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Draft 2024 Annual Deployment Plan and Partial Coverage Cost Efficiencies Analysis

September 14th, 2023

Summary of Priorities

- Design a monitoring program that collects credible, statistically rigorous scientific data
- Collect the best and most data for a given budget
- Collect data for a wide range of analytic needs (multi-objective program)

Challenge is to...

- Meet the data needs of data users with a wide range of analytic objectives (MSA)
- Collect data that reflects the full range of fishing activities



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Stratification

- How fishing trips are grouped for sampling
- Groups are defined by trip characteristics known *before* random selection
- Every sampling unit can only be in one stratum

Can be used to:

- Focus sampling on a particular objective
- Control costs

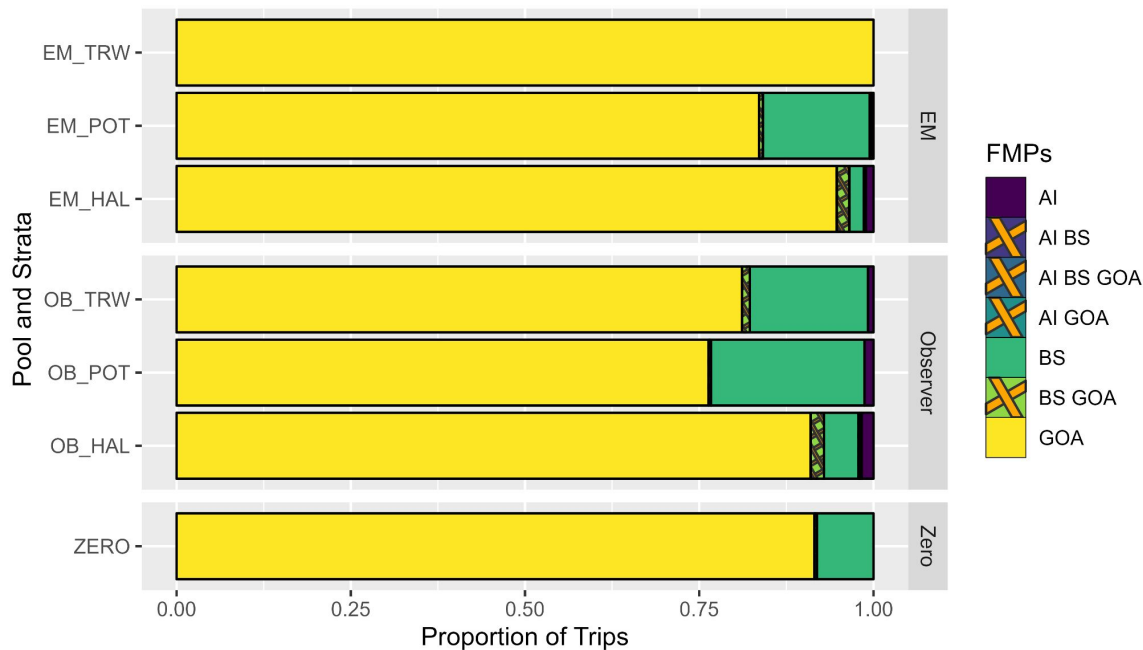
Can be defined by:

- Monitoring method
- Gear
- FMP - Bering Sea / Aleutian Islands / Gulf of Alaska



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Stratification Issues



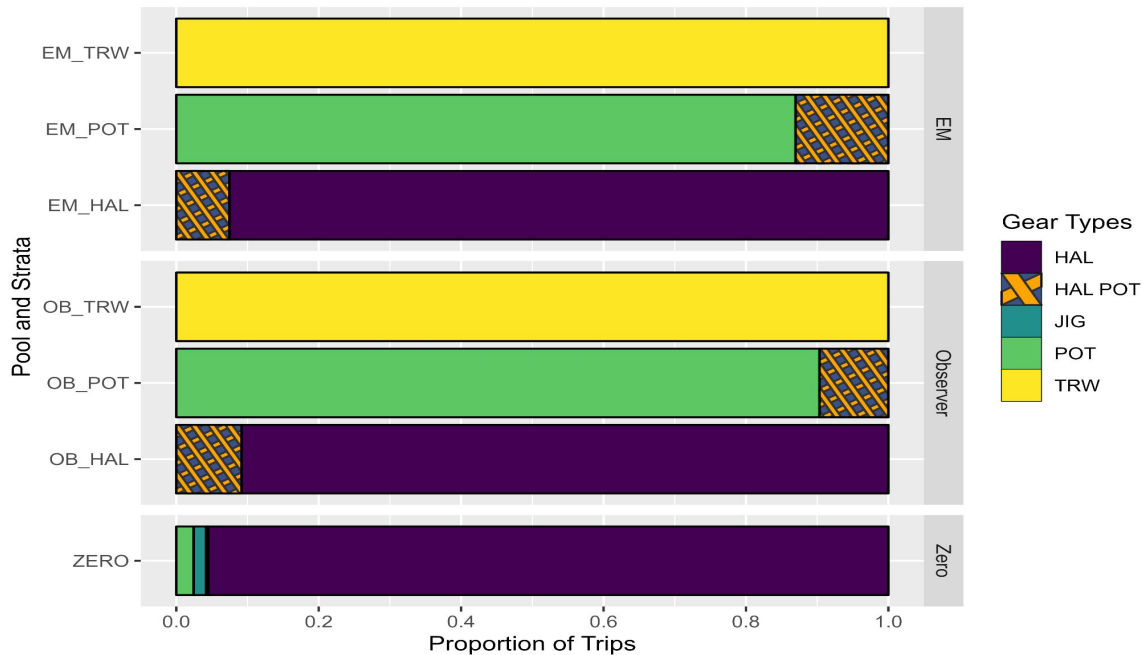
- Few trips fish in multiple FMPs
- AI-BS most multiple-FMP trips
- Stable pattern expected to persist

- AK-wide sampling resulted in few BS and AI monitored trips
 - data gaps negatively impact the ability of the AFSC to move to a tier 3 assessment for some stocks (AI P. cod)
- Evaluated
 - AK-wide, BSAI and GOA, BS and AI and GOA stratification definitions
- Including **BSAI** and **GOA** in stratum definition
 - allowed targeted sampling
 - avoided creation of strata with few trips



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Stratification Issues



- 15% to 20% trips fish with multiple gear types
- Pattern expected to persist
- Recent increasing trend

- Each trip (or delivery) must be on only one stratum
- Evaluated
 - combining HAL and POT gears to a single stratum
 - creating a new stratum of only trips fishing with multiple gears
- Combined HAL+POT with FMP stratum definition (Fixed-FMP)
 - allowed targeted sampling
 - increased statistical integrity



Stratification Definitions Evaluated

Stratification	Number of Sampled Strata	Definition	Rationale
2023 (CURRENT)	6	Monitoring Method (Observer, EM Fixed Gear, EM Trawl) and Gear Type (HAL, POT, TRW)	Current stratification definition
FMP	11	Monitoring Method (Observer, EM Fixed Gear, EM Trawl) and Gear Type (HAL, POT, TRW) and FMP (BSAI, GOA)	Potential to reduce the likelihood of data gaps
Combined fixed gear - FMP (FIXED-FMP)	7	Monitoring Method (Observer, EM Fixed Gear, EM Trawl) and Gear Type (FIXED, TRW) and FMP (BSAI, GOA)	Maintains statistical integrity without creating small strata and allowing focused sampling



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Stratification Definitions Not Evaluated

FMP (AI, BS, GOA)

- Separate strata for each of the three FMPs; need to declare when logging trips
- This stratification increased logistical difficulties and resulted in strata with few trips

HAL, POT, and BOTH

- Separate strata for HAL, POT, and trips that fish both gears
- This stratification increased logistical difficulties and resulted in strata with few trips when coupled with stratification by FMP



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Allocation: Distributing samples to different strata

Equal Rates

Goal: Representative sample with equal burden of monitoring

Baseline 15% plus optimization (Status quo)

Goal: *Equal Rates* to 15% observed strata plus variance minimization with EM rates set by policy

EM integrated Baseline 15% plus optimization

Goal: *Equal Rates* to 15% for all strata plus variance minimization

Cost-weighted boxes

Goal: maximize the proportion of “boxes” monitored (or near), decreasing allocation to strata with high monitoring costs

