2016 Observer Program Update

for the Joint Plan Team meeting

September -2015

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I. Observer Program Update

- ## 2014 Review

  NMFS. 2015. North Pacific Groundfish and Halibut Observer Program 2014 Annual Report. National Oceanic and Atmospheric Administration, 709 West 9th Street. Juneau, Alaska 99802. May 2015. Available at: http://alaskafisheries.noaa.gov/sustainablefisheries/observers/annualrpt2014.pdf

- ## 2015 ADP

  NMFS. 2014. 2015Annual Deployment Plan for Observers in the Groundfish and Halibut Fisheries off Alaska. National Oceanic and Atmospheric Administration, 709 West 9th Street. Juneau, Alaska 99802. Available at: http://alaskafisheries.noaa.gov/sustainablefisheries/observers/final2015adp.pdf

- ## 2016 *Draft* ADP

  NMFS. 2015. 2016 Annual Deployment Plan for Observers in the Groundfish and Halibut Fisheries off Alaska. National Oceanic and Atmospheric Administration, 709 West 9th Street. Juneau, Alaska 99802. Available at: http://alaskafisheries.noaa.gov/sustainablefisheries/observers/draft2016adp.pdf

II. Analysis to support the observer deployment design for 2016

2014 Review (June 2015)

- Among all fishing activity (full and partial coverage categories) in Federal fisheries off Alaska, 5,883 trips (43%) and 417 vessels (32.8%) were observed.

- The program met expected rates of coverage for the full-coverage regulatory and full-coverage voluntary strata, the trip selection stratum (15%), four of six time-periods within vessel selection, and the partial coverage no selection.

- In 2014, the observer program did not achieve a random sample of trawl pollock deliveries in partial coverage at the desired rate. Coverage rates were especially low in ports with high tendering activity.

Faunce, C., J. Gasper, J. Cahalan, S. Lowe, T. A'mar, and R. Webster. 2014. Deployment performance review of the 2013 North Pacific Groundfish and Halibut Observer Program. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-281, 74 p.

2014 SSC Review (June 2015)

- Get variances already (ongoing, June 2016)
- The SSC recommends that an appropriate level of stratification for sampling beyond, or as a replacement for, vessel length be investigated.
- The SSC recommends that sampling issues with tendered trips be addressed.
- The SSC recommends that the policy of allowing trip cancellation and logging multiple trips prior to sailing be reevaluated.
- The SSC recommends that methods to link data from the ODDS to the e-Landings system be developed.

2015 ADP (December 2015)

- All at-sea partial coverage is based on trip-selection:
  - 24% for large vessels
  - 12% for small vessels

- NMFS proposes that conditional releases in 2015 be granted only for vessels in the small vessel trip-selection stratum that do not have sufficient life-raft capacity to accommodate an observer.

- Vessels selected by NMFS to participate in Electronic Monitoring (EM) Cooperative Research will be in the no selection pool (i.e., not subject to observer coverage) while participating in such research.

- NMFS will continue to collect genetic samples from salmon caught as bycatch in groundfish fisheries to support efforts to identify stock of origin. The same sampling protocol established in the 2014 ADP will be used in 2015.

2016 *Draft* ADP

NMFS recommends

GEAR stratification with OPT allocation.

Preliminary coverage rates (%) expected to be:

No selection – 0
Trawl – 29
Hook and line – 14
Pot – 14

GOA and BSAI genetic sampling protocols - No change

End to coverage exceptions due to life raft capacity or bunk space

Allow only 2 instead of 3 open trips in ODDS to reduce temporal bias

Voluntary field linking ODDS and eLandings

2016 *Draft* Annual Deployment Plan

for observers in the Groundfish and Halibut fisheries off Alaska:

Appendix B:

An Initial analysis of alternative sample designs for the deployment of observers in Alaska

September - October, 2015

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Why

- Observer deployment into the partial coverage fleet is funded though a 1.25% fee that is expected to be re-evaluated in 2018.

- Observer deployment in partial coverage under intense scrutiny since 2013. NMFS recommended improvements be explored (June 2015).

- Efficiency can be achieved through the sampling design, which is comprised of 1) how you divide the population of interest and 2) how you allocate your samples. The first is called stratification, the second is called allocation.

