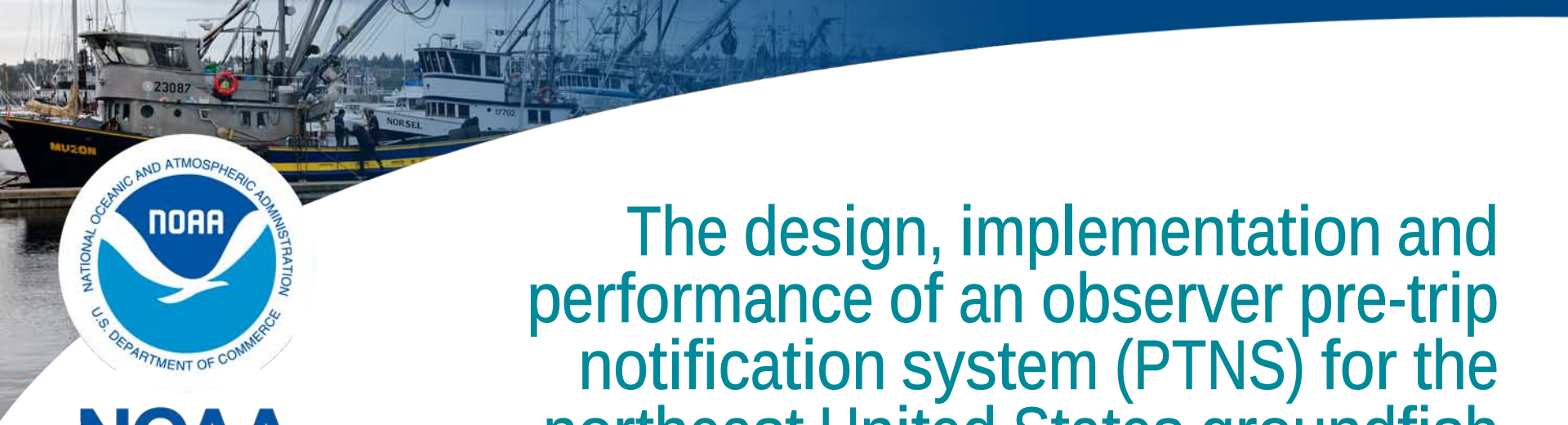

The design, implementation and performance of an observer pre-trip notification system (PTNS) for the northeast United States groundfish fishery

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Presentation overview

PTNS needs and objectives

- Historical deployment of observers
- Changes required under Amendment 16 to the Multispecies FMP (groundfish)

PTNS design and implementation

- System decision logic, simulation of probability selection procedures.
- Overview of the production system.

PTNS monitoring and performance

- Tracking coverage rates, sea day burn rates, compliance and provider performance.

The future of PTNS?

I. PTNS needs and objectives

Prior to Amendment 16 (May 2010), observer deployment in the groundfish fishery was handled in the same manner as most other fisheries.

- Sea day schedule established through SBRM optimization process.
- Randomized list of vessels.
- Trips were selected by observer providers using a dock-intercept process.
  - Largely a manual process performed by the service provider.
  - Exception: Call-in requirements for vessels fishing in special management programs.

I. PTNS needs and objectives

Amendment 16 introduced large-scale changes to the observer requirements for the groundfish fishery

- The addition of 15 active groundfish sectors (up from two).
- Observer deployment must support in-season monitoring of fishery discards
- An approximate four-fold increase in the level of observer coverage.
- A new class of trained observers, at-sea monitors (ASMs).
- The potential for industry-funded observer coverage to supplement government-funded coverage.

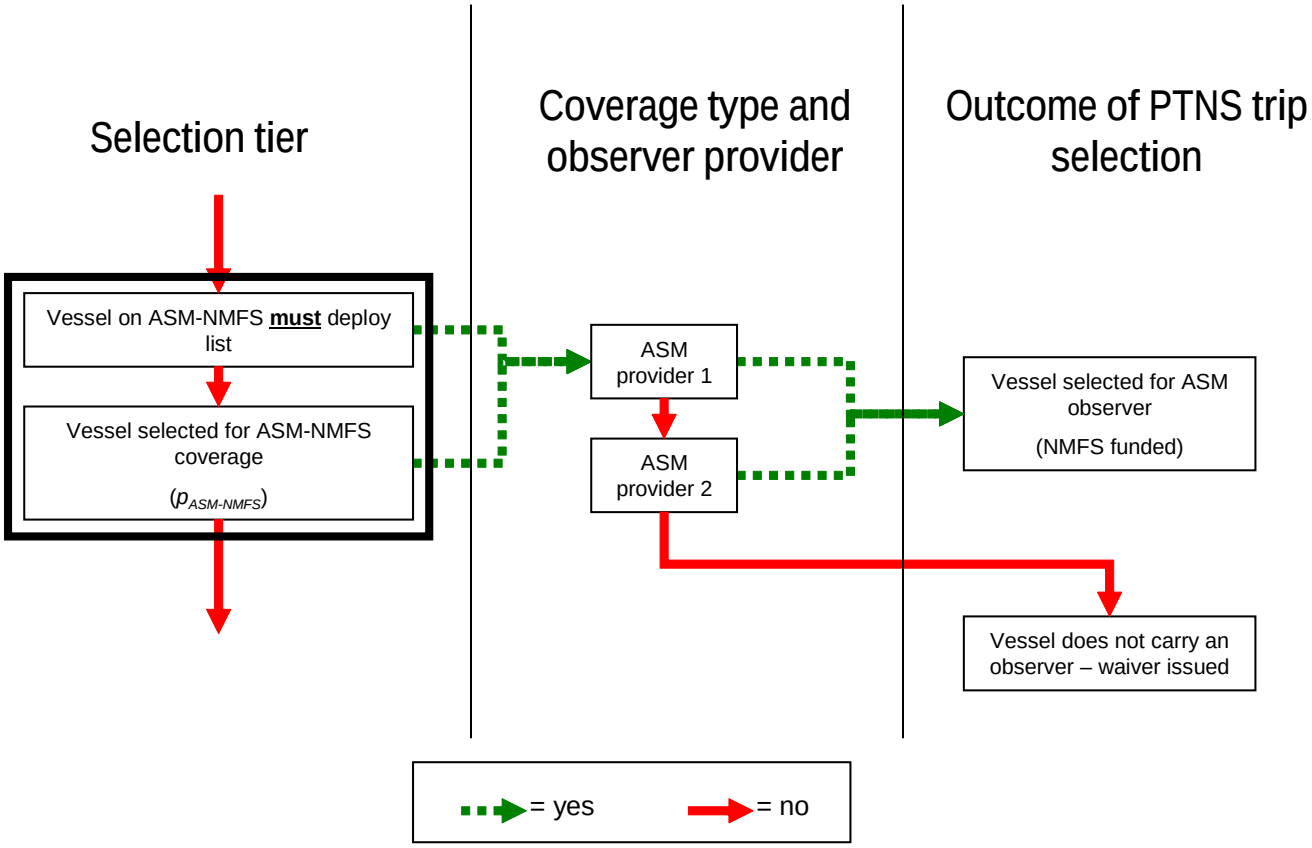
The sea day schedule/dock-intercept process could not handle the complexities introduced by Amendment 16.