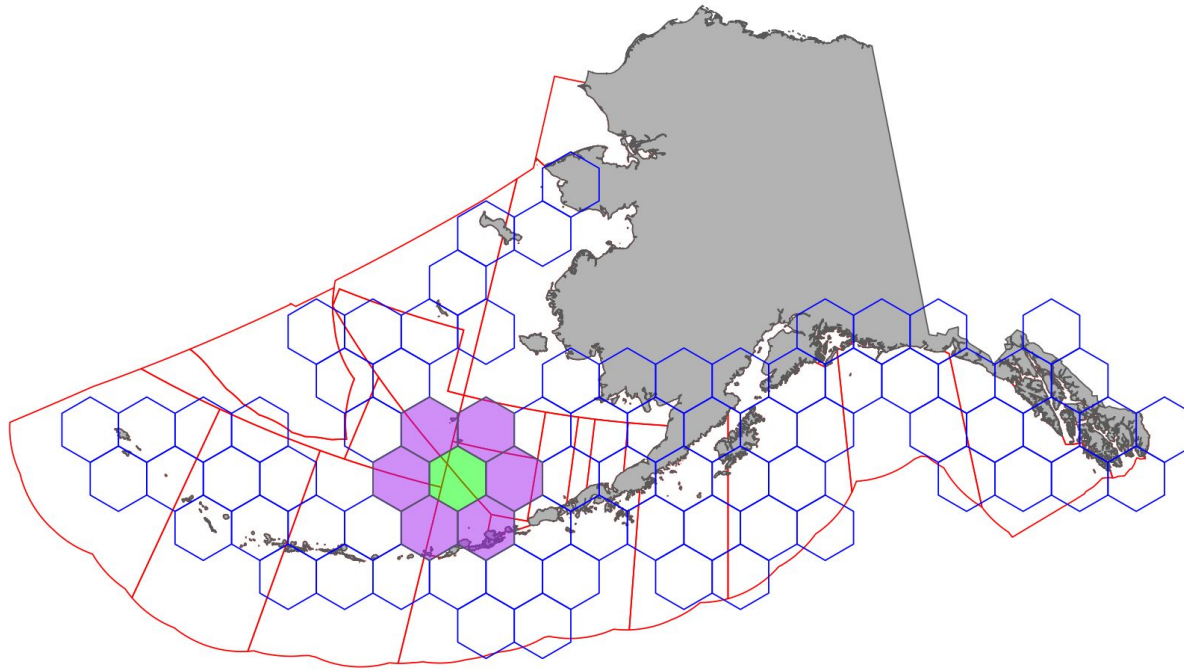
Proximity

Goal: maximize proportion of trips near monitored trips while guarding against low sample sizes



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Allocation



Box definition:

200 km wide hexagon and 1 week period and adjacent neighboring hexagons and weeks



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Allocation Method	Objective	Rational	Benefits	Shortcomings
Equal Rates	Sample proportionally to the size of the stratum	Simple allocation relies on few assumptions	Few assumptions on data	At low sample size, can be prone to data gaps
Baseline 15% plus optimization (status quo)	<ul style="list-style-type: none"> ● 30% coverage on EM ● Baseline 15% observer rate, ● Minimize combined variance of discards of groundfish, halibut PSC, and salmon PSC 	Lower variance on estimates of halibut PSC and salmon PSC	Baseline rate to decrease data gaps	<ul style="list-style-type: none"> ● High EM rate results in low at-sea observer rates ● Policy based EM rates ● Low funding, at-sea baseline rates not reached ● Uses between-trip (not CAS) variance
EM integrated Baseline 15% plus optimization	<ul style="list-style-type: none"> ● Baseline 15% rate ● Minimize combined variance of discards of groundfish, halibut PSC, and salmon PSC 	Lower variance on estimates of halibut PSC and salmon PSC	Baseline rate to decrease data gaps	<ul style="list-style-type: none"> ● Low funding, at-sea baseline rates not reached ● Uses between-trip (not CAS) variance
Cost Weighted Boxes	<ul style="list-style-type: none"> ● Decrease data gaps ● Minimize overall costs 	Collection of representative data at varied resolution and cost efficiency	<ul style="list-style-type: none"> ● High data utility ● Fewer data gaps ● Limits sampling in high-cost strata 	Iterative process to set stratum weightings
Proximity	<ul style="list-style-type: none"> ● Decrease data gaps ● Prevent low sample size 	Collection of representative data at varied resolutions and sufficient sample size	<ul style="list-style-type: none"> ● High data utility ● Fewer data gaps ● Fewer low-sample strata 	Iterative process to allocate sample effort

Allocation Method	Stratification Definition		
	2023 (Current)	FMP	Combined Fixed Gear and FMP
Equal Rates	Integrated EM, baseline comparison	Integrated EM	Integrated EM
15% plus optimization (status quo)	both the stratification definition and allocation method were used in 2023		
Cost Weighted Boxes	2023 stratification definition and gap minimization with cost efficiencies	Integrated EM	Integrated EM
Proximity	2023 stratification and gap minimization with sample size buffer	Integrated EM	Integrated EM



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Evaluation Metrics

- Data collection opportunities
 - Trips sampled (observers)
 - Trips monitored (observers or EM)
- Variance in *expenses*
- ~~Burden share~~
- Power to detect
 - Rare events (Short-tailed albatross, Steller sea lion)
 - Observer effects
- Data timeliness
- Variance between trips
 - Salmon PSC
 - Halibut PSC
 - Groundfish discards
 - Crab PSC
- Interspersion (monitored trips near unmonitored trips)

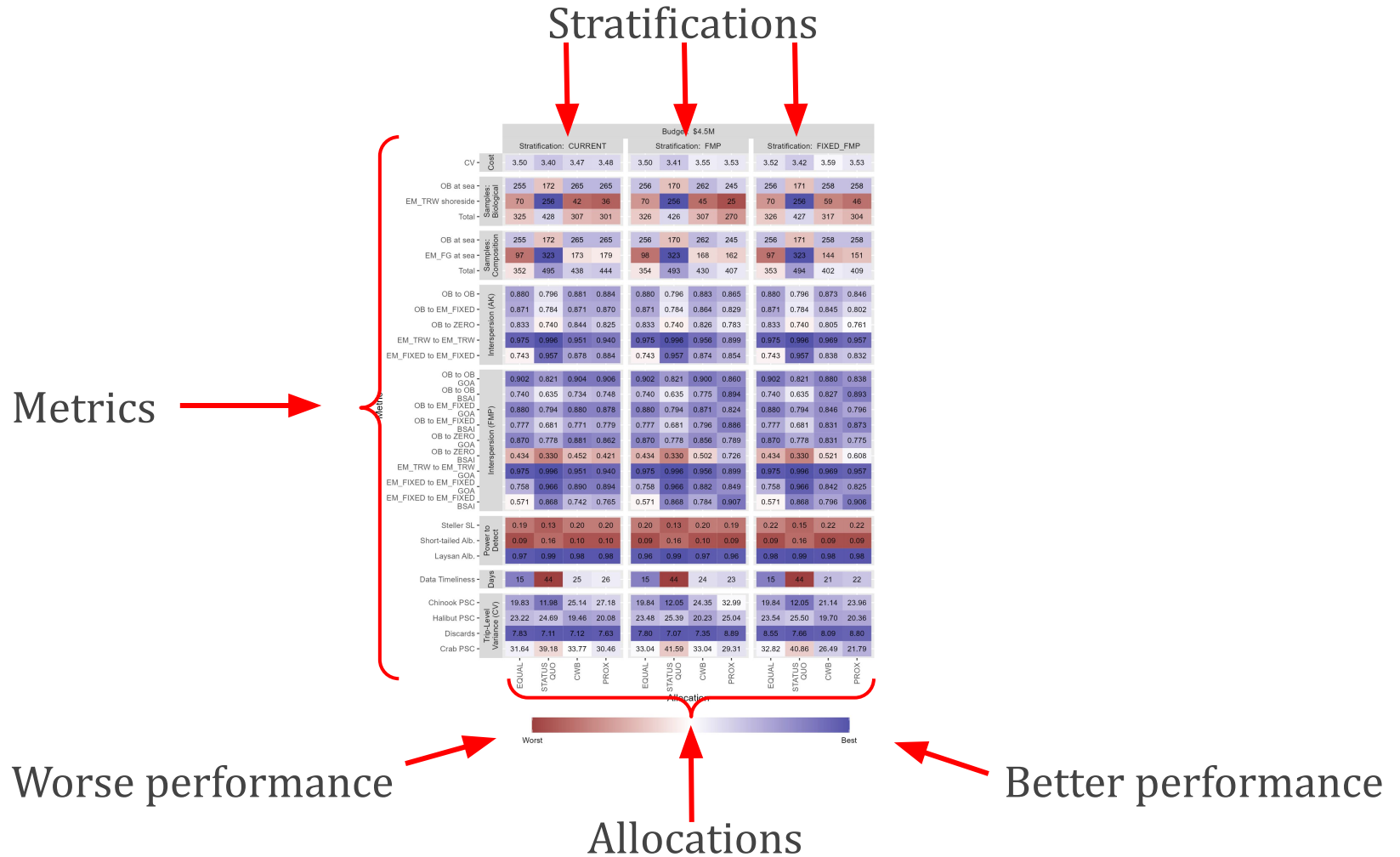
Evaluations of Designs - what we proposed

- It is unlikely that one design will be the best across all metrics
- Scores and rankings will change with different budgets
- We want the best design that will work on small and large budgets.

