

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
 - Rebuilding Plans, Allocation

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 STATUTES

- 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

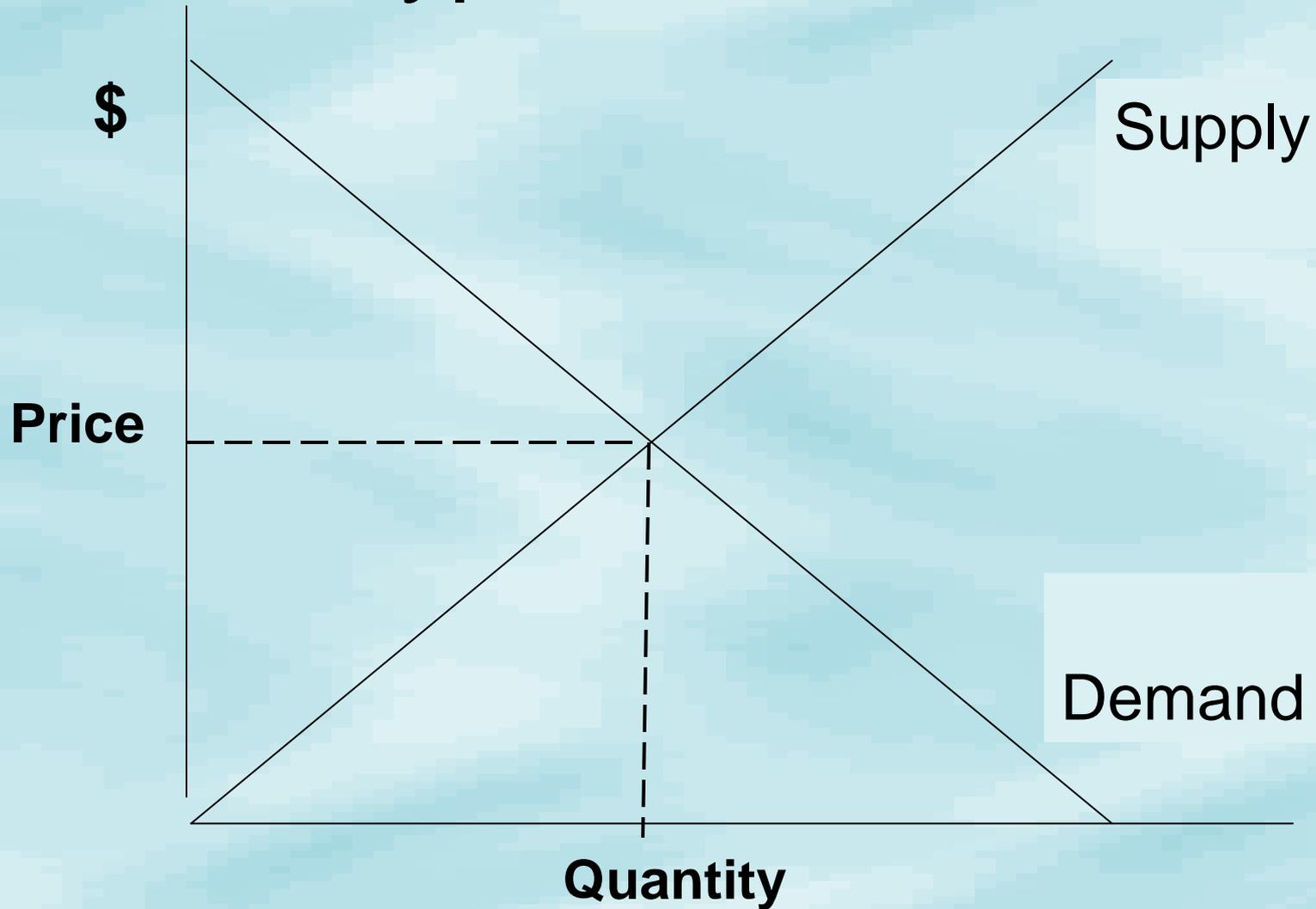
Broad requirements for economic analyses;
Here, focus on two distinguishing requirements:

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

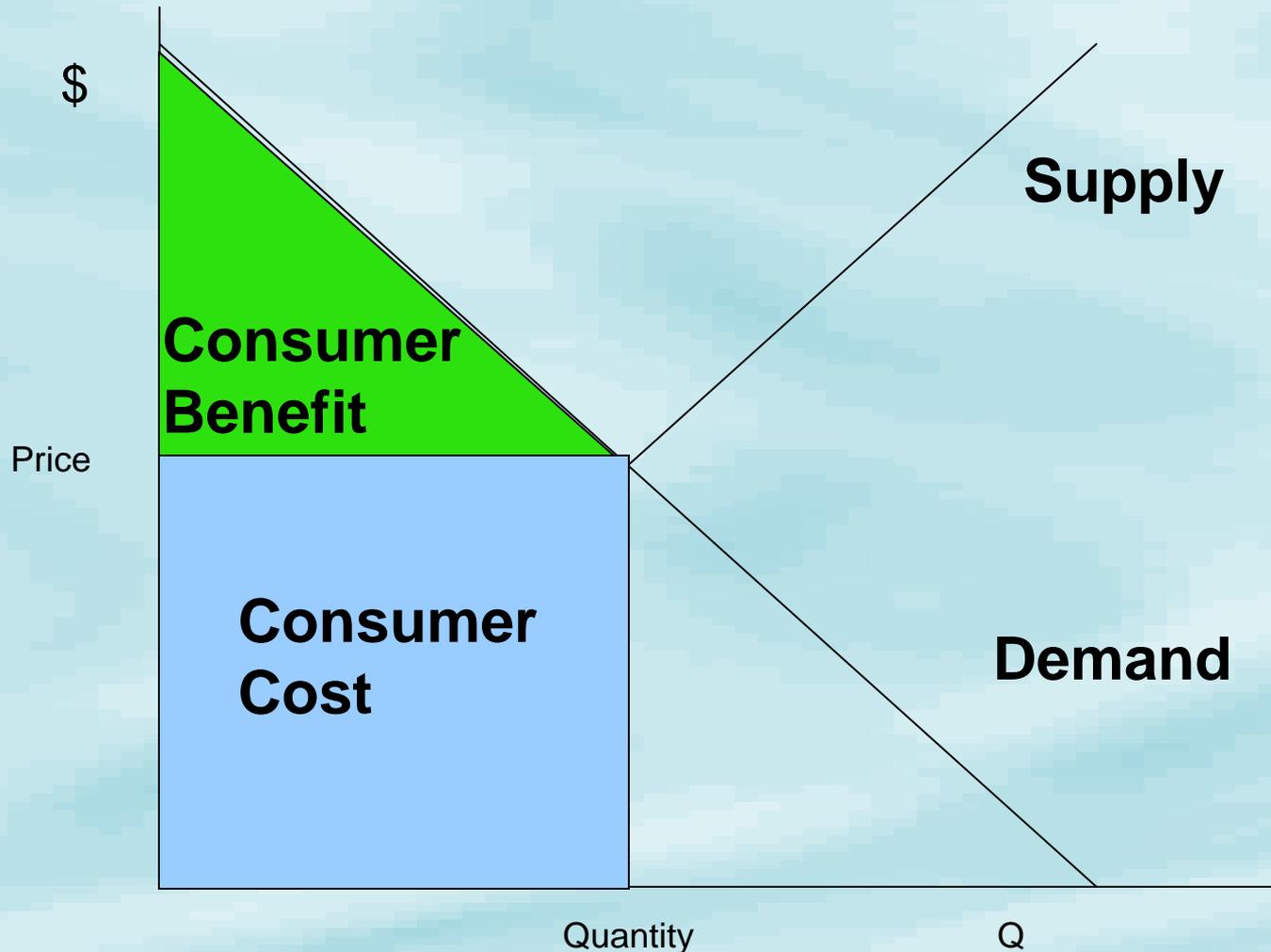
Economic Benefits

- Features:
 - Identifies option w/ highest societal benefits
 - Provides trade-offs, efficient outcomes;
 - Considers distributional effects;
 - Can incorporate risk;
 - Allows for wealth and income effects
- Two components:
 - Consumers - economic value is the difference between price paid for a good or service and what 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.

