Evaluating the Impact of Inaccurate Catch Information on Groundfish Management

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Science. Education. Community.

New England Groundfish Monitoring

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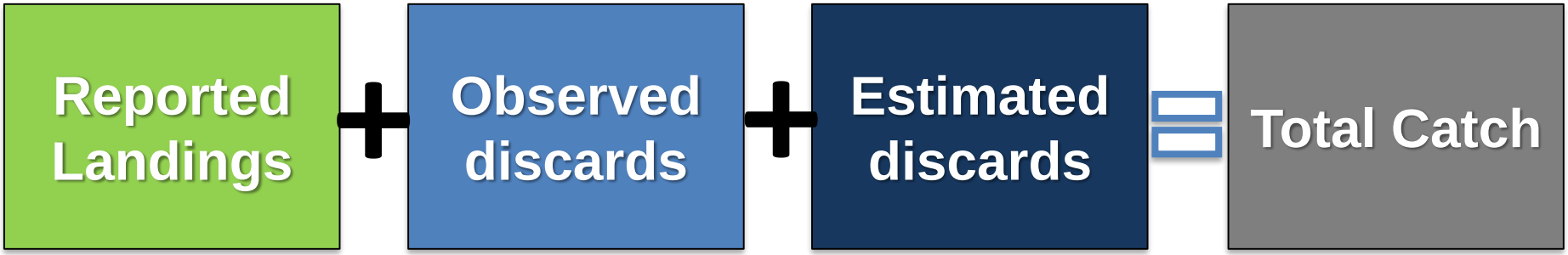
- Quantifying total removals of a fishery resource is critical for accurate stock assessment and successful fisheries management.
- Discarded catch can comprise a significant portion of total removals.
- A portion of groundfish trips are observed (~15-30%) and used to estimate discard rates.



Amendment 23

- NEFMC is considering adjusting the groundfish monitoring program through Amendment 23 to the Northeast Multispecies Fishery Management Plan.

- **Aim:** To improve the reliability and accountability of commercial catch reporting and to ensure a precise and accurate representation of catch (landings and discards).

New England Groundfish Monitoring

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- NEFMC reviewed analyses conducted by the Groundfish PDT relevant to Amendment 23 issues.
- This work identified an observer effect

  (Demarest 2019, Linden 2019, Nitschke 2019, Henry et al. 2019)

  - ➢ Observed trips discards ≠ unobserved trips discards
  - ➢ No quantification of the magnitude of unaccounted for discards
- This could result in inaccurate estimation of total discards and catch.

Our Work

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- We were contracted by NEFMC to explore the impact of inaccurate catch information on stock assessment performance and management.

- Questions we will address:

  If unaccounted discarding is occurring:

  – How does this impact the performance of the stock assessment?
  – What does it mean for biomass estimates? Status determination?
  – How might this influence the management process?
  – Would catch limits differ? By how much?

Our Work

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What this is testing:

- Impact of inaccurate catch information on stock assessment and management performance (in isolation).

What this isn't testing:

- All potential contributing issues to stock assessment and management performance.

Scenario Testing

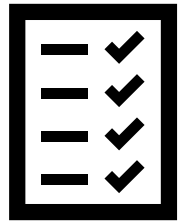
- We have developed a modeling tool that allows for simulating Atlantic cod population dynamics and the process of stock assessment and management.
- We can use this to quantify the impact of alternate harvest scenarios.

Scenarios we will test:

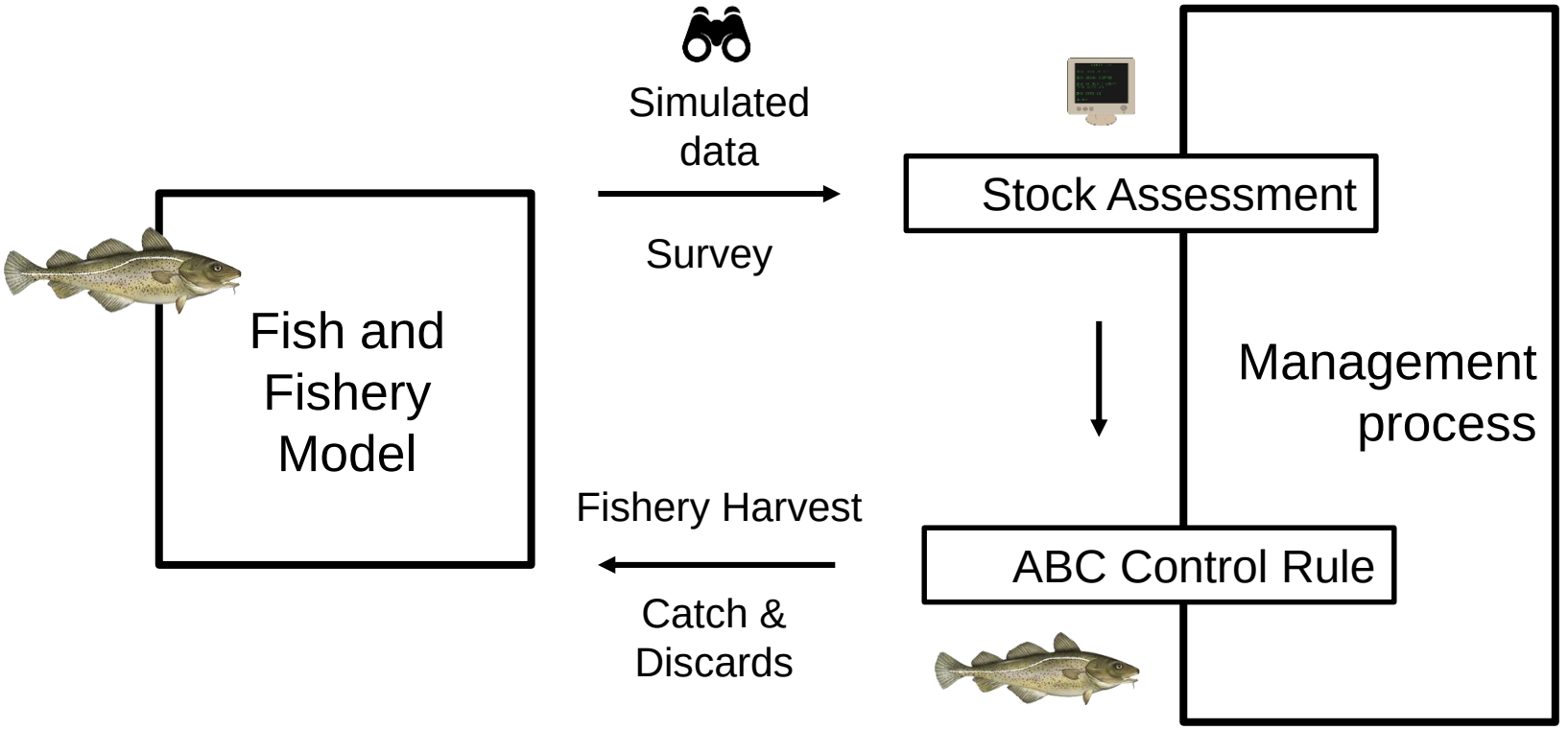
Range of unaccounted for discards.

What we will quantify:

Assessment and management performance.



Scenario Testing Framework



Fish and Fishery Model*

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Emulates the dynamics of the fish population and key features of how it is fished.

Fish – Gulf of Maine cod

- How fast do fish grow?
- How fast do fish die naturally?
- When do fish start to reproduce? How many young?

Fishery

- How many fish are caught?
- What size of fish are caught?

