

Global Perspectives on Fisheries Bycatch: The Legacy of Lee Alverson

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Wakefield Bycatch Symposium
May 13, 2014

Outline

- What is Bycatch? (again….?)
- Some Evolving Global Perspectives/Perceptions
- On Counting/Accounting for the (By)Catch
- Mitigation Approaches
  - Regulatory-Based
  - Incentives
- Economic & Social Considerations
- Ecological Considerations
- Bycatch as an Element of EBM/EAF Policies
- Comments on Our Conference

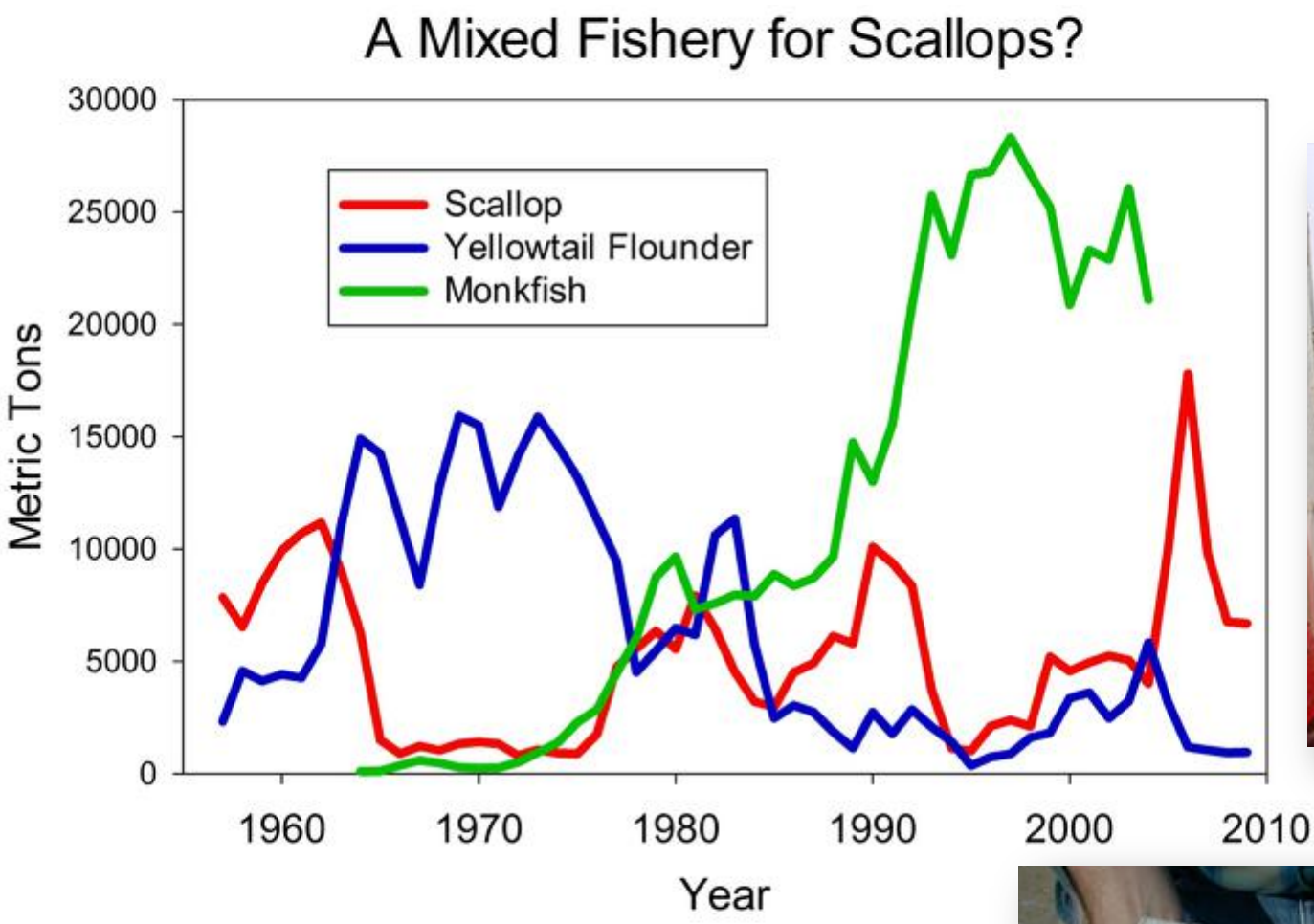
Defining Bycatch

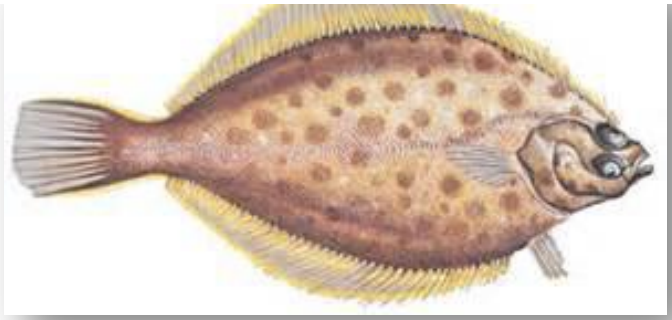
Etiology of the Word "Bycatch" is murky but probably means "By-Product"

Alternative Working Definitions…

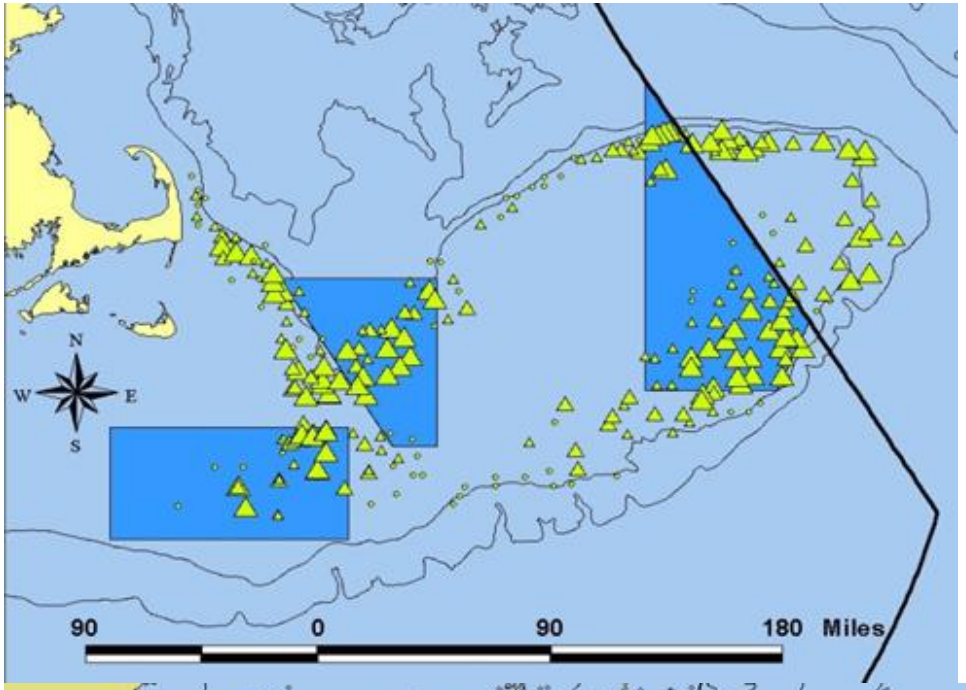
- Any "non-target" catch
- Discards of Fish
- Dead Discards of Fish (MSA)
- Live & Dead Discards of Fish
- Dead Protected Resources (PETs)
- Any "Take" (alive or dead) of TEs (ESA)
- Total catch of a fishery minus landings of managed species (Davies et al. 2009)