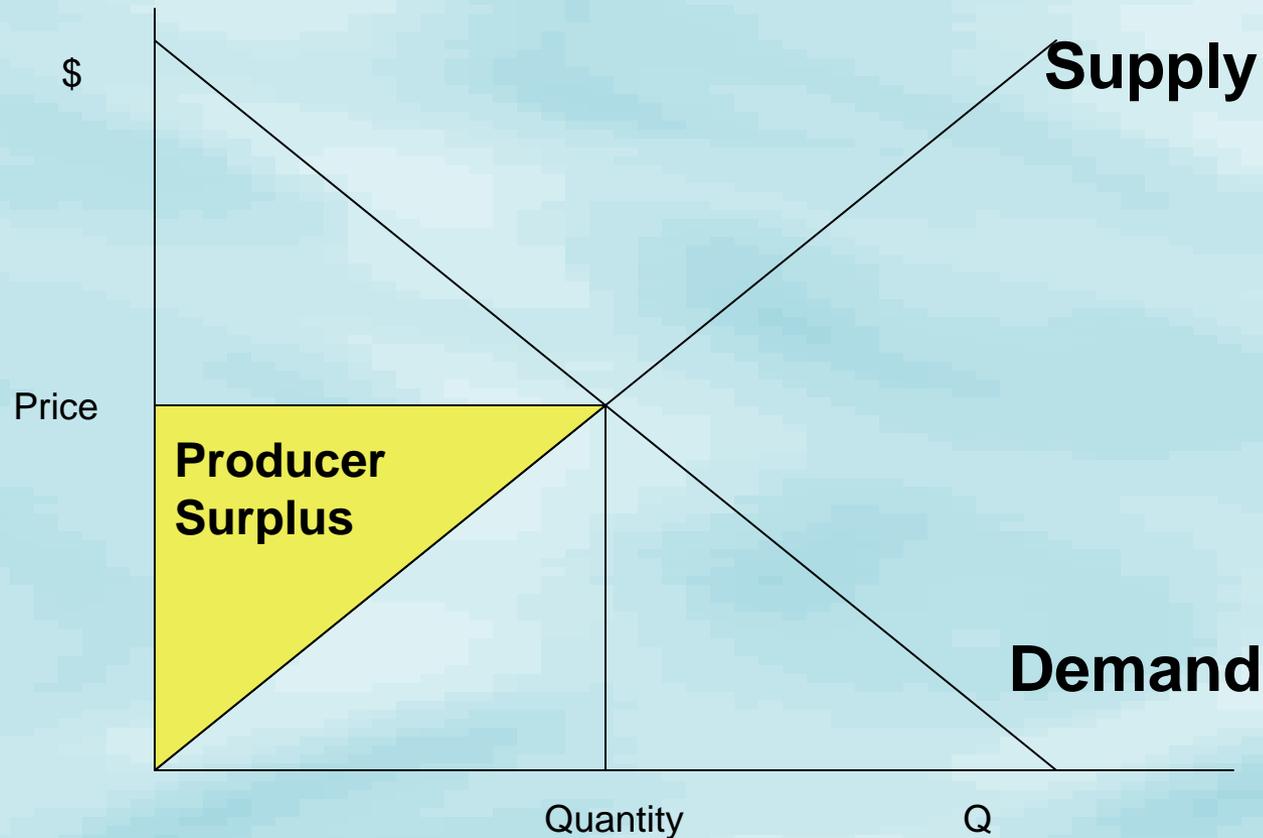
A Hypothetical Market



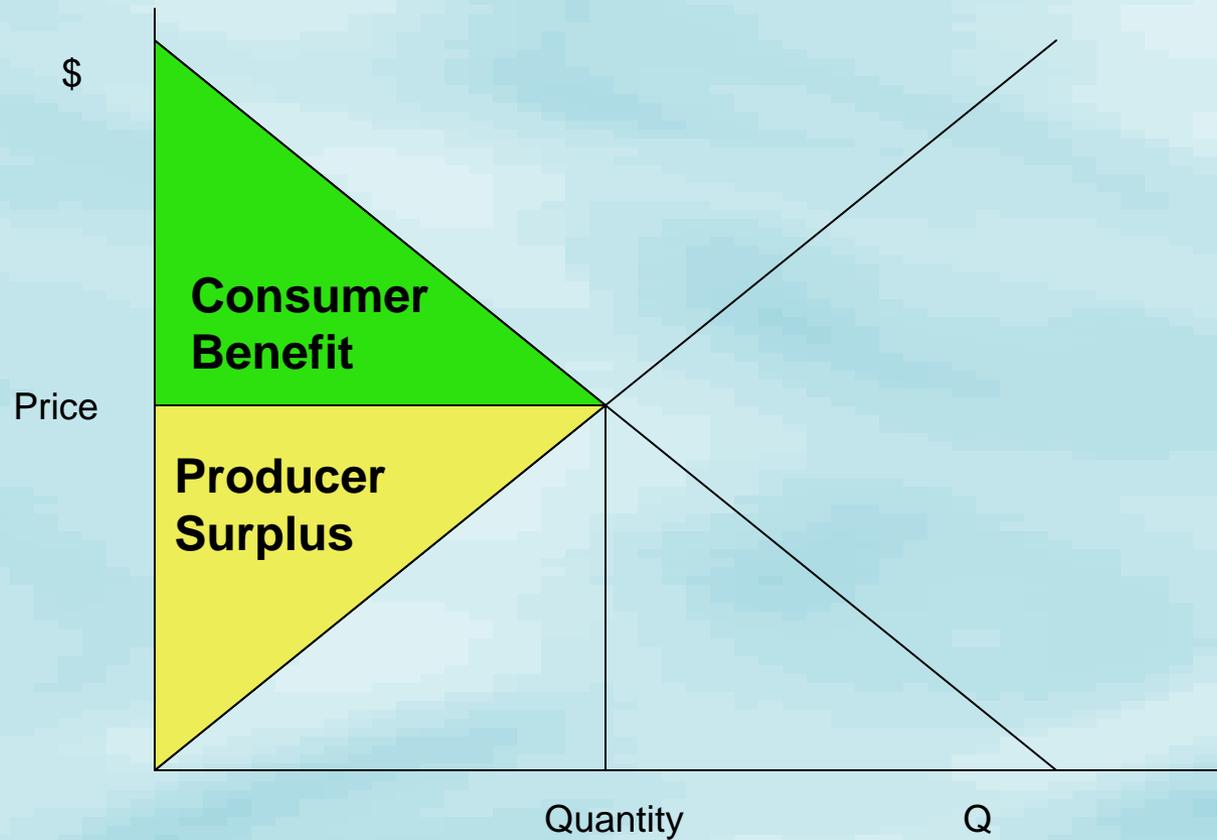
Consumer Value: Basis for Angler Analyses