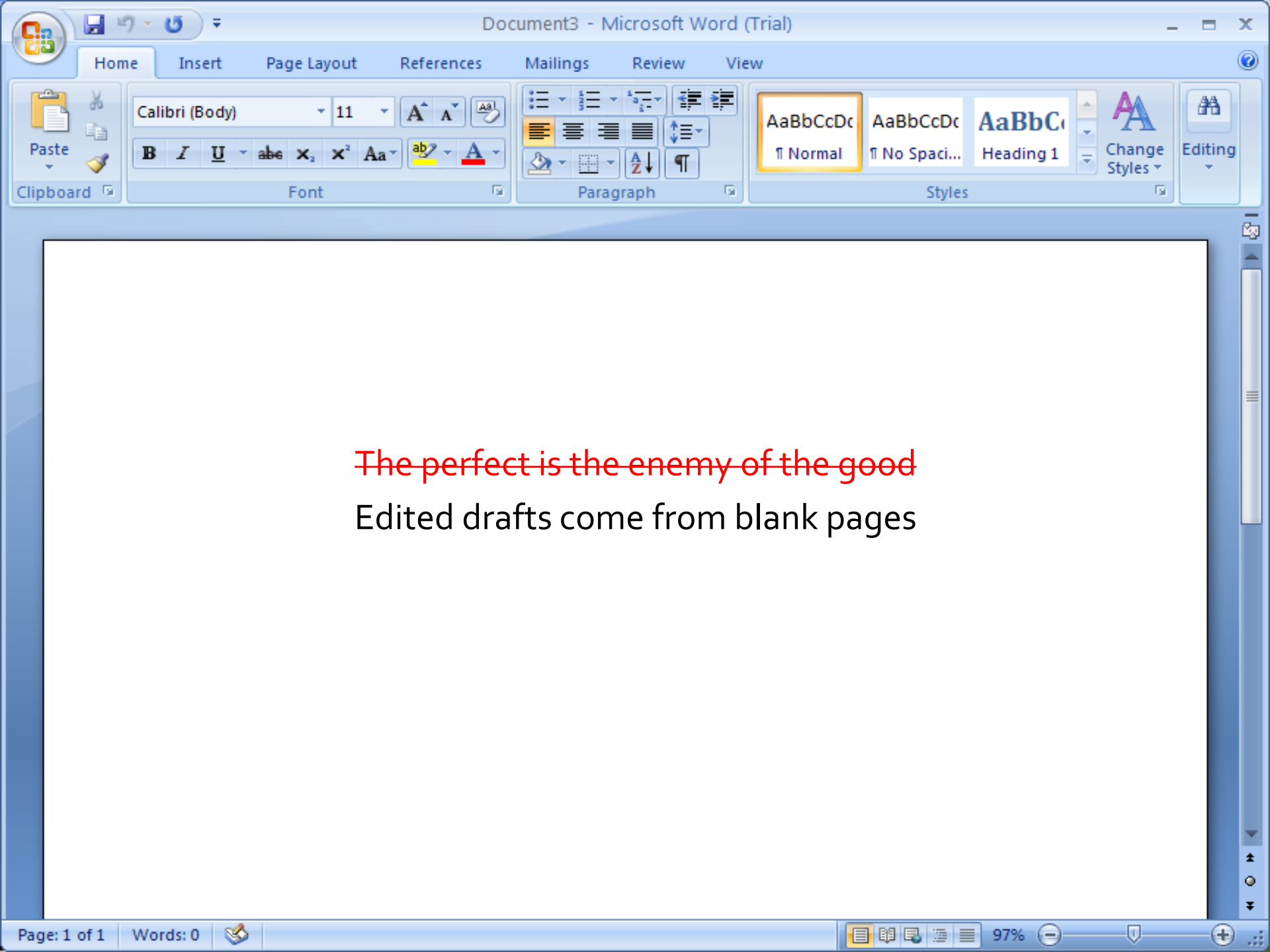
Allocation strategies

"where to put those samples you bought"

A. You can set all rates = (proportional allocation)
B. You can allocate to reduce overall variance (Neyman allocation)
C. You can do B. but for multiple metrics, or
D. You can select along a large range of possibilities by what feels good, sounds good, is popular, etc.

Here alternative designs are compared.

Which one you think is best is a matter of opinion, and challenging that is the hard part.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Editing
~~The perfect is the enemy of the good~~
Edited drafts come from blank pages
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97%

How

Simple Assumptions

- All groundfish are of equal importance
- All discards of groundfish species (including halibut PSC) are of equal importance
- We have perfect knowledge of the fishing outcomes
- There are no observer effects (deployment is without error)
- All trips have same length (for converting days to trips to expected rates).