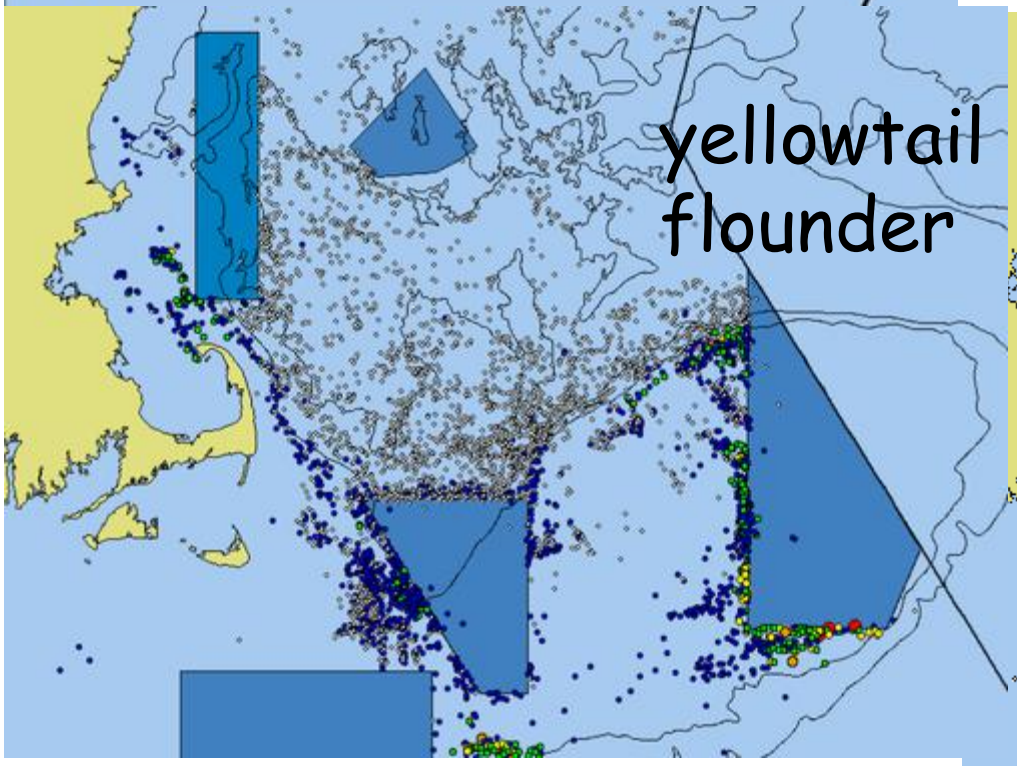
Georges Bank

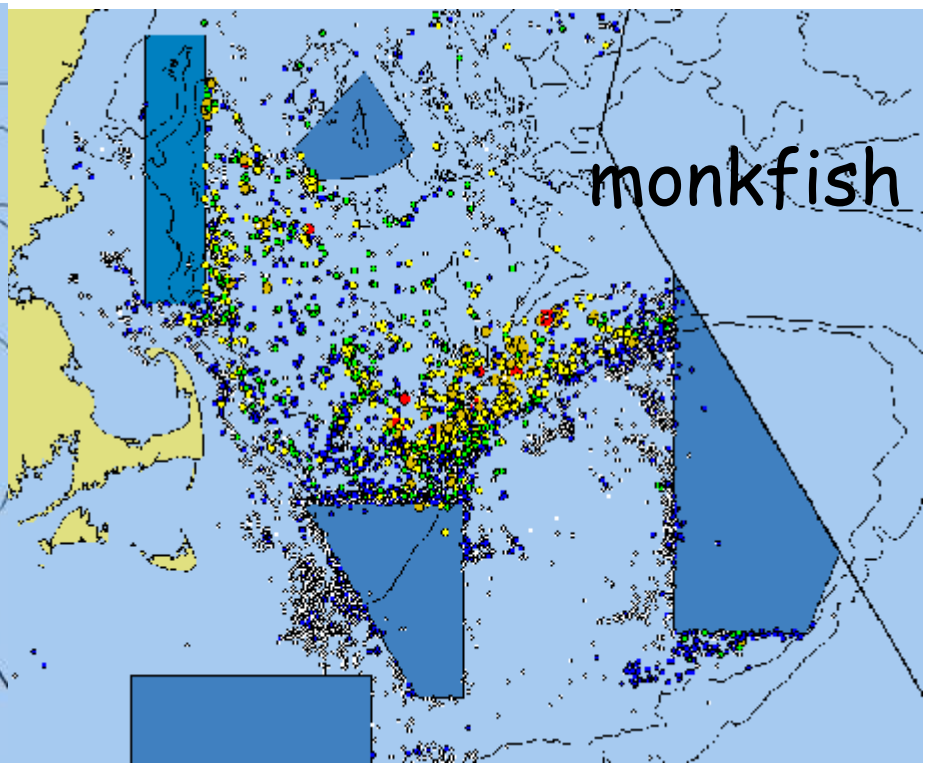


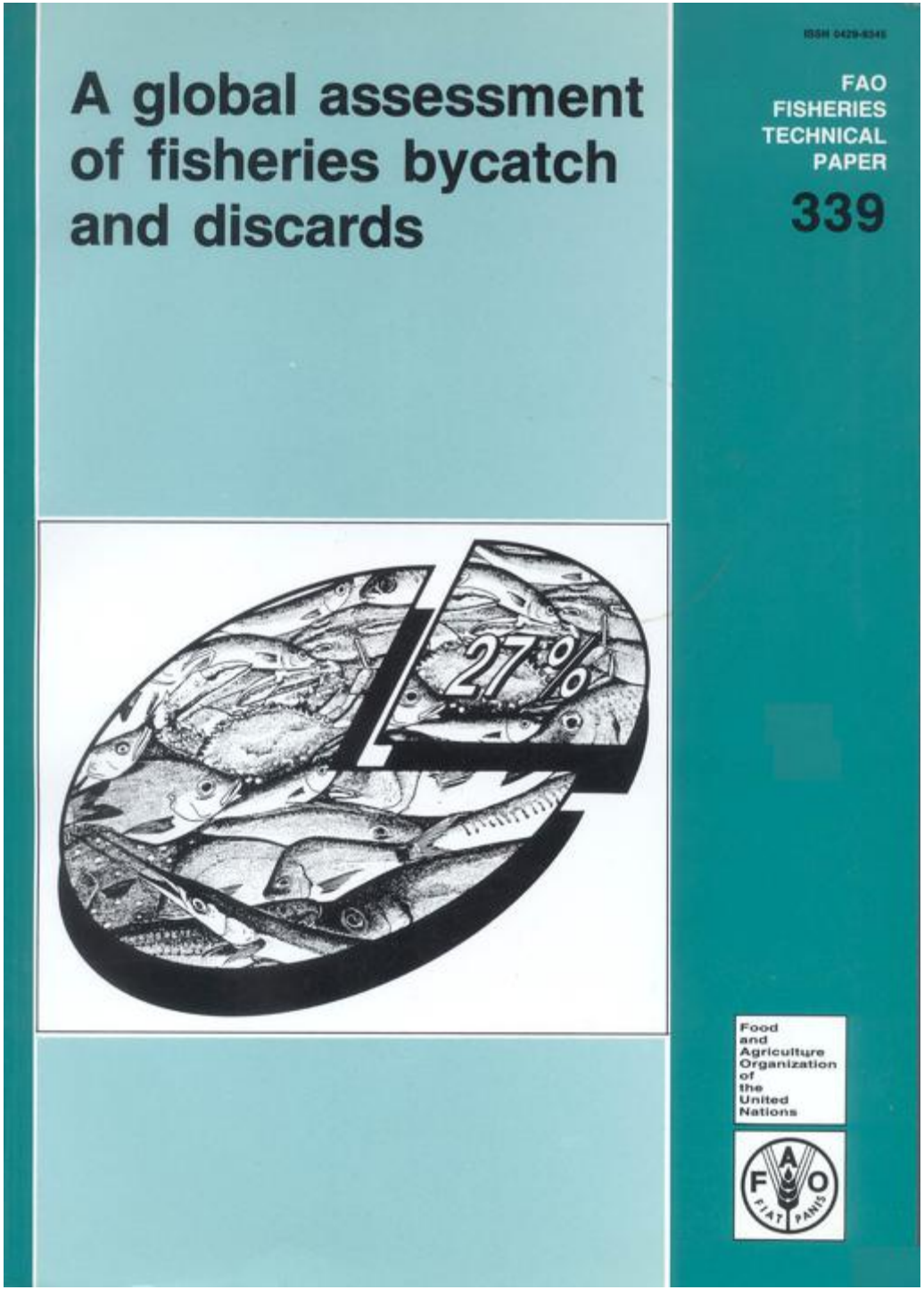


Spatial Distributions of Scallops and two Historical Bycatch species

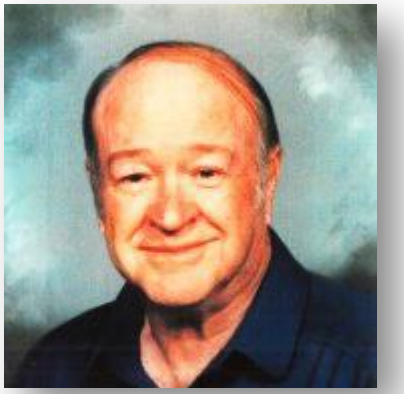








Alverson, Freeburg et al. 1994



27 million tons / year based on 1980s and early 1990s data

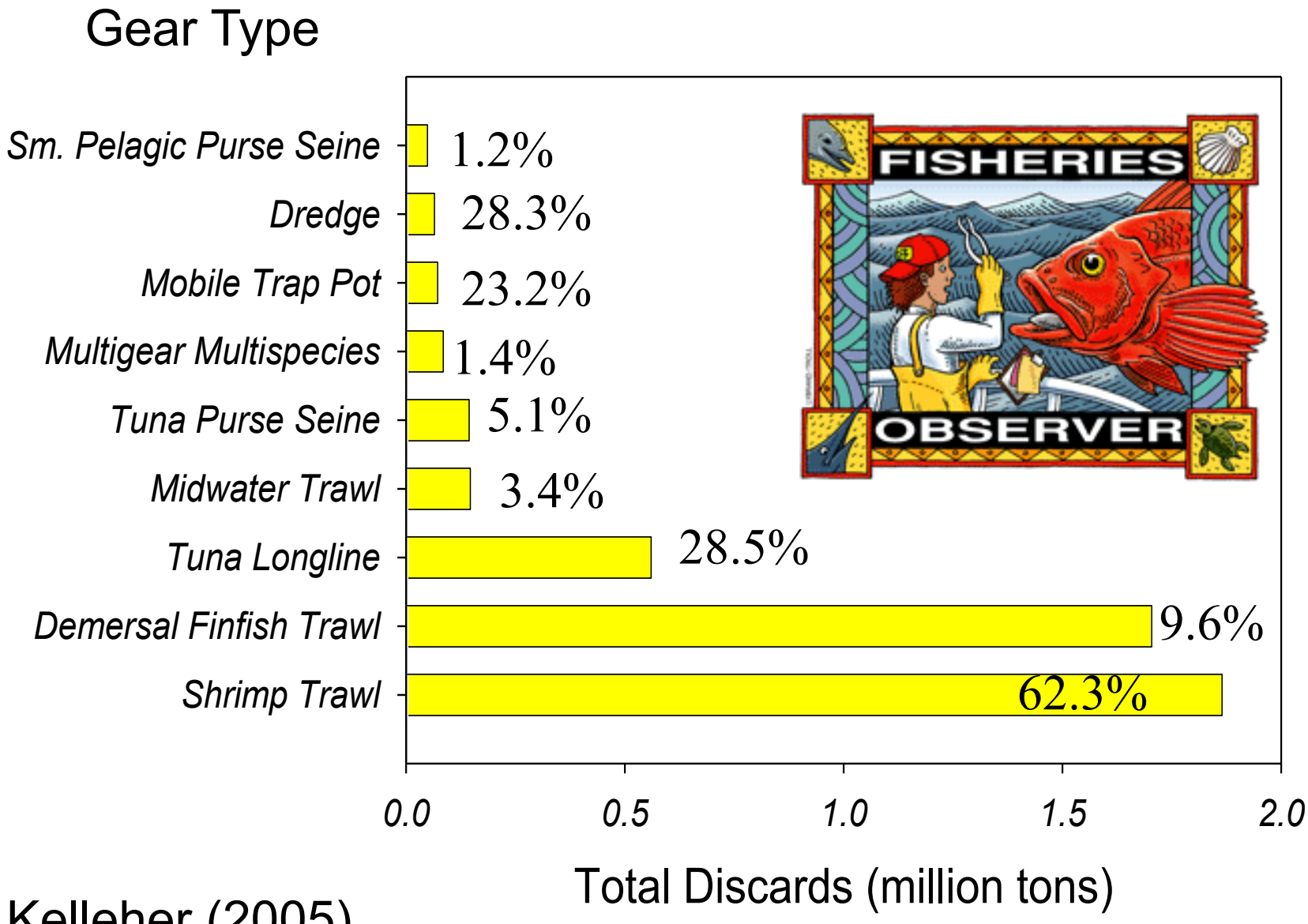
Reactions to the Report:

- Call to action!
- Does not have all the data
- Need to get better data
- Just 27%?
- More study is required

Follow-up Studies

- Kelleher 2005 (FAO, again), 8% Discard
- Herrington et al. (USA) - 22%
- NMFS (Karp, Desfosse, Brooke) (USA) 17%
- Davies et al. 2009 40% (definition issue)
- Lewiston, Crowder et al. PR “Hotspots” 2014 PNAS
- An Update from NMFS (this meeting)

Est. = 7.3 m tons
8% of total catch



Kelleher (2005)

Why Did Bycatch rates Go Down?
27 million tons to 7 million tons

- Decreases in effort & changes in target species for some trawl fisheries
- Changes in regulations requiring greater selectivity
- Changes in regulations to use more of the catch (aquaculture?)

or perhaps it was a change in methodology?