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.
- Trip based selection process tuned to multiple target coverage rates.
- Should dynamically adjust to changes in fishing behavior.
- Should have the ability to auto-adjust selection probabilities.
- Must continue to meet all other existing coverage demands.

I. PTNS needs and objectives

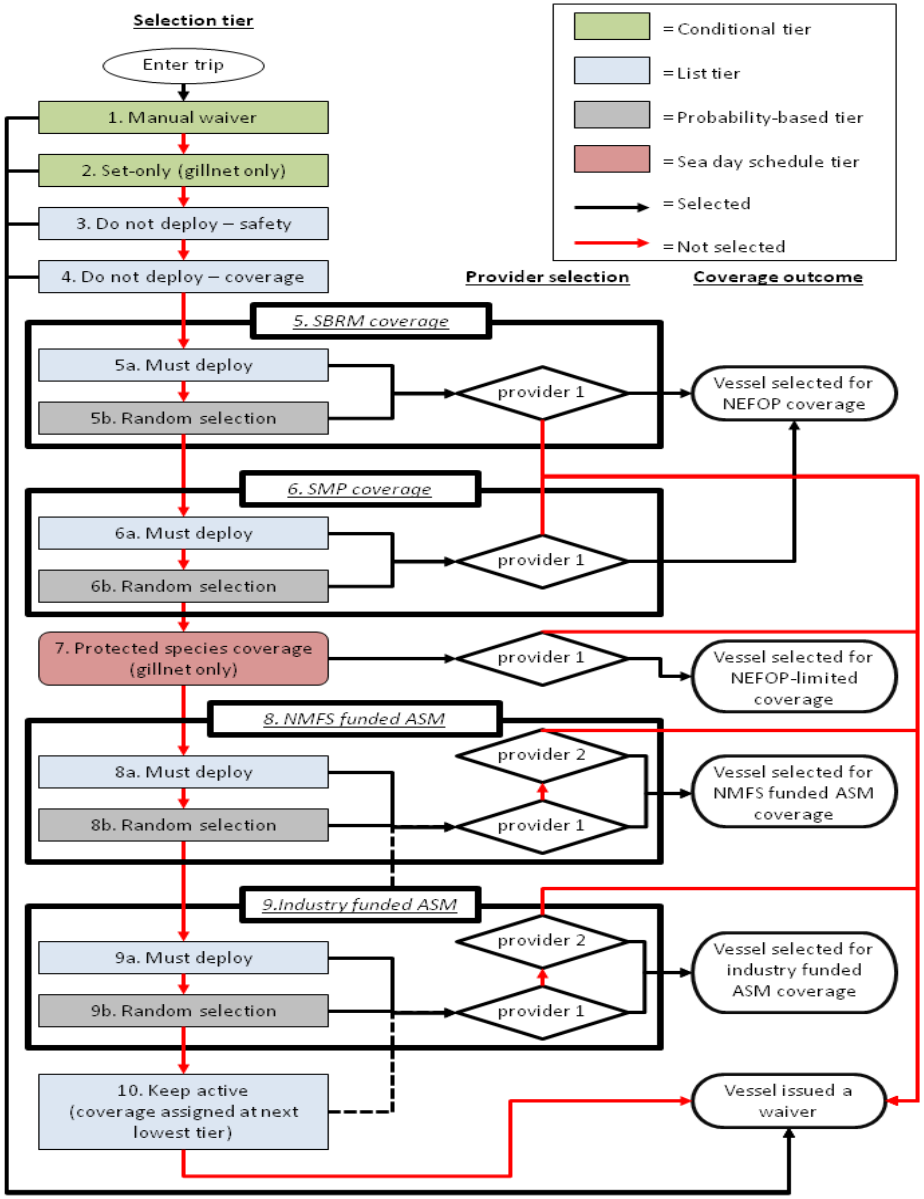
- General system design:
  - Selection tiers, coverage types and providers



II. PTNS design & implementation

General system design

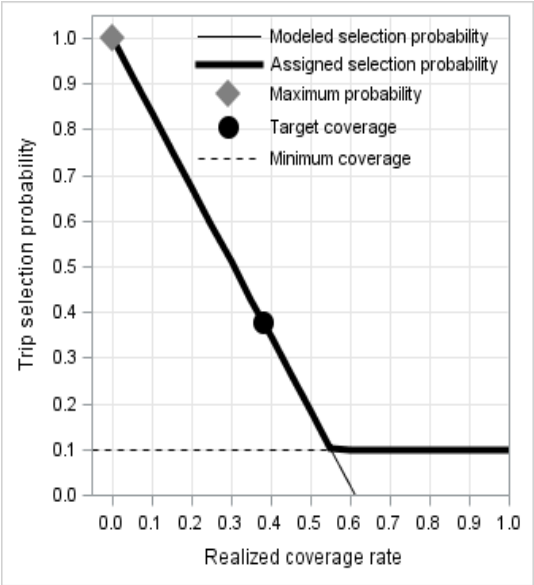
- 10 selection tiers
- 3 types of coverage
- 3 observer providers
- ≈270 possible PTNS strata
  - ≈ 18 active sectors
  - 3 fishing regions
  - 5 gear types
- The selection method used for the majority of trips is based on some random probability of a trip being selected for coverage.