What

- 6 stratification schemes

1. The original 2010 CART (5 strata) Trawl, HAL+POT big T, HAL + POT little t .
2. The 2013 – 2015 design: (2 strata) T and t
3. The 2016 design: (2 strata) T, t with some tweaks
   - 9 CPs formally in full coverage moved into partial coverage (Council action)
   - 56 EM vessels removed from partial coverage (EM workgroup)*
   - Voluntary full-coverage AFA non-pollock CVs in 2014 assumed to be full-coverage for 2016.
4. Gear only (3 strata)
5. 2 FMPs and 3 gears (6 strata)
6. Contract friendly: (5 strata) Trawl, HAL+POT first half of year, HAL+POT second half of year
7. ~~3 FMPs and 3 gears (9 strata)~~ Discontinued – some strata not sampled

*

Draft 2016 Electronic Monitoring Pre-Implementation Plan

EM Workgroup Recommendation, 9/16/2015

Year	Fieldwork / Pre-implementation (Pre-Imp)	Council process, regulations	Observer Program/ Annual Deployment Plan (ADP)
2014	*Fieldwork*	*EMWG develops 2015 Cooperative Research Plan (CRP), discusses alternatives for analysis*	*Oct – 2015 ADP places 10 vessels that are participating in EM research into the no selection pool*
2015	*Feb – SSC reviews CRP* *Jan-Jul – operational and stereo camera field research*	*Feb – SSC, Council review CRP* Oct – propose a 2016 Pre-Implementation plan to Council	Oct – 2016 ADP proposes all EM Pre-Imp vessels in no selection pool
2016	Jan-Dec – Pre-implementation on 60 longline vessels 40-57.5'. Jan-Jul – EM field research on stereo cameras, pot vessels.	Oct – initial review for EM analysis to integrate EM into obs program. Dec – final action on EM analysis	Oct – 2017 ADP proposes all EM Pre-Imp vessels in no selection pool
2017	Jan-Dec – Second pre-implementation year for longline vessels 40-57.5'. Potentially expand to include other fixed gear vessels or other technology.	Jan-Dec – Develop regulations for integrating EM	June – Annual Report provides prelim analysis on allocating observer fee between observer and EM deployment Oct – 2018 ADP allocates funding to observers and EM deployment
2018	**Integrated observer/EM monitoring program**		

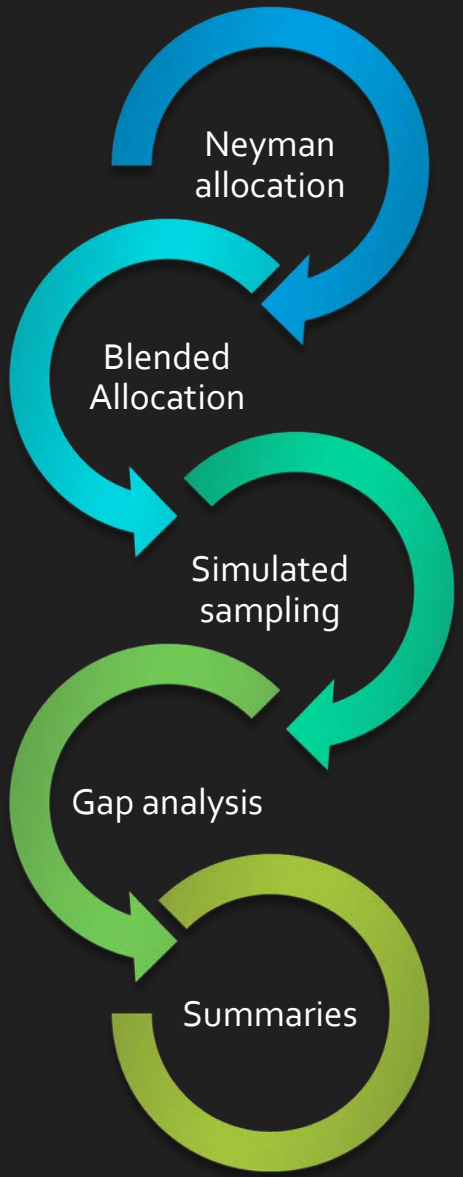
What

For each stratification scheme:

- 2 evaluation metrics:
    1. All groundfish retained,
    2. All groundfish discarded (including halibut PSC)

- 2 allocation strategies:
    1. proportional to N,
    2. proportional to NS (optimized)

Analysis Process



- For each Scheme (6), there are 2 methods :
  - proportional
  - Blended optimal weights (m_h)

- For each Metric (2) & Stratification scheme (6)
  - n_h

- Iterations , method, scheme, metric:
- $n_{initial}$ = 2000
  - Estimates
    - % error
    - SE

2013 & 2014 combined data

2014 data

- Use n expected in 2016
- Hypergeometric
- Gear: Area: Target
- Chance > 50% of >3 observed
- PASS / FAIL

- Ellipse plot
- Means plot
- Gaps rank plot
- Distance plot
- DRAFT expected coverage rates

