trip was **selected for monitoring**; no estimate required

AREA – **Unmonitored**; fished within **15 days** of a monitored trip in the same **NMFS Area**

FMP – **Unmonitored**; fished within **45 days** of a monitored trip in the same **FMP**

YTD – **Unmonitored**; must use pooled data ‘**year-to-date**’

Calculate proportions of each data level to calculate **GAP index**

$$GAP = (P_C \times 1) + (P_A \times 0.75) + (P_F \times 0.25) + (P_Y \times 0)$$

Repeat for **1000** ODDS sampling iterations (total of **402,000** ODDS iterations!)



Methods – MED and P25 Metrics

Distributions of GAP indices from all ODDS iterations

Status quo (TNFN) on bottom

P25 = 0.264

MED – median GAP index

P25 = 0.318

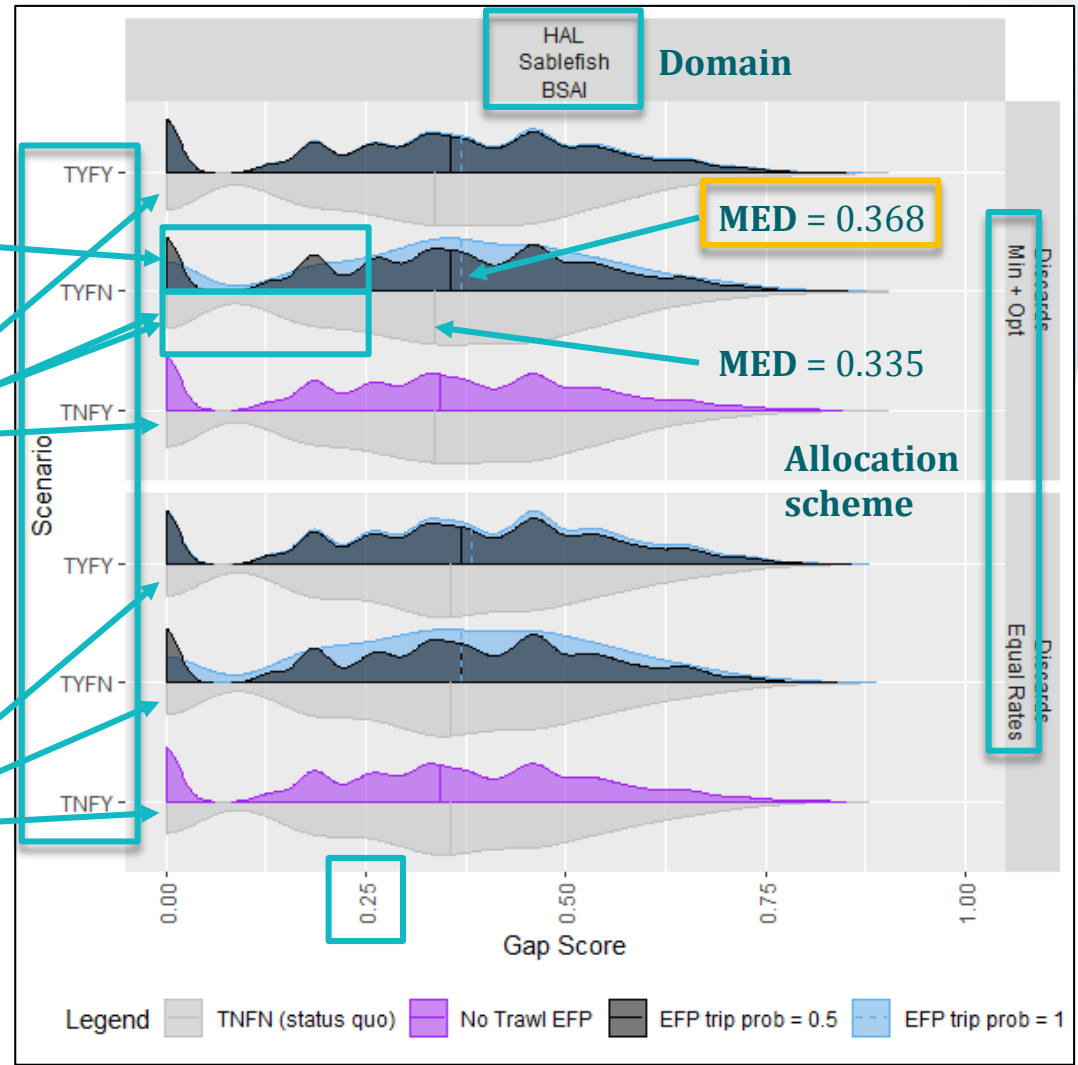
TNFN

P25 – proportion of ODDS outcomes where $GAP \leq 0.25$

Compare MED and P25 metrics to status quo

TNFN

For each allocation scheme & scenario, **count domains that are worse/better**



Results

Performance of allocation schemes & scenarios relative to **Min + Opt / TNFN**

Greater than 0 = Better

Lesser than 0 = Worse

Pollock trawl EFP (TY) causes tender trawl pollock domain to shrink from 27 to 2-3 trips.

Fixed-gear EM expansion (FY) causes BSAI tender pot cod domain to shrink (worse P25), which also reduces availability of average weight data for EM Pot cod (worse MED).