Metric	Design			
	A	B	C	D
Trips sampled (observers, all data)	291	126	221	237
Trips monitored (observers or EM)	20	37	60	43
Variance in expenses	3115	3028	3017	2979
Short-tailed albatross	0.03	0.07	0.25	0.15
Steller sea lion	0.01	0.04	0.04	0.01
Observer effects ...	0.45	0.47	0.39	0.56
Burden share	0.42	0.85	1	0.49
Data timeliness	164	164	200	159
Salmon PSC (#)	3940	4444	3892	4602
Halibut PSC (t)	60	180	98	181
Crab PSC	51	111	70	38
Groundfish discards (t)	651	735	1198	338
Interspersion ...	0.16	0.11	0.54	0.5

EXAMPLE

Evaluations of Designs

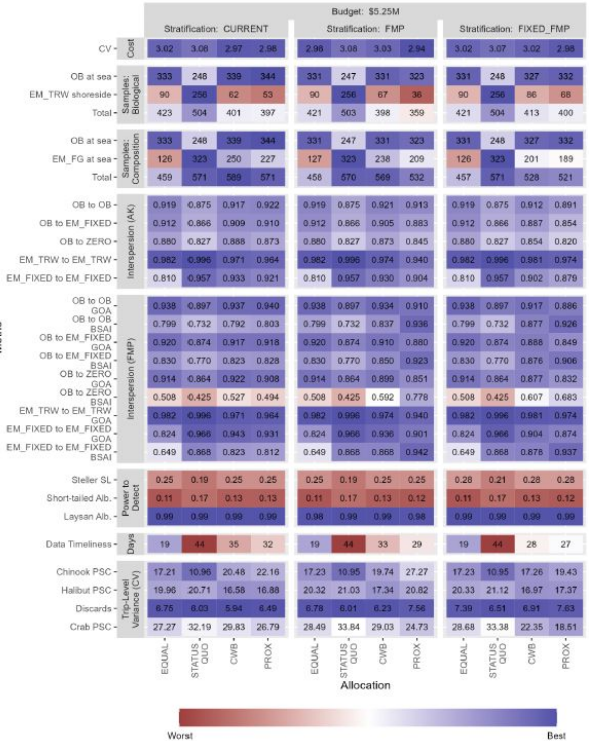
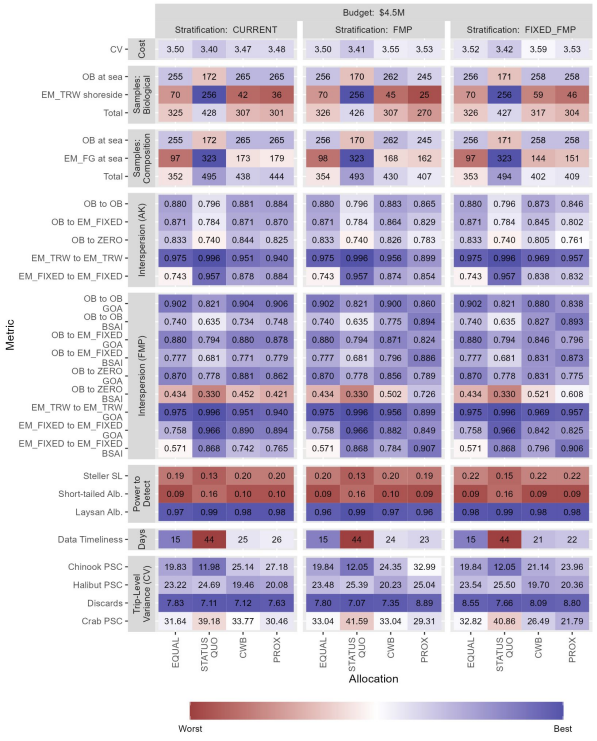
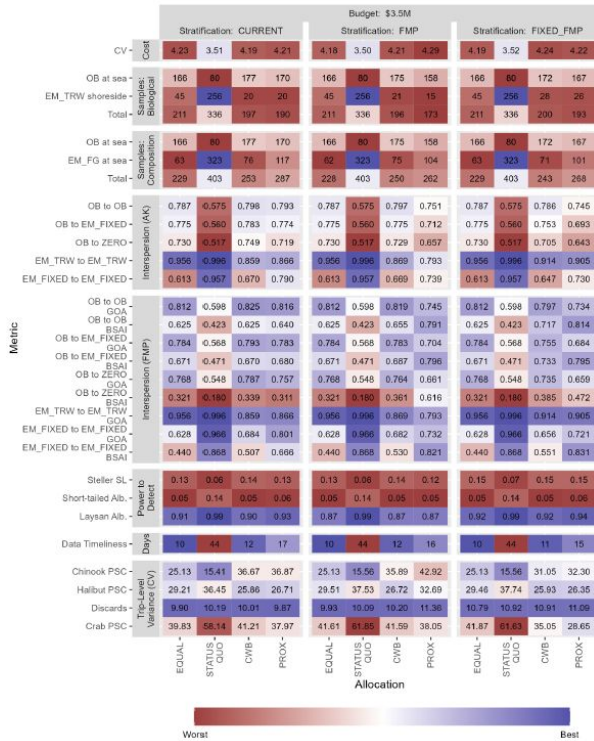


