

# **Fishery Management Council Member Training: Economic Analysis**

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# Overview

- Central Questions:
  - What is the economic effect of each management option?
  - Who wins / who loses?
- Mandates
  - Focus on mandates that “shape” analyses
- Two Types of Model
  - Economic Benefits vs. Economic Impacts
- Some Management Issues
  - Allocation, Rebuilding Plans

# Primary Purpose of Economic Analyses

- What is the economic effect of proposed management options on fishermen and other affected entities (related firms, communities)?
- Who is affected and by how much?
- Provides opportunity to systematically and objectively assess the economic consequences of management options
- **SOLE OPPORTUNITY FISHERMEN HAVE TO MAKE THE REGULATORY PROCESS FOCUS ON THEM**

# KEY MANDATES

- MSA Section 303 (a)(9): Fishery Impact Statement
- E.O. 12866: Regulatory Impact Review (RIR): net benefits
- E.O. 13272: Proper Consideration of Small Entities in Agency Rulemaking.
- Regulatory Flexibility Act (RFA): (small businesses / substantial impact)
- Small Business Regulatory Enforcement Fairness Act
- NEPA (cumulative effects, indirect effect)

# E.O. 12866

- Regulate only when market failure requires it;
- Consider all benefits and costs broadly defined;
- Choose alternative that maximizes net benefit
  - Economic, Environmental, Health and Safety
  - Distributive impacts
  - Equity

# Regulatory Flexibility Act

- Purpose is to establish the principle that agencies shall endeavor to fit regulatory requirements to the scale of businesses **subject to regulation**.
- Small entity involvement
  - Will action have **significant** economic effect on a **substantial** number of regulated small entities?
  - If yes, seek alternatives to minimize burden
  - No requirement to choose any particular alternative

# NEPA

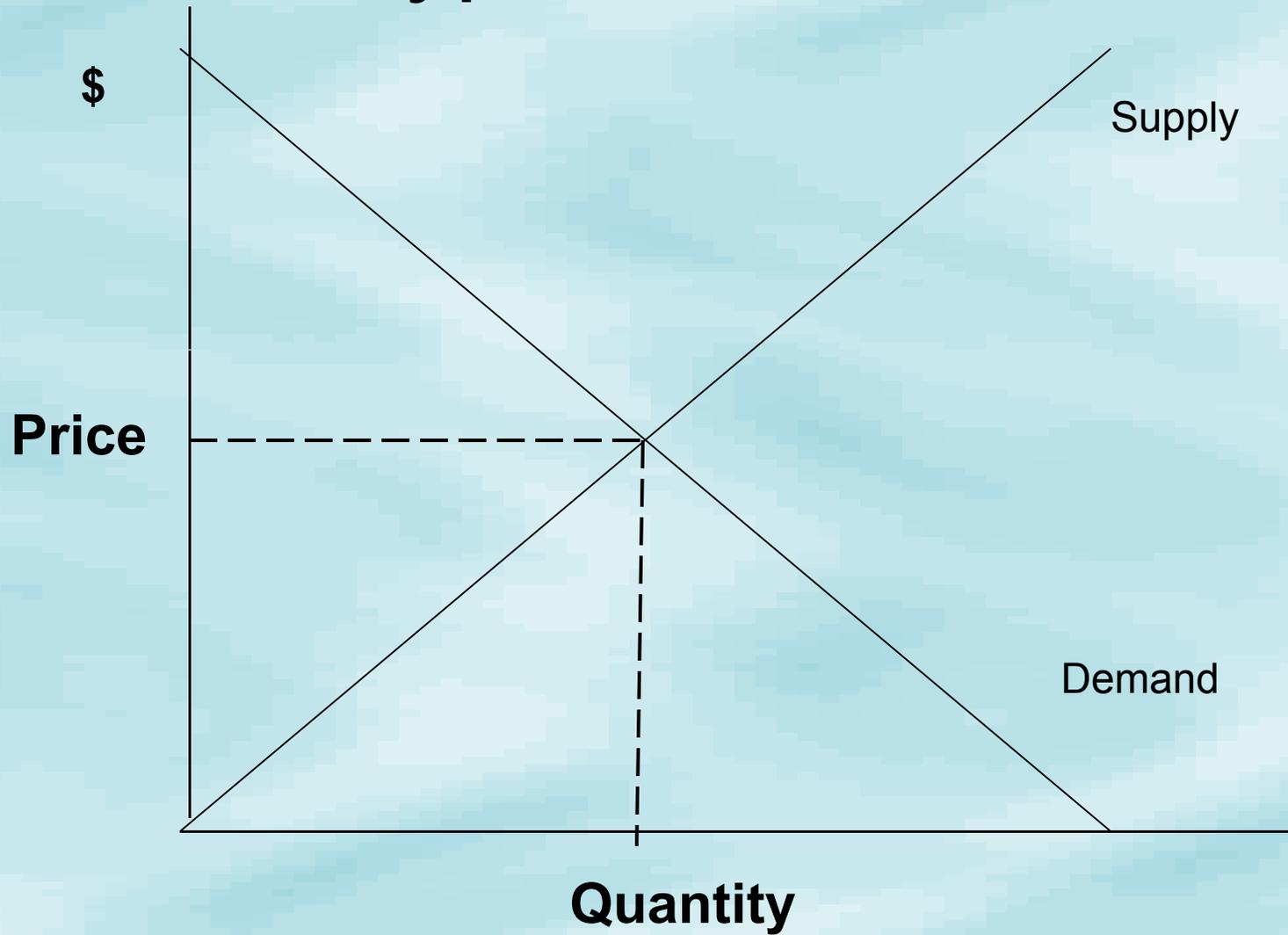
Broad requirements for economic analyses;  
Here, focus on two distinguishing requirements:

- Cumulative Effects
- Affected Human Environment, i.e., “Indirect Effects”

