Organization

I. Motivation

II. General Issues

III. Voluntary Approaches

IV. Regulatory Approaches

V. Parting Thoughts



I. Motivation

Lessons from Environmental Policies

- Bycatch reduction is related to reducing environmental pollution or greenhouse gasses.
- An undesirable byproduct from production of a desirable one.
- What can bycatch reduction learn from experience in reducing pollution and greenhouses gasses?

Externality

- An impact not considered by firms or consumers and not included in market price.
- Called an external cost with bycatch, pollution, greenhouse gasses.
- Can also be called a public bad.



Motivation

- Command-and-control measures are top down.
- Have not worked well in pollution or greenhouse gas control & same recognition is growing for fisheries bycatch.
- They are gradually being abandoned in pollution and greenhouse gas control for methods that create explicit incentives at the level of individual decision maker to reduce pollution.
- Increasing the cost of emitting pollution by making marginal units of emissions costly => changing incentives at plant level to induce decisions that reduce emissions.

II. General Issues

II.1. Incentives

Technology & Behavior

- Bycatch reduction is both a technological and behavioral problem.
- Technology
  - Multiple product (multispecies) harvest technology
  - Some ability to avoid bycatch by changing catch-bycatch mix
  - Stochasticity can be important
- Behavior
  - Incentives

Incentives Induce Changes In Behavior:

- Location and timing of fishing to avoid bycatch
- Bycatch handling
- Technology (e.g. FAD design and adoption, circle hooks)
- Consumer behavior
- Etc.

Incentives

- Incentives change behavior
- Positive ("carrots")
  - Reward favored behavior
  - Market access, subsidies, payments for ecosystem services
- Negative ("sticks")
  - Penalize unfavorable behavior
  - Taxes, fines, penalties, deny market access
- Perverse/unexpected
  - Behavior undesired/unexpected by society
  - Payments for releasing turtles can create incentive to catch them just to release them

Short- vs. Long-Run Incentive Impacts

- Short-Run:
  - Alter timing and location of fishing, catch composition, etc.
- Long-Run:
  - Technical change and fleet reconfiguration.

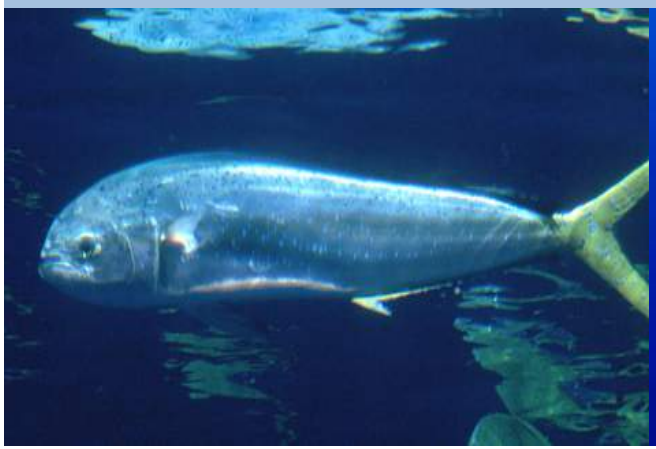


Policy Design & Flexibility

- Need to factor incentives (both positive and negative) into policy design
- For cost-effectiveness, generally want to give flexibility in how to meet environmental goal

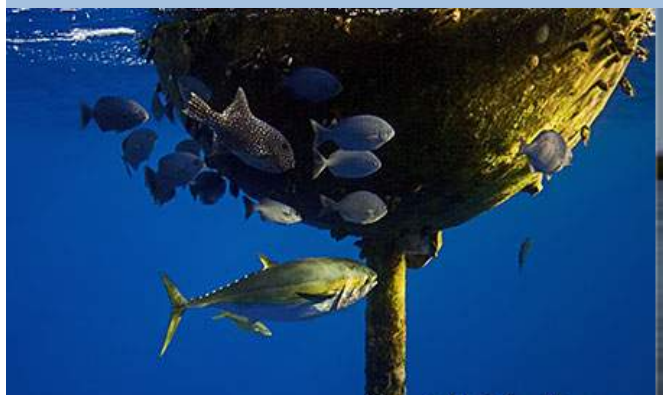
All Parties Address All Costs

- Fishers, processers, and consumers.
- Includes costs not presently captured by market values (externalities).
- Otherwise, don't have economic efficiency.



"Price" Bycatch

- Increases bycatch cost to change behavior
- Pressures participants to innovate and reduce bycatch efficiently.
- Incentive approaches more economically efficient than "command-and-control" top-down and direct regulations.



Practice vs. Performance…(1)

- Incentives on Practice (Inputs)
  - Harvest process (e.g. backdown procedure, no sundown sets)
  - Investment (e.g. Tori lines, FAD design)
  - Where most current emphasis lies
  - More indirect and weaker than when focused on performance (output)



Practice vs. Performance…(2)

- Incentives on Performance
  - Outcomes (e.g. bycatch quotas, property rights)
  - Incentives stronger because more direct
  - More difficult and costly to verify, especially in fisheries where production occurs at sea

Two Approaches to Create Incentives Devolving to Individual Vessels…(1)

- (1) Directly implement policies at individual vessel level.