The blended ranking system

Three relative components

Uncertainty

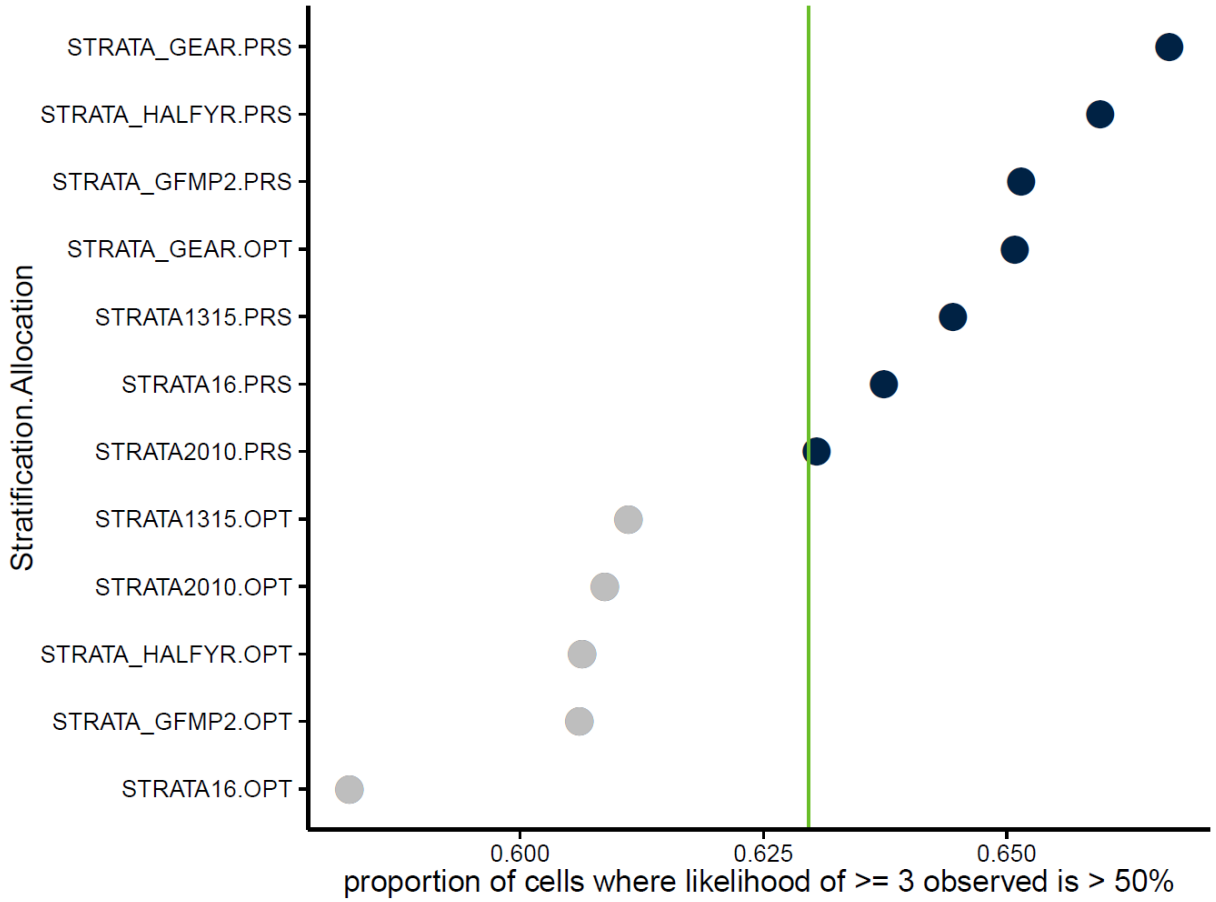
Accuracy

Gap analyses

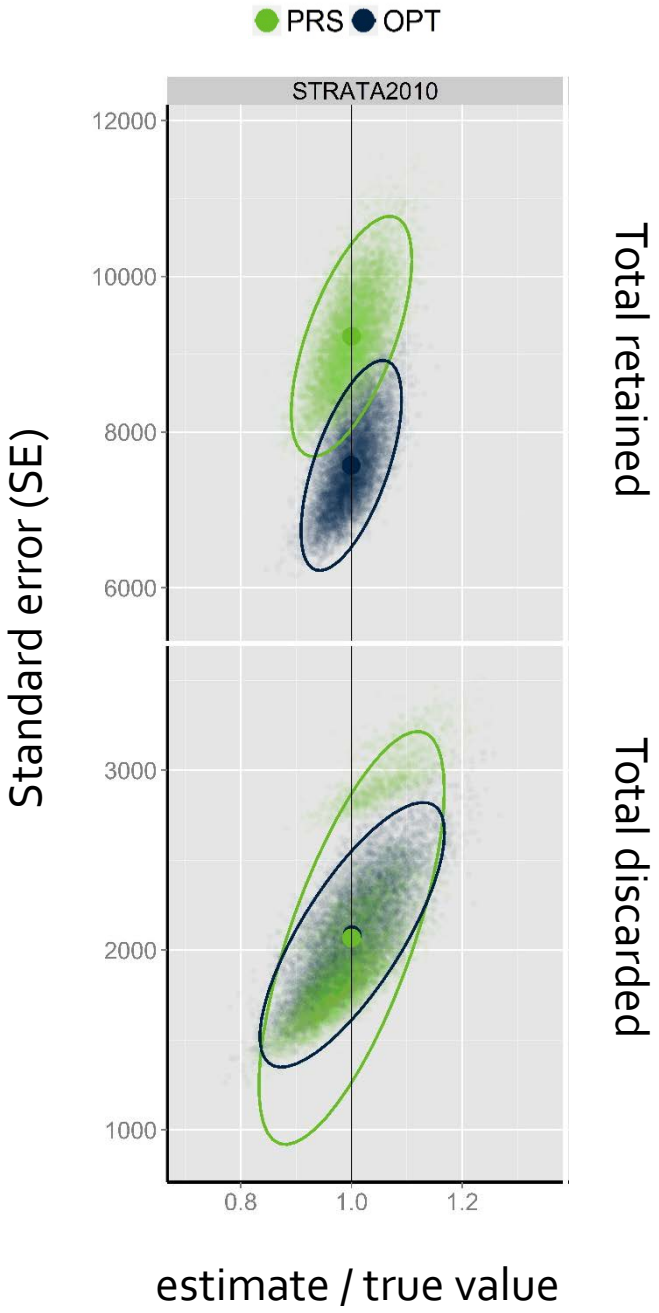
Euclidian Distance on these components

Disregard stratifications and allocations where metric 3 is below average.