Producer Value: Basis for Harvester Analyses



Economic Value / Benefits



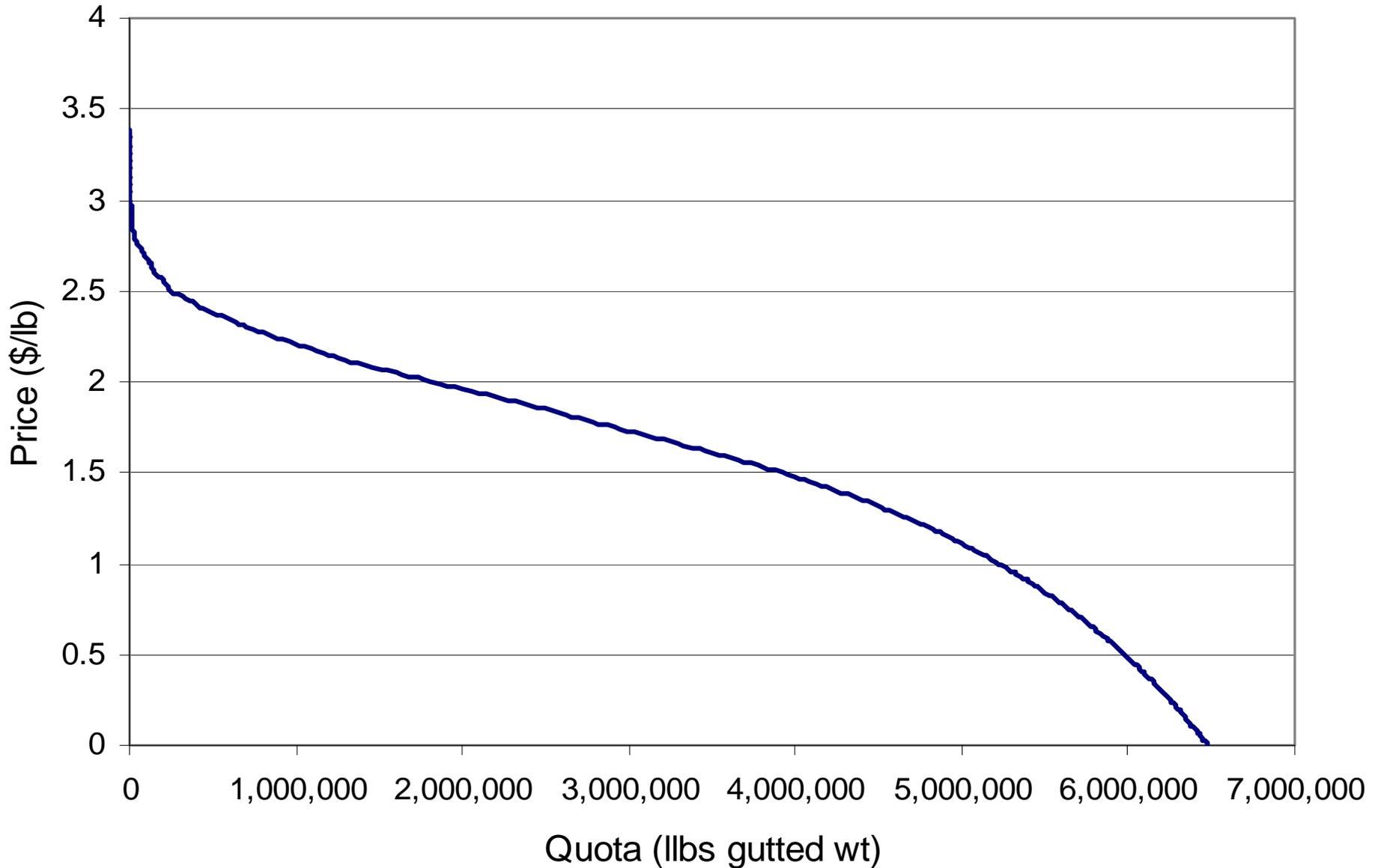
Example: Economic Allocation of Red Grouper in the Gulf of Mexico