Global Discard "Hotspots"

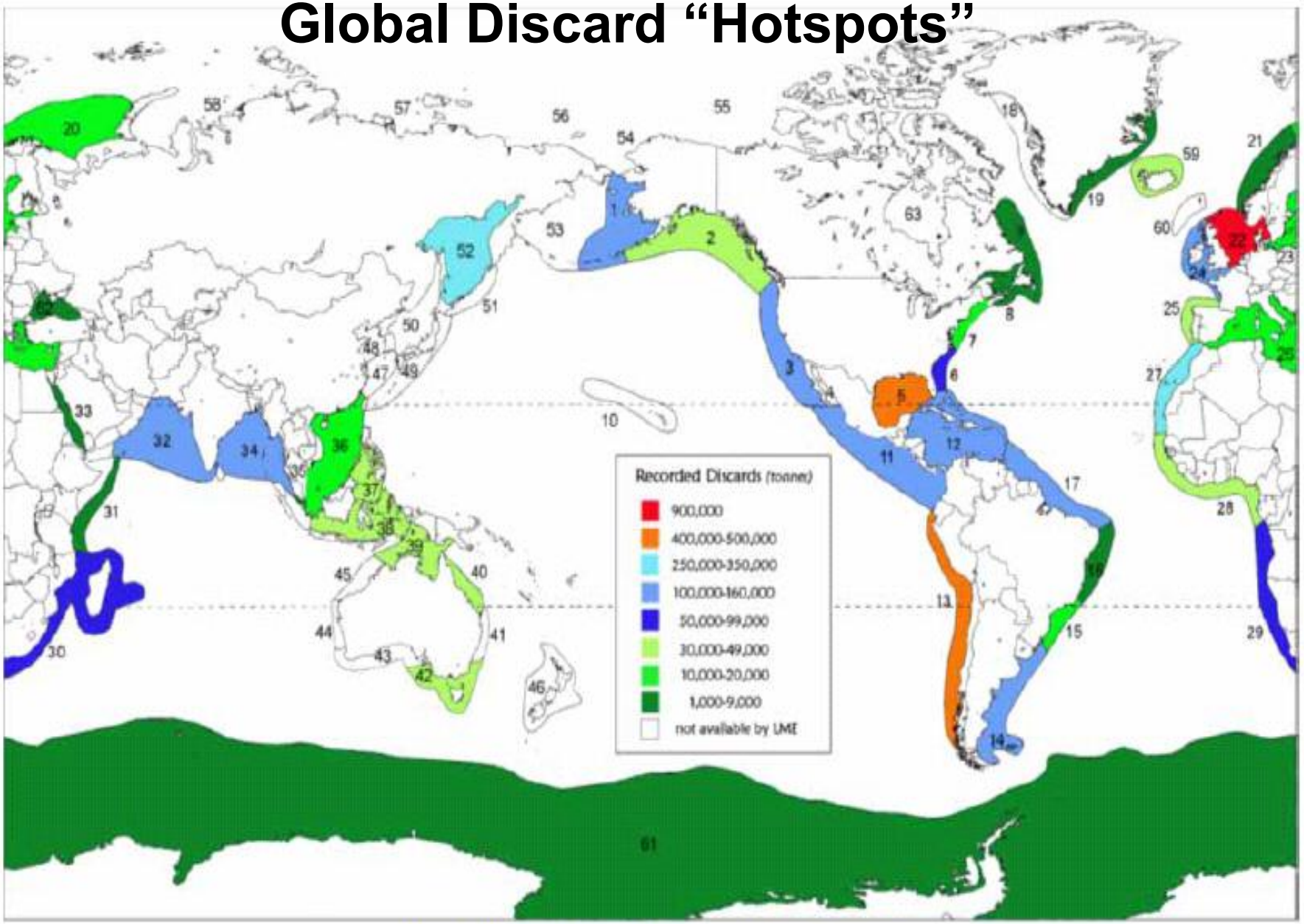
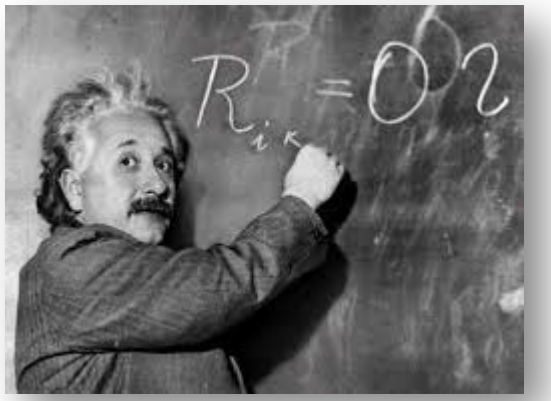


Figure 2. Recorded discards by Large Marine Ecosystem

On Counting Bycatch

Not everything that can be counted, counts…..

Not everything that counts, can be counted……



often attributed to:
A. Einstein

An Hierarchy of Bycatch Importance

Does Bycatch:

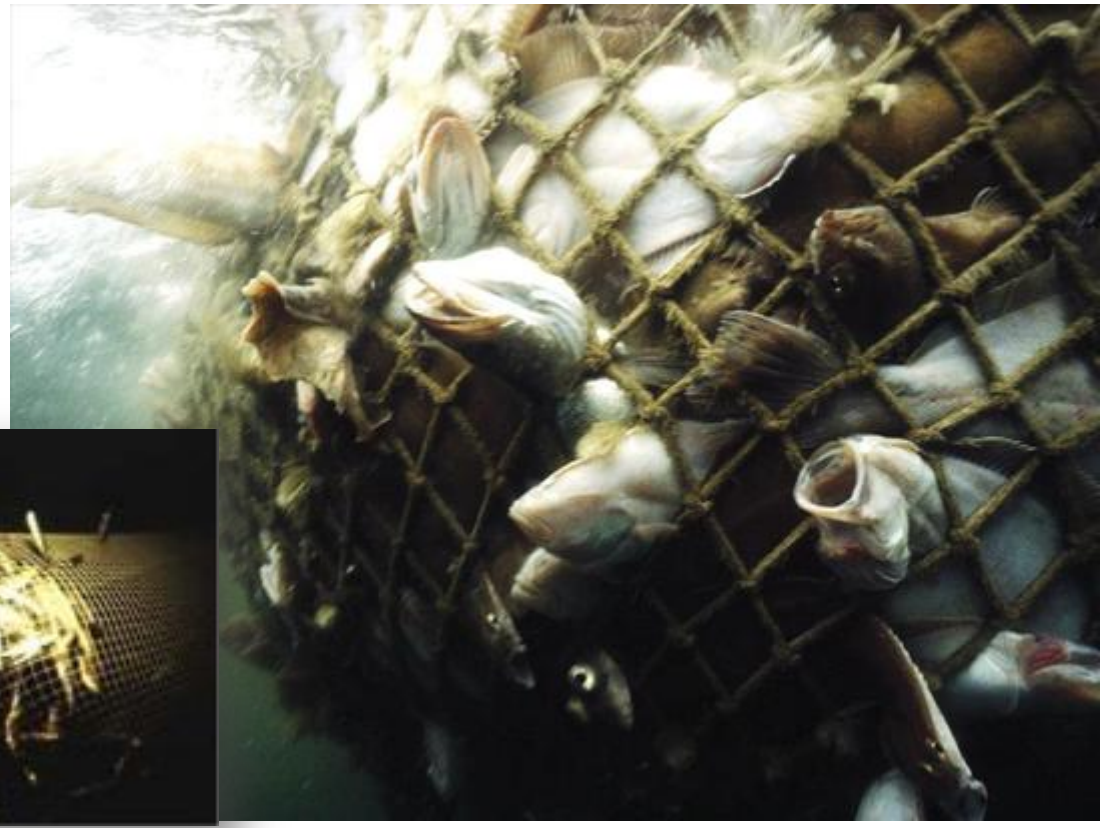
- threaten the existence of a species?,
- materially contribute to overfishing (e.g., is including bycatch critical to status determination – overfished, overfishing)?,
- contribute to “lost” yield potential?,
- result in competitory interactions among fisheries for common species?
- result in “waste”?
- create an ethics issue?