TenP BSAI Pacific Cod
EM_POT BSAI Pacific cod
TenTR GOA Pollock

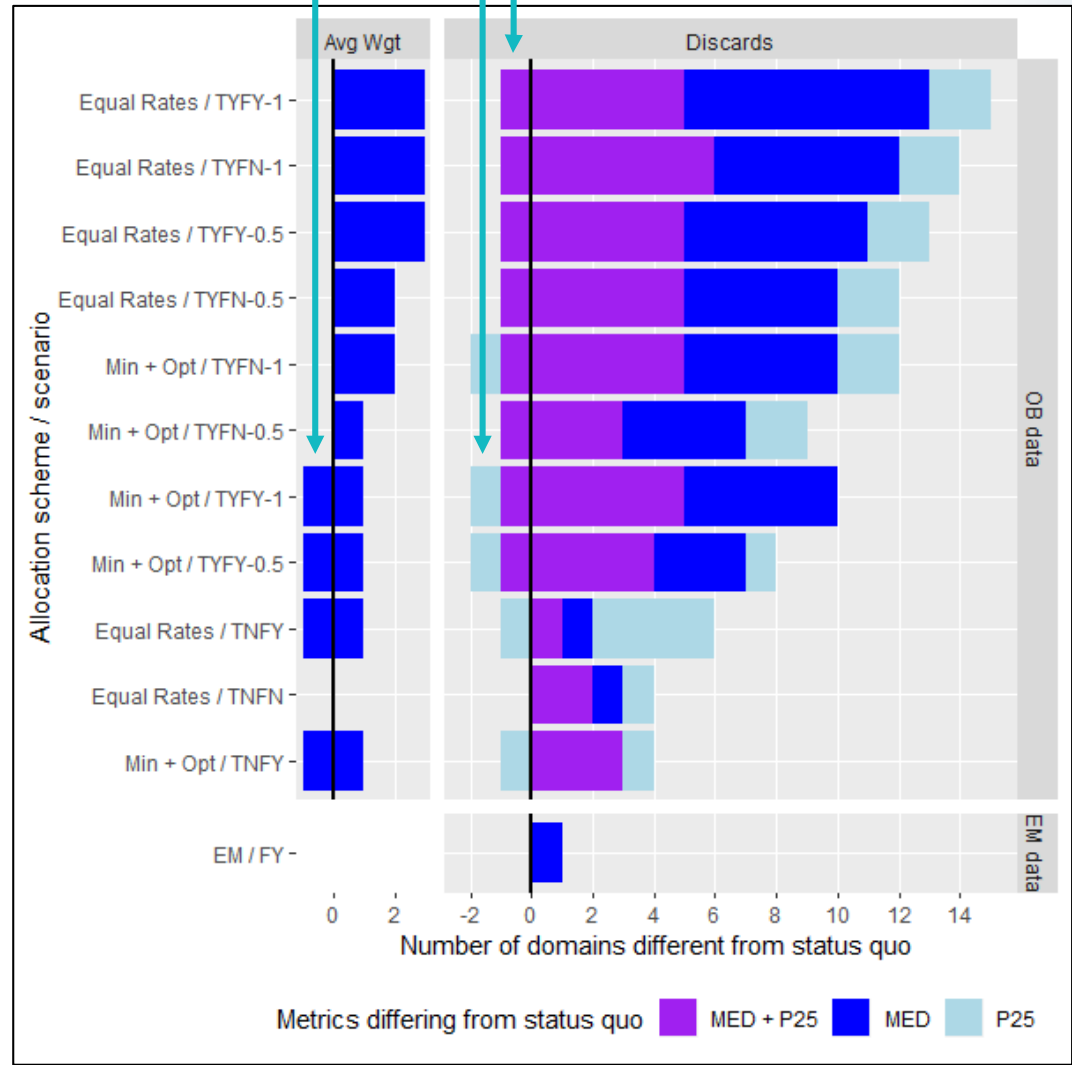


Figure C-7, page 45



Results (Appendix C):

Notes of Caution

- Data available to generate discard estimates from tendered trawl pollock trips get really variable and scarce when Trawl EFP or fixed gear EM fleet expansion is approved
- Scenarios where EFP not approved but fixed gear EM fleet is expanded degrades estimates for hook and line sablefish trips in the BSAI (but improved with other scenarios)
- Scenarios where fixed gear EM fleet is expanded degrades discard estimates for tendered pot trips targeting pacific cod
- Average weight estimates from EM Pot stratum get worse when fixed gear EM fleet is expanded
- **Appendix C Authors do not recommend expanding EM fleet.**



2020 Draft ADP

Summary



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Observer trip-selection pool

NMFS recommends 3 sampling strata for the deployment of observers in 2020:

- 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



2020 Draft ADP

Fixed Gear EM

- New vessels may request to be in, and existing vessels may request to be out of the EM fixed gear pool until Nov. 1, 2019.
- NMFS anticipates a fleet size of less than or equal to 168 vessels if no extra funds made available. If extra funds permit, NMFS will add an extra 30 vessels.
- If the number of vessels in fleet is larger than funding permits, NMFS will prioritize
 - Vessels that are already equipped with EM systems
 - Vessels that are already wired for EM but not fully equipped
 - Vessels 40-57.5' LOA where carrying an observer is problematic due to bunk space or life raft limitations
 - Vessels that are unlikely to introduce data gaps based on 3 years of past fishing activity



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Fixed Gear EM (continued)

- If a vessel operator has repeat problems with EM system reliability or video quality or has failed to comply with the requirements in their Vessel Monitoring Plan, NMFS may disapprove a Vessel Monitoring Plan for the following calendar year and the vessel may be removed from the EM pool the following calendar year.