- 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

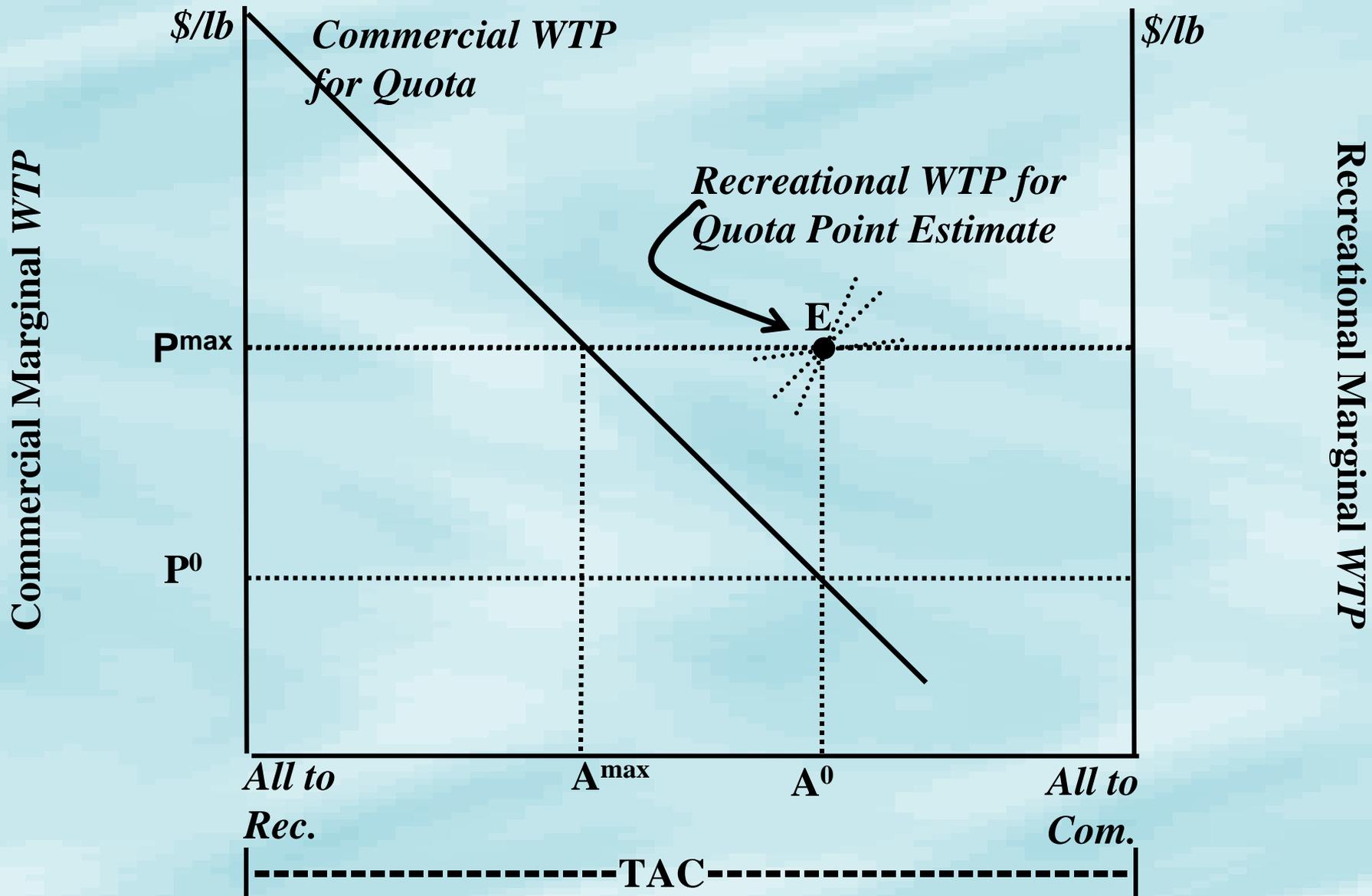


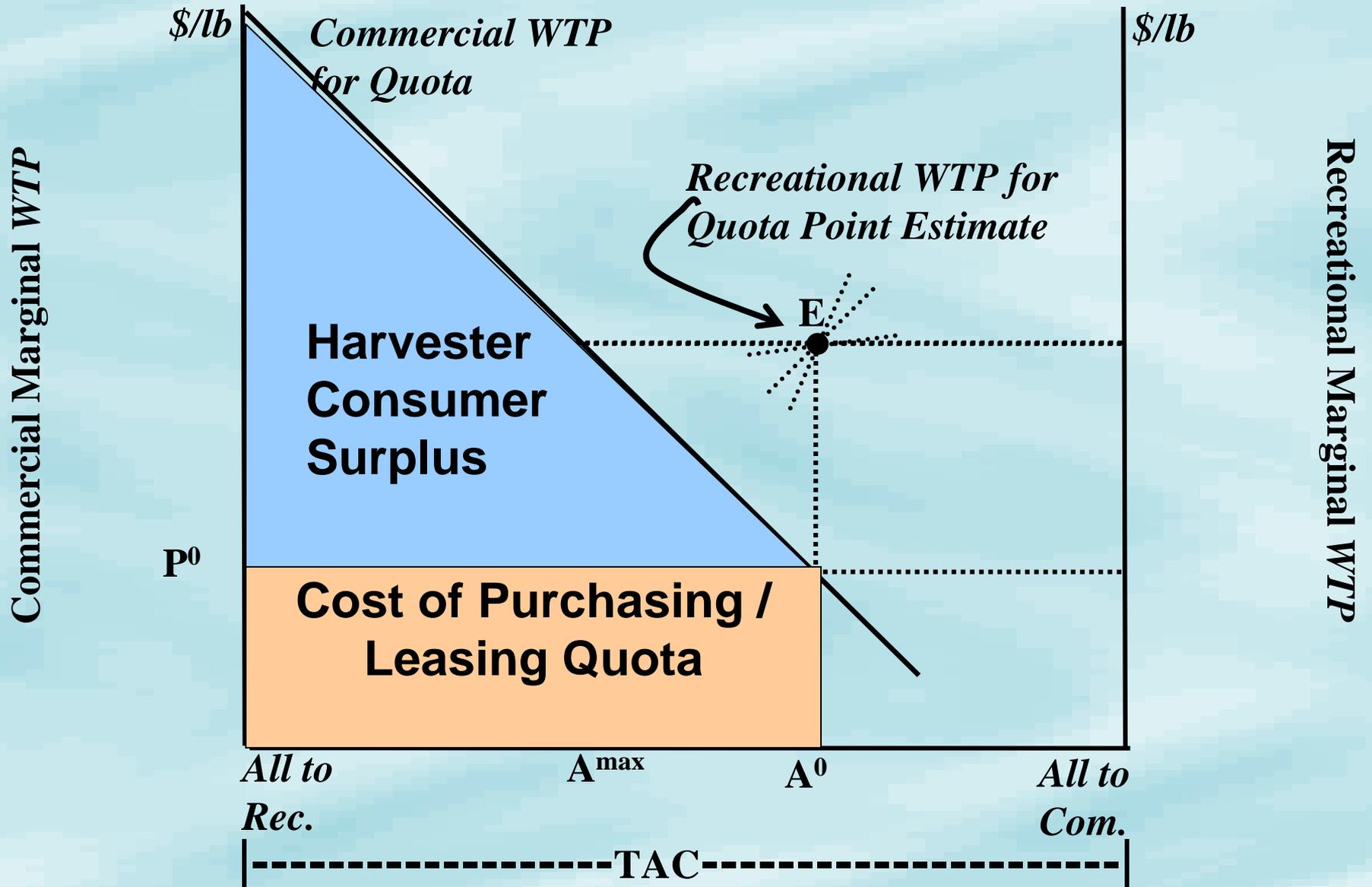
Analysis of Recreational Sector

- 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

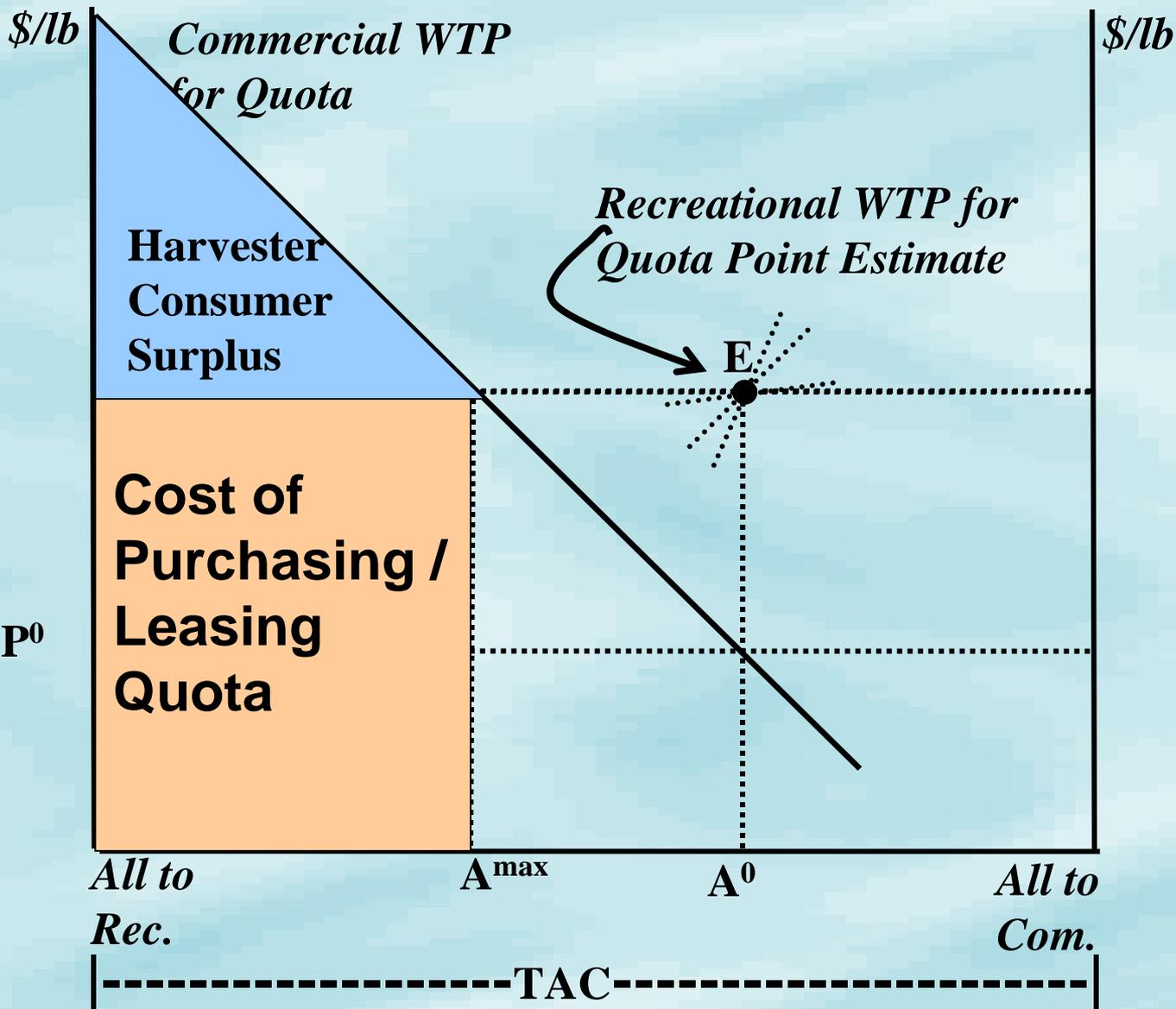
Recreation Model Results

- 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)

