



# ***Evaluating the Impact of Soak Durations on Bycatch of Small Cetaceans in the Northwest Atlantic, USA***

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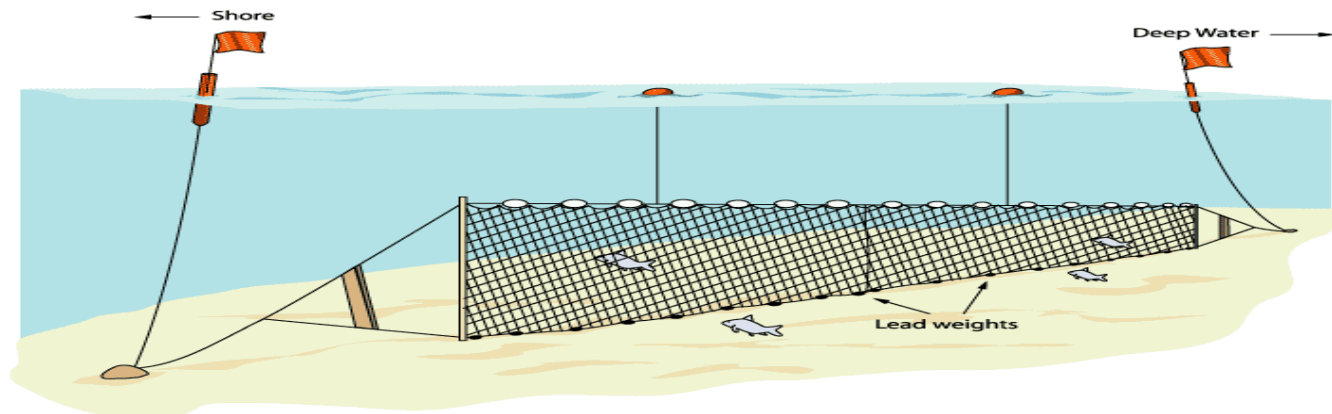
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## ***Research Objective***

**Demonstrate how observer data can be utilized to evaluate the effect of proposed mitigation measures on reducing bycatch mortality of small cetaceans in gillnet gear.**