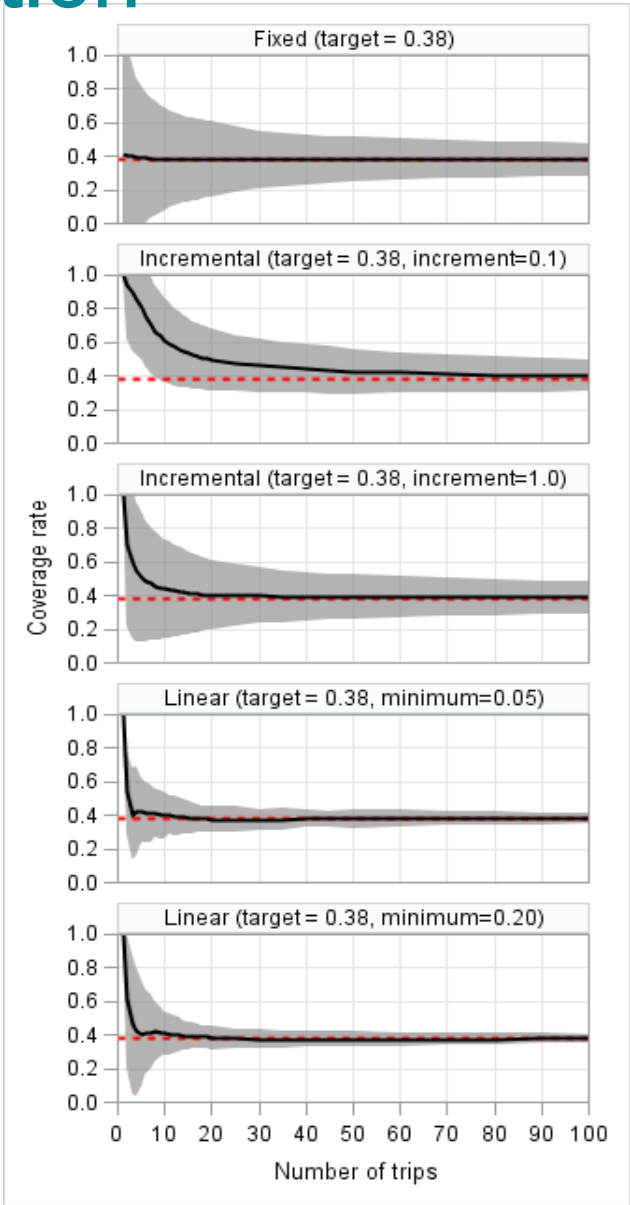


II. PTNS design & implementation

Selection logic

- Three different selection methods were evaluated through simulation.
- The 'linear' method had optimal properties.
  - Allows some level of 'front-loading' without introducing bias.
  - Self-adjusting: meets coverage targets and reduces coverage variability.





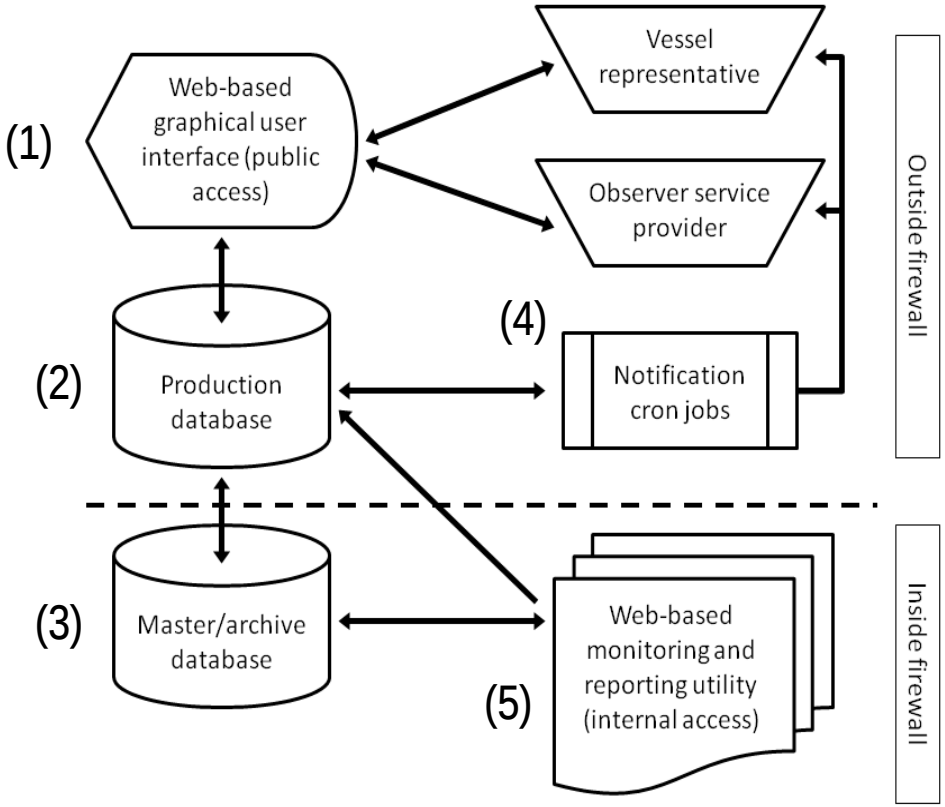
II. PTNS design & implementation

Production system:

- A full-scale system was built in early spring 2010 and implemented on May 1, 2010.
  - There were nine system upgrades between May 2010 and April 2013.