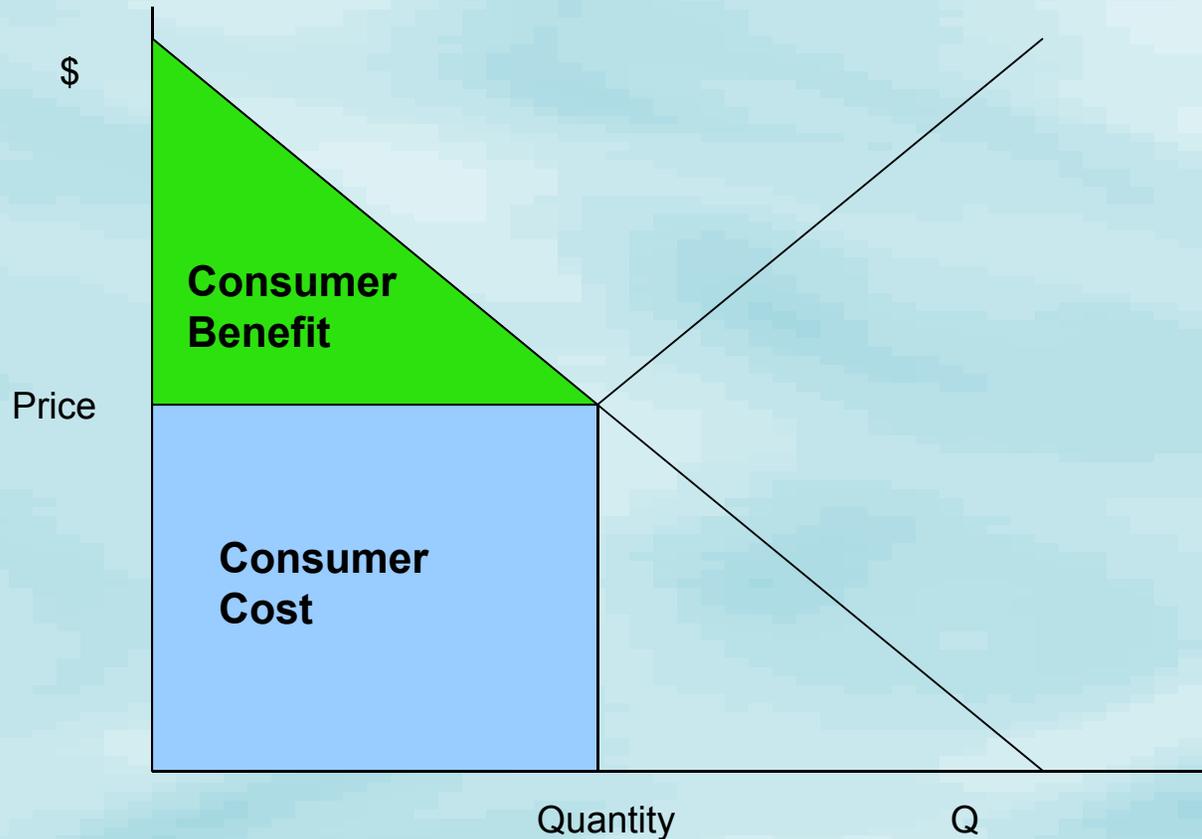
# Economic Value

- Two components:
  - Consumers - economic value is the difference between the price actually paid for a good or service and what the consumer would have been willing and able to pay.
  - Producers – economic value is the difference between the cost of producing a good or service and the price actually charged.