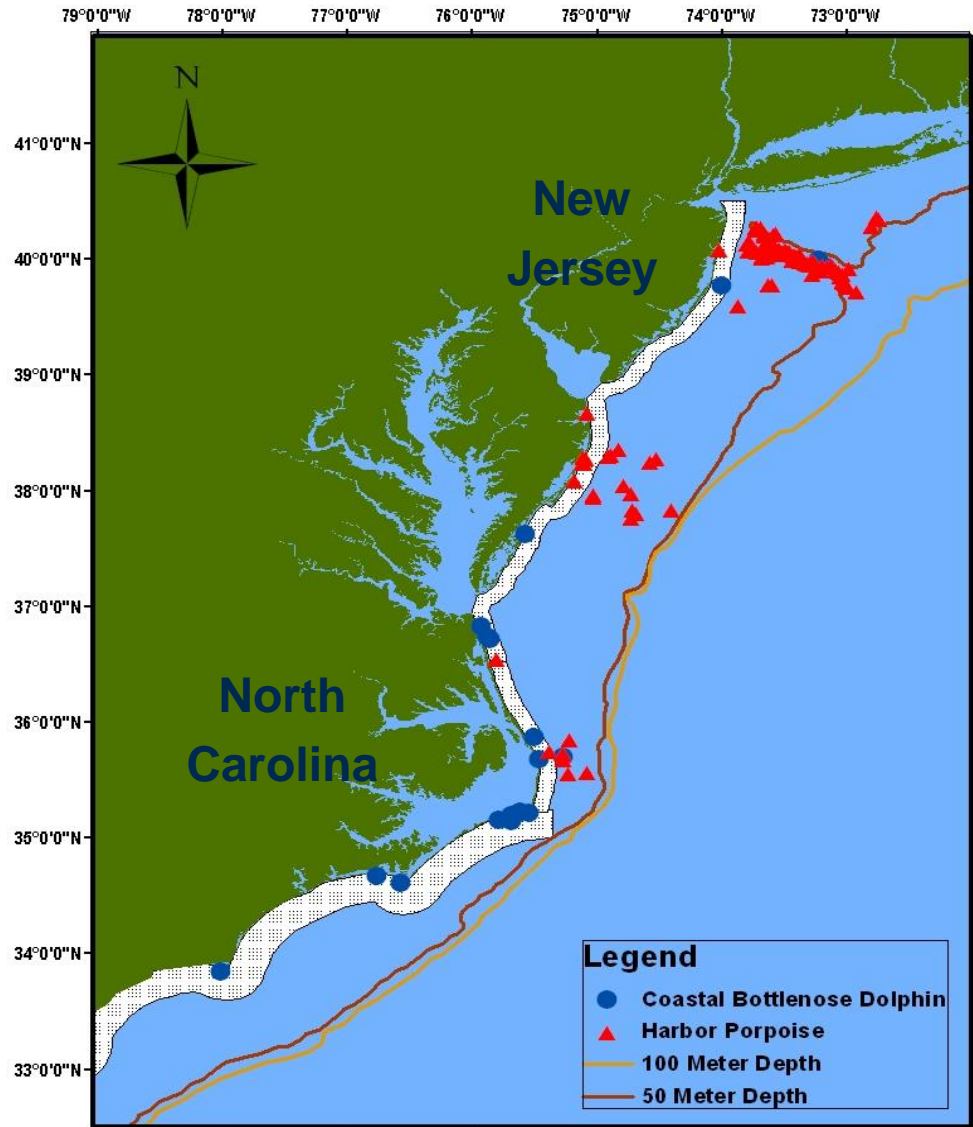


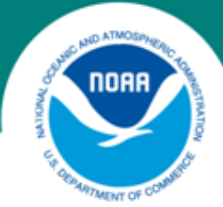
***In situ experiments often are not feasible due to rare events and tend to be costly \$\$\$\$***




# US Mid-Atlantic Region of NWA

## Takes Observed 1996-2008





## ***Historical Context***

- **Potential Biological Removal (PBR)**
  - **Threshold of human related mortalities**
- **US Marine Mammal Protection Act (MMPA)**
  - **Strategic status**
- **Take Reduction teams (TRT's)** 
  - **Establishes a team of stakeholders**
  - **A deliberative process**
  - **Goal to develop a take reduction plan (TRP) to reduce bycatch mortality below PBR**



## ***Analytical Approach***

- **Scientists provide data and analyses to facilitate informed deliberations**
- **Primary data source - Fisheries Observer Data**
- **Manipulate observer data to simulate effect of proposed gear modification by TRT**
- **Model modified data to predict effect on bycatch rates**
- **Quantify reduction in mortality under different mitigation scenarios by comparing baseline bycatch rates to simulated rates.**



# ***VARIABLES***

## ***Fishing Characteristics proposed for modification by TRT's***

### Harbor Porpoise TRT

- Soak duration
- Float line length (feet)
- Twine size
- Mesh size
- Hang ratio
- Number of tie-downs

### Coastal BD TRT

- Soak duration  $\leq$  12 hrs in state waters
- No Fishing within 3km of shore
- No Fishing in State waters