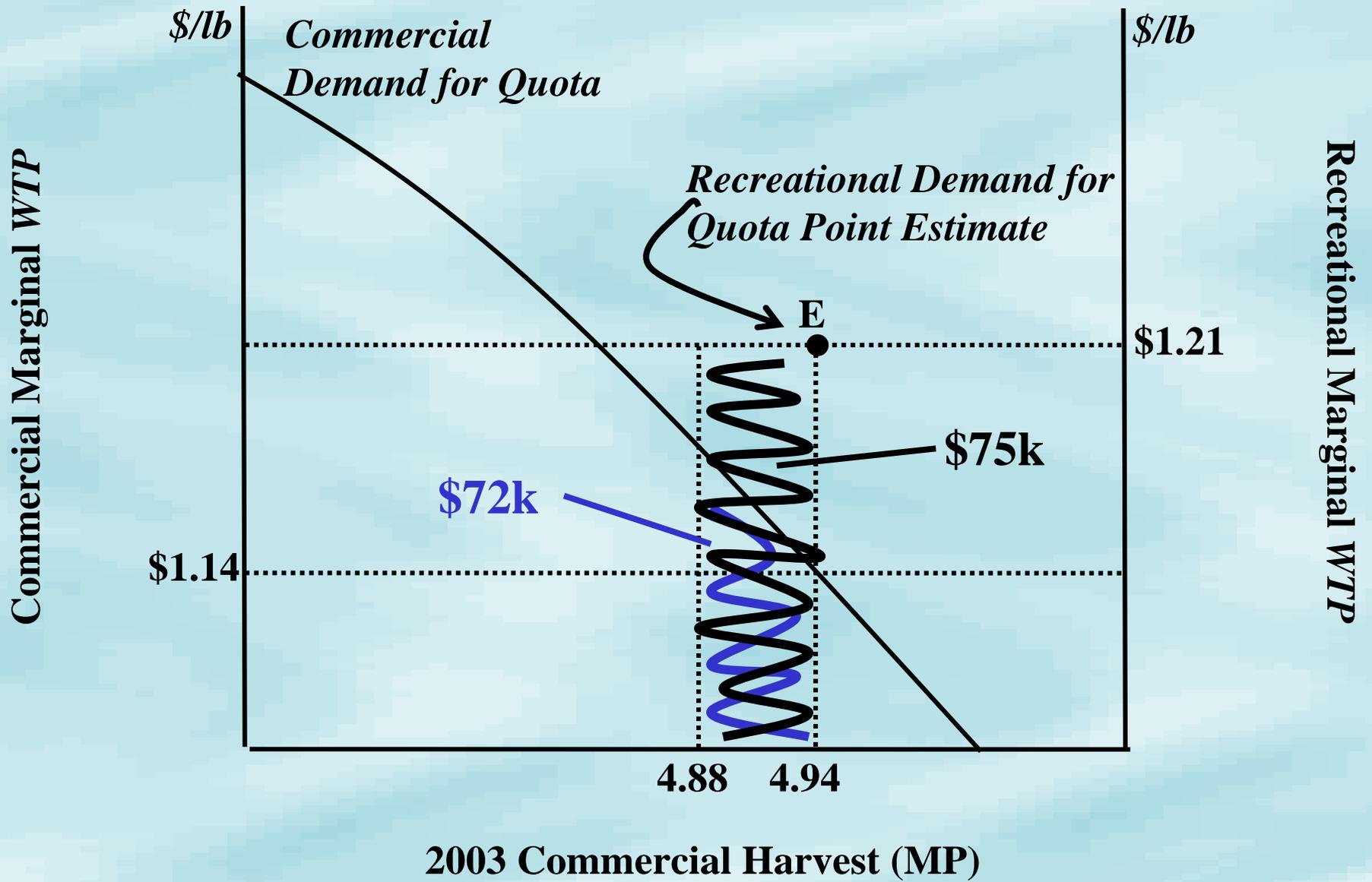




Commercial Marginal WTP



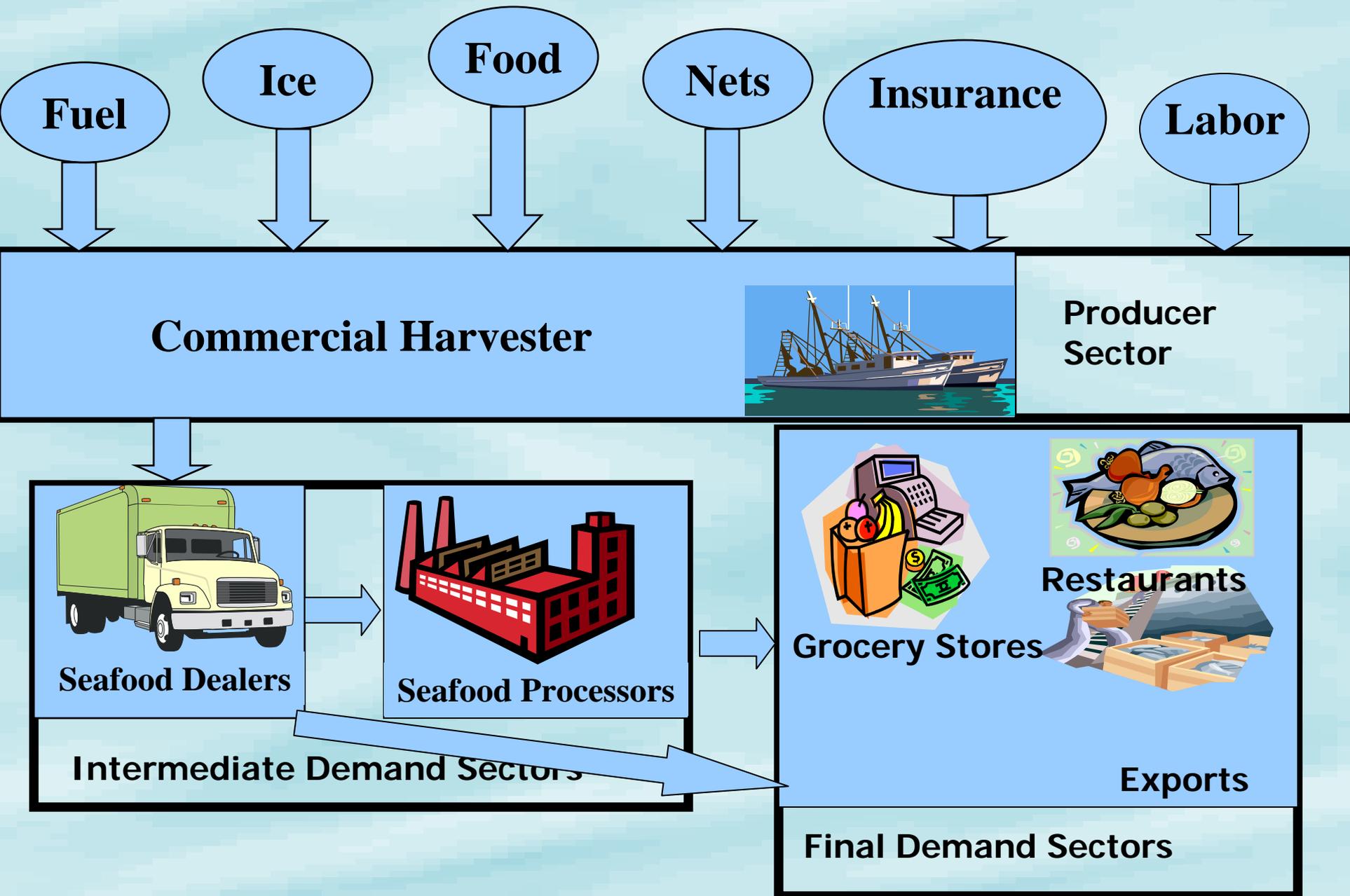
Recreational Marginal WTP



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

- Examines the flow of expenditures thru a community
- Capture inter-industry transactions between businesses and between businesses and final consumers in an economy
- 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