Evaluations of Designs - Budgets

\$3.5 M

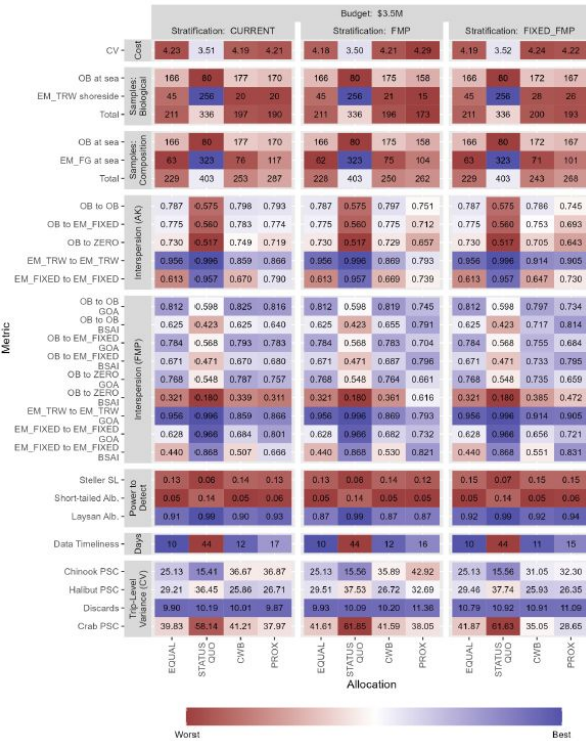
\$4.5 M

\$5.25 M

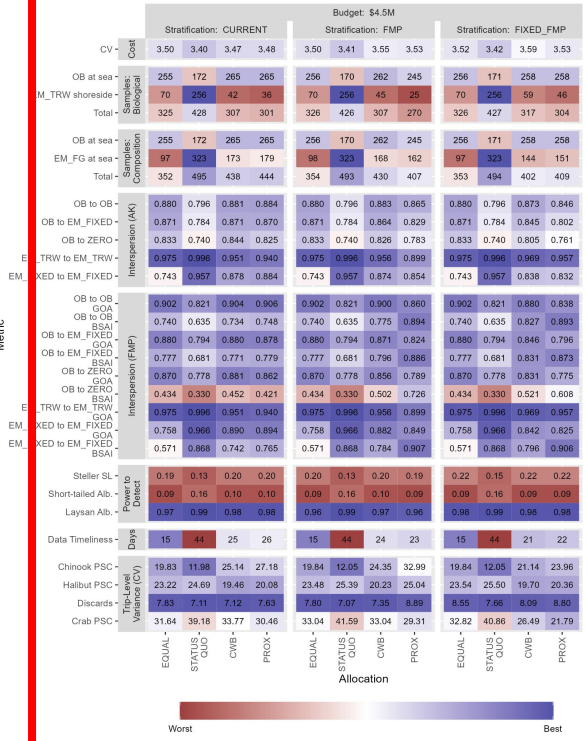


Evaluations of Designs - Budgets

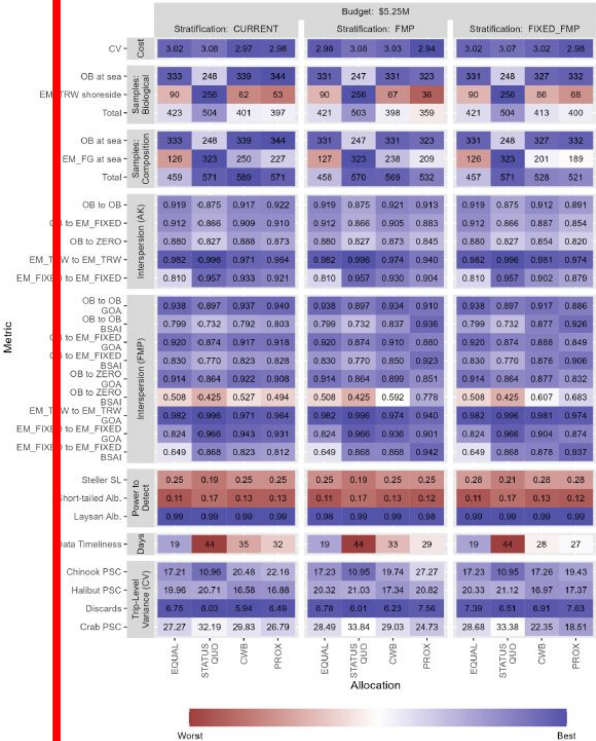
\$3.5 M



\$4.5 M

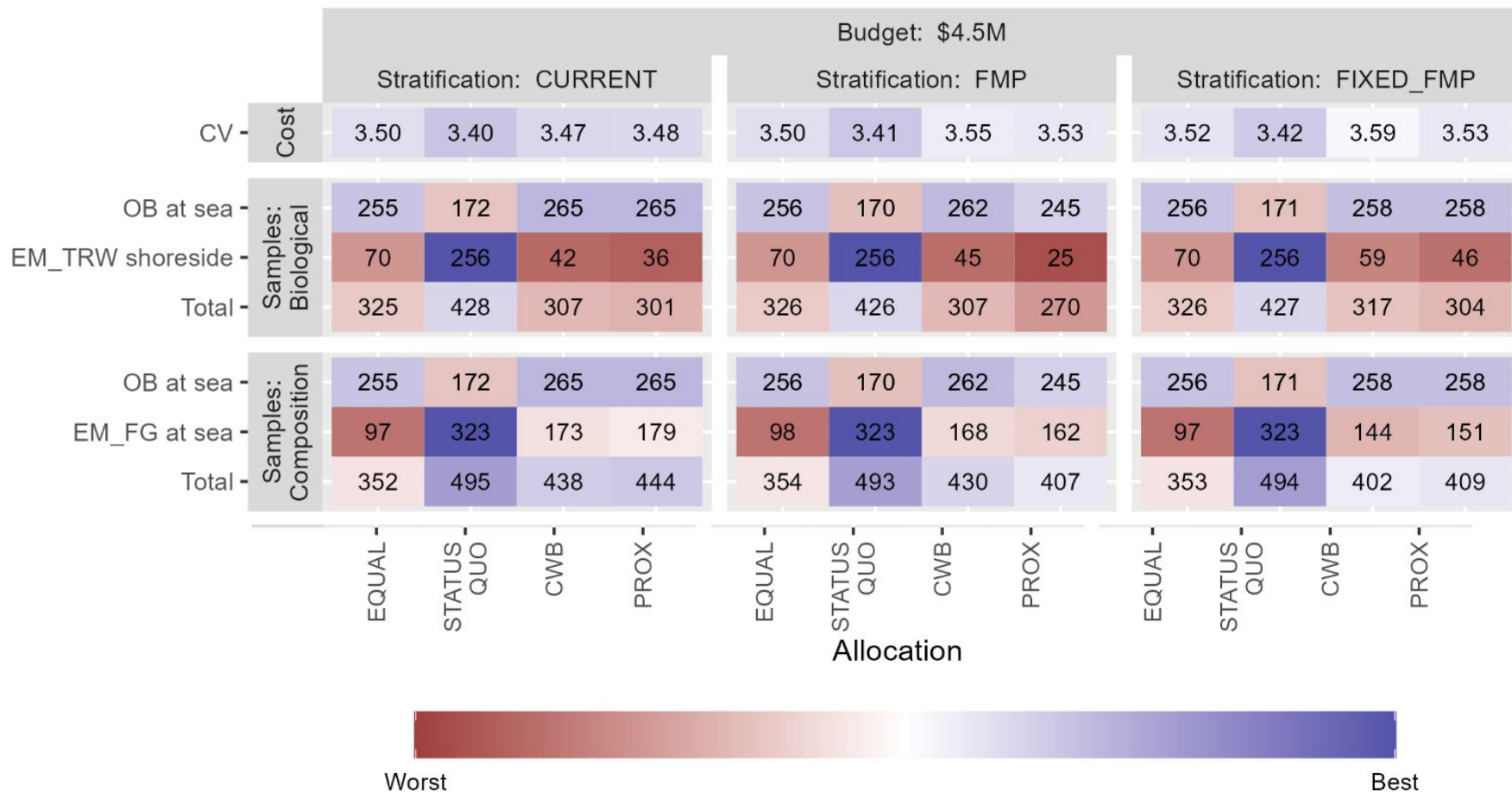


\$5.25 M



Evaluation Metrics - Cost and Samples

Number of samples refers to the number of trips where biological or species composition data were collected

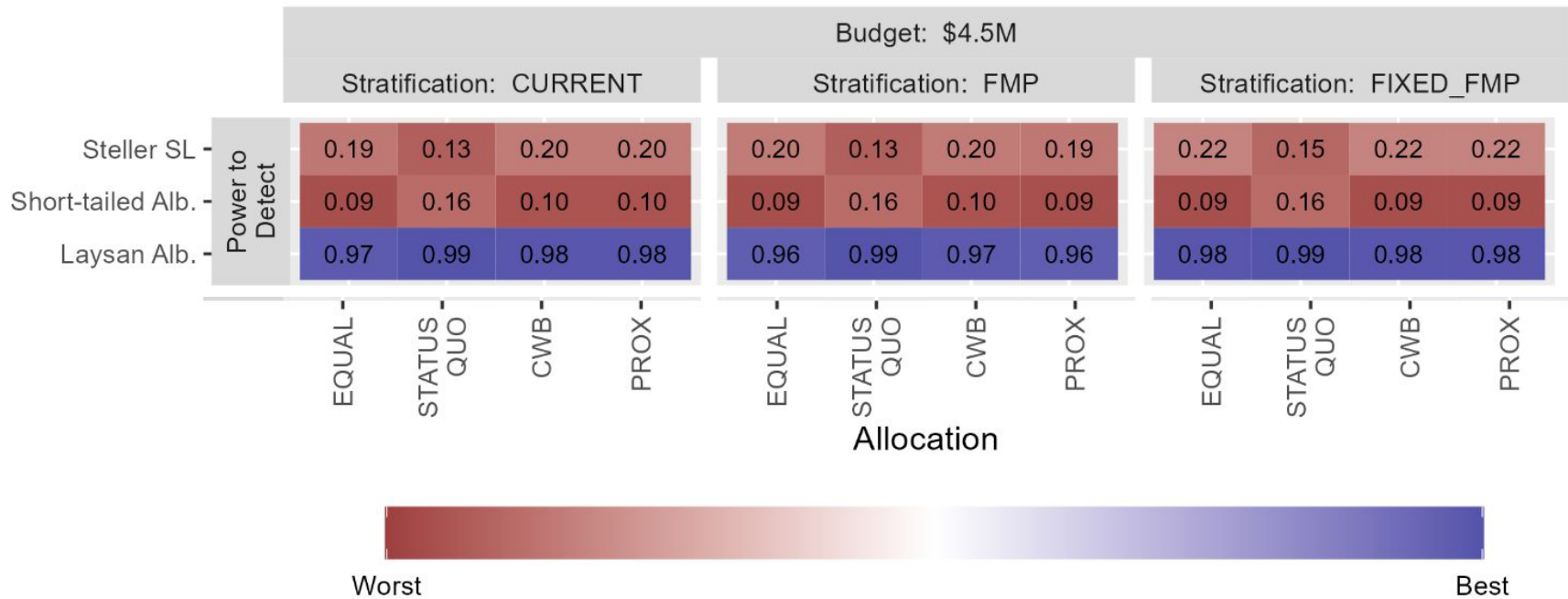


Evaluation Metrics - Interspersion

		Budget: \$4.5M											
		Stratification: CURRENT				Stratification: FMP				Stratification: FIXED_FMP			
Metric		Allocation											
		EQUAL	STATUS QUO	CWB	PROX	EQUAL	STATUS QUO	CWB	PROX	EQUAL	STATUS QUO	CWB	PROX
Interspersion (AK)	OB to OB	0.880	0.796	0.881	0.884	0.880	0.796	0.883	0.865	0.880	0.796	0.873	0.846
	OB to EM_FIXED	0.871	0.784	0.871	0.870	0.871	0.784	0.864	0.829	0.871	0.784	0.845	0.802
	OB to ZERO	0.833	0.740	0.844	0.825	0.833	0.740	0.826	0.783	0.833	0.740	0.805	0.761
	EM_TRW to EM_TRW	0.975	0.996	0.951	0.940	0.975	0.996	0.956	0.899	0.975	0.996	0.969	0.957
	EM_FIXED to EM_FIXED	0.743	0.957	0.878	0.884	0.743	0.957	0.874	0.854	0.743	0.957	0.838	0.832
Interspersion (FMP)	OB to OB	0.902	0.821	0.904	0.906	0.902	0.821	0.900	0.860	0.902	0.821	0.880	0.838
	GOA												
	OB to OB	0.740	0.635	0.734	0.748	0.740	0.635	0.775	0.894	0.740	0.635	0.827	0.893
	BSAI												
	OB to EM_FIXED	0.880	0.794	0.880	0.878	0.880	0.794	0.871	0.824	0.880	0.794	0.846	0.796
	GOA												
	OB to EM_FIXED	0.777	0.681	0.771	0.779	0.777	0.681	0.796	0.886	0.777	0.681	0.831	0.873
	BSAI												
	OB to ZERO	0.870	0.778	0.881	0.862	0.870	0.778	0.856	0.789	0.870	0.778	0.831	0.775
	GOA												
	OB to ZERO	0.434	0.330	0.452	0.421	0.434	0.330	0.502	0.726	0.434	0.330	0.521	0.608
	BSAI												
	EM_TRW to EM_TRW	0.975	0.996	0.951	0.940	0.975	0.996	0.956	0.899	0.975	0.996	0.969	0.957
GOA													
EM_FIXED to EM_FIXED	0.758	0.966	0.890	0.894	0.758	0.966	0.882	0.849	0.758	0.966	0.842	0.825	
GOA													
EM_FIXED to EM_FIXED	0.571	0.868	0.742	0.765	0.571	0.868	0.784	0.907	0.571	0.868	0.796	0.906	
BSAI													