Not Everything that Counts…
Importance of Unobserved Mortalities

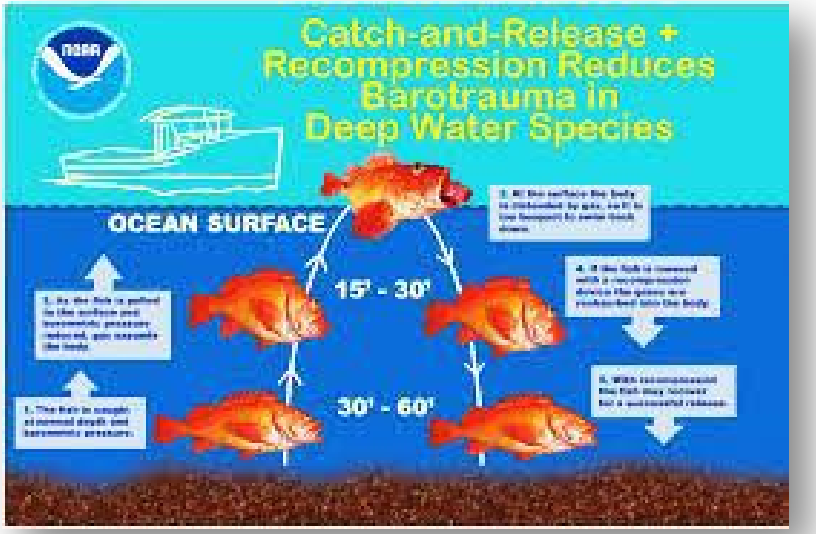
Mesh regulations have been used to reduce discards for a century……

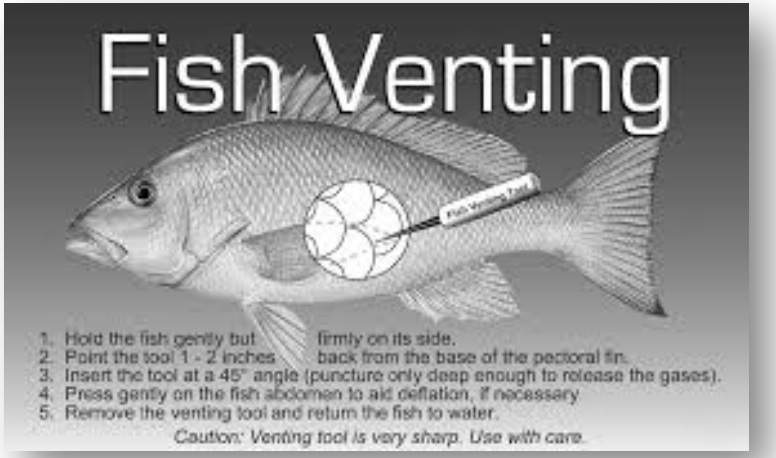
Factors that may increase mortality:

- Swimming exhaustion
- Size/shape of mesh
- Predation
- Tow duration
- Collision with ground gear



Barotrauma in Recreational Fisheries Significant Technological Development to Reduce Potential Mortalities





Mitigation Approaches

- Regulatory
  - Time/Area management (if the fish cooperate)
  - Mandatory gear-based (compliance?)

- Incentives-based
  - Relies on independent accounting
  - uses ingenuity “for doing good”

Economic & Social Considerations

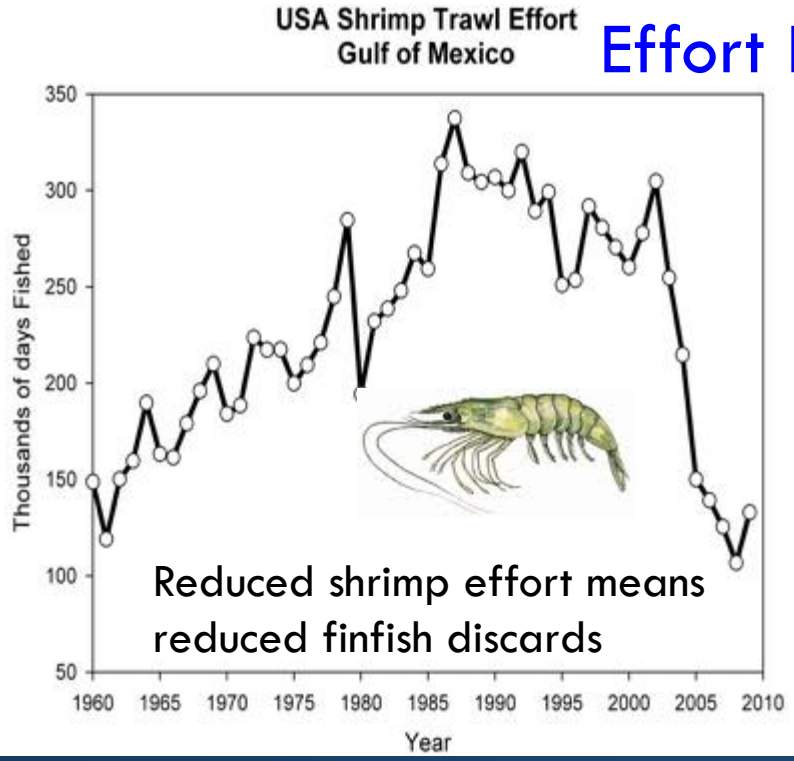
- Fisheries are becoming much more specialized and thus competition for bycatches becomes a limiting factor
- Rights-based fishing allows the market to assign the value of the limiting species (e.g., New England scallop vs. yellowtail flounder)
- Issues of equity, tenure and scale have confounded the use of rights-based systems

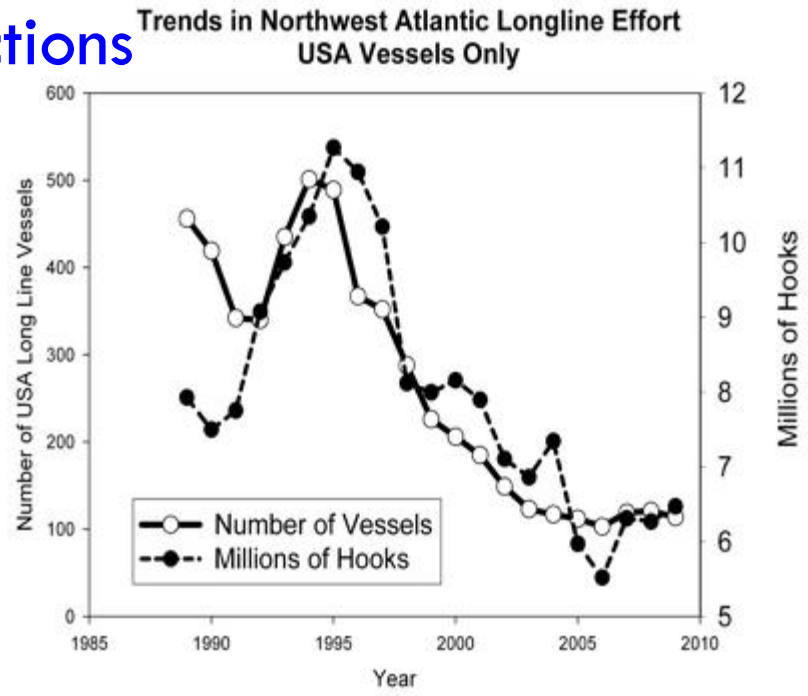
Ecological Considerations

- Impacts of effort reduction in many global fisheries on catch and bycatches (potentially the most important factor in volume reduction)