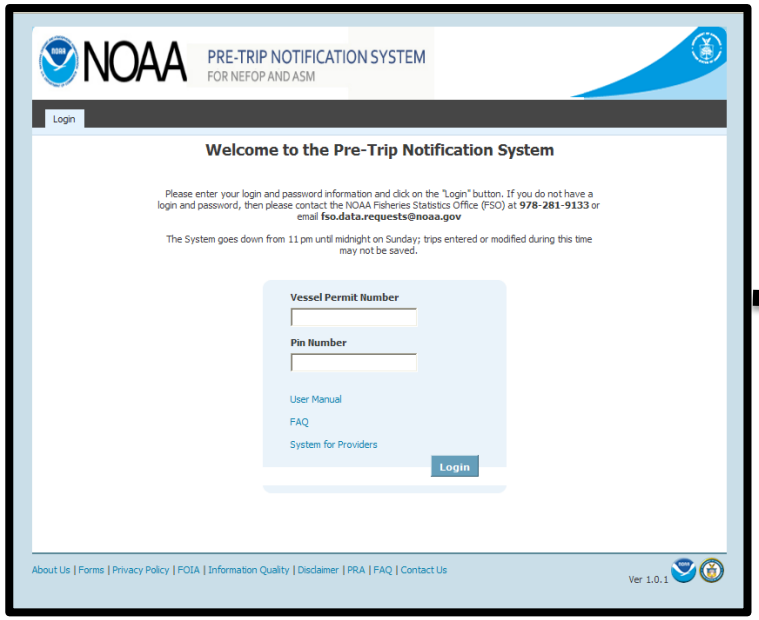
PTNS system overview:

- Five major components



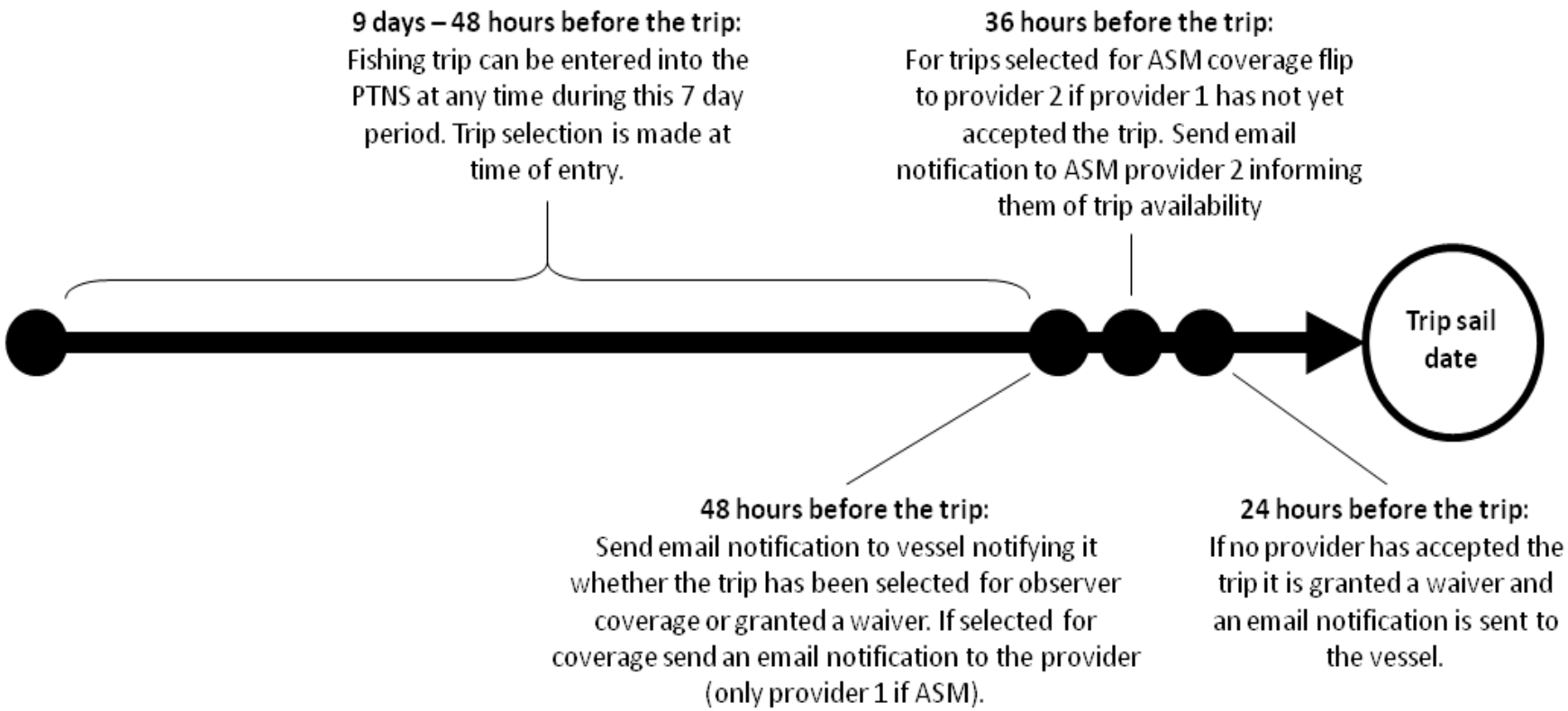
II. PTNS design & implementation

PTNS vessel interface



II. PTNS design & implementation

PTNS notification time lines



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 the level of observer coverage?
- Was the coverage deployed in a equitable manner across all strata?
- Where are improvements needed?

III. PTNS monitoring and performance

Has the PTNS achieved the desired level of coverage?