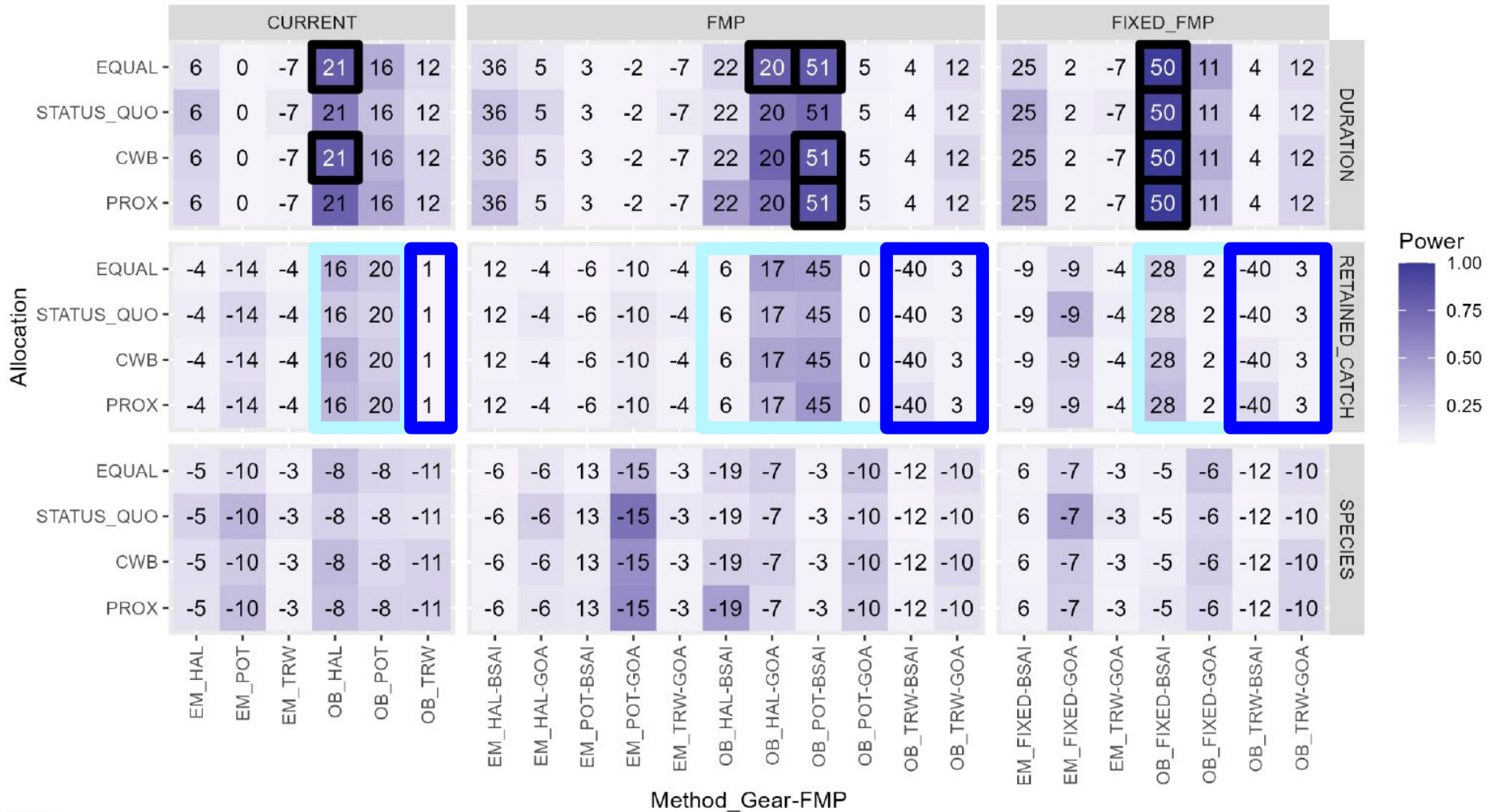
Evaluation Metrics - Power to detect



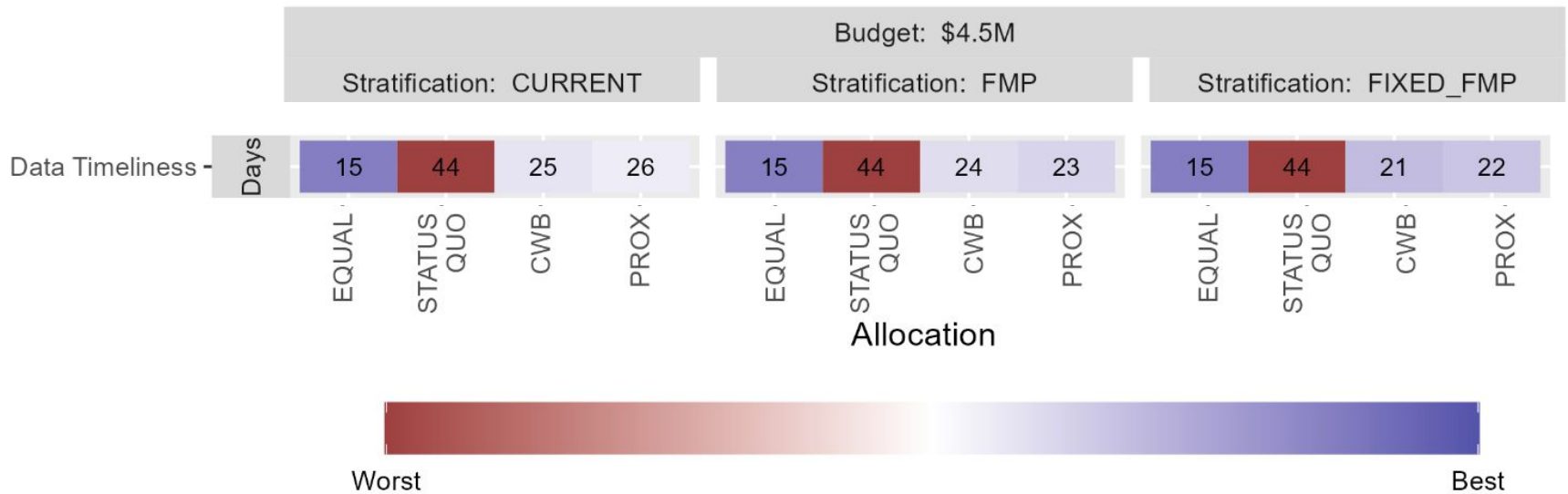
Evaluations of Designs - Tradeoffs

- Summaries are great but they suffer from a loss of information in an attempt to simplify.
- One example is how power to detect is influenced by sample size. From summaries it would appear that *Status quo* allocation has the greatest ability to detect albatross. However, this is a function of total samples in the design.
- When we dive further into the stratum that actually have the bycatch, we see that *Status quo* allocation actually performs the worst for the OB-HAL... stratum because few samples are going into the BSAI (Figures 5-2 to 5-4).