- Change in gear types to reduce discards can have profound and unintended consequences

Effort Reductions

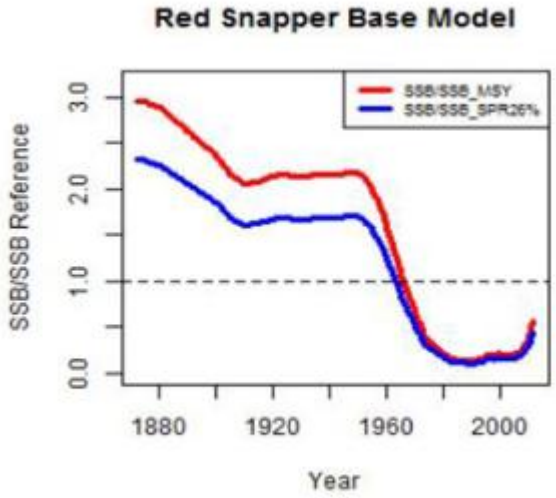


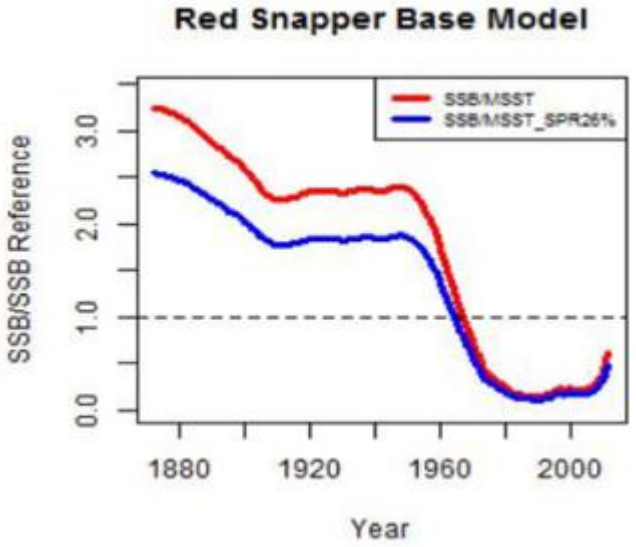


How Will Changes in Fishing Effort Affect Bycatch Species?
-70% change in shrimp effort
Scavengers: Dolphins, birds, crabs, fish

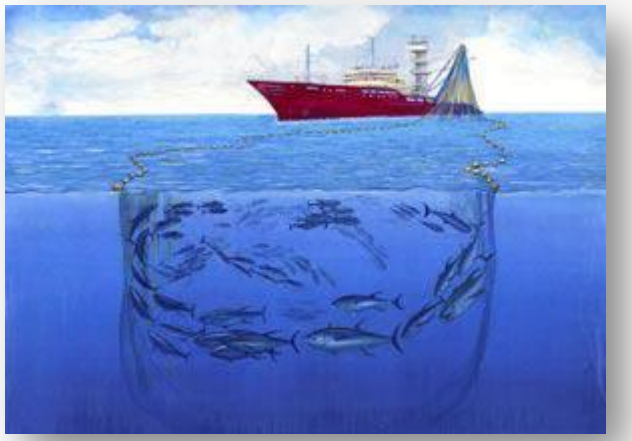
-80% Reduction in USA Longline Effort (swordfish & tunas)
Effects on bycatch species
Sea turtles, bluefin tuna

Significant reduction in shrimp trawl effort likely a factor in increasing red snapper populations in the Gulf of Mexico





The Switch from Purse Seines to FADs in the Tropical Pa

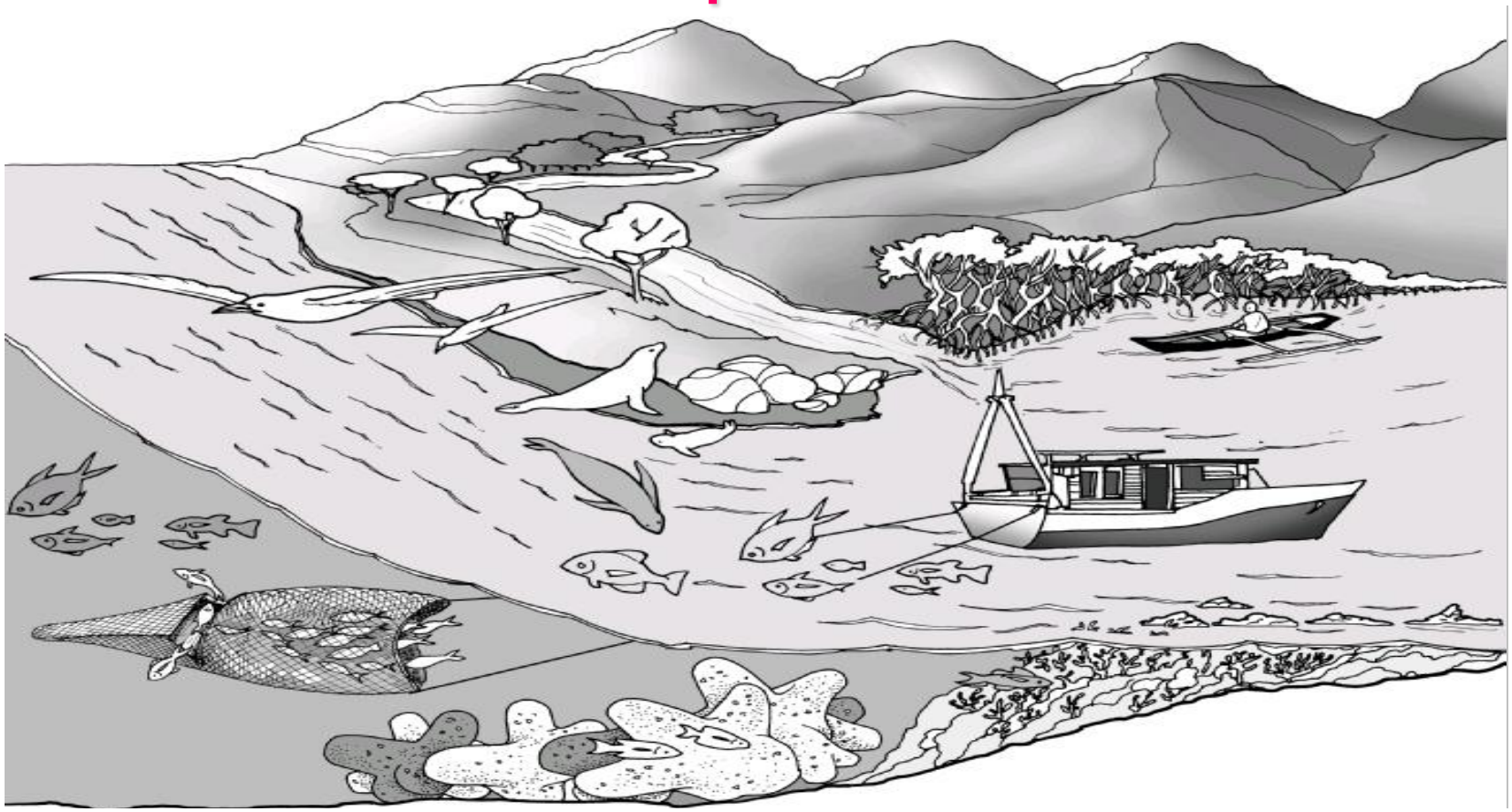


Some Consequences:

- Reduced dolphin deaths
- Smaller average size of tunas
- Catch of a wide array of small pelagic predators

Advancing an Ecosystem Approach to Fisheries

Uses quantitative indicators and performance measures in management of target species and ecosystem impacts



Beyond SS, What are the Main Issues relevant to Ecosystem Approaches to Fisheries (EAF)?