- **Don't measure societal benefits, efficiency, or trade-offs**

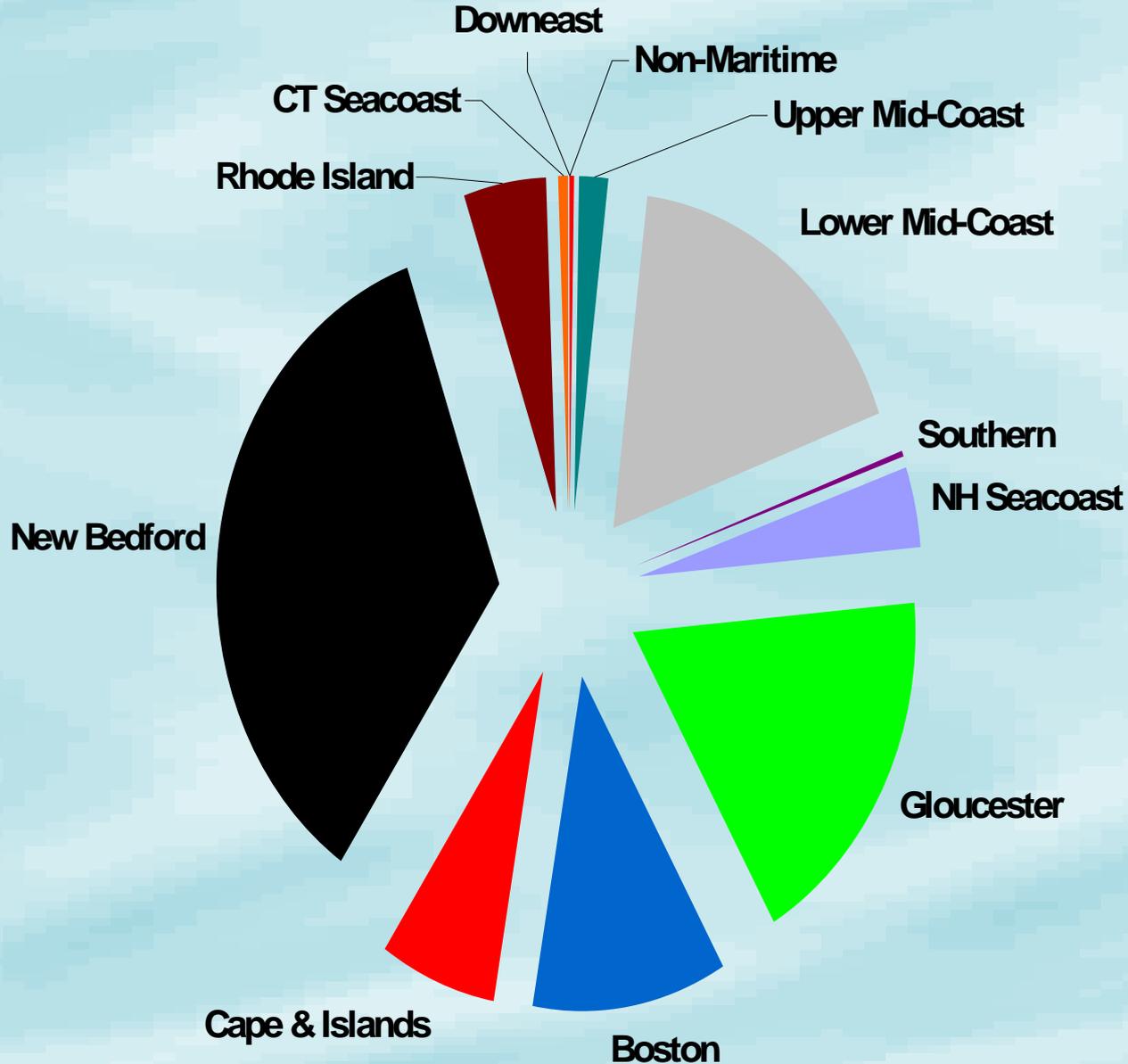
Basic Input-Output Logic



Ranking Alternatives: Income Impacts from a Change in Commercial Fishing

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

Regional Distribution of Direct Income Impacts



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 generates losses
- But, Firm B generates more economic value but smaller economic impacts

