Draft 2024 Annual Deployment Plan and Partial Coverage Cost Efficiencies Analysis

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NPFMC Groundfish Plan Team

September 19th, 2023
Catch and Effort 2022

Coverage Type: Full (black) vs. Partial (yellow)

Number of Vessels

- BSAI: 200 (Full) + 200 (Partial)
- GOA: 800 (Partial)

Catch Weight (mt)

- BSAI: 800,000 (Full) + 1,200,000 (Partial)
- GOA: 400,000 (Partial)
Partial Coverage Catch and Effort 2022
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) at a variety of budgets
- Collect data that reflects the full range of fishing activities
Timeline

- **Analytic Plan** (03/2022 - 06/2023)
  - 7/5 (Overview)
  - 7/18 (Stratifications and Allocations)
  - 8/15 (Evaluation metrics)
  - 9/05 (Review Document)

- **Fish. Monit. Sci. Comm.** (*Sandra Lowe, Steve Barbeaux, Jason Gasper, Ray Webster*)
  - 7/5 (Overview)
  - 7/18 (Stratifications and Allocations)
  - 8/15 (Evaluation metrics)
  - 9/05 (Review Document)

- **Council Partial Coverage Fish. Monit. Comm.** (09/14)

- **Council Groundfish Plan Team** (09/19)

- **Council Advisory Panel** (10/03) - No SSC

- **Council** (10/06)

- **Final ADP Development** (10 - 11/2023)

- **Council GPT** (Nov.)

- **Council** (Dec.)

- **Implementation** (01/01/2024)
Observer and Electronic Monitoring

Full Coverage

The majority of groundfish harvest is from vessels with full coverage: at least one observer present during all fishing or processing activity.

Partial Coverage

Vessels are assigned partial observer or EM coverage. Partial coverage vessels are mainly smaller boats representing all gear types.

Fixed Gear EM

A randomly selected 30% of trips are covered by EM for volunteer vessels using fixed gear (hook-and-line or pots).

Pelagic Pollock Trawl EM

Participating vessels volunteering for 100% EM coverage within the pelagic pollock trawl fleet and 33% of trips are sampled shoreside.
Designs:  
Stratification & Allocation

- **Stratification:** *Currently* defined by monitoring method (at-sea observer, fixed-gear EM, or shoreside observer with full retention compliance monitoring at-sea) and gear type (hook-and-line, pot, or trawl)

- **Allocation:** *Currently:*
  
<table>
<thead>
<tr>
<th>Gear Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed-gear EM</td>
<td>30.0% (policy)</td>
</tr>
<tr>
<td>Trawl EM</td>
<td>33.3% (policy)</td>
</tr>
<tr>
<td>At-sea Observer</td>
<td>[Remaining funds]: 15%</td>
</tr>
</tbody>
</table>

Baseline, then minimize variance on groundfish discards, halibut PSC, and Chinook PSC.
Designs: Stratification & Allocation

- **Stratification:** *Currently* defined by monitoring method (at-sea observer, fixed-gear EM, or shoreside observer with full retention compliance monitoring at-sea) and gear type (hook-and-line, pot, or trawl)

- *Alternatively,* also stratify by FMP, splitting trips in the **BSAI vs GOA**
  - Higher sample allocation in BSAI

- *Alternatively,* combine fixed gear trips into one stratum (hook-and-line and pot)
  - Addresses issues with trips fishing **both gear types.**
# Stratification Definitions Evaluated

<table>
<thead>
<tr>
<th>Stratification</th>
<th>Number of Sampled Strata</th>
<th>Definition</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023 (CURRENT)</td>
<td>6</td>
<td><strong>Monitoring Method</strong> (Observer, EM Fixed Gear, EM Trawl) and <strong>Gear Type</strong> (HAL, POT, TRW)</td>
<td>Current stratification definition</td>
</tr>
<tr>
<td>FMP</td>
<td>11</td>
<td><strong>Monitoring Method</strong> (Observer, EM Fixed Gear, EM Trawl) and <strong>Gear Type</strong> (HAL, POT, TRW) and <strong>FMP</strong> (BSAI, GOA)</td>
<td>Potential to reduce the likelihood of data gaps</td>
</tr>
<tr>
<td>Combined fixed gear - FMP</td>
<td>7</td>
<td><strong>Monitoring Method</strong> (Observer, EM Fixed Gear, EM Trawl) and <strong>Gear Type</strong> (FIXED, TRW) and <strong>FMP</strong> (BSAI, GOA)</td>
<td>Maintains statistical integrity without creating small strata and allowing focused sampling</td>
</tr>
</tbody>
</table>
Designs: Stratification & Allocation

- **Allocation: Currently:**
  - Fixed-gear EM: 30.0% (policy)
  - Trawl EM: 33.3% (policy)
  - At-sea Observer: [Remaining funds]: 15%

  baseline, then minimize variance on groundfish discards, halibut PSC, and Chinook PSC.

- **Alternatively,** allocate sampling effort to reduce data gaps in a way that also scales with budget
- **Alternatively,** allocate more to cheaper strata
- **Alternatively,** allocate more to strata with fewer trips to guard against sample size
Allocation

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

New Allocation Methods:

Cost-weighted Boxes (CWB)
- spatiotemporal gaps
- monitoring costs

Proximity (PROX)
- spatiotemporal gaps
- sample size
<table>
<thead>
<tr>
<th>Allocation Method</th>
<th>Stratification Definition</th>
<th>FMP</th>
<th>Combined Fixed Gear and FMP</th>
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<tbody>
<tr>
<td>2023 (Current)</td>
<td></td>
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<tr>
<td>Equal Rates</td>
<td>Integrated EM, baseline comparison</td>
<td>Integrated EM</td>
<td>Integrated EM</td>
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<tr>
<td>15% plus optimization (status quo)</td>
<td>both the stratification definition and allocation method were used in 2023</td>
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<tr>
<td>Cost Weighted Boxes</td>
<td>2023 stratification definition and gap minimization with cost efficiencies</td>
<td>Integrated EM</td>
<td>Integrated EM</td>
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<tr>
<td>Proximity</td>
<td>2023 stratification and gap minimization with sample size buffer</td>
<td>Integrated EM</td>
<td>Integrated EM</td>
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Sample Size and Rates

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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
Evaluations of Designs - Budgets

$3.5\ M$

$4.5\ M$

$5.25\ M$
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.
Additional Program Considerations

- Size of zero coverage stratum
- Current observer contract structure (hourly billing savings 10%)
- Future observer employment structure (7-13% savings)
- Hiring additional EM video reviewers (300k, 30% increase in EM budget)
- Biological data collection
- Balancing flexibility with cost
What we need from you

● Interspersion as a metric.
● FMP Differences - Fixed FMP.
● Other [scientific] concerns.
Discussion