Bycatch or Fishery Interactions: Bycatch and fishery interactions including mortalities of non-target species (e.g., multiple fisheries share the same species or status of non-target, non-commercial species)

Indirect Effects of Harvesting: Indirect effects of harvesting through trophic interactions, and indirect effects through habitat-alteration, e.g. by fishing gear.

Interactions between Biological and Physical Components of Ecosystems: Trends in environmental variables (e.g. temperature, other oceanographic attributes) may result in long-term re-structuring of ecosystems. Emphasis on low-frequency variability

What is our National Policy Concerning Bycatches?

National policy (such that it is) is embodied in various federal statutes (SFA, MMPA, ESA), but not clearly articulated

Current NS-9 Language:

"…minimize bycatch and to the extent bycatch cannot be avoided, minimize the mortality of such bycatch."

Policy Objective for bycatch mitigation might be:

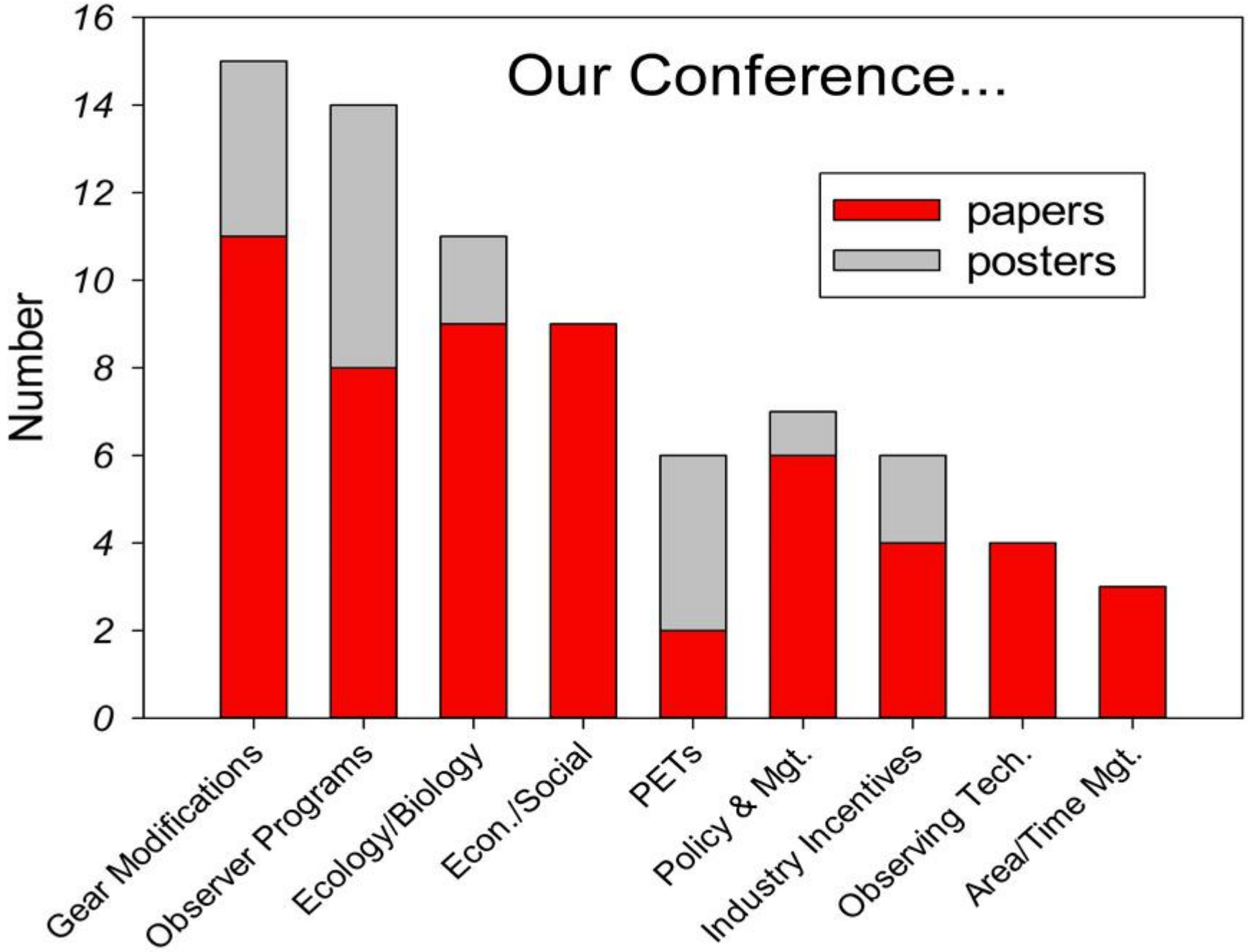
* Reduce deaths resulting from discards and unobserved mortalities to levels that do not threaten the attainment of biological objectives for target or non-target animals.

* Bycatches from one fishery should not undermine the attainment of optimum yields in associated fisheries.

The strange case of sea turtle management (managing the numerator = takes), a strong disincentive to rebuild populations

Finishing the Job……

- Clarify the Policy (-ies)
- Establish Objective Goals
- Provide the Tools
  - * Require Minimum Standards for Data and Synthesis
  - * Accelerate development of Gear/Management alternatives
  - * Tap Creativity…


Our Conference...
papers
posters
Number
0
2
4
6
8
10
12
14
16
Gear Modifications
Observer Programs
Ecology/Biology
Econ./Social
PETs
Policy & Mgt.
Industry Incentives
Observing Tech.
Area/Time Mgt.


What I Will be Looking For….
• Incentivising Industry Creativity
• Innovation in Approaches
• A Population Context
• Recreational Fisheries
• Priorities Moving Forward

Backup Slides

What is Ecosystem-Based Management (EBM)?

"Look at the whole picture, not just the parts."
Dave Goethel
SIMOR Listening Session