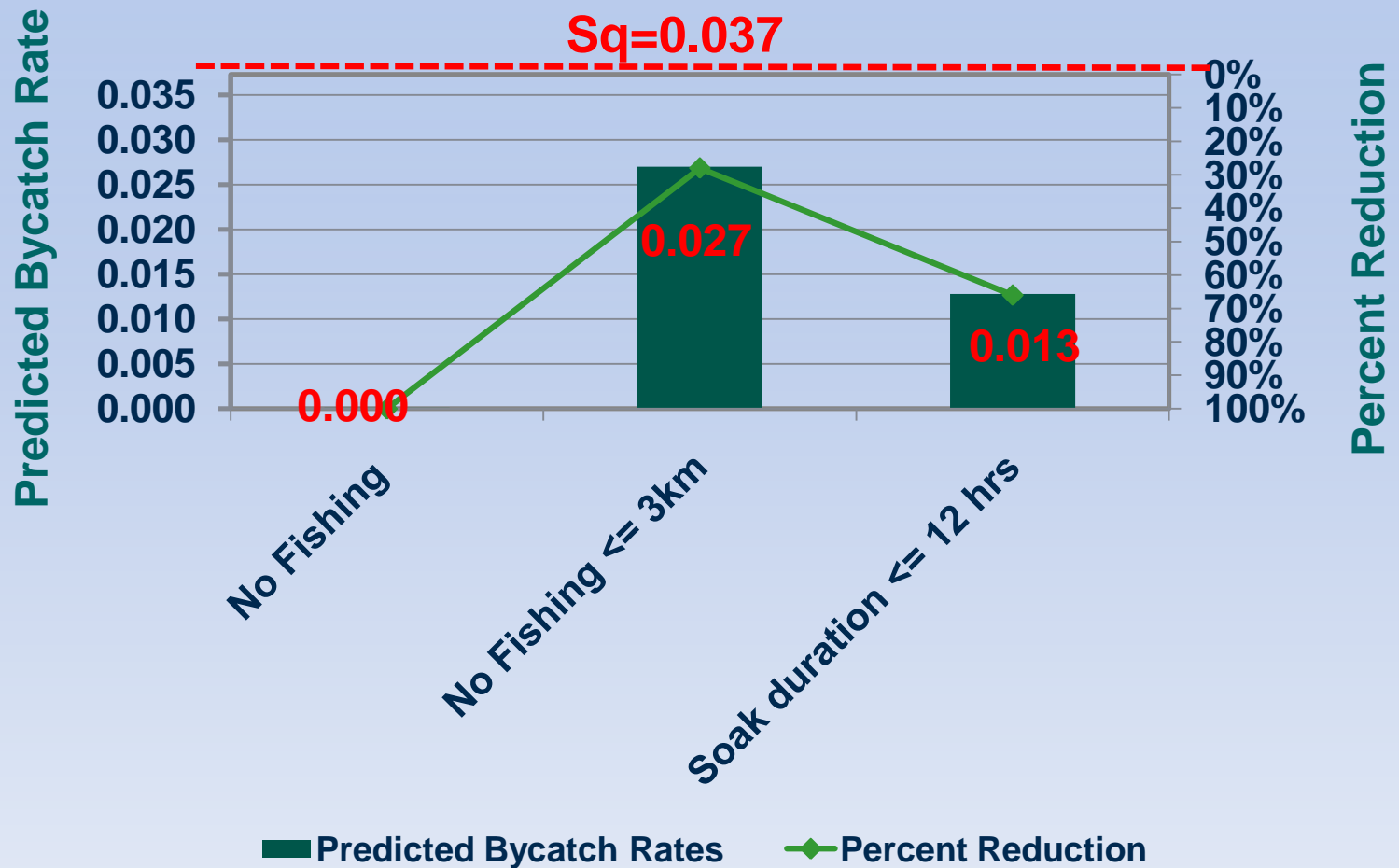


## ***METHODS***

- 1. Estimate baseline bycatch rates – status quo (SQ)**
  - GLM – two covariates: seasonal management unit and mesh size category (Palka & Rossman 2001)**
- 2. Take out observed hauls  $\geq 12$  hours**
- 3. Model new bycatch rates from data reflecting only soak durations  $< 12$  hrs**
- 4. Calculate % change in bycatch rates**
- 5. Evaluate Effectiveness – below PBR**