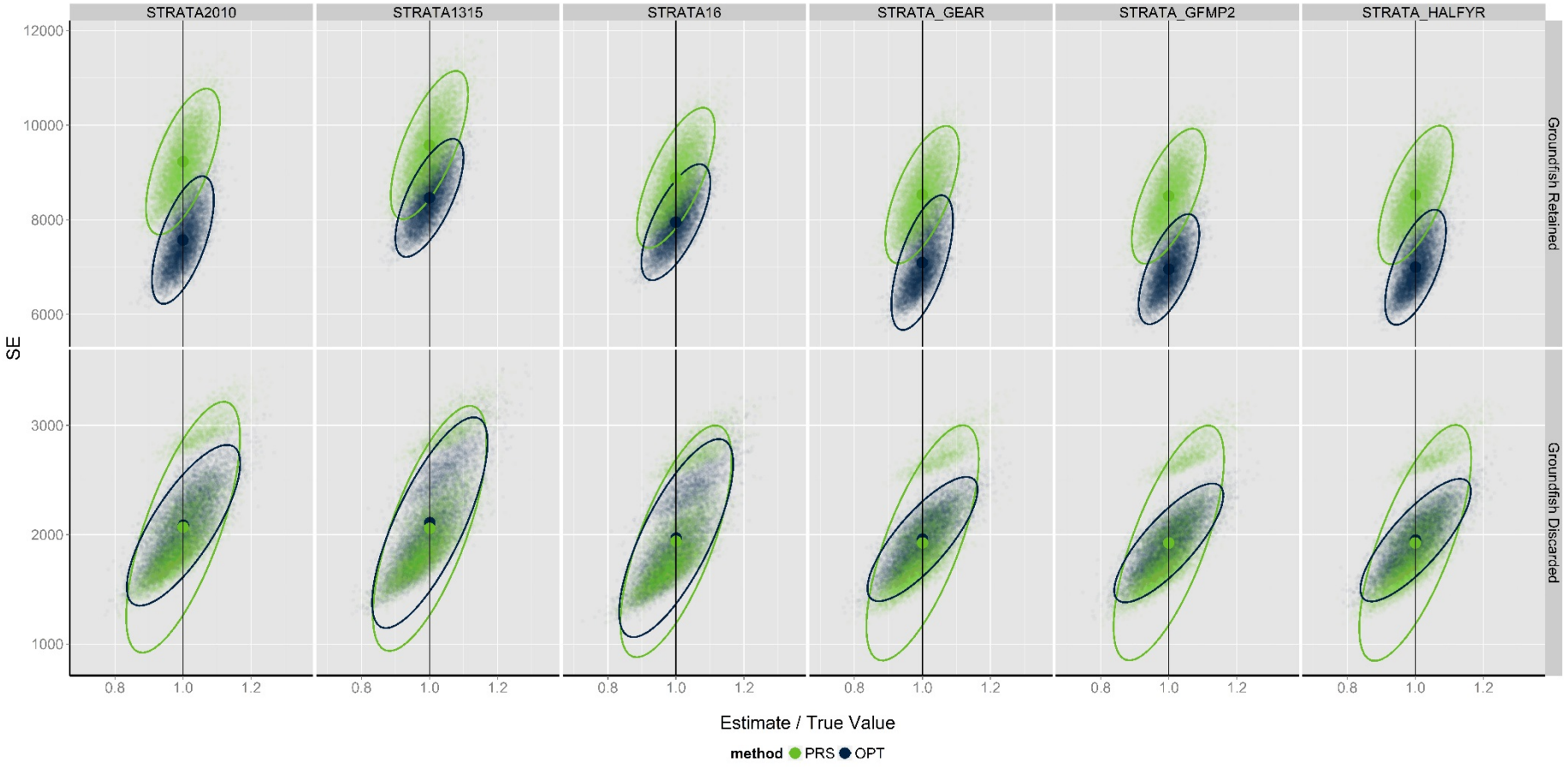
Gap Analysis



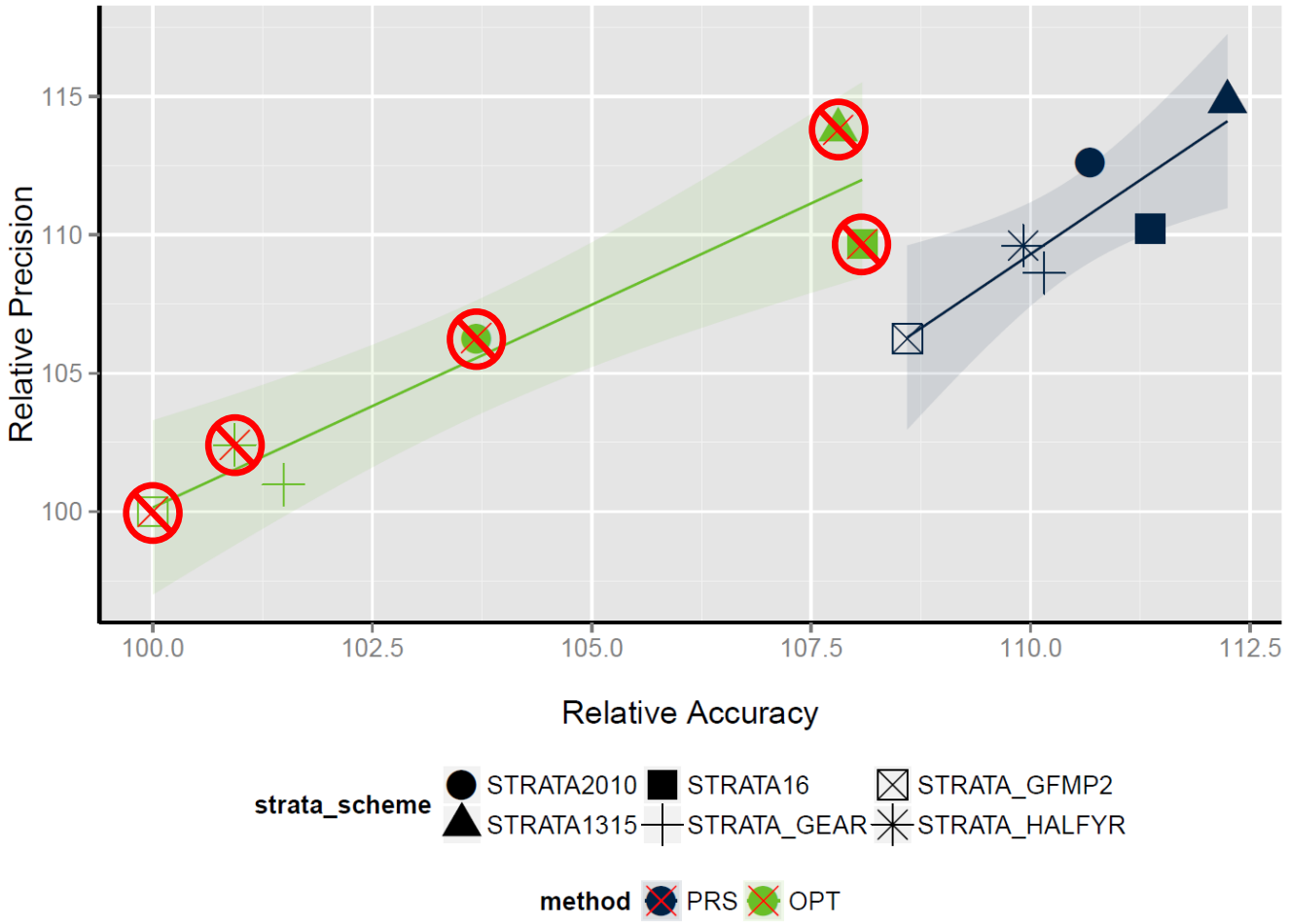
Example


PRS
OPT
STRATA2010
12000
10000
8000
6000
3000
2000
1000
0.8
1.0
1.2
Standard error (SE)
Total retained
Total discarded
estimate / true value

Ellipse Plot



Mean plot


Relative Precision
115
110
105
100
100.0
102.5
105.0
107.5
110.0
112.5
Relative Accuracy
strata_scheme
STRATA2010
STRATA16
STRATA_GFMP2
STRATA1315
STRATA_GEAR
STRATA_HALFYR
method
PRS
OPT