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No-Selection Pool

As in all deployment plans, NMFS recommends the no-selection pool continue to be composed of:

1. fixed-gear vessels less than 40 ft LOA and vessels fishing with jig gear, which includes handline, jig, troll, and dinglebar troll gear
2. vessels voluntarily participating in EM innovation and research.



2020 Draft ADP

Trawl Electronic Monitoring Trip-Selection Pool (EFP)

EM on pollock catcher vessels using pelagic trawl gear in the Bering Sea and Gulf of Alaska.

If NMFS approves the EFP application and fishing occurs in 2020, then vessels will carry EM systems in lieu of observers.

The goal for EM would be compliance monitoring and the accounting for the vessel's catch and bycatch would be done via eLandings reports and shoreside plant observers.

The specific requirements for vessels in the trawl EM trip-selection pool would be determined through the permit approval process.



2020 Draft ADP

Selection method

Trip-selection

Observer Declare and Deploy System

(Internet or phone)



2020 Draft ADP

Allocation strategy

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

This allocation strategy provides a balance between minimizing the variability of discard estimates, prioritization of PSC-limited fisheries, and the need to reduce gaps in observer coverage in the partial coverage category.



2020 Draft ADP

Genetic samples (Dockside Monitoring)

NMFS will continue to collect genetic samples from salmon caught as bycatch in groundfish fisheries to support efforts to genetically identify salmon stock of origin.

In the BSAI this is achieved through full observer coverage.

In the GOA, method is dependent on EFP and observation status:

Non EFP Observed: sampling protocol will remain unchanged; delivery is completely monitored for Chinook salmon bycatch by the vessel observer during offload of the catch at the shoreside processing facility

Non EFP Unobserved: For trips that are outside of the trawl EFP and delivered to tender vessels and the trips outside of the pollock fishery, salmon counts and tissue samples will be obtained from all salmon found within observer at-sea samples of the total catch.