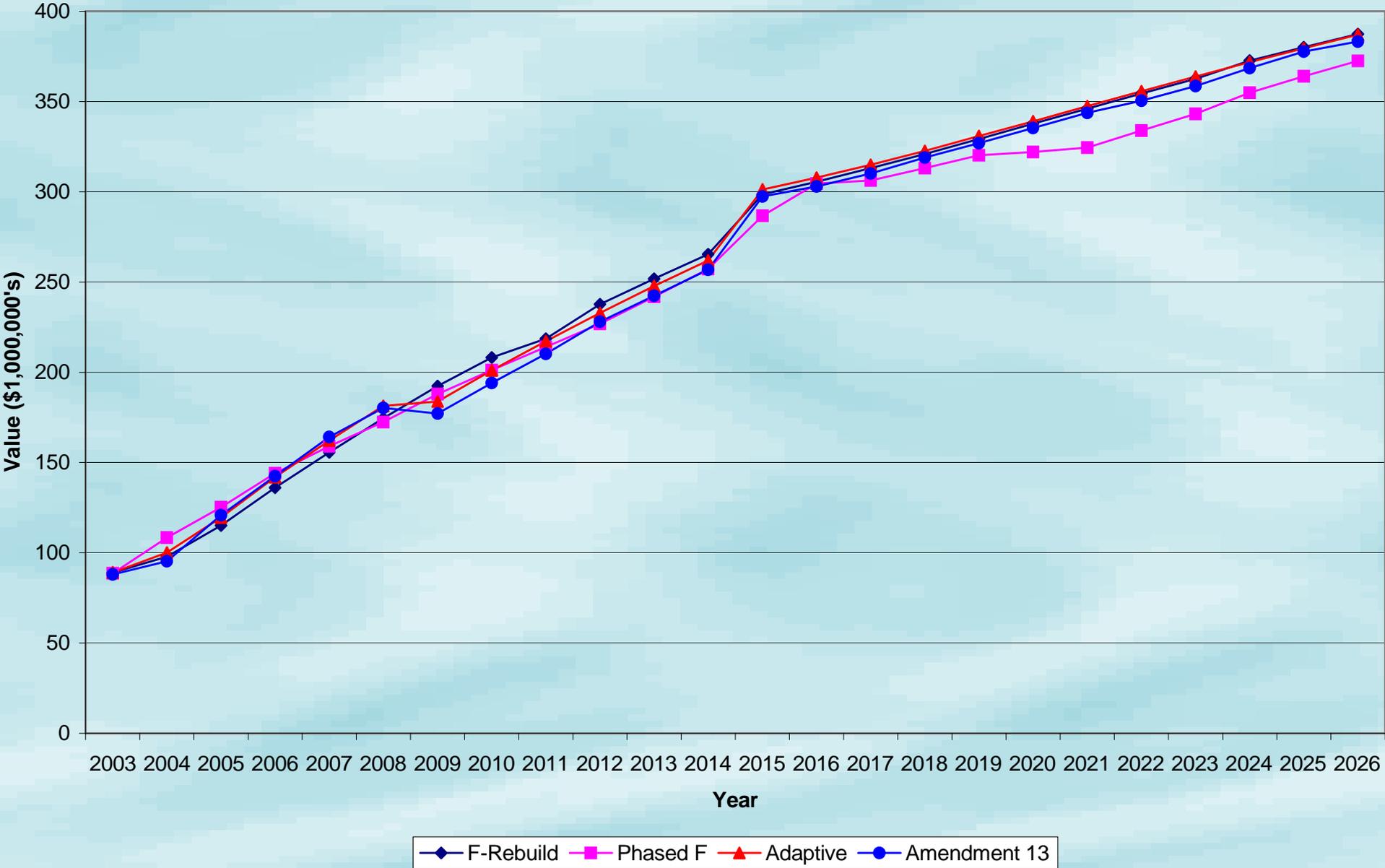
Ex 2: 50% Reduction in Red Snapper Bag Limit

		1: Reduction in Keep from 4 to 2 Fish		Changes in Expenditures	
Target Species	2003 Effort	Share Change	Effort Change	Average Trip Cost	Total Expenditure Change
Grouper	32,418	-1.05%	-340	\$67.20	-\$22,874
Red Snapper	18,891	-5.18%	-979	\$89.01	-\$87,101
King Mackerel	35,851	1.83%	656	\$69.09	\$45,328
Dolphin	17,556	2.51%	441	\$50.60	\$22,297
No Trip		1.90%	-359	\$68.98	-\$24,757
Net Loss			-581		-\$67,107
Welfare Effects					
CV per Trip			\$132.28		
Welfare Loss			\$2,498,901		
Expenditures and					
Sales Impacts			-\$150,521.01		
Income Impacts			-\$51,052.45		
Job Losses			-1.74		