- It is often [incorrectly] assumed that the PTNS attempts to achieve a specified level of observer coverage.
  - For example: if 25% coverage of the fleet is needed to achieve a 30% CV on discard estimates, then the PTNS target coverage rates are tuned to achieve 25% coverage.

This would work if there were an infinite budget with which to purchase observer sea days.

- There's not – the PTNS must work within budget realities.

The PTNS is allocated a set number of sea days every year.

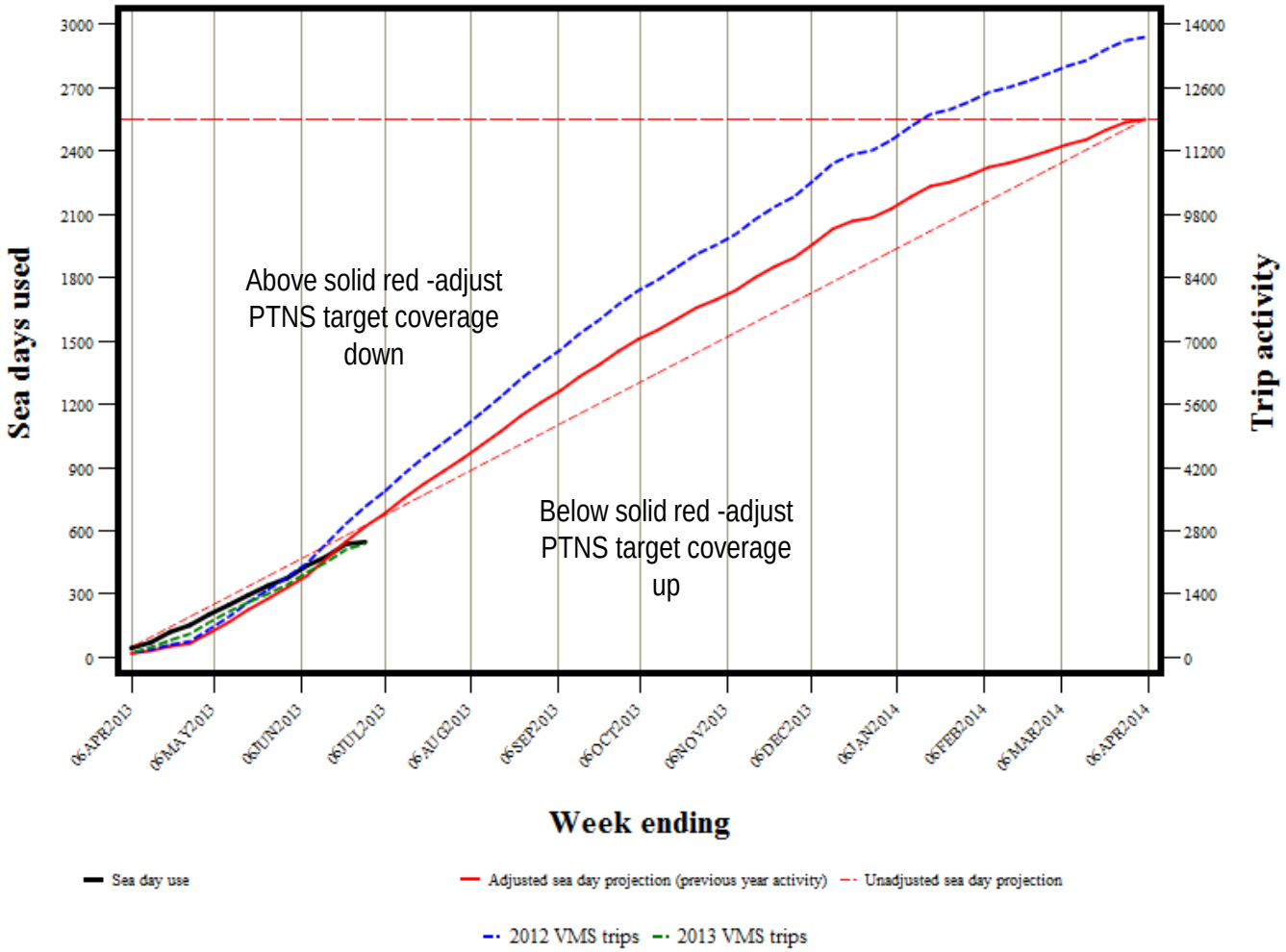
- Different allocations for SBRM/NEFOP and NMFS-funded ASM.

The job of the PTNS is to maximize the utilization (a.k.a., burn) of those sea days over the course of the year.

- The sea days should be spread out proportional to fishing activity.