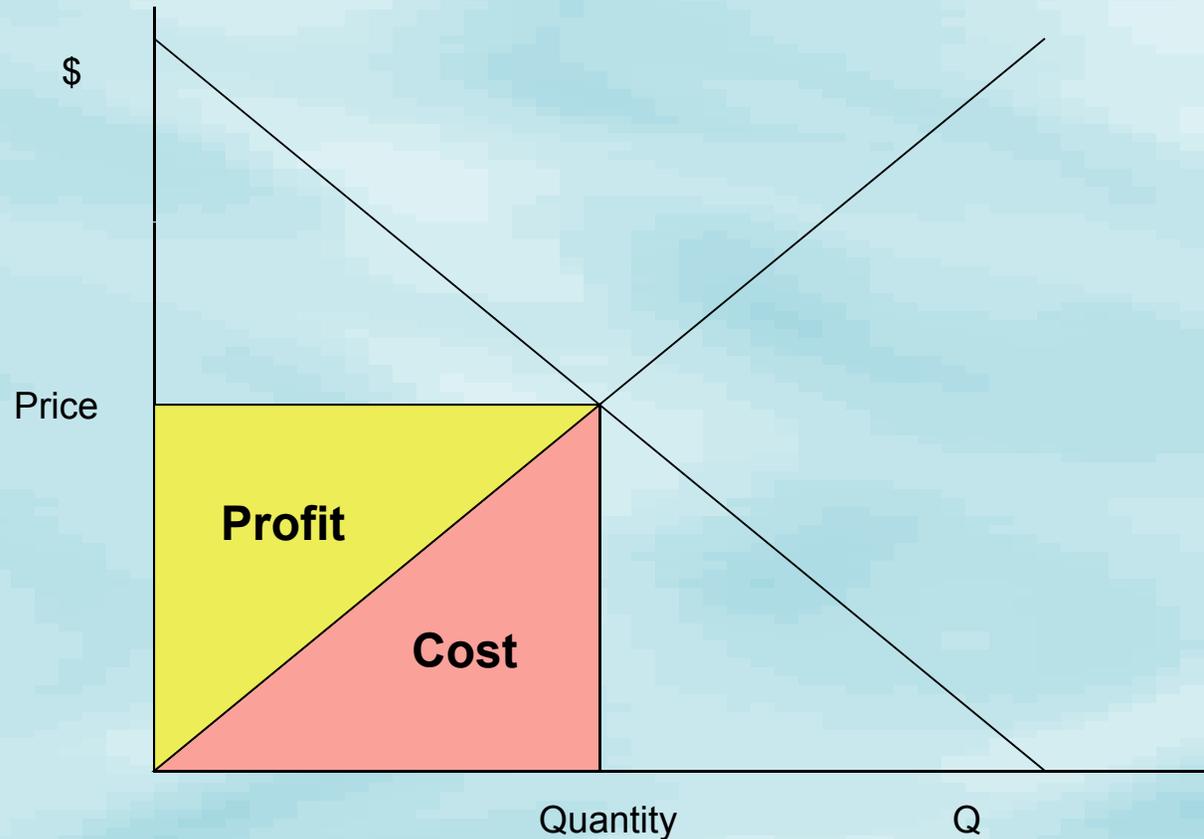
# A Hypothetical Market



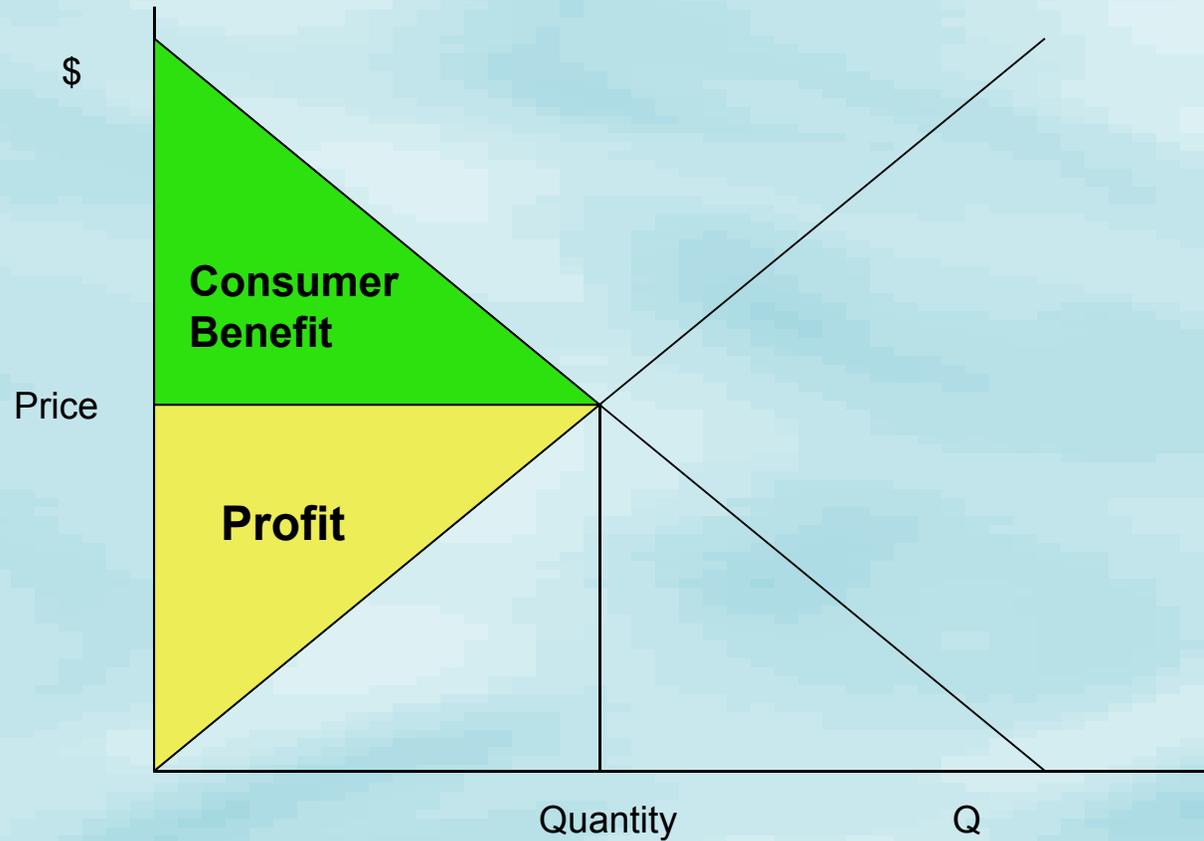
# Consumer Value: Basis for Angler Analyses



# Producer Value: Basis for Harvester Analyses



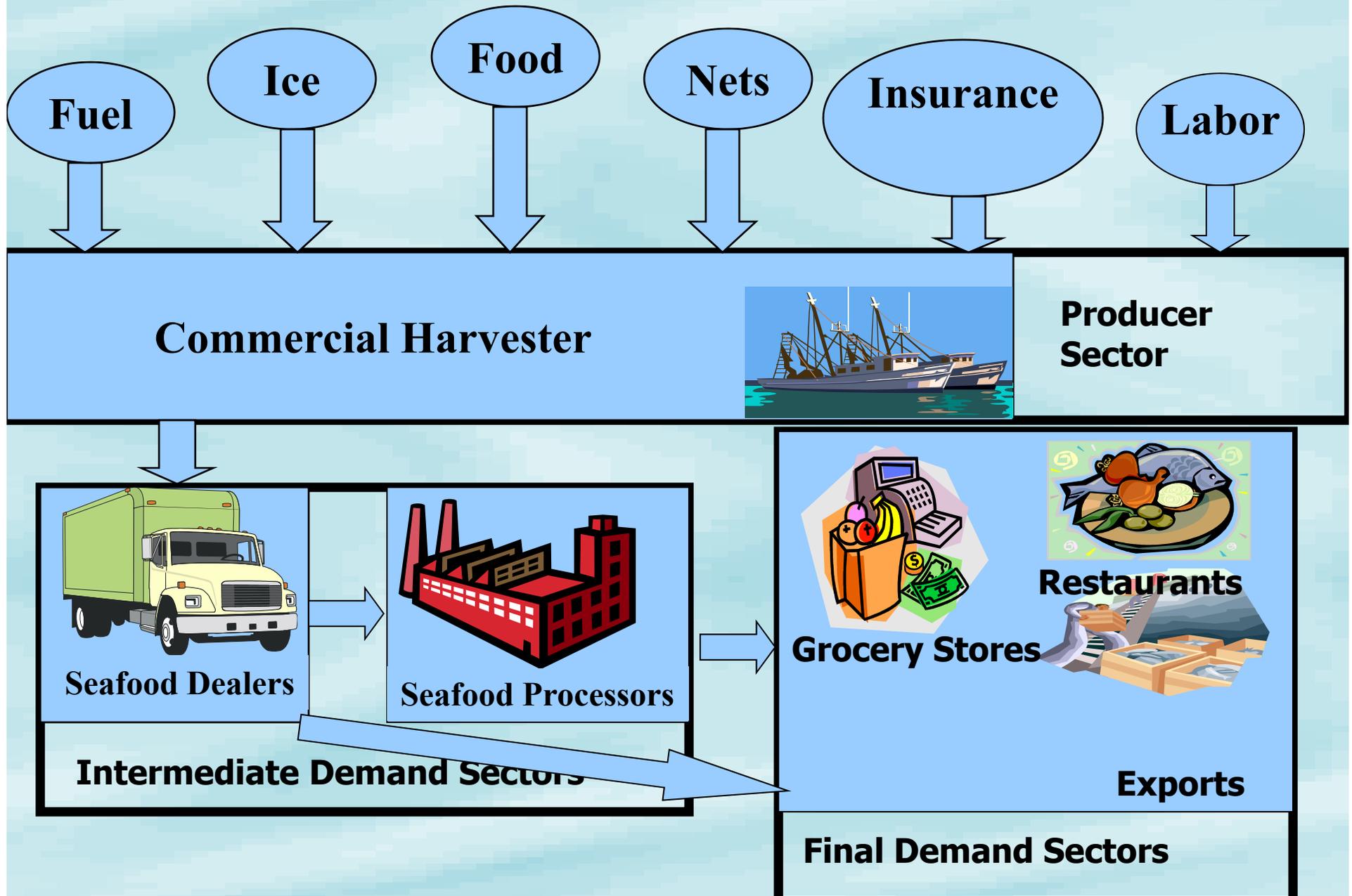
# Economic Value / Benefits



# Uses of Economic Impact Models (aka Input/out Models) in Fishery Management

- Estimate impacts on sales, income, and jobs of different alternatives
- Inform managers of how these impacts are distributed
  - Across different regions
  - Sectors of the regional economy
- I/O models capture inter-industry transactions between businesses and between businesses and final consumers in an economy

# Basic Input-Output Logic



# Economic Impact and Economic Value: An Example

- Firm A
  - \$200 million in sales
  - \$210 million in operating cost
  - \$10 million loss
- Firm B
  - \$125 million in sales
  - \$100 million in operating cost
  - \$25 million in profit
- Firm A has higher economic impact
- But, Firm B generates more economic value