EFP: The sampling protocol for Chinook salmon for the vessels participating in the EFP will be determined by the Alaska Fisheries Science Center's Fisheries Monitoring and Analysis Division in concert with the EFP applicants. The EFP application outlines the use of EM on both tender and non-tender trips to enable shoreside observers to conduct offload monitoring at shoreside processing facilities.



2020 Draft ADP

Dates to remember:

- Owners of trawl catcher vessel in the partial observer coverage category may request placement in the full observer coverage category for all directed fishing for groundfish using trawl gear in the BSAI for the upcoming calendar year. Requests may be submitted in the Observer Declare and Deploy System (ODDS) and must be received by **October 15, 2019**, for the 2020 fishing year.
- New vessels may request to be in, and existing vessels may request to be out of the EM fixed gear pool until **November 1, 2019**.



Additional information

Strata specific gap analyses results



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Results

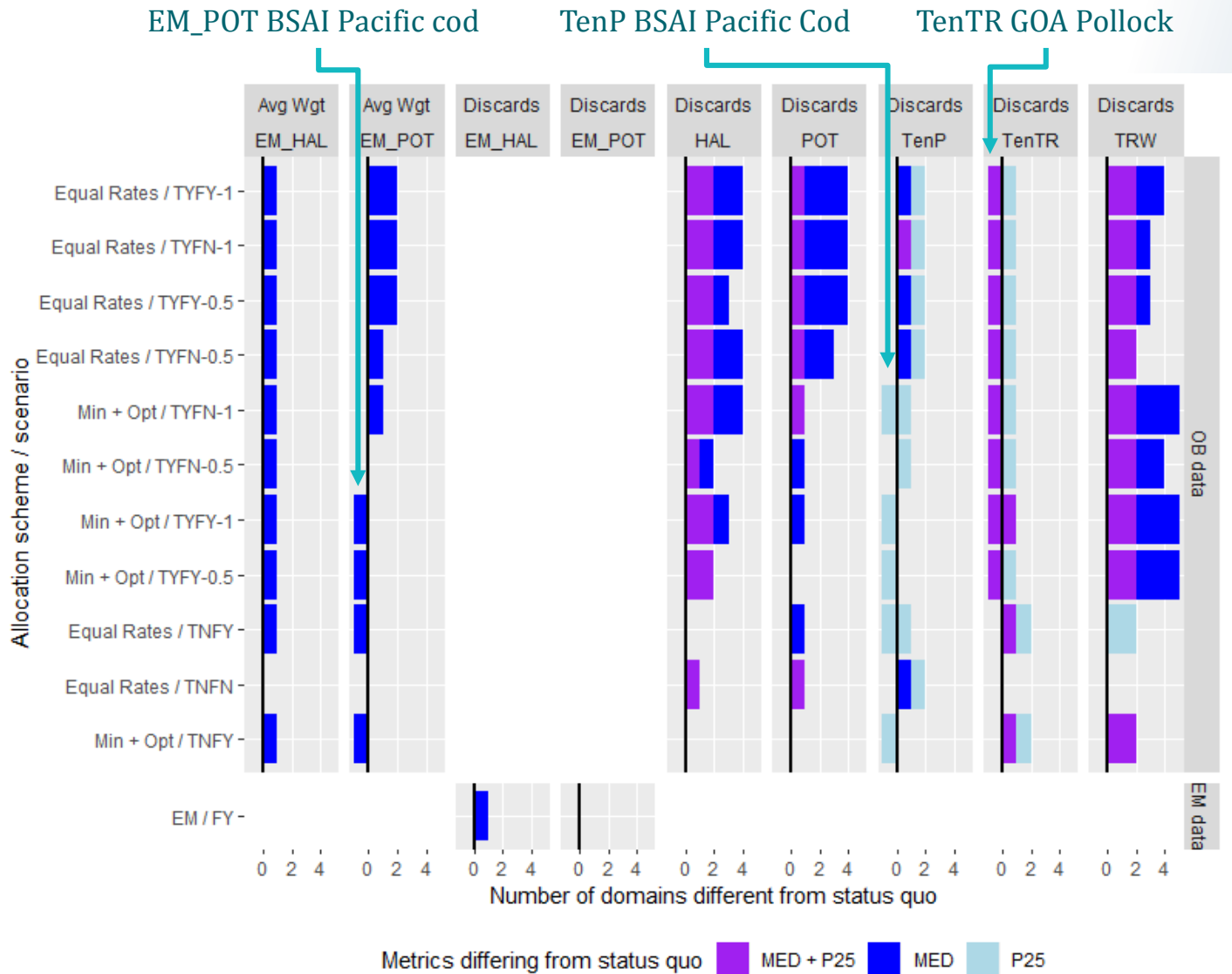


Figure C-6, page 44



Additional information

Evaluating the Utility of Tender Strata



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Introduction

- The 2015 Annual Report showed that tendered trips differ from non-tendered trips in six metrics:
 - Number of NMFS Areas fished
 - Days fished
 - Vessel length
 - Species landed
 - Proportion of the catch that is the predominant species
 - Landed catch
- These differences were the rationale for evaluating tender strata in the Draft 2017 ADP
- The Draft 2017 ADP showed that gear-tender stratification performed worse than gear-only stratification, but better than creating a separate stratum for partial coverage CPs



This analysis asks:

- Does tendered catch differ from non-tendered catch in ways that are best addressed with stratification?
- Has the agency has been able to observe tendered trips at intended rates before and after tender strata were implemented?

Results

From 2015 Annual Report:

Table 3-10. Results of permutation tests between tendered and non-tendered trips in the 2015 trip-selection strata re-coded as 2016 trip-selection strata. OD: Observed Difference.

2016 Strata	NMFS Areas	Days Fished	Vessel Length	Species Landed	pMax Species	Landed Catch	Metric
<i>HAL</i>	0.056	1.142	0.121	-0.794	0.027	11.600	OD
<i>POT</i>	0.003	1.344	-6.635	0.411	0.000	14.240	OD
<i>TRW</i>	-0.101	1.432	-24.891	-0.701	0.048	0.538	OD
<i>HAL</i>	5.0	23.9	0.2	-21.4	3.1	149.4	OD (%)
<i>POT</i>	0.3	37.7	-9.5	22.8	0.0	43.9	OD (%)
<i>TRW</i>	-9.2	52.6	-30.0	-12.9	5.1	0.6	OD (%)
<i>HAL</i>	0.651	0.104	0.980	0.205	0.465	0.001	p-value
<i>POT</i>	1.000	0.000	0.000	0.000	0.905	0.000	p-value
<i>TRW</i>	0.000	0.000	0.000	0.002	0.000	0.901	p-value

* = p-value < 0.05



Results

Permutation test results from 2015 Annual Report:

- Tendered trips differ from non-tendered trips in duration, catch composition, and amount.
- However, these are not the same metrics we try to minimize variance for with stratification.



Results

Do tender trips differ from non-tender trips in variance and/or cost?

Strata	Weight	Rate
2017: Fully optimized on groundfish discards		
POT	0.04	3.88
TenP	0.01	3.92
TRW	0.55	17.57
TenTR	0.03	14.29
2018: 15% + optimized on groundfish discards, Chinook PSC, and halibut PSC		
POT	0.02	16.21
TenP	0.00	17.29
TRW	0.78	20.18
TenTR	0.01	16.67
2019: 15% + optimized on groundfish discards, Chinook PSC, and halibut PSC		
POT	0.01	15.43
TenP	0.00	16.11
TRW	0.70	23.70
TenTR	0.01	27.12

Non-tender trips consistently have higher weights than tender trips.

This means that more optimized trips go toward non-tender strata.



Results

Do tender trips differ from non-tender trips in variance and/or cost?

Strata	Variance	Average trip length (days)
Discard		
TRW	71.07	3
TenTR	27.09	5
POT	1.00	4
TenP	14.20	8
Chinook PSC		
TRW	196.40	3
TenTR	1582.40	5
POT	0.00	4
TenP	0.00	8
Halibut PSC		
TRW	3.36	3
TenTR	2.38	5
POT	0.02	4
TenP	0.03	8

High variance in one metric does not mean high weights.

Metrics are blended.

Tender trips are longer (more costly to observe).



Results

Do tender trips differ from non-tender in variance and/or cost?