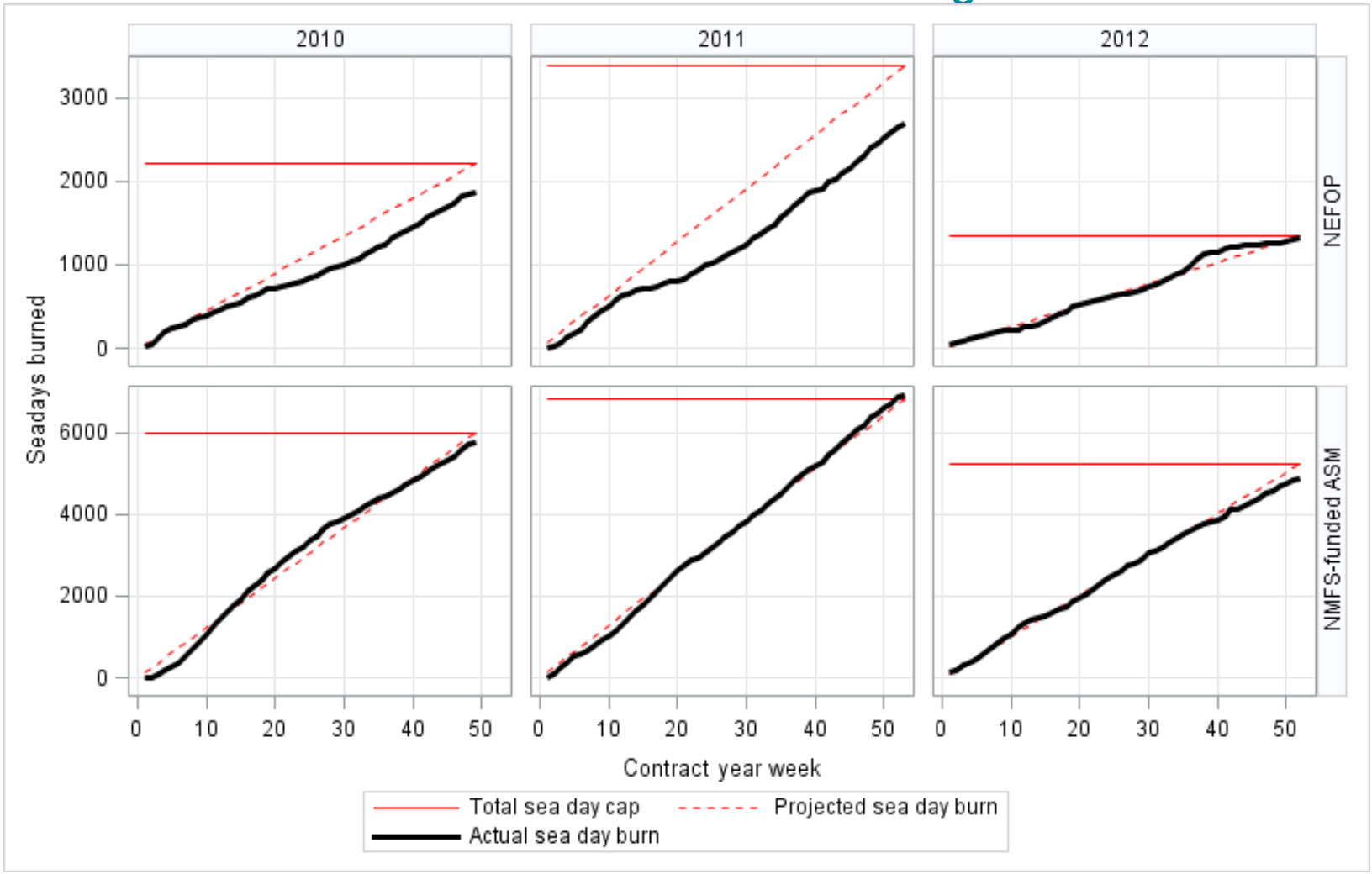
III. PTNS monitoring and performance

What is the basis for adjusting PTNS target coverage rates?



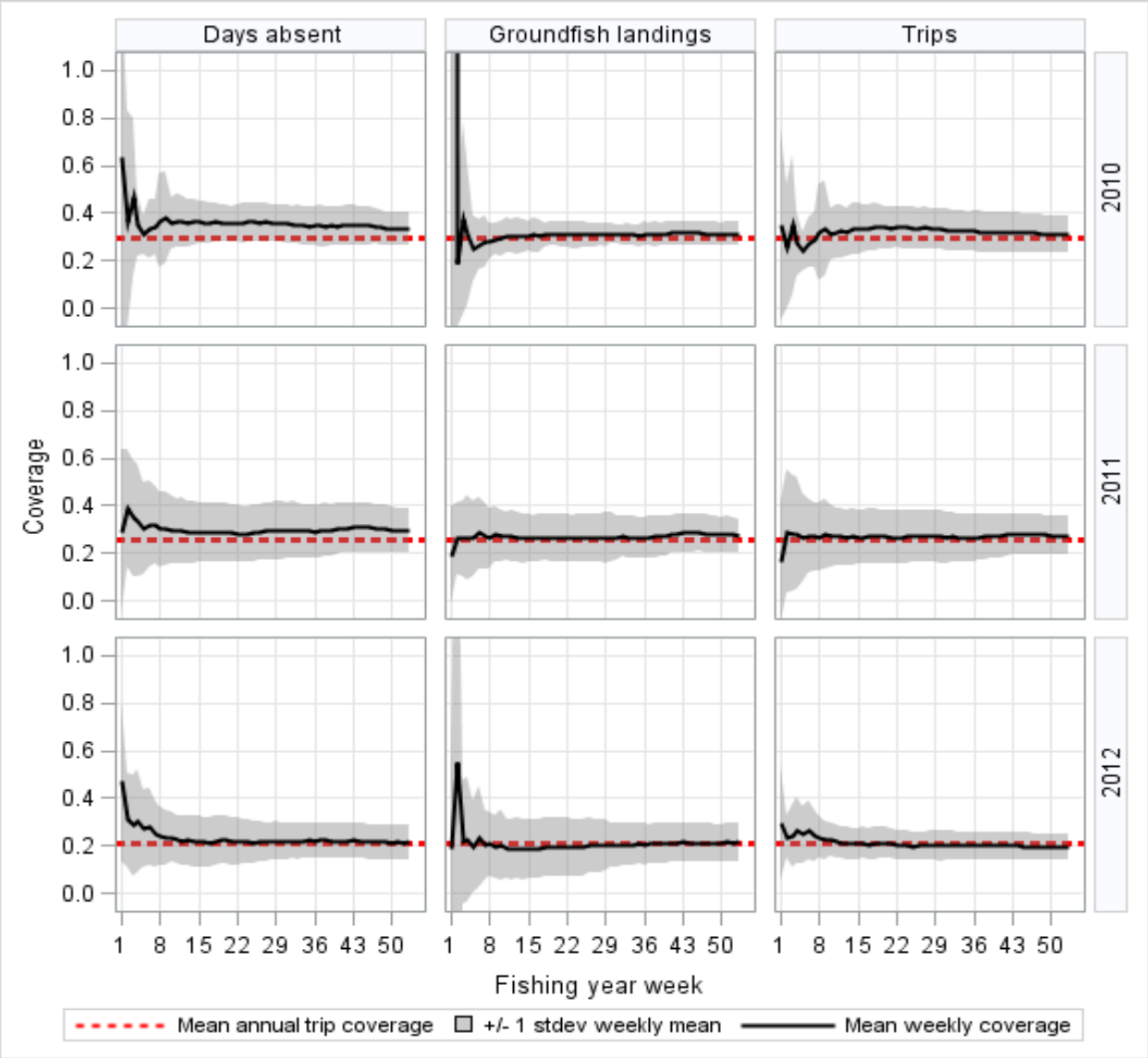
III. PTNS monitoring and performance

How successful have we been at steering the PTNS?