# Another Example: Recreational Anglers

- Angler A
    - Takes a private boat trip
    - Spends \$45
    - Willing to pay \$50
  - Has higher economic impact
  - Generates \$5 in economic value
- Angler B
    - Fishes from a pier
    - Spends \$5
    - Willing to pay \$25
  - Lower economic impact
  - Generates \$20 in economic value

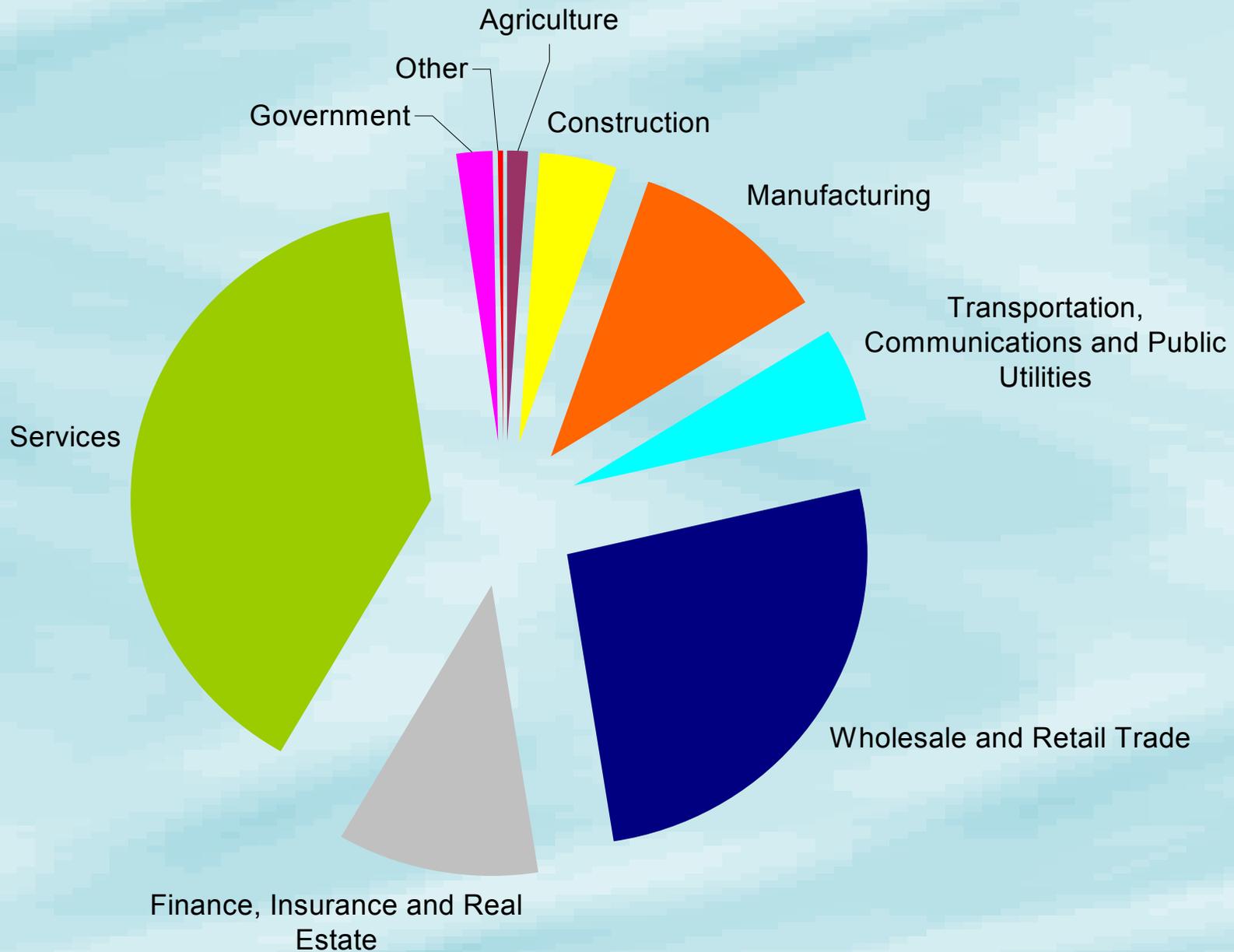
# Consequence

- Allocation based on economic impact rewards the highest spender or highest cost producer:  
**the bigger the expenditure, the bigger the impact**
- Sound economic policy would seek to minimize the cost of providing goods and services to consumers (fish, for example)
- Primary use of I/O to identify distributive effects;
- Should **NOT** be used to make allocation decisions
- Take the estimate with a grain of salt – i.e. does not take adjustments to policy change into account

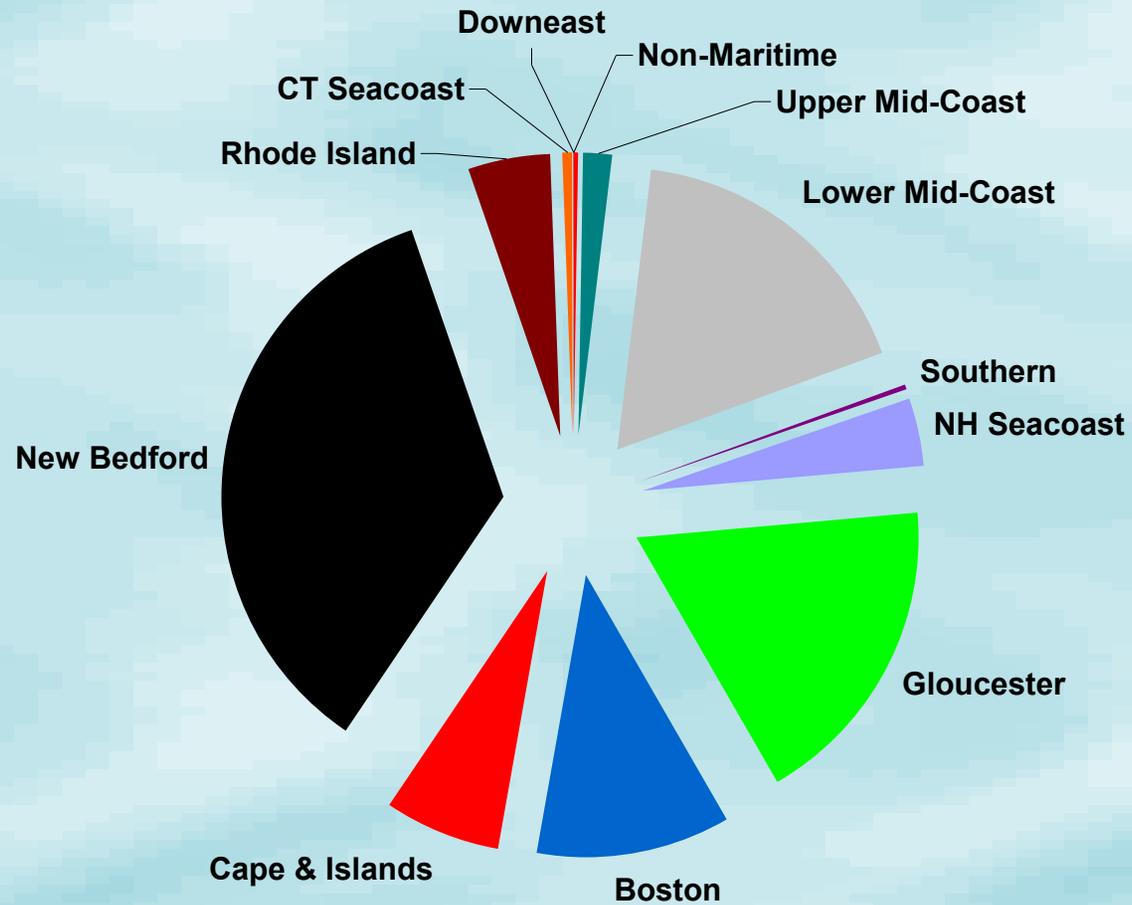
## Ranking Alternatives: Income Impacts from a Change in Commercial Fishing