Two Approaches to Create Incentives Devolving to Individual Vessels…(2)

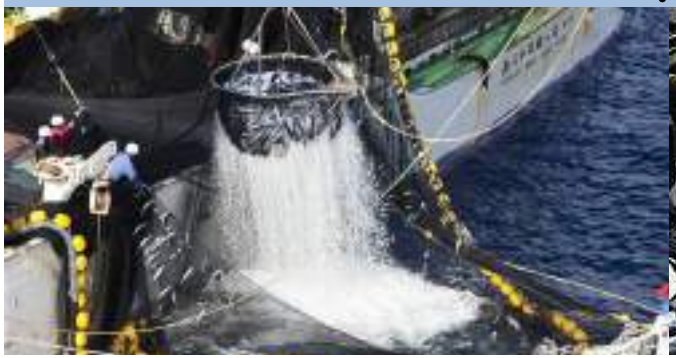
- (2) Implement on groups
  - Sufficiently small to devise and self-manage their own bycatch reduction scheme.
  - Good for rare events like endangered turtles
  - Example: group insurance or group bycatch quota.



II.2. Social Norms

More Than Just Incentives

- Social norms are explicit or implicit rules specifying what behaviors are acceptable within a society or group
- Examples: awareness and education campaigns
  - Skipper workshops
  - Consumer preferences




II.3. Economically Efficient Conservation
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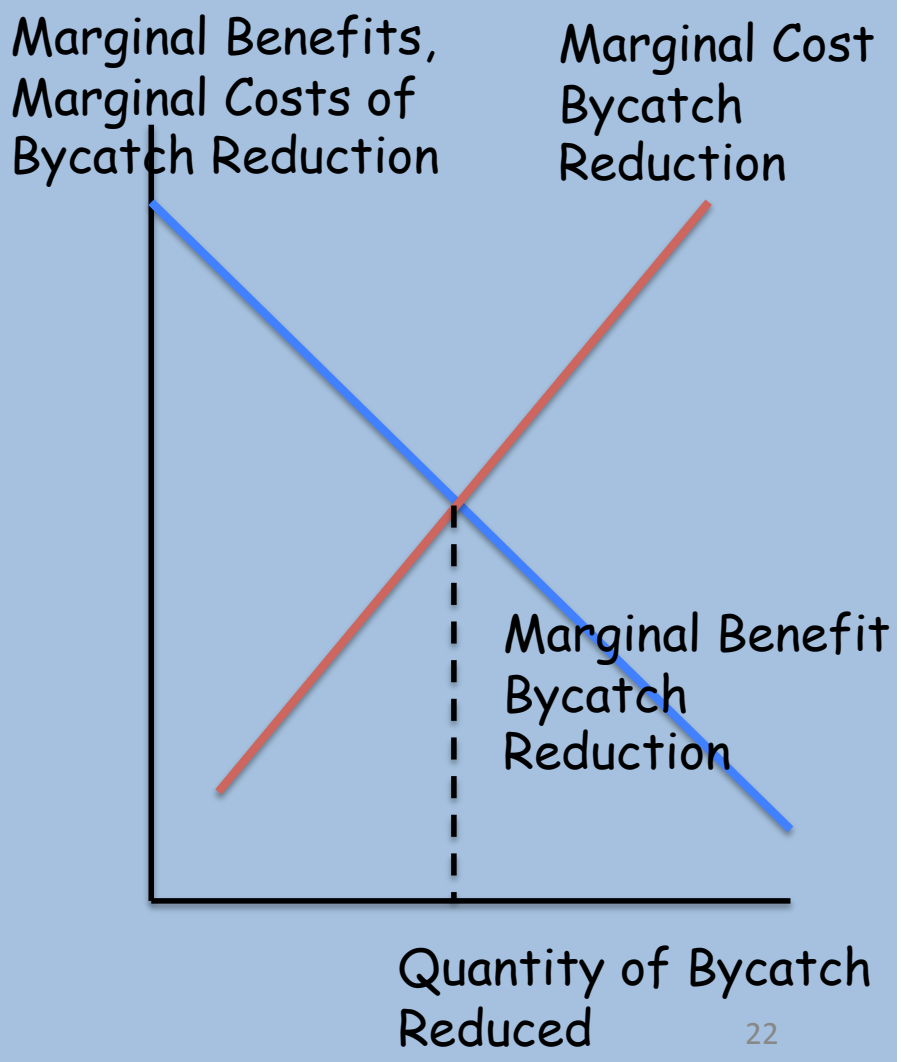
Optimum Level of Bycatch is Not Zero!

- Reduce bycatch to level at which additional reductions increase costs of foregone profits more than benefits of bycatch reduction.



In Practice, Cost-Effective Conservation

- Concentrate conservation where costs are lowest per unit bycatch reduction
- Least cost across different gear types, areas, fleets, life history and range of species.



Example of Cost-Effective Bycatch Reduction

Table 3. Annual cost per adult female of leatherback protection strategies

	Annual cost of intervention per adult female	Ratio of cost of fisheries interventions relative to nesting beach intervention
Jamursba Medi/Warmon nesting beach	$1,858	$1,858/$1,858=1
Hawaii-based shallow-set longline	$28,054	$28,054/$1,858=15
California drift gillnet	$205,363	$205,363/$1,858=111

Nesting site protection yields the greatest conservation bang for the buck and leaves profits to finance conservation.

Gjertsen, Squires, Dutton, Eguchi, *Conservation Biology* in press

Cost-Effectiveness & Flexibility

- Give vessels flexibility in how they meet environmental goal.
- Allows cost effectiveness
- Gives vessels ability to respond to changes in markets & environment