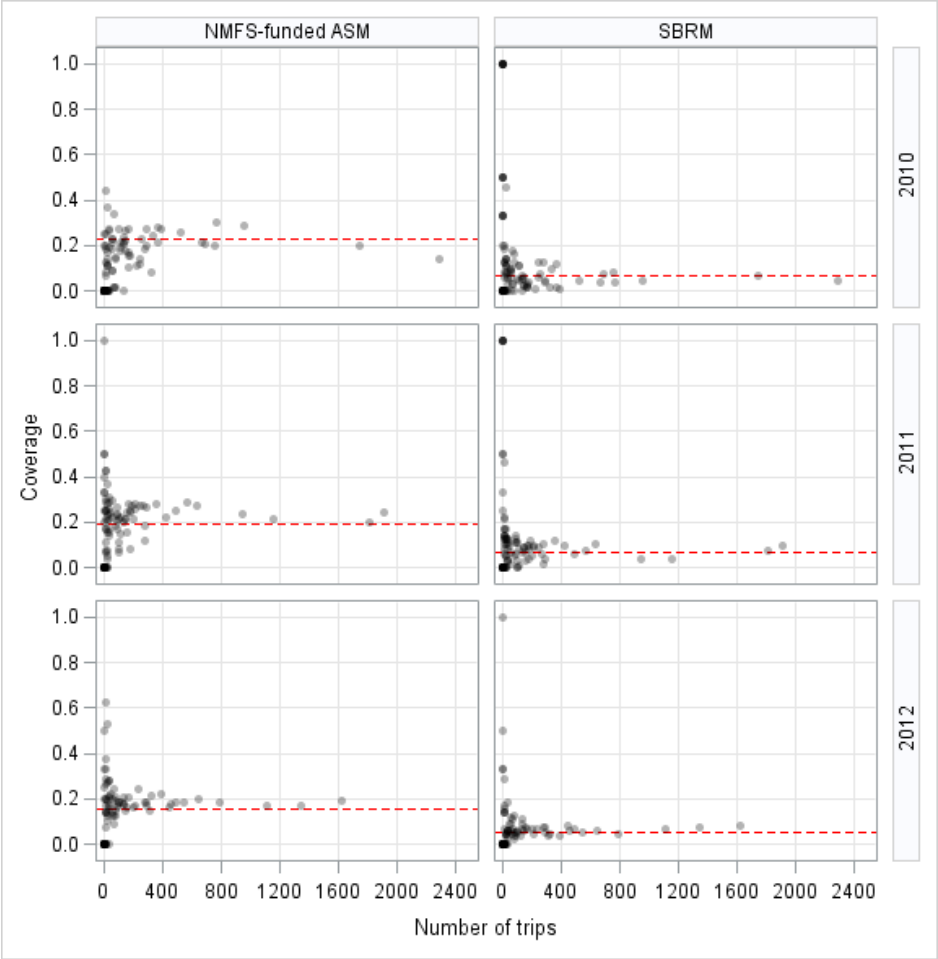
III. PTNS monitoring and performance

- Has the PTNS achieved the desired level of coverage?
  - Coverage across multiple metrics was similar



III. PTNS monitoring and performance

- Has the PTNS achieved the desired level of coverage?
  - Strata-level coverage



SBRM+ ASM ≈ Total

7% + 22% ≈ 29%

6% + 20% ≈ 26%

6% + 15% ≈ 21%

III. PTNS monitoring and performance

The PTNS is only as good as the industry self-reported information entered into it.

Accurate trip counts are needed to achieve estimates of realized observer coverage.