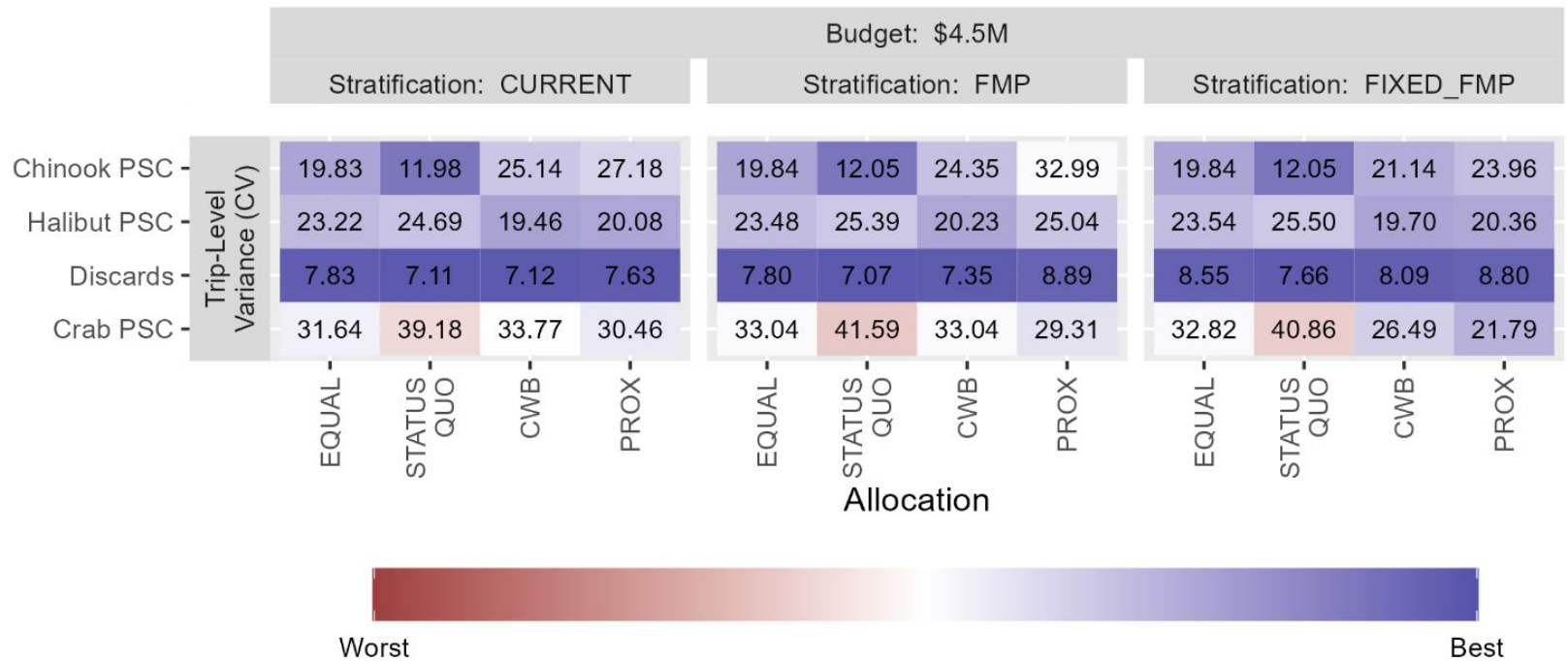
Evaluation Metrics - Monitoring Effects Power



Evaluation Metrics - Timeliness



Evaluation Metrics - Trip level CV



Evaluations of Designs - Budgets

\$3.5 M

\$4.5 M

\$5.25 M

Metric	Stratification: CURRENT				Budget: \$3.5M Stratification: FMP				Stratification: FIXED_FMP						
	CV	Cost	Biological	Composition	CV	Cost	Biological	Composition	CV	Cost	Biological	Composition			
OB at sea	166	80	177	170	166	80	175	158	166	80	172	167			
EM_TRW shorelands	45	256	20	20	45	256	21	15	45	256	28	26			
Total	211	336	197	190	211	336	196	173	211	336	200	193			
OB at sea	166	80	177	170	166	80	175	158	166	80	172	167			
EM_FG at sea	63	323	76	117	62	323	75	104	63	323	71	101			
Total	229	403	253	287	228	403	250	262	229	403	243	268			
OB to OB	0.787	0.575	0.798	0.793	0.787	0.575	0.797	0.751	0.787	0.575	0.786	0.745			
OB to EM_FIXED	0.775	0.560	0.783	0.774	0.775	0.560	0.775	0.712	0.775	0.560	0.753	0.693			
OB to ZERO	0.730	0.517	0.749	0.719	0.730	0.517	0.729	0.657	0.730	0.517	0.705	0.643			
EM_TRW to EM_TRW	0.956	0.996	0.959	0.966	0.956	0.996	0.960	0.793	0.956	0.996	0.914	0.905			
EM_FIXED to EM_FIXED	0.613	0.957	0.870	0.790	0.613	0.957	0.860	0.739	0.613	0.957	0.647	0.730			
OB to OB	0.812	0.598	0.825	0.816	0.812	0.598	0.819	0.745	0.812	0.598	0.797	0.734			
OB to EM_FIXED	0.825	0.423	0.825	0.816	0.825	0.423	0.816	0.791	0.825	0.423	0.717	0.814			
OB to ZERO	0.784	0.568	0.793	0.783	0.784	0.568	0.783	0.704	0.784	0.568	0.755	0.684			
EM_TRW to EM_TRW	0.671	0.471	0.670	0.680	0.671	0.471	0.687	0.798	0.671	0.471	0.733	0.795			
EM_FIXED to EM_FIXED	0.768	0.548	0.787	0.757	0.768	0.548	0.764	0.661	0.768	0.548	0.735	0.659			
OB to ZERO	0.321	0.193	0.339	0.311	0.321	0.193	0.361	0.816	0.321	0.193	0.385	0.472			
EM_TRW to EM_TRW	0.965	0.996	0.959	0.966	0.965	0.996	0.960	0.793	0.965	0.996	0.914	0.966			
EM_FIXED to EM_FIXED	0.628	0.966	0.884	0.801	0.628	0.966	0.862	0.732	0.628	0.966	0.656	0.721			
EM_FIXED to EM_FIXED	0.440	0.968	0.907	0.866	0.440	0.968	0.830	0.821	0.440	0.968	0.551	0.831			
Steller SL	0.13	0.08	0.14	0.13	0.13	0.08	0.14	0.12	0.13	0.07	0.15	0.15			
Short-tailed Alb.	0.08	0.14	0.05	0.06	0.05	0.14	0.05	0.05	0.05	0.14	0.05	0.06			
Laysan Alb.	0.91	0.99	0.90	0.93	0.87	0.99	0.87	0.87	0.92	0.99	0.92	0.94			
Data Timeliness	19	44	12	17	19	44	12	16	19	44	11	15			
Chinook PSC	25.13	15.41	36.67	38.87	25.13	15.56	35.89	42.92	25.13	15.56	35.89	32.30			
Hallbut PSC	29.21	36.45	25.86	26.71	29.51	37.53	26.72	32.69	29.46	37.74	25.03	26.35			
Discards	8.90	10.19	10.01	9.87	8.93	10.09	10.20	11.36	10.79	10.92	10.91	11.69			
Crab PSC	39.83	58.14	41.21	37.97	41.61	59.85	41.59	38.05	41.87	59.63	35.05	28.65			
Allocation	EQUAL	STATUS	Q10	CWB	PROX	EQUAL	STATUS	Q10	CWB	PROX	EQUAL	STATUS	Q10	CWB	PROX



Metric	Stratification: CURRENT				Budget: \$4.5M Stratification: FMP				Stratification: FIXED_FMP						
	CV	Cost	Biological	Composition	CV	Cost	Biological	Composition	CV	Cost	Biological	Composition			
OB at sea	255	172	265	265	256	170	262	245	256	171	258	258			
EM_TRW shorelands	70	256	42	36	70	256	45	25	70	256	59	46			
Total	325	428	307	301	326	426	307	270	326	427	317	304			
OB at sea	255	172	265	265	256	170	262	245	256	171	258	258			
EM_FG at sea	97	323	173	179	98	323	168	162	97	323	144	151			
Total	352	495	438	444	354	493	430	407	353	494	402	409			
OB to OB	0.880	0.796	0.881	0.884	0.880	0.796	0.883	0.865	0.880	0.796	0.873	0.846			
OB to EM_FIXED	0.871	0.784	0.871	0.870	0.871	0.784	0.864	0.829	0.871	0.784	0.845	0.802			
OB to ZERO	0.833	0.740	0.844	0.825	0.833	0.740	0.826	0.783	0.833	0.740	0.805	0.761			
EM_TRW to EM_TRW	0.975	0.996	0.951	0.940	0.975	0.996	0.956	0.899	0.975	0.996	0.969	0.957			
EM_FIXED to EM_FIXED	0.743	0.957	0.876	0.884	0.743	0.957	0.874	0.854	0.743	0.957	0.838	0.832			
OB to OB	0.902	0.821	0.904	0.906	0.902	0.821	0.900	0.860	0.902	0.821	0.880	0.838			
OB to EM_FIXED	0.740	0.635	0.734	0.748	0.740	0.635	0.775	0.894	0.740	0.635	0.827	0.893			
OB to ZERO	0.880	0.794	0.880	0.878	0.880	0.794	0.871	0.824	0.880	0.794	0.846	0.796			
EM_TRW to EM_TRW	0.777	0.681	0.771	0.779	0.777	0.681	0.796	0.888	0.777	0.681	0.831	0.873			
EM_FIXED to EM_FIXED	0.870	0.778	0.881	0.862	0.870	0.778	0.856	0.789	0.870	0.778	0.831	0.775			
OB to ZERO	0.434	0.330	0.452	0.421	0.434	0.330	0.502	0.726	0.434	0.330	0.521	0.608			
EM_TRW to EM_TRW	0.975	0.996	0.951	0.940	0.975	0.996	0.956	0.899	0.975	0.996	0.969	0.957			
EM_FIXED to EM_FIXED	0.758	0.966	0.890	0.894	0.758	0.966	0.882	0.849	0.758	0.966	0.842	0.825			
EM_FIXED to EM_FIXED	0.571	0.868	0.742	0.765	0.571	0.868	0.784	0.907	0.571	0.868	0.796	0.906			
Steller SL	0.19	0.13	0.20	0.20	0.20	0.13	0.20	0.19	0.22	0.15	0.22	0.22			
Short-tailed Alb.	0.09	0.16	0.10	0.10	0.09	0.16	0.10	0.09	0.09	0.16	0.09	0.09			
Laysan Alb.	0.97	0.99	0.98	0.98	0.96	0.99	0.97	0.96	0.98	0.99	0.98	0.98			
Data Timeliness	15	44	25	26	15	44	24	23	15	44	21	22			
Chinook PSC	19.83	11.98	25.14	27.18	19.84	12.05	24.35	32.99	19.84	12.05	24.14	23.86			
Hallbut PSC	23.22	24.69	19.46	20.08	23.48	25.39	20.23	25.04	23.54	25.50	19.70	20.36			
Discards	7.83	7.11	7.12	7.63	7.80	7.07	7.35	8.89	8.55	7.66	8.09	8.80			
Crab PSC	31.64	39.16	33.77	30.46	33.04	41.59	33.04	29.31	32.82	40.86	26.49	21.79			
Allocation	EQUAL	STATUS	Q10	CWB	PROX	EQUAL	STATUS	Q10	CWB	PROX	EQUAL	STATUS	Q10	CWB	PROX