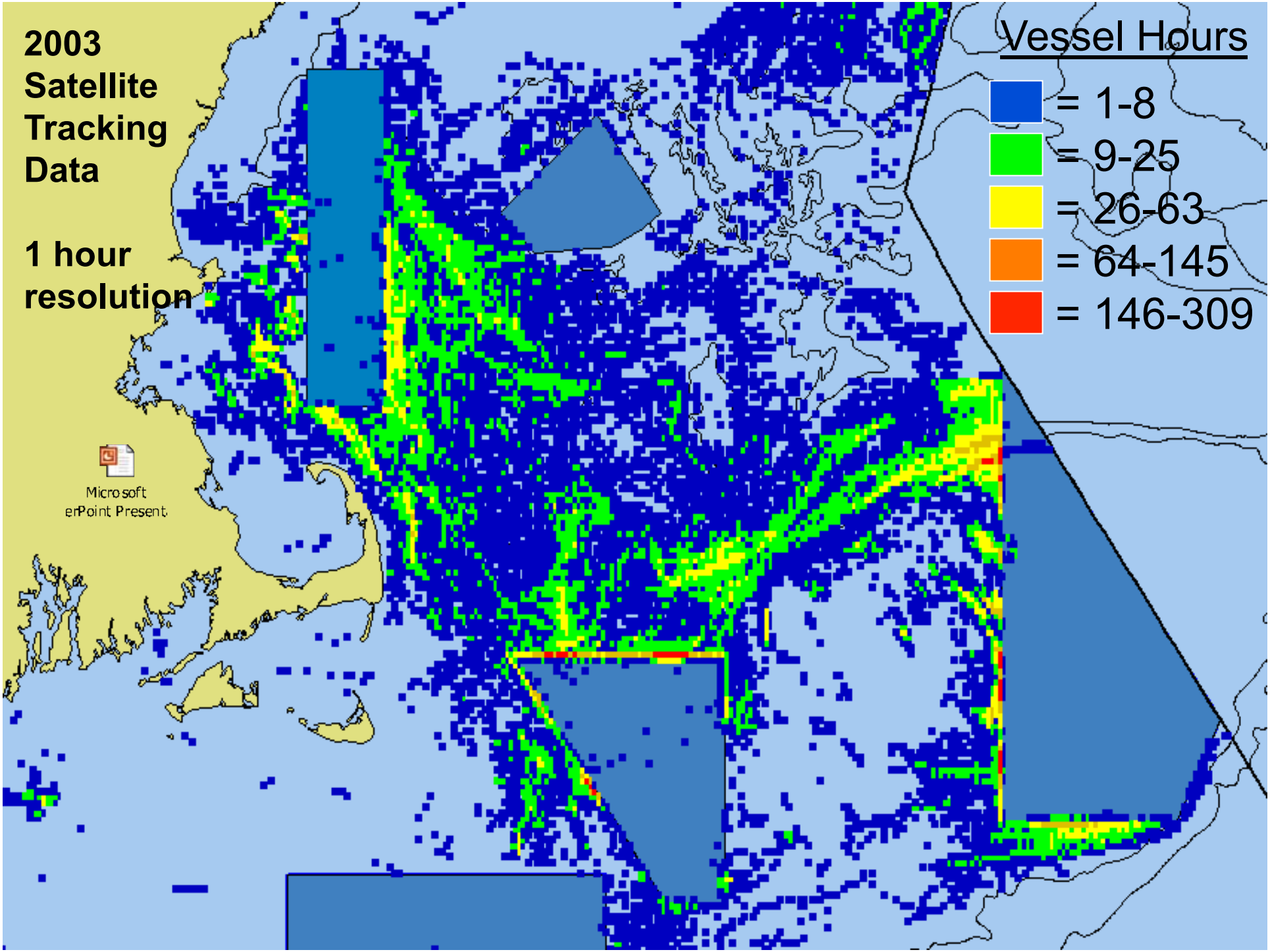
*Ecosystem-based management provides a comprehensive framework for living marine resource decision making. In contrast to individual species or single issue management, EBM considers a wider range of relevant ecological, environmental, and human factors bearing on societal choices regarding resource use."……*NOAA EGT

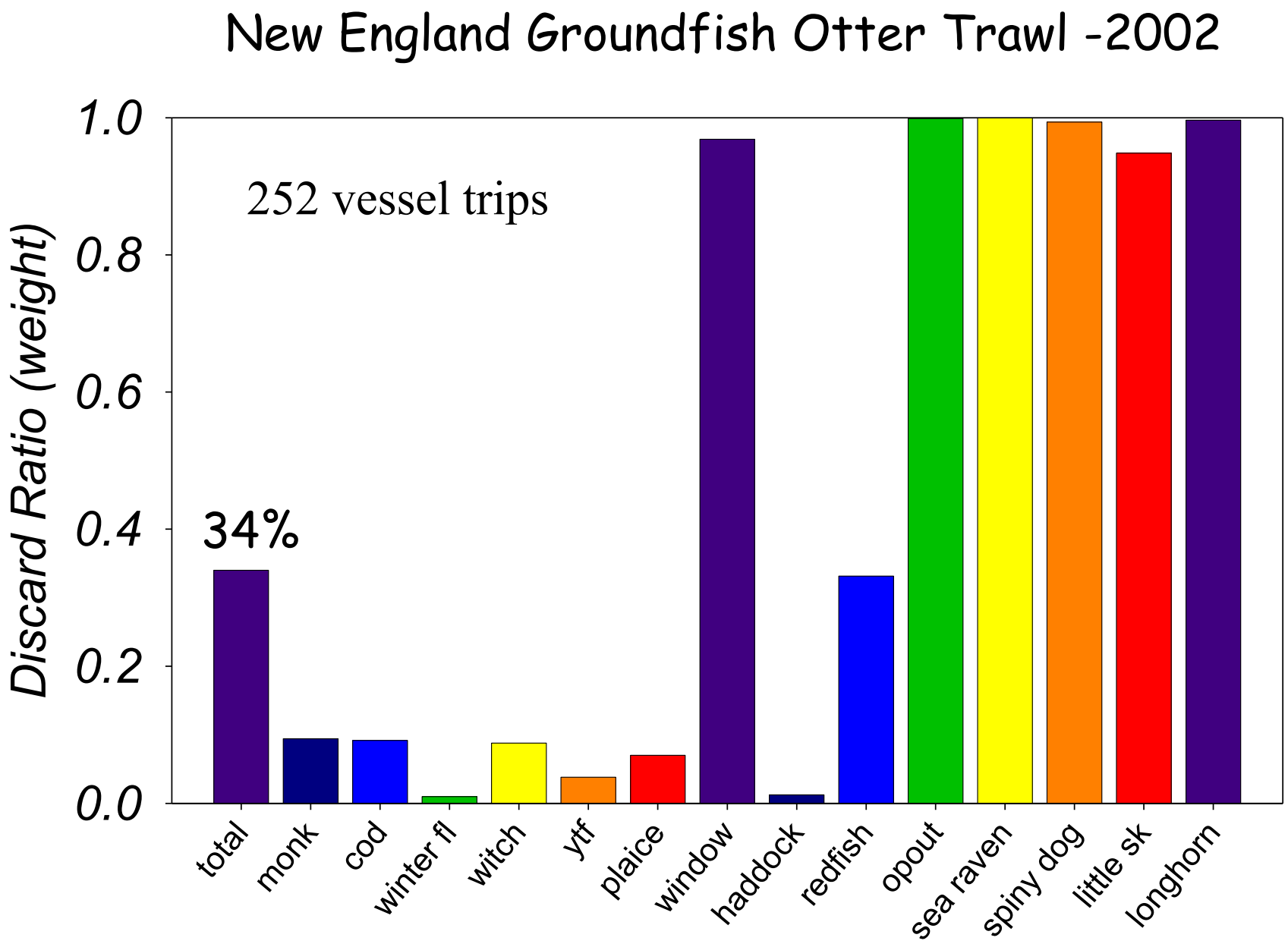
The #1 *Myth* Concerning EBM*:*

"***Ecosystem-based ocean resource management is not well defined and we do not know how to implement it***"

UN Law of the Sea Meeting, April 2006

Managing Bycatch is more than just fish


2003
Satellite
Tracking
Data
1 hour
resolution
Vessel Hours
= 1-8
= 9-25
= 26-63
= 64-145
= 146-309


New England Groundfish Otter Trawl -2002
252 vessel trips
34%
Discard Ratio (weight)
1.0
0.8
0.6
0.4
0.2
0.0
total
monk
cod
winter fl
witch
ytf
plaice
window
haddock
redfish
opout
sea raven
spiny dog
little sk
longhorn


Observing systems have helped us prosper
So have a great conference…..