- Yes: tender trips receive a lower weight than non-tender trips, meaning that they are less variable and/or more expensive to observe.
- This suggests that the number of observed tender trips would not decrease if tender and non-tender strata are combined.
- However, given the few number of tender trips, their influence over the weight and rate is likely minimal.



Results

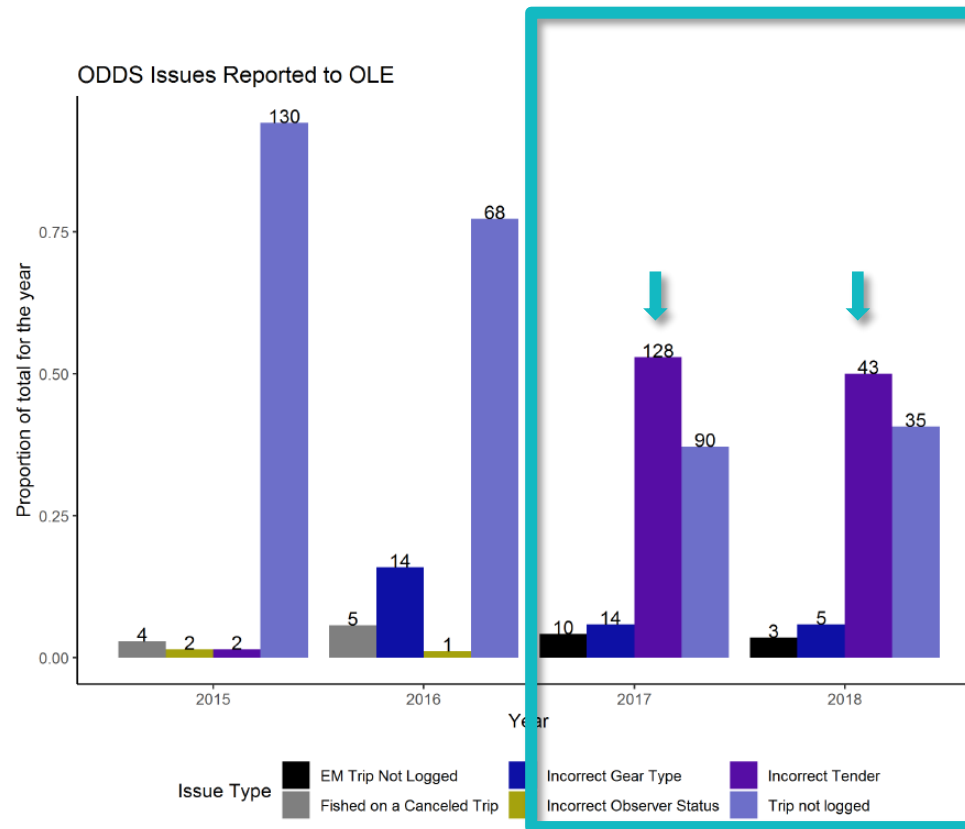
Was NMFS able to observe tendered trips at expected rates prior to tender strata?

Strata	Observed tender trips (n _{Tender})	Coverage above the minimum level expected?
2015		
T	44	No
t	15	Yes
2016		
POT	14	Yes
TRW	122	Yes
2017: Tender strata implemented		
TenP	4	Yes
TenTR	13	Yes
2018: Tender strata implemented		
TenP	9	Yes
TenTR	14	Yes

Results

Incorrect tender status is the most commonly reported ODDS issue to OLE (2018 Annual Report):

Appendix Figure D-7. -- The proportion (bars), and number of ODDS-related issues reported by FMA to OLE 2015-2018. Tendering strata were introduced in 2017.



Deployment might be incorrect.

Discussion

- Variance and cost differ between tender and non-tender strata.
- However:
 - Tender strata have lower weightings and few trips, meaning that the number of selected tender trips is unlikely to change.
 - NMFS did not have difficulty observing tender strata above minimum rates prior to the implementation of tender strata, meaning that the number of observed tender trips is unlikely to change.
- Differences between tender catch and non-tender catch can be addressed with post-stratification.
- Deployment into tender strata might be incorrect.



Conclusion

NMFS evaluated one stratification design in the Draft 2020 ADP that does not create separate strata for tendered trips.