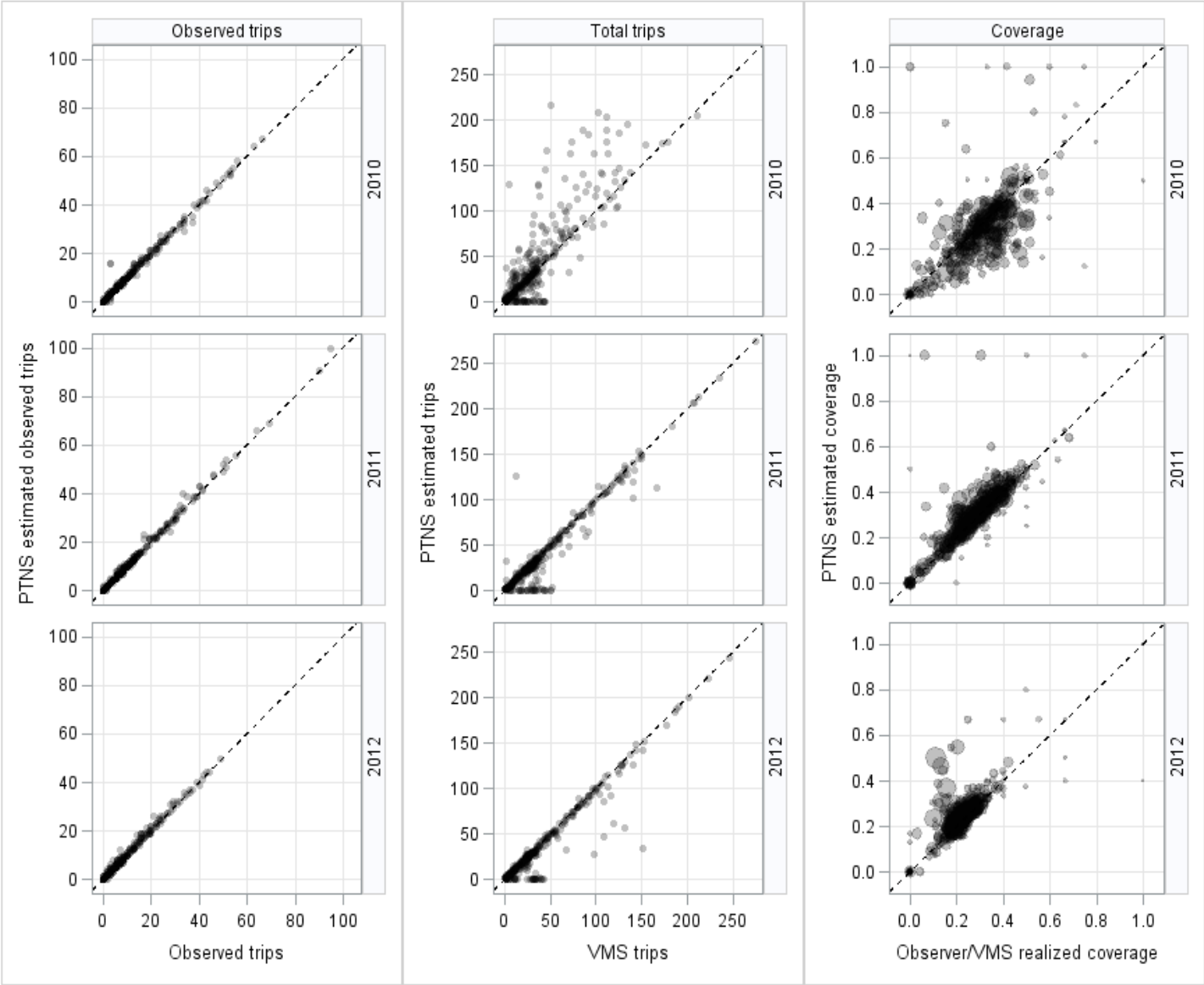
- *Example:*
  - *Percent of trips declared through PTNS = 80% (80 of 100)*
  - *Internal PTNS estimated coverage rate = 25% (20 of 80)*
  - *Actual coverage = 20% (20 of 100)*

How accurate is the PTNS information?

- There is no unique trip identifier to link PTNS declarations to the trip information contained in other fisheries-dependent data collection systems so we can't verify the accuracy on a trip-by-trip basis.
  - But…we can compare total trip counts on a vessel-by-vessel basis.
    - The total number of groundfish trips can be verified using VMS activity declarations.
    - The number of observer trips can be verified using observer data.

III. PTNS monitoring and performance

Comparison of internal PTNS/ observed trips counts to external 'realized' counts.



III. PTNS monitoring and performance

A frequent complaint of the PTNS is that coverage among vessels is not equitable.

- The PTNS does not explicitly attempt to deploy coverage equitably among vessels.
- Vessel-level selection should vary randomly around overall mean.
- With a few exceptions, that is how the PTNS has functioned.

The biggest issue affecting coverage equitability is the lack of coverage on a large number of vessels.

- Vessel avoidance of observer coverage.
- Failure of vessels to notify through the PTNS
- Failure of providers to cover certain vessels.

Because the PTNS is attempting to meet strata-level coverage requirements, low coverage on one vessel must be offset by higher coverage on another.

III. PTNS monitoring and performance

PTNS performance summary

Strengths

- Since May 2010, 94% of the sea days allocated to PTNS have been utilized.
- Observer coverage was similar regardless of the coverage metrics examined.
- Observer coverage has been deployed proportional to fishing effort.
- Has generally performed consistent with system design and initial simulations.

Challenges

- Continued improvements needed in the equitability of vessel-level coverage.
- Variable compliance with pre-trip notification requirements.
  - Non-notification and non-cancelation of trips that did not sail.
- Provider selection bias.
- No direct link with other fisheries dependent data collection systems.

III. PTNS monitoring and performance

Proposed Solutions

- PTNS compliance could be improved through additional outreach, education and enforcement of notification requirements.
- Hide vessel identity from providers until after trip selection.
- Create a unique trip identifier ("*one trip, one identifier*").

III. PTNS monitoring and performance

Potential solutions (cont.) Create a unique trip identifier

- Would allow linking of trips across all the fisheries-dependent data collection programs.
- The PTNS could directly communicate with other fisheries-dependent data collection systems (e.g., VMS activity declarations, observer data) to self-correct internal trip/observed trip counts.
- The unique trip identifier should be generated by the first system that a vessel reports to for a given trip (e.g., groundfish fishery→PTNS).
- Increased use of electronic data collection systems (e.g., eVTR) will make propagating a unique trip identifier from system to system easier.
- Improved efficiencies by reducing the amount of duplicative information currently being collected from the fishing industry.

IV. The future of PTNS?

Application to other fisheries.

- Automated observer deployment systems will likely become more common-place.
  - Fishery regulations are becoming more complex.
  - Increased need for improved accuracy and precision in monitoring fishery catches.

PTNS was implemented in the targeted longfin squid fishery in 2011.

- Its performance has been difficult to monitor due to an inability to identify targeted trips.
- There are other NE Region fisheries with existing observer notification requirements (e.g., herring, scallop).
- A single observer notification system could streamline vessel reporting requirements and offer efficiencies with respect to system administration and support.
- ***The fine print:*** *Past experiences with large scale improvements to the PTNS and its application to multiple fisheries have shown that large changes to a system of this complexity are not simple and will require extensive planning and development time to properly implement.*