**also known as an operating model*

Simulated Survey and Fishery Data

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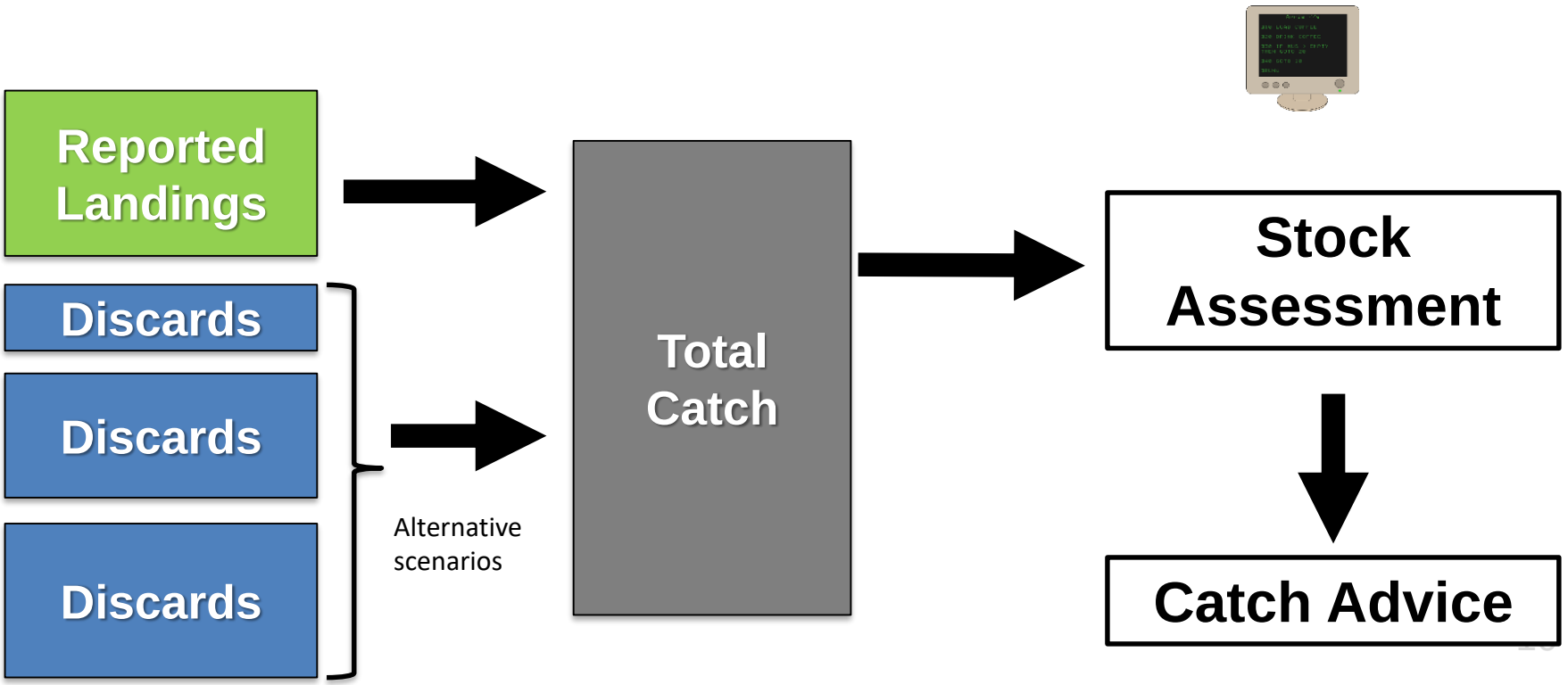
- We generate “data” that is typically input to stock assessment.
  - Simulate the survey⟶ Index of abundance (aggregate and at-age)
  - Simulate harvest by the fishery ⟶ Catch information (total and at-age)

- We can introduce bias to catch information to emulate unaccounted for discards.



Unaccounted discards scenarios

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- Scenarios will incrementally increase the level of error in discard accounting.

True catch: Base case

Biased accounting of catch: Emulates observed bias in reporting of catch.

Proposed Discard Scenarios	Multiplier
Perfect accounting	
Slight bias in accounting	+ 25%
Large bias in accounting	+ 50%
Extreme bias in accounting	+ 100%

Measuring Impacts

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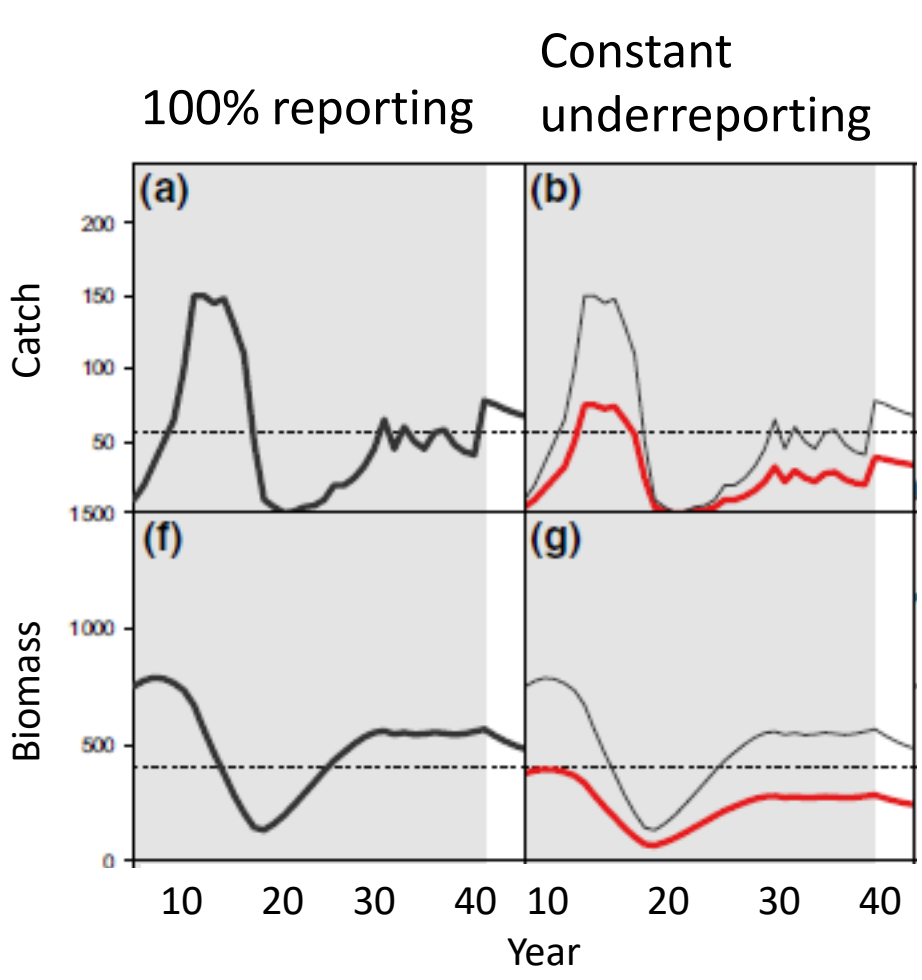
Assessment performance:

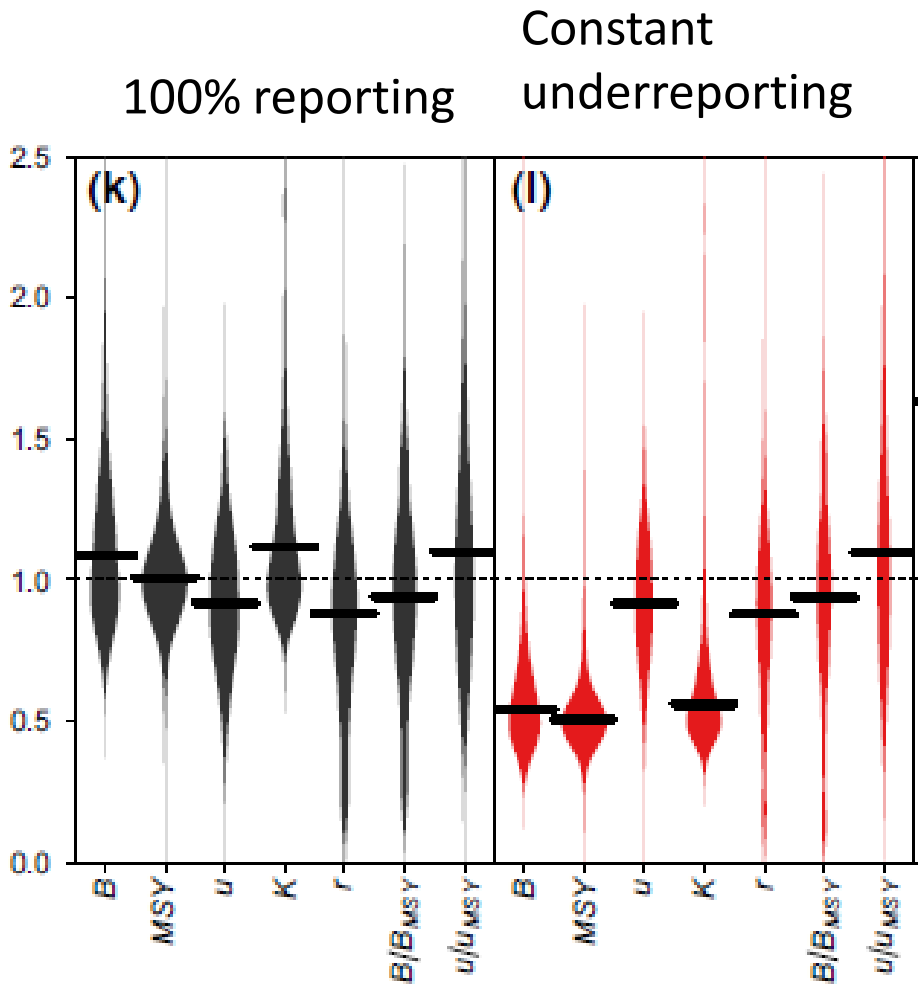
- Scenarios will emulate the assessment getting inaccurate catch information.
- We can then quantify the impact of alternative scenarios on the stock assessment.
  - Accuracy of SSB, Fishing Mortality, Recruitment estimates
- We can compare stock assessment estimates to their “true” values.

Management performance:

- If stock assessment performance is impacted this can influence catch advice.
- We can compare catch advice and stock status metrics resulting from alternate discard scenarios.
- Evaluate frequency of unintended overfishing.
- We can compare catch advice and management reference points to their “true” values.

Example Output of Impacts of Unreported Catch





Rudd and Branch 2016

Timeline

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Task	Sept	Oct	Nov	Dec	Jan	Feb
Meet with PDT members to discuss and agree on model scenarios and inputs	X					
Develop operating model and implement modifications to MSE framework	X	X	X			
Brief PDT on progress and resolve outstanding questions for further work		X				
Conduct discard scenario simulations			X	X	X	
Meet with PDT and discuss modelling results					X	
Present the modelling work for a review by the SSC or other review panel identified by the Council						X
Provide a final report, addressing any SSC suggestions for improvement						X

Questions?

What's a realistic range of underestimated cod discards?

How did this change before and after sectors?