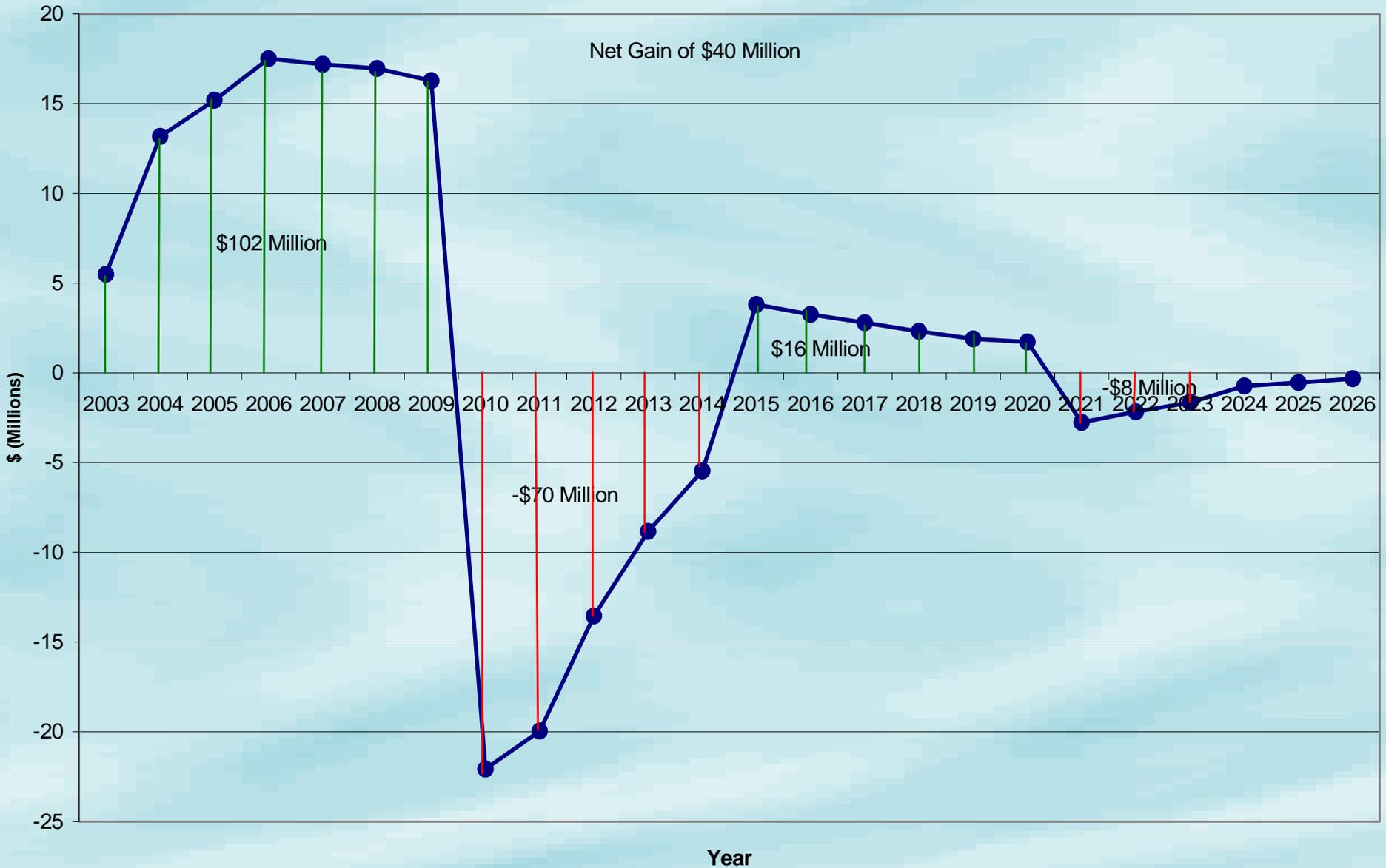
Consequence

- 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

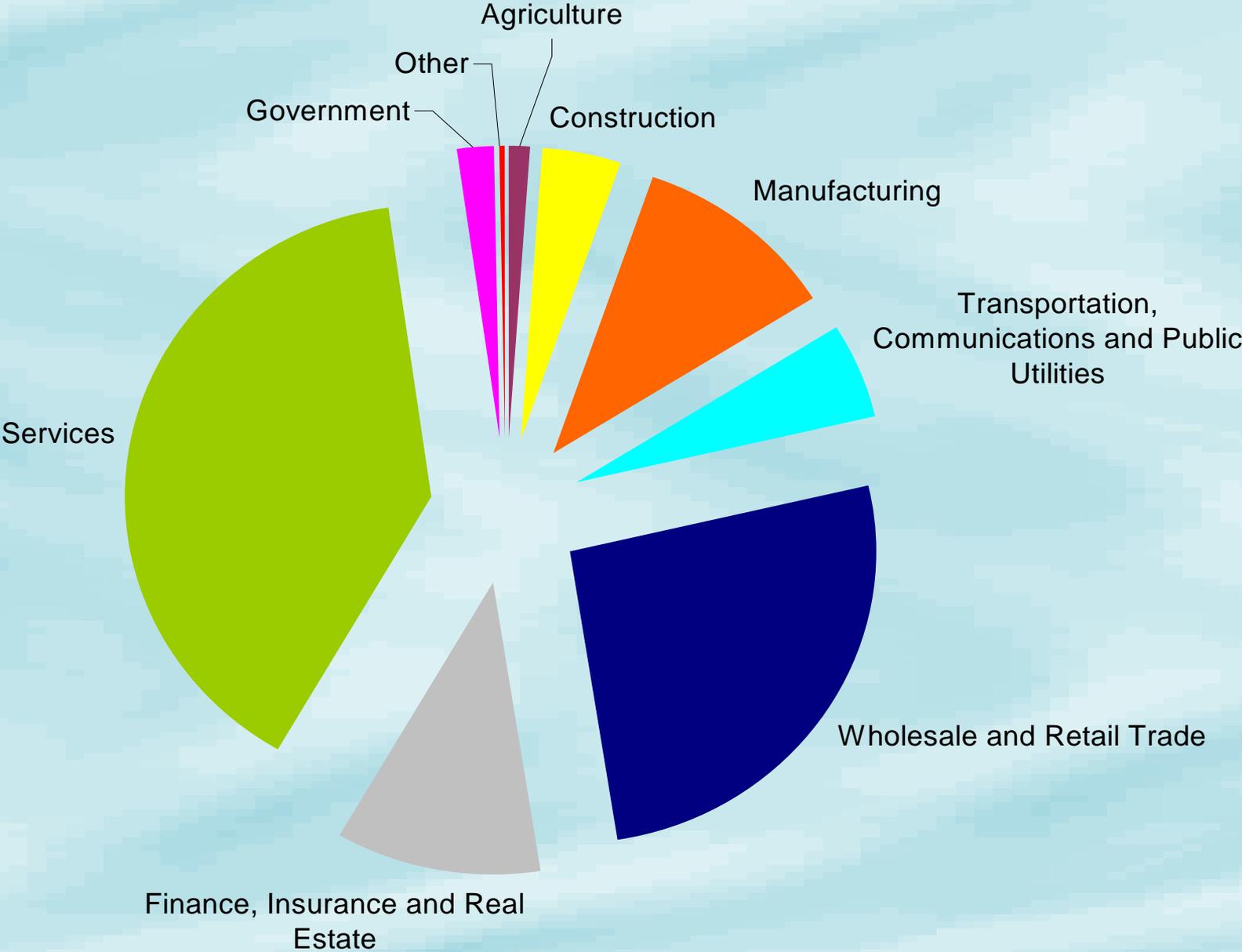
Net Benefit by Alternative Rebuilding Strategy



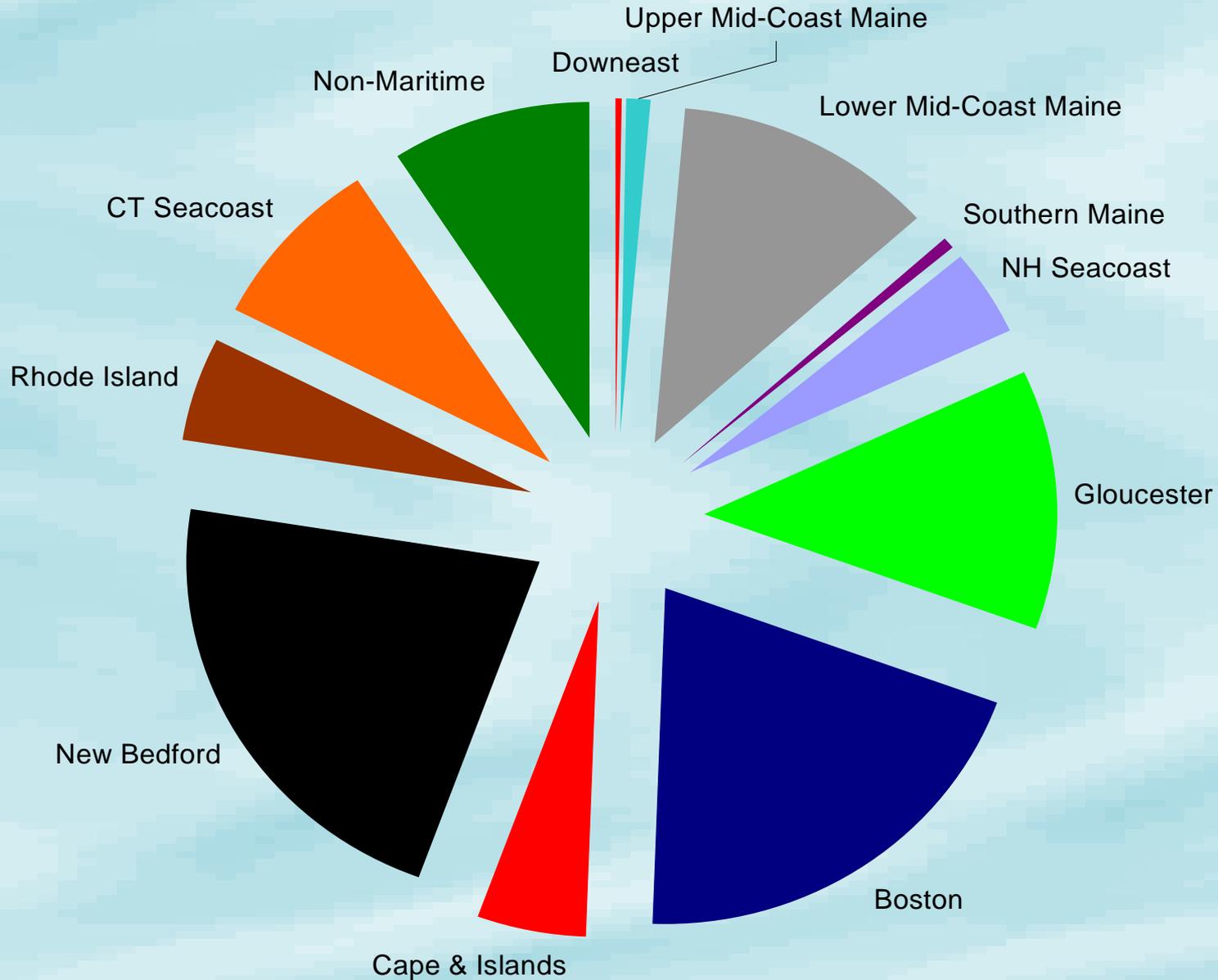
Annual Difference in Discounted Net Benefit (Rebuild in 2014 minus Rebuild in 2009)



Economic Impact Model: Income impacts by Industry



Economic Impact Model: Income Impacts by Location



Social Sciences & Fishery Management

- We manage people not fish
- NMFS & Council staff know the statutes and have developed process for meeting statutes
- Statutory framework not about economic impact assessment (I/O) but assessing benefits/value
- Economic models require economic data