Metric	Stratification: CURRENT				Budget: \$5.25M Stratification: FMP				Stratification: FIXED_FMP			
	CV	Cost	Biological	Composition	CV	Cost	Biological	Composition	CV	Cost	Biological	Composition
OB at sea	333	248	338	344	331	247	331	323	331	248	327	332
EM_TRW shorelands	90	256	62	53	90	256	67	36	90	256	86	68
Total	423	504	401	397	421	503	398	359	421	504	413	400
OB at sea	333	248	338	344	331	247	331	323	331	248	327	332
EM_FG at sea	126	323	250	227	127	323	238	209	126	323	201	189
Total	459	571	589	571	458	570	569	532	457	571	528	521
OB to OB	0.919	0.875	0.917	0.922	0.919	0.875	0.921	0.913	0.919	0.875	0.912	0.891
OB to EM_FIXED	0.912	0.868	0.909	0.910	0.912	0.868	0.905	0.883	0.912	0.868	0.887	0.854
OB to ZERO	0.880	0.827	0.888	0.873	0.880	0.827	0.873	0.845	0.880	0.827	0.854	0.820
EM_TRW to EM_TRW	0.982	0.996	0.971	0.964	0.982	0.996	0.974	0.940	0.982	0.996	0.981	0.974
EM_FIXED to EM_FIXED	0.810	0.957	0.933	0.921	0.810	0.957	0.930	0.904	0.810	0.957	0.902	0.879
OB to OB	0.938	0.897	0.937	0.940	0.938	0.897	0.934	0.910	0.938	0.897	0.917	0.886
OB to EM_FIXED	0.799	0.732	0.792	0.803	0.799	0.732	0.837	0.936	0.799	0.732	0.877	0.926
OB to ZERO	0.920	0.874	0.917	0.918	0.920	0.874	0.910	0.880	0.920	0.874	0.886	0.849
EM_TRW to EM_TRW	0.830	0.770	0.823	0.828	0.830	0.770	0.850	0.923	0.830	0.770	0.876	0.906
EM_FIXED to EM_FIXED	0.914	0.864	0.922	0.908	0.914	0.864	0.909	0.851	0.914	0.864	0.877	0.832
OB to ZERO	0.508	0.425	0.527	0.494	0.508	0.425	0.592	0.778	0.508	0.425	0.607	0.683
EM_TRW to EM_TRW	0.982	0.996	0.971	0.964	0.982	0.996	0.974	0.940	0.982	0.996	0.981	0.974
EM_FIXED to EM_FIXED	0.824	0.966	0.943	0.931	0.824	0.966	0.936	0.901	0.824	0.966	0.904	0.874
EM_FIXED to EM_FIXED	0.649	0.868	0.823	0.812	0.649	0.868	0.868	0.942	0.649	0.868	0.876	0.937
Steller SL	0.28	0.19	0.25	0.25	0.25	0.19	0.25	0.25	0.28	0.21	0.28	0.28
Short-tailed Alb.	0.11	0.17	0.13	0.13	0.11	0.17	0.13	0.12	0.11	0.17	0.13	0.12
Laysan Alb.	0.98	0.99	0.99	0.98	0.98	0.99	0.99	0.98	0.98	0.99	0.99	0.98
Data Timeliness	19	44	35	32	19	44	33	29	19			

Evaluations of Designs - Tradeoffs

Under budgets examined, *Current* Stratification and *Status quo* allocation resulted in much more EM sampling than observers.

- 👍 Greatest cost efficiency
- 👍 Most samples (largely from Trawl EM)
- 👍 Best CV for between trip Chinook PSC

- 👎 Doesn't address multiple gear types on same trip
- 👎 Differences between FMP not detected
- 👎 Few at-sea observer biological measurements and tissue collections
- 👎 Low interspersion of observers to EM or observers to zero coverage
- 👎 Worst power to detect Steller Sea lion bycatch - relatively poor at Short tailed albatross in the BSAI.
- 👎 High between trip CV for Pacific halibut PSC and worst CV for crab PSC.
- 👎 EM data too slow to be useful for quota management

Evaluations of Designs

- **Analysts recommend we make changes for the 2024 ADP.**
- **Analysts recommend use of the *Fixed FMP* stratification for 2024.**
 - 👍 Facilitates multiple fixed gear types on the same trip.
 - 👍 Accounts for FMP differences without resulting in strata with too little effort.
- **When combined with either *CWB* or *Proximity* allocation:**
 - 👍 Greatly improves EM timeliness.
 - 👍 Uses cost / effort in its algorithm to avoid over/under sampling.
 - 👍 Relatively good interspersion
 - 👍 Relatively good power to detect Albatross in the BSAI.
 - 👍 Decreased between trip CV of Pacific halibut and Crab PSC
 - 👎 Increased between trip CV of Chinook PSC.

Cost Efficiency Considerations



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Zero Selection

- Increasing the number of vessels in Zero Selection would increase the coverage rates in strata that remain available to monitoring
- We would expect this to decrease the **precision** of estimates
 - Data from a few vessels is likely to be more variable than data from many vessels.
- We don't know what affect this would have on the **accuracy** of estimates
 - It is generally best to get a sample from all segments of a population
 - The presence of a Zero Selection pool is known to decrease the accuracy of estimates (compared to having all vessels available to sampling), but it's a logistical concession that had to be made to accommodate vessels that are not capable of carrying an observer
 - As technology advances, it would increase the accuracy of estimates if affordable monitoring can be achieved on small vessels using EM
 - It is unknown whether monitoring effects disappear at coverage rates less than 100%



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Hiring Observers as Federal Employees

At-Sea

- With 2 supervisors: \$1,237 - \$1,260 per day (11-13% less than most recent 3-year average of cost per day)
- With 4 supervisors: \$1,276 - \$1,319 per day (7-10% less than most recent 3-year average of cost per day)

Shoreside

- With 1 supervisor: ~\$779 per day for 1,306 days (Kodiak only)
- Future contract (estimate): \$500-\$1,050 per day (\$775 average)



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Fixed-Gear EM Review Timeliness

- Pacific States currently has 3 staff who review video from fixed-gear trips in Alaska
- During much of the year, this number of video reviewers is sufficient to produce a 1-week turnaround time on video review from the time the hard drive is received
- However, there are times of the year when 6-10 video reviewers would be needed to maintain a 1-week review time
- Therefore, an additional 3 reviewers (for a total of 6) would be needed to achieve a 1-week review time for **most** of the year
- This all assumes no backlog of trips to review from the prior year
- The estimated cost of 3 additional reviewers annually is $3 \times \$100,000 = \$300,000$, a 30% increase in the current EM budget of $\sim \$1,000,000$



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Multi-Provider / Voucher Program to Procure Observers

- Vessels would procure observer coverage directly from providers
- NMFS would then reimburse vessels for coverage with money from the landing fee
- In 2017, the Observer Advisory Committee reviewed a discussion paper ([NPFMC 2017; section 3.5](#)) that evaluated this approach
 - The paper outlined legal issues, explained the complication of setting a voucher amount that is equitable, and discussed ways that it could introduce bias
- In 2022, the PCFMAC discussed this approach again and decided it did not want to divert NMFS staff resources to evaluate it
 - The committee recommended that if the Council were to be initiated by the Council, it be developed by Council staff and considered separately from the 2024 ADP and Cost Efficiencies Analysis



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Have Observers Review EM Video

- Under this approach, deployed observers would review video during their down time in port
- NMFS did a preliminary analysis and did not find evidence of sufficient observer down time that could be dedicated to video review
- Additionally, this approach would have logistical difficulties
 - Field computers that are sufficient for video review
 - Training observers on video review software
 - Observers tracking hard drives in between going to sea
- NMFS did not consider this approach further



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Structure of Partial Coverage Contract

- In August 2024, a new partial coverage contract will begin. The structure of the Request for Proposals includes several components designed to improve efficiency and reduce costs:
 - Guaranteed days have been set to the maximum realistic amount in order to get the maximum price per day as low as possible
 - Plant days to support EM on trawl vessels are incorporated, which reduces travel costs and may add flexibility for the provider to reduce lodging costs
 - Moved from half-day to hourly billing
 - Comparative costs of observer deployment from recent past programs will be provided by all bidders
 - Contract is not solely evaluated on the cost of observer deployment



