The design, implementation and performance of an observer pre-trip notification system (PTNS) for the northeast United States groundfish fishery

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I. PTNS needs and objectives

• In 2010 there were large changes in the management of northeast US groundfish.
  • Input controls → output controls.
  • Movement to a catch share/sector management system.
  • Four-fold increase in the level of observer coverage.
    • An additional observer program (at-sea monitors, or ASMs).

• The previous manual methods of deploying observers were insufficient to handle to complexities brought about by the new management regime.
I. PTNS needs and objectives

- In January 2010, the NEFSC set out to design, and develop, an automated system to deploy observers in the groundfish fishery.
- Pre-trip Notification System (PTNS)
  - Must support in-season discard monitoring as well as stock assessments needs.
  - Should dynamically adjust to changes in fishing behavior.
  - Trip based selection process capable of handling multiple selection processes each with their own target coverage rates.
  - Should have the ability to auto-adjust selection probabilities.
II. PTNS design and implementation

• General system design:
  • It’s complex!
  • 10 selection tiers
  • 3 types of coverage
  • Many observer providers
  • >250 possible PTNS strata
    • ≈ 18 active sectors
    • 3 fishing regions
    • 5 gear types

• The selection method used for the majority of trips is based on some random probability of a trip being selected for coverage.
II. PTNS design and implementation

- The probability of a trip being selected is not constant!
- Relies on a ‘linear’ method to determine a trip’s selection probability.
  - Allows some level of ‘front-loading’ without introducing bias.
  - Self-adjusting: meets coverage targets and reduces coverage variability.
II. PTNS design and implementation

- A full-scale system was deployed on 1 May, 2010.
  - There have been ten system upgrades since May 2010.

- PTNS system overview:
  - Three major components.

![Diagram of PTNS system components]

- System dashboard (internal performance monitoring)
- Production database(s) and server processes
- Web-based graphical user interface (public access)
III. PTNS monitoring and performance

- The PTNS has been in use in the groundfish fishery for over three years.

- How well has the system performed?
  - Has the PTNS achieved the desired level of observer coverage?
  - Were there temporal biases in observer coverage?
  - Was the coverage deployed in an equitable manner?
  - Where are improvements needed?

![Performance Evaluation]

- Exceptional
- Exceeds requirements
- Meets requirements
- Needs improvements
III. PTNS monitoring and performance

• Has the PTNS achieved the desired level of coverage?
  • Coverage across multiple metrics was nearly identical.
• Were there temporal biases in observer coverage?
  • Coverage was constant throughout the fishing year.
III. PTNS monitoring and performance

- Was the coverage deployed in an equitable manner?
  - Coverage across sectors was similar.
  - Exceptions are low-activity sectors and those subject to lower observer coverage (e.g., Sector ID 2).
III. PTNS monitoring and performance

• Was the coverage deployed in a equitable manner?
  • Vessel-level coverage
    • The PTNS does not explicitly attempt to deploy coverage equitably among vessels (it’s a strata-based system).
    • However, vessel-level selection varies randomly around overall mean with variability decreasing with additional trips.
III. PTNS monitoring and performance

• Summary
  • Strengths
    • Performed consistent with system design and initial simulations.
    • Observer coverage has been deployed proportional to fishing effort and groundfish landings.
    • Coverage has been equitable at the sector- and vessel-level, though there is variability.
      • Variability decreases with increased fishing activity.
  • Weaknesses
    • Continued improvements needed in the equitability of vessel-level coverage.
      • Improved compliance monitoring of pre-trip notification requirements.
      • Reduce the provider selection bias.
IV. More information

• For more information on the PTNS design and performance:
  • http://nefsc.noaa.gov/publications/crd/crd1321/