	Alternative 1	Alternative 3	Preferred
<b>Commercial Fishing</b>	-22,582	-29,537	-20,067
<b>Processing</b>	-5,267	-6,989	-4,673
<b>Dealers</b>	-9,097	-12,053	-8,056
<b>Agriculture</b>	-246	-326	-218
<b>Construction</b>	-1,019	-1,347	-901
<b>Manufacturing</b>	-1,677	-2,214	-1,481
<b>Transportation</b>	-3,598	-4,735	-3,161
<b>Trade</b>	-6,304	-8,340	-5,574
<b>Finance</b>	-2,614	-3,443	-2,319
<b>Services</b>	-9,542	-12,613	-8,439
<b>Government</b>	-463	-610	-409
<b>Other</b>	-75	-99	-66
<b>Total</b>	-62,488	-82,307	-55,367

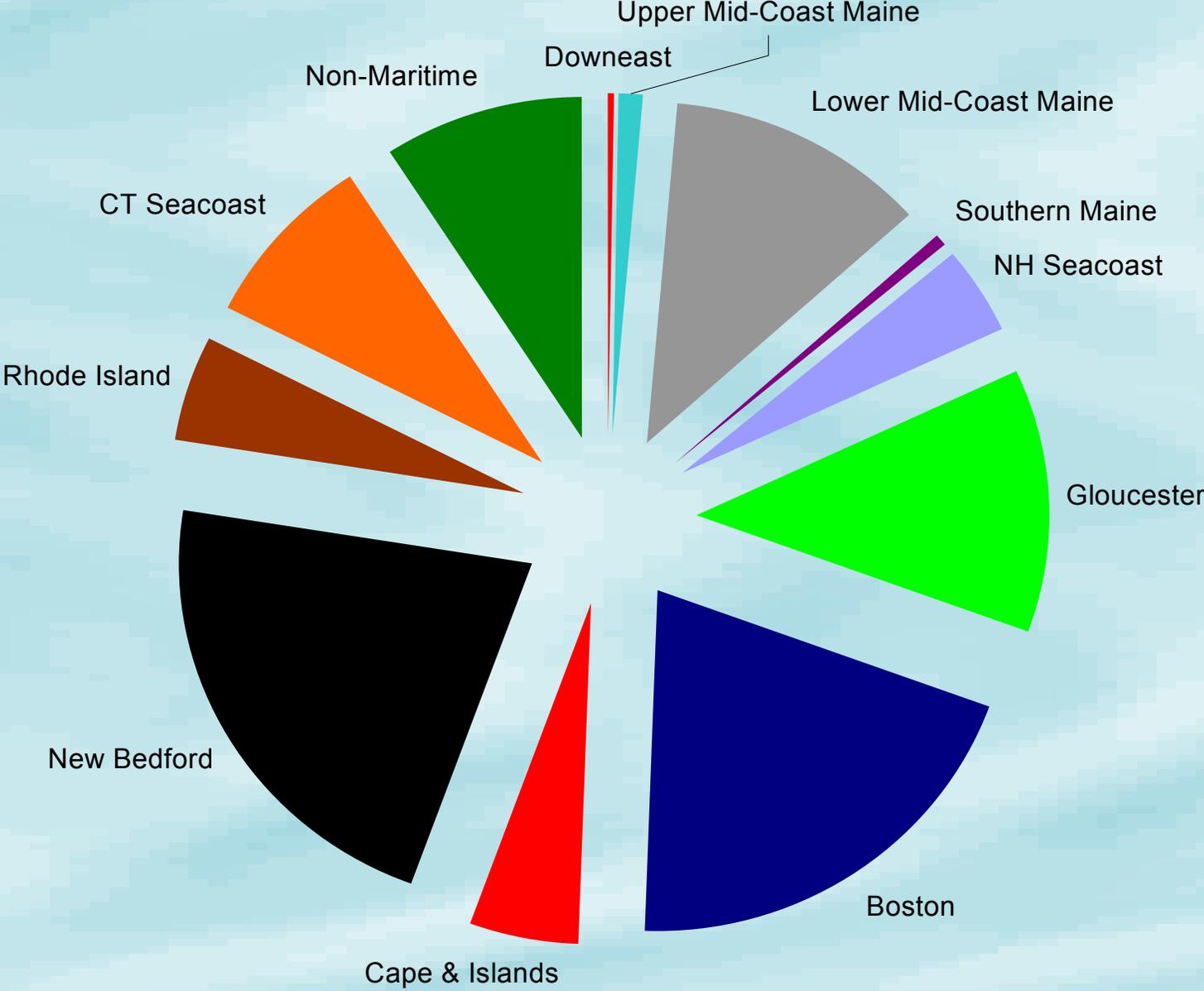
# Economic Impact Model: Income impacts by Industry



# Regional Distribution of Direct Income Impacts



# Economic Impact Model: Income Impacts by Location



# Net Benefits and Reallocation

- Net benefits are calculated as the change in consumer and producer surpluses due to new allocation
- Change allocation as long as gains in surpluses for one sector exceed reductions in surpluses for the other sector