## Coastal BD – NC Mix stock Medium mesh gillnets – State waters





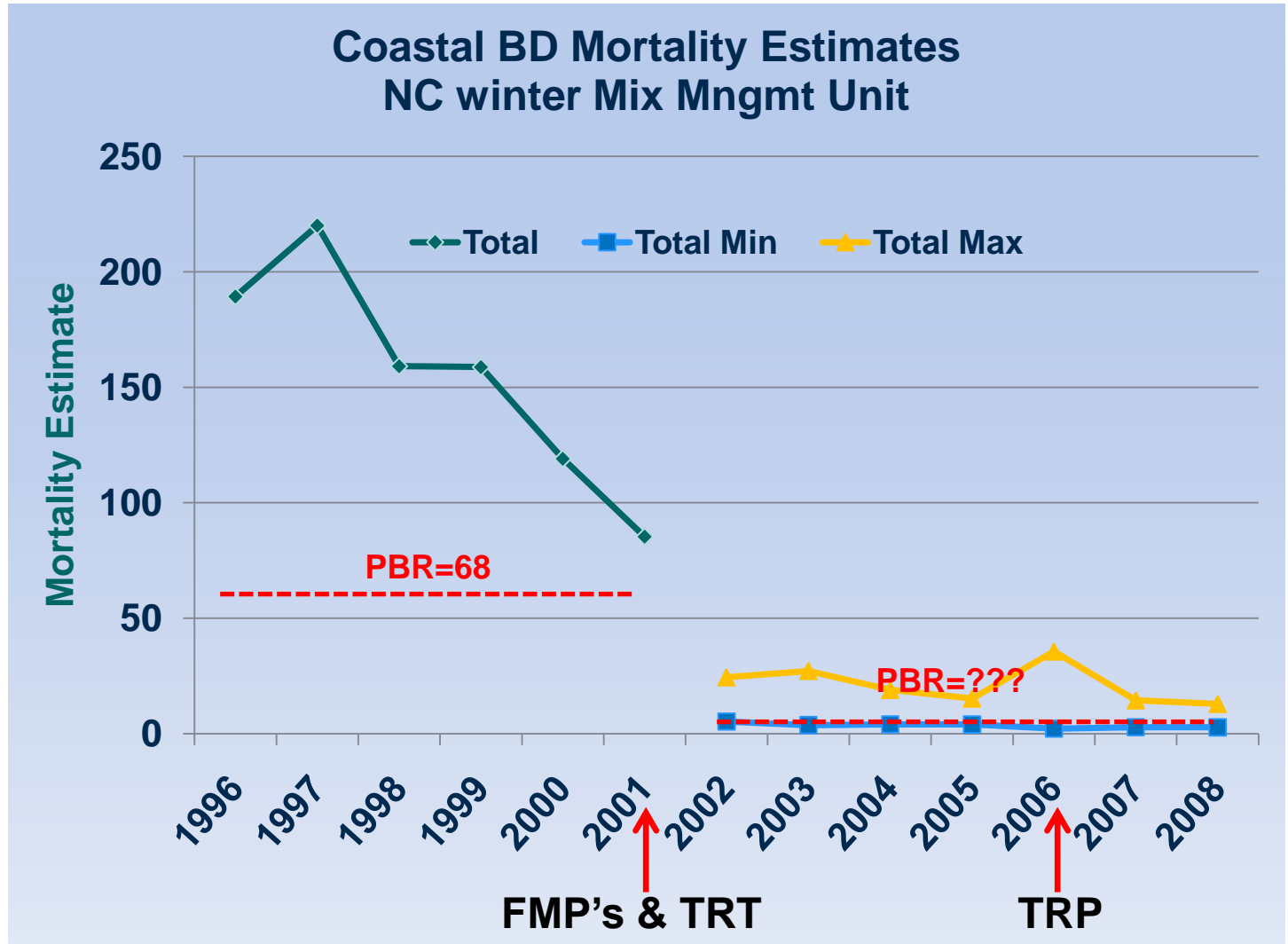


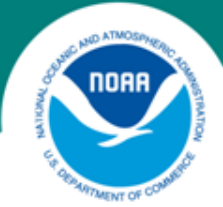
## ***Assumptions***

- **1) Change in fishing practice does not shift effort into unexpected time/areas**
- **2) Direct cause-and-effect from model predicted bycatch rates**
- **3) Correctly modeled the relationships**
- **4) Correctly defined SQ conditions and SQ fishing environment remains unchanged after mitigation measure is implemented**
- **5) Observer data are representative sample of the fleet being observed**