Distance plot

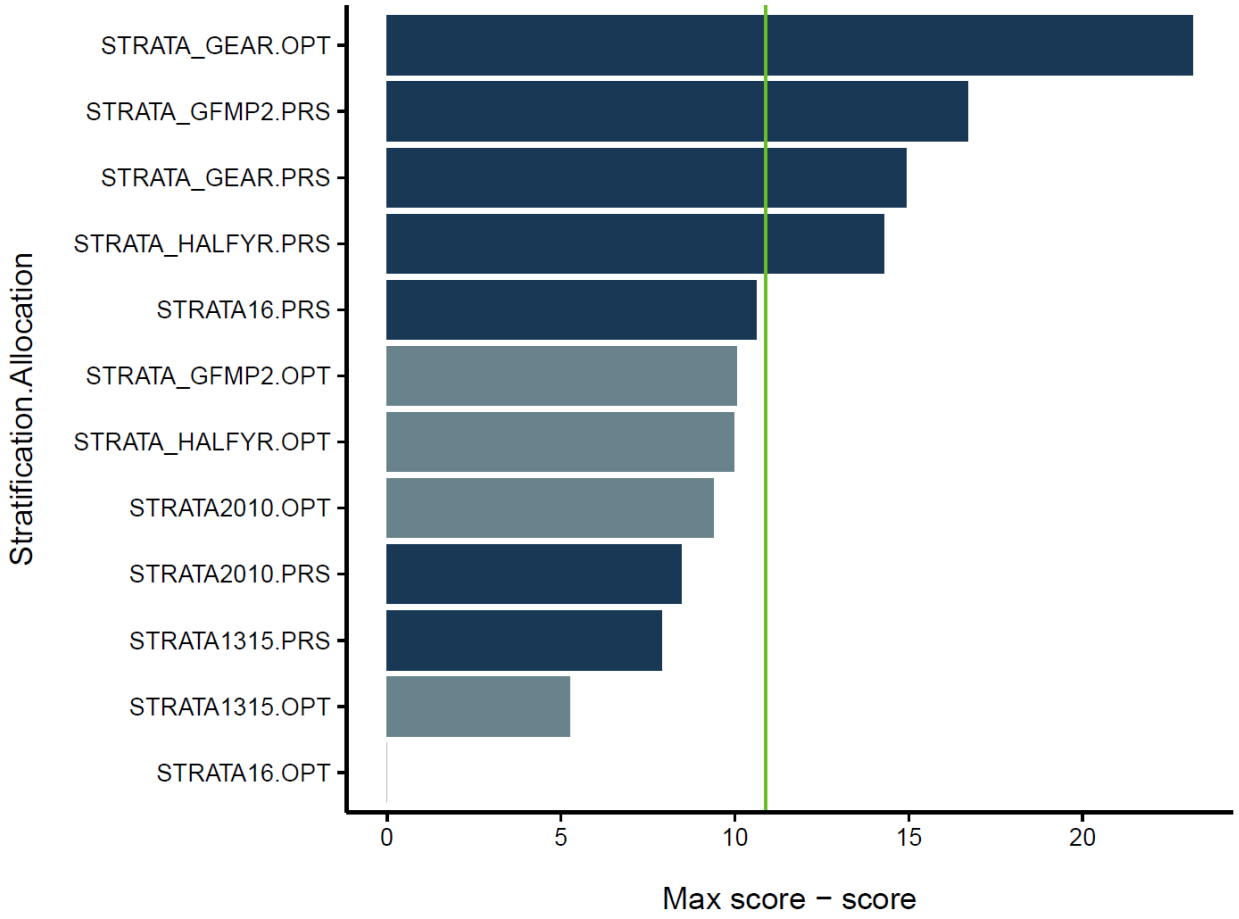


Table 1. Sampling designs with above average gap analysis results and above average distance values recommended for consideration in the 2016 ADP. Sampling designs are defined by their stratification schemes and sampling allocations (OPT = optimal, PRS = proportional). Gear stratum abbreviations are HAL = Hook and Line, POT = Pot, and TRW = Trawl. FMP stratum abbreviations are: BSAI = Bering Sea and Aleutian Islands, GOA = Gulf of Alaska. The total number of trips in each stratum, their relative proportion (Proportion N), and relative allocation under compromised optimal allocation (Relative mh) are also provided for comparison. The number of samples afforded in each stratum (nh) is the product of the number of samples afforded total (n) and either the PRS weighted allocation (Wh) for proportional allocation or the OPT weighted allocation (mh) for compromised optimal allocation. The weighted allocation used in each rate calculation is depicted in bold. The anticipated preliminary coverage rate (Rate) is nh divided by Nh.

Sampling Design (Strata Scheme. Allocation)	Stratum (h)	Trips (N_h)	PRS weighted allocation (W_h)	OPT weighted allocation (m_h)	n_h	Rate*
GEAR.OPT	HAL	2775	0.522	**0.339**	419	0.151
GEAR.OPT	POT	1253	0.190	**0.152**	187	0.149
GEAR.OPT	TRW	1992	0.288	**0.510**	630	0.316
GEAR.PRS	HAL	2775	**0.522**	0.339	646	0.233
GEAR.PRS	POT	1253	**0.190**	0.152	235	0.188
GEAR.PRS	TRW	1992	**0.288**	0.510	357	0.179
FMP.PRS	HAL_BSAI	323	**0.067**	0.032	83	0.257
FMP.PRS	HAL_GOA	2452	**0.454**	0.311	562	0.229
FMP.PRS	POT_BSAI	546	**0.082**	0.089	101	0.185
FMP.PRS	POT_GOA	707	**0.108**	0.052	134	0.190
FMP.PRS	TRW_BSAI	119	**0.021**	0.025	26	0.218
FMP.PRS	TRW_GOA	1873	**0.267**	0.491	331	0.177
HALFYR.PRS	HAL_First	1665	**0.302**	0.183	373	0.224
HALFYR.PRS	HAL_Second	1110	**0.220**	0.154	272	0.245
HALFYR.PRS	POT_First	650	**0.106**	0.099	131	0.202