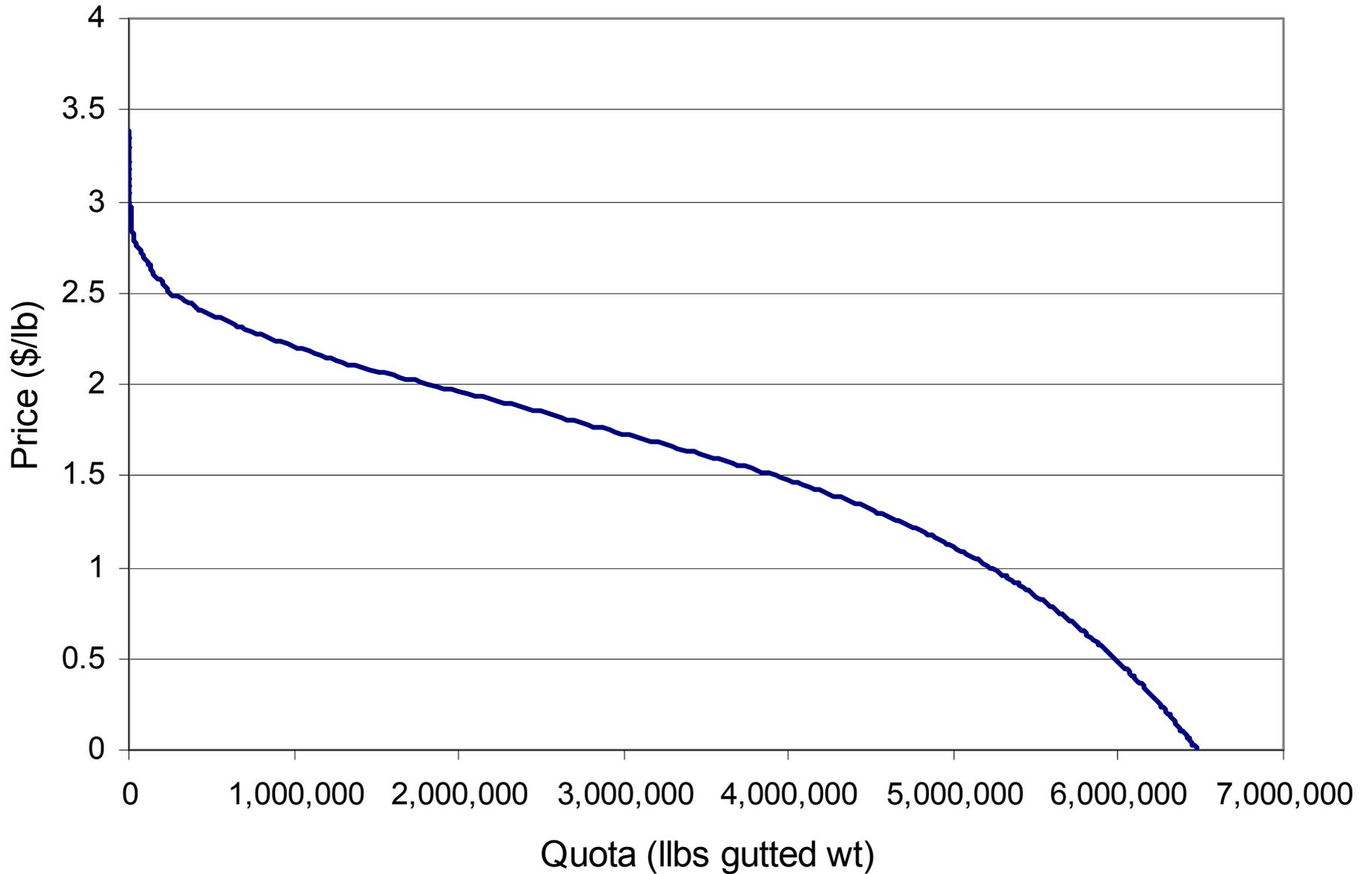
# Example: Economic Allocation of Red Grouper in the Gulf of Mexico

- Red grouper an important species for commercial and recreational fishermen
- Historical catches unrestricted, resulting in equilibrium distribution between sectors
- Stock depletion results in lower TAC
- Reallocation redistributes the burden of stock recovery
- Preliminary estimates of gains and losses for small redistribution of TAC for red grouper

# Analysis of Commercial Sector

- Marginal willingness-to-pay (MWTP) equivalent to predictions of the lease price for quota under an IFQ system
- Estimate demand for quota by calculating MWTP for a wide range of commercial quotas