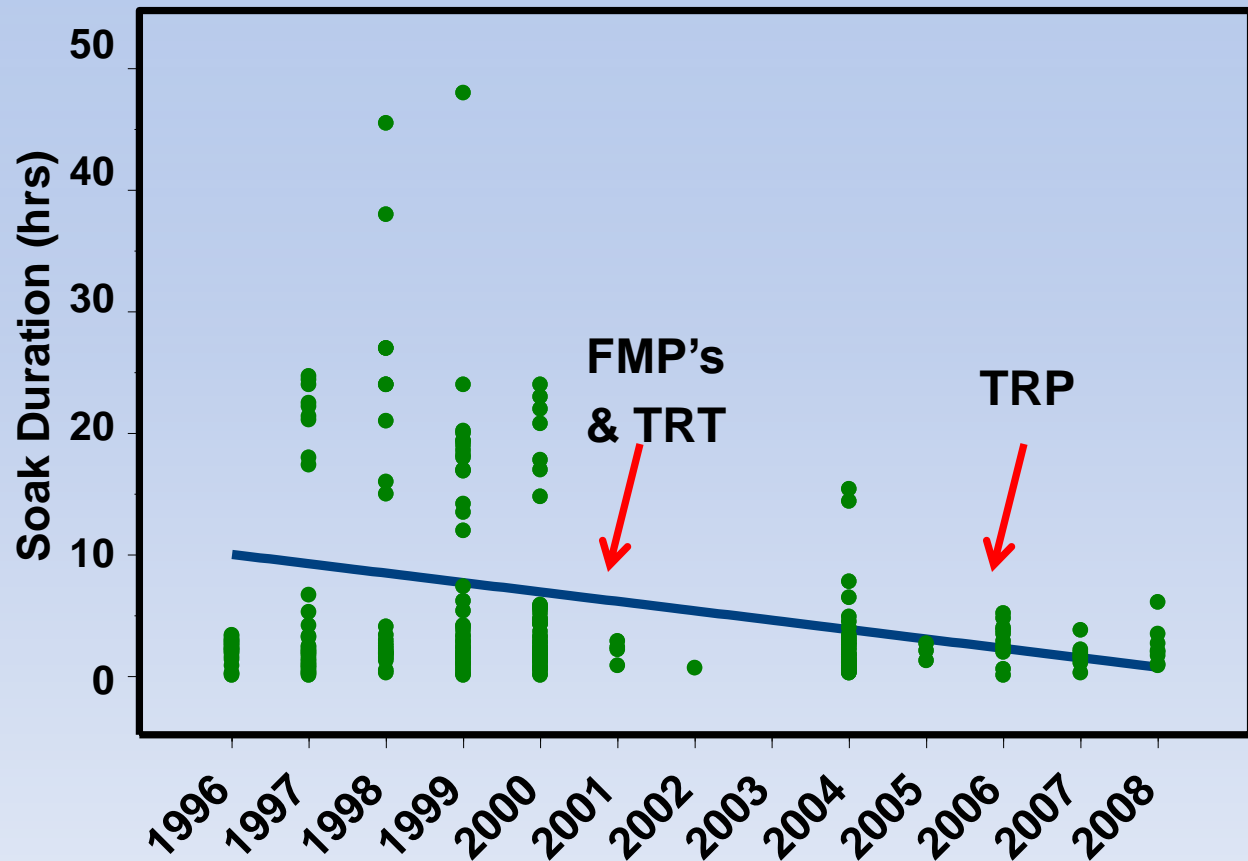


# Prediction vs. Reality





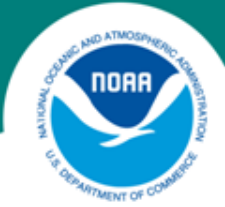
## NC state waters – medium mesh gillnets





## ***Conclusions***

- Analytical approach proven to be an effective tool for researching changes in fishing practices and their effect on bycatch rates.
- **Realized results validate predictions.**
- Declining trend in soak durations consistent with reduction in bycatch mortality of CBD's
- **Codifying fishing practices robust to changes in fishery resource management (e.g. stocks rebuilding, increasing effort)**
- Inexpensive but resource intensive (staff and observer data collection)
- **Heavily dependent on assumptions related to future fishing effort.**



***Thank You !***



Photo Credit: Dolphin Ecology Project

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