HALFYR.PRS	POT_Second	603	**0.084**	0.049	104	0.172
HALFYR.PRS	TRW	1992	**0.288**	0.515	357	0.179

Summary:

We can make the following generalizations for the deployment of observers in the 2016 *remaining* partial coverage (> 0% selection) fleet:

- We can improve on 2013-2015
- Among viable sampling plans, Trawl > Fixed, GOA > BSAI, First half > Second half.
- Proportional allocation better than optimal for filling gaps; borrowing data can lead to poor inference.
- Optimal now ≠ optimal later; depends on metrics and stability of past data.
- Blended ranking is just that – weights relative performance of designs equally in terms of accuracy, precision, and gaps. Metric 3 driving overall D' score.
- Two of the four viable sampling plans has strata defined by gear type.

Table 2. Comparison of observer coverage rates* for the STRATA GEAR stratification scheme that result from proportional allocation and compromised optimal allocation (Relative mh; OPT). Also depicted is how the OPT coverage rates differ from those that would have resulted from either the Neyman allocation based on total groundfish discarded (Discarded) or total groundfish retained (Retained). The sampling design GEAR.OPT was the only design with OPT allocation with above average gap analysis scores and above average distance scores.

		Rates			
Stratification Scheme	Stratum (h)	Proportional (PRS)	Relative m_h (OPT)	Neyman allocation (Discarded)	Neyman allocation (Retained)
GEAR	HAL	0.233	0.151	0.231	0.071
GEAR	POT	0.188	0.149	0.049	0.251
GEAR	TRW	0.179	0.316	0.269	0.363

2016 *Draft* ADP

NMFS recommends

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End to coverage exceptions due to life raft capacity or bunk space

Allow only 2 instead of 3 open trips in ODDS to reduce temporal bias

Voluntary field linking ODDS and eLandings

Thomas Eakins (1881) Shad Fishing at Gloucester on the Delaware River. Oil on canvas.