## Marginal Benefit Schedule for the Commercial Sector

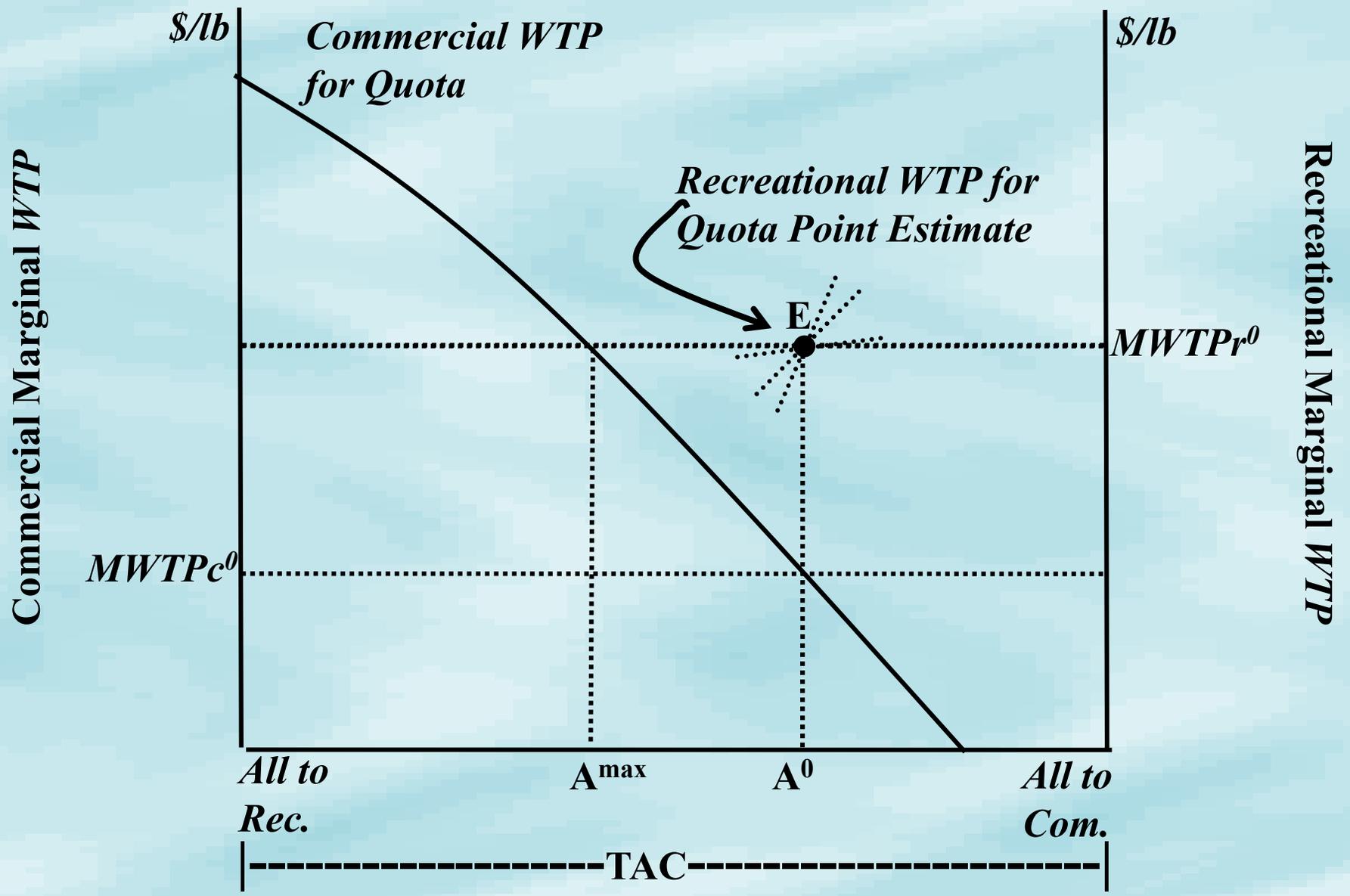


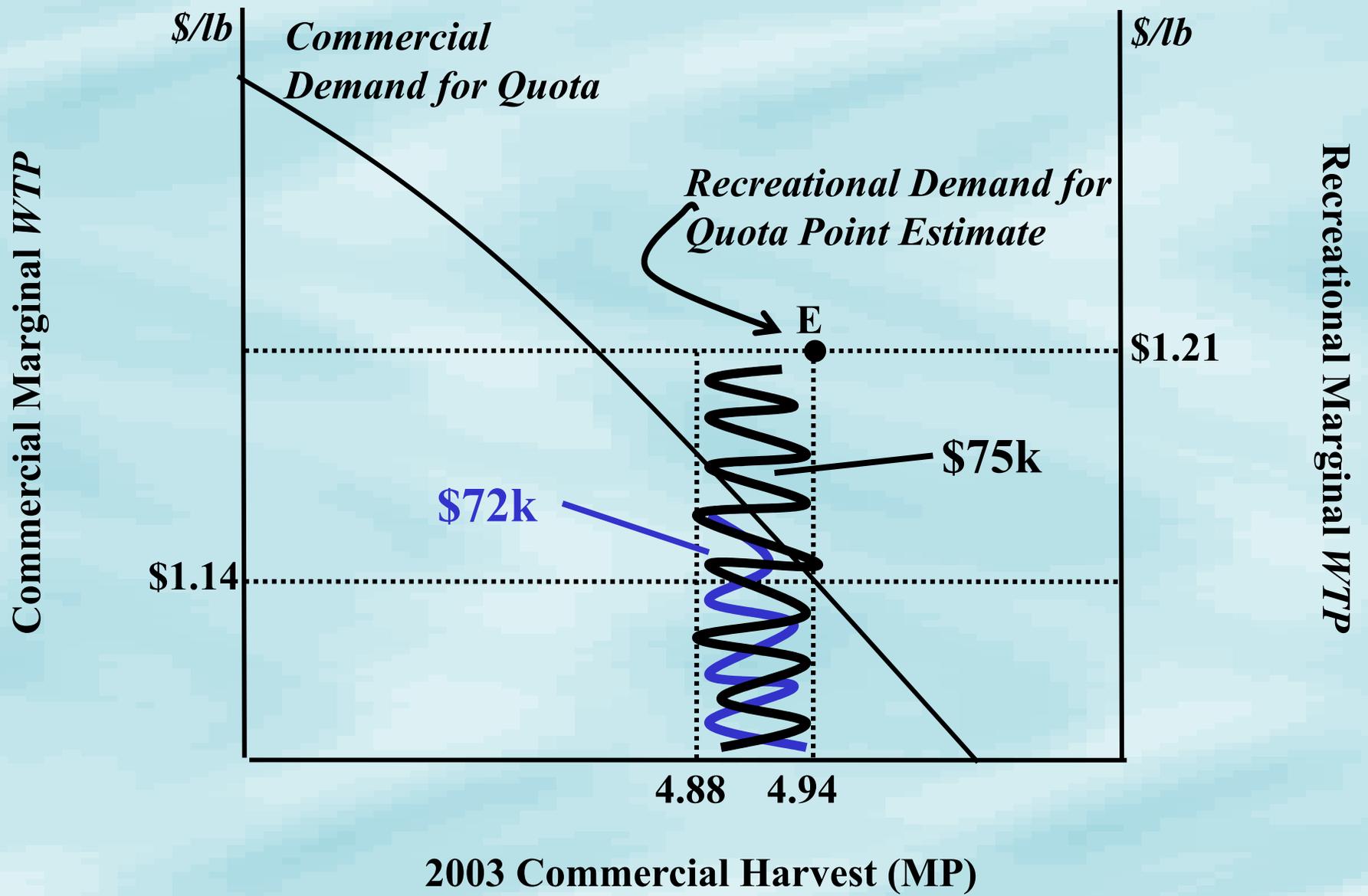
# Analysis of Recreational Sector

- Hedonic price function--charter trip prices a function of trip characteristics:
- Trip length
- Number of passengers
- County-level harvest characteristics averaged over all species
  - Keep per angler hour fished
  - Discards per angler hour fished
  - Weight per fish kept