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Biological Data Collection

- Use fishery-independent longline survey data for weights to inform fixed-gear EM? Stock assessment authors were consulted and they raised several concerns:
 - This is problematic for the growing EM sablefish pot fishery because of gear selectivity differences
 - Average weights in the fishery may be higher than survey because the fishery is targeting larger fish at ideal depths
 - Weight data is only one component of observer data used in assessments
 - If full retention requirements for sablefish were to be removed, the assessment would have no data to understand discard information



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Biological Data Collection

- Opportunistically deploy idle observers for focused collection of biological data?
 - Opportunistic deployments do not add value to a statistically rigorous sampling plan
 - Sea days are more expensive than idle days
 - Predicting where and when observers will be idle is challenging
 - NMFS is not planning to evaluate this further



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Biological Data Collection

- Specify differing observer sampling protocols regionally or temporally based on data needs?
 - The highest quality data come from standardized sampling protocols
 - It is most efficient to have observers with skills that are interchangeable
 - NMFS is not planning to evaluate this further



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Reduce Flexibility for Fishery Participants

- Although the following ideas may result in cost savings, the PCFMAC did not support moving any of them forward due to the impact on fishery participants:
 - Requiring vessels to pick up observers in specific ports
 - Multi-trip or vessel selection
 - Extending notification before a trip



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Acknowledgments

- Thank you to the observers, observer providers, captains, crew members, EM providers, video reviewers, and agency staff who make fishery-dependent data collection possible
- Thank you to the members of the FMAC, PCFMAC, and Trawl EM Committee for their input, feedback, and dedication to sustainable fisheries management
- Thank you to the AFSC, AKR, and PSMFC staff who have developed new deployment models to evaluate for 2024

Preliminary Budget for 2024

Funds already in place:

- Carryover funds from Year 4 into Year 5 on AIS contract: \$1,365,291
- FY23 **fee** funds obligated for Year 5 AIS contract (Aug 2023 - Aug 2024): \$3,084,915
- FY23 federal funds obligated for Year 5 AIS contract (Aug 2023 - Aug 2024): \$827,192
- FY23 **fee** funds for fixed gear EM implementation July 2023 - June 2024: \$1,019,314

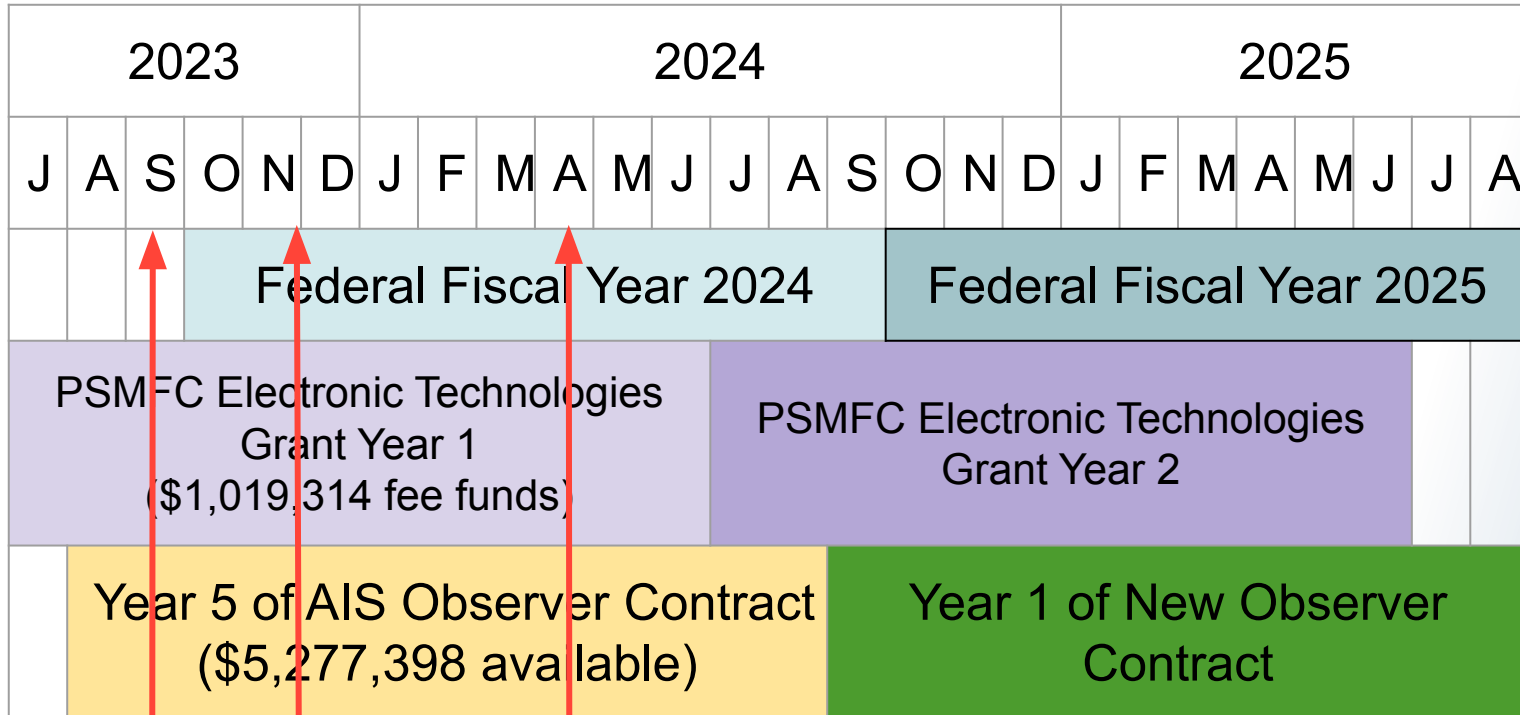
Additionally, we can expect the following funding to be available for the new observer contract (deployments starting after August 2024) and to provide support for EM:

- FY23 **fee** funds carrying forward: \$1,687,988 (these are with NMFS)
- 2023 fee funds assessed to date: \$3,260,000
 - a. Note that the AKR is projecting \$4.71M total assessment in 2023
- FY24 federal funds: \$700,000
- Industry is applying for funding to finish the final year of the trawl EM EFP as well



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Fishing Year, Fiscal Year, Grant Year, and Contract Year



We are here

Expecting \$700K for trawl
EM support and
carryover fee funds

Projected fee
revenue of
\$4.7M



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Discussion



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Sample Size and Rates

Budget: \$4.5M			Allocation scheme							
			EQUAL		STATUS_QUO		CWB		PROX	
Stratification	Stratum	N	Rate	n	Rate	n	Rate	n	Rate	n
CURRENT	EM_HAL	722	9.06	65	30.00	217	15.45	112	13.50	97
	EM_POT	353	9.06	32	30.00	106	17.34	61	23.14	82
	EM_TRW	768	9.06	70	33.33	256	5.44	42	4.67	36
	OB_HAL	1,352	9.06	122	6.07	82	9.78	132	8.60	116
	OB_POT	1,086	9.06	98	6.07	66	8.05	87	9.66	105
	OB_TRW	389	9.06	35	6.07	24	11.93	46	11.22	44
FMP	EM_HAL-BSAI	32	9.06	3	30.00	10	19.42	6	54.45	17
	EM_HAL-GOA	690	9.06	63	30.00	207	13.87	96	9.94	69
	EM_POT-BSAI	57	9.06	5	30.00	17	21.98	13	31.23	18
	EM_POT-GOA	296	9.06	27	30.00	89	18.05	53	19.52	58
	EM_TRW-GOA	768	9.06	70	33.33	256	5.82	45	3.22	25
	OB_HAL-BSAI	106	9.06	10	6.07	6	12.76	14	35.15	37
	OB_HAL-GOA	1,246	9.06	113	6.07	76	8.32	104	5.96	74
	OB_POT-BSAI	255	9.06	23	6.07	15	8.99	23	11.28	29
	OB_POT-GOA	831	9.06	75	6.07	50	9.01	75	8.35	69
	OB_TRW-BSAI	21	9.06	2	6.07	1	18.38	4	44.29	9
OB_TRW-GOA	368	9.06	33	6.07	22	11.40	42	7.47	27	
FIXED_FMP	EM_FIXED-BSAI	89	9.06	8	30.00	27	23.15	21	44.89	40
	EM_FIXED-GOA	986	9.06	89	30.00	296	12.47	123	11.30	111
	EM_TRW-GOA	768	9.06	70	33.33	256	7.65	59	6.00	46
	OB_FIXED-BSAI	361	9.06	33	6.07	22	13.89	50	20.45	74
	OB_FIXED-GOA	2,077	9.06	188	6.07	126	7.46	155	5.89	122
	OB_TRW-BSAI	21	9.06	2	6.07	1	20.93	4	61.66	13
	OB_TRW-GOA	368	9.06	33	6.07	22	13.21	49	13.20	49



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