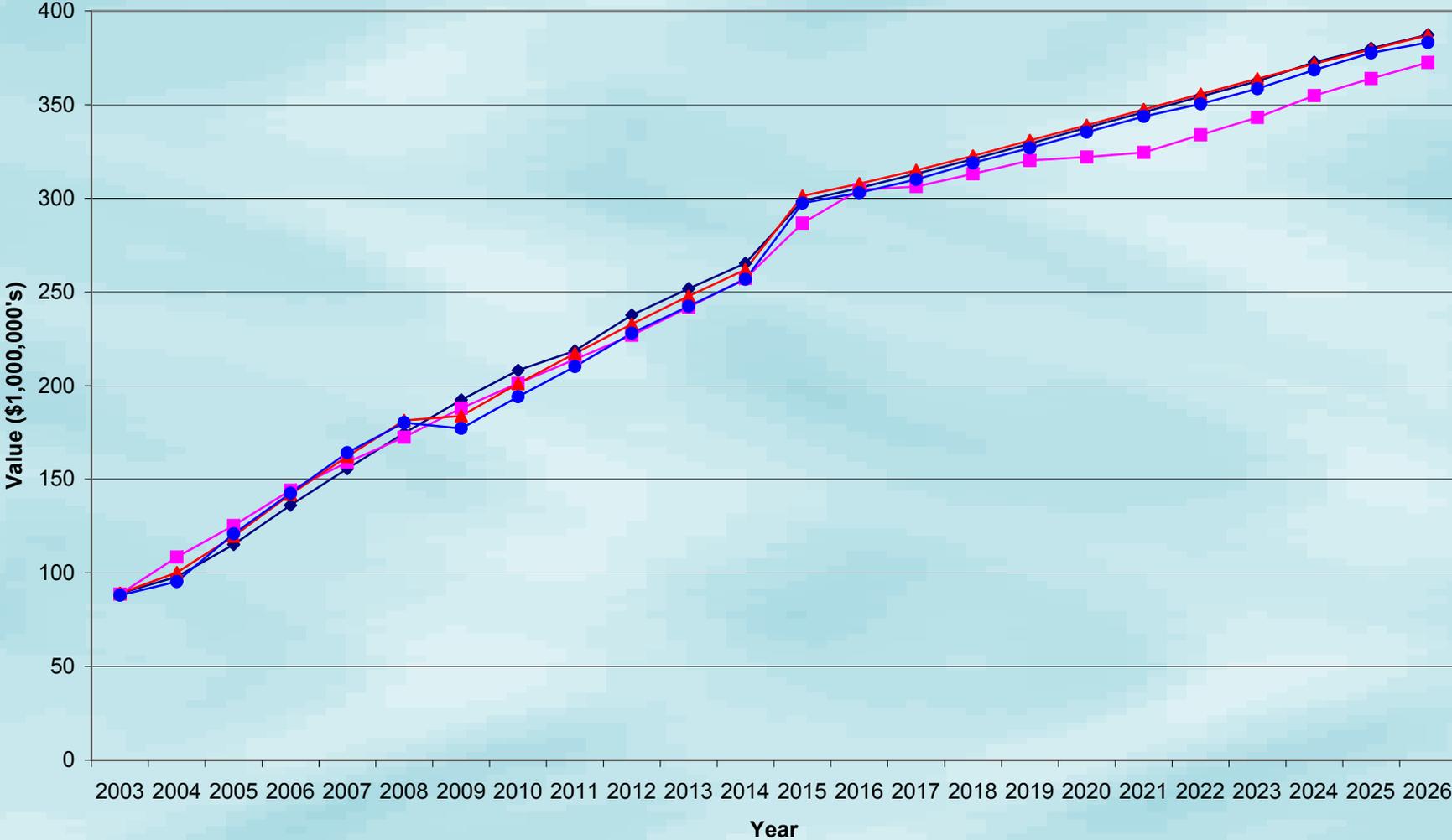
# Recreation Model Results

- Mean *MWTP*/trip in 2003
  - \$/keep = 5.86 ( $\pm$  4.41)
  - \$/discard = -2.90 ( $\pm$  7.55)
  - \$/lb = 1.11 ( $\pm$  0.83)
  - \$/lb of gutted red grouper  
= \$1.21 ( $\pm$  0.91)



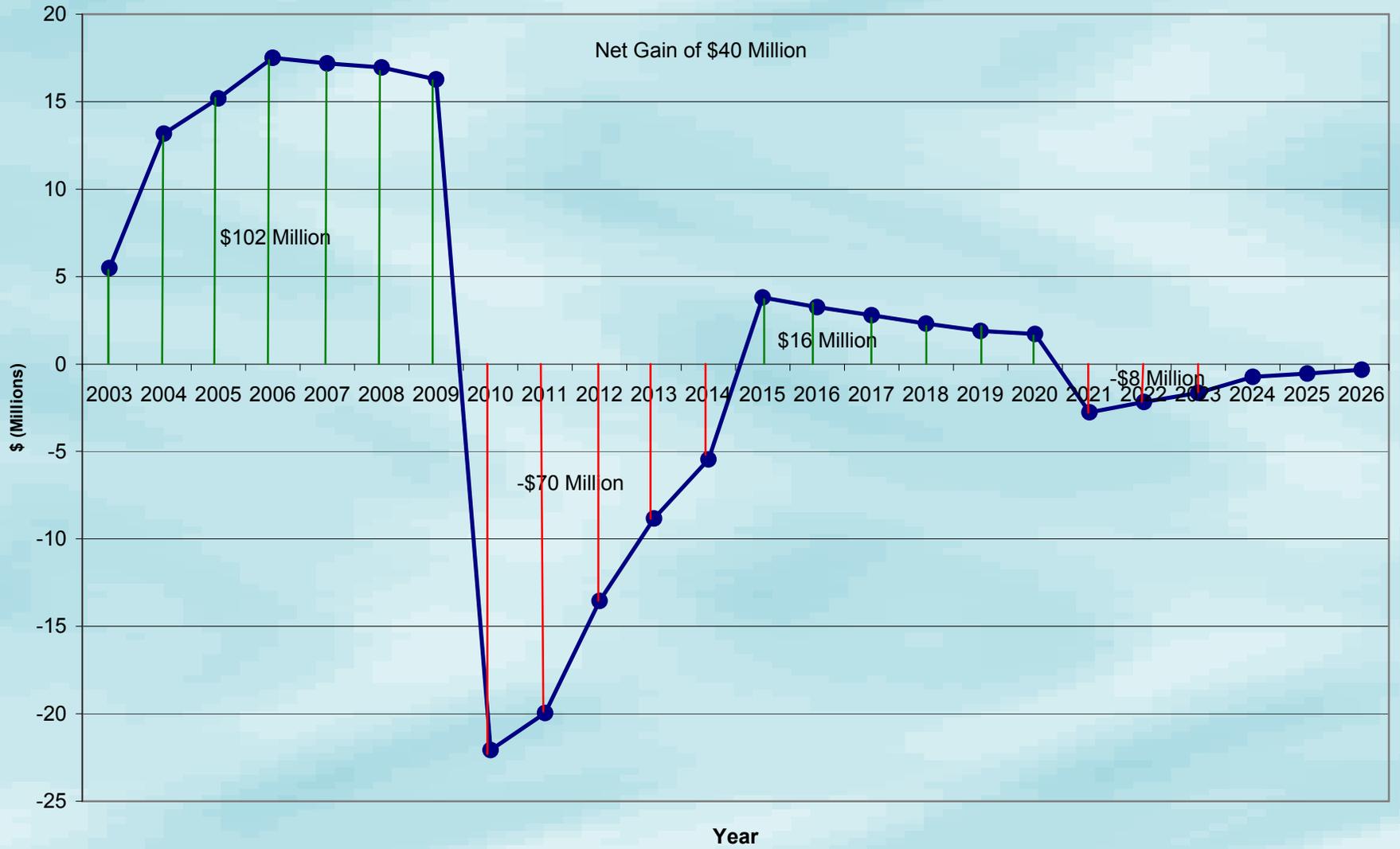


### Net Benefit by Alternative Rebuilding Strategy



◆ F-Rebuild    ■ Phased F    ▲ Adaptive    ● Amendment 13

Annual Difference in Discounted Net Benefit (Rebuild in 2014 minus Rebuild in 2009)



# Social Sciences & Fishery Management

- We manage people not fish
- Management decisions are about allocation and security
- Statutory framework not about economic impact assessment (I/O) but assessing benefits/value
- Biological requirements are constraints not objectives
- Optimum yield is defined in social science terms (economic, social, cultural)
- Strengthened fishing rights a necessary component of economical fishery management