

The Economic Benefits of Reducing Eutrophication: Recreational Fishing as an Indicator



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An Individual-Based Model of Angler Catch

- From MRFSS data individual catch for a targeted species is a function of:
 - Hours spent fishing
 - Aggregate catch rate in the same area and time of the year in earlier years
 - Angler characteristics
 - Fishing experience (years of recreational angling)
 - Avidity (frequency of fishing trips in a season)
- From water quality monitoring data
 - Water temperature
 - Salinity
 - Dissolved oxygen
 - Other (e.g., Chlorophyll a)

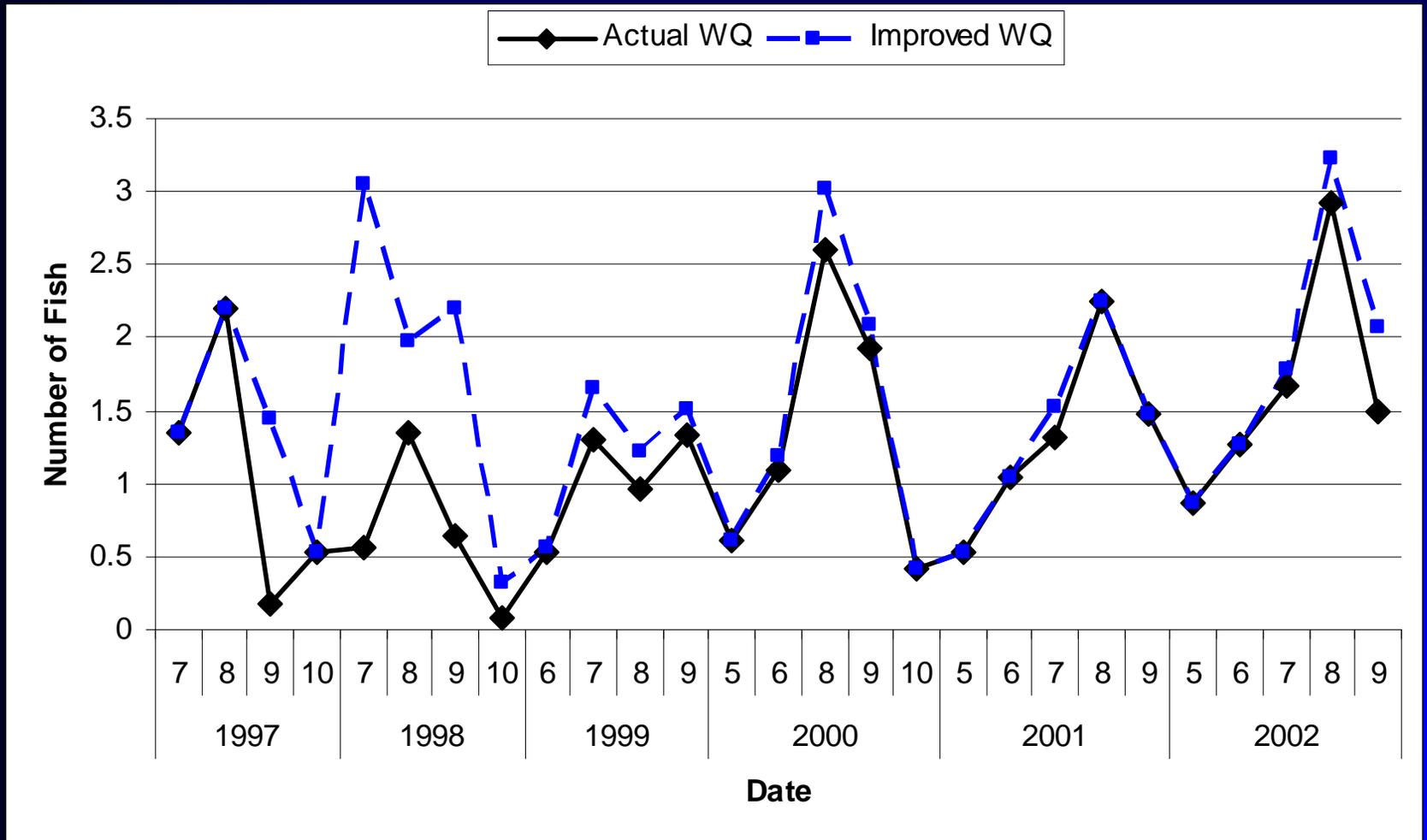
The Economic Model: Random Utility Model

- The probability of choosing a particular fishing site within the estuary is a function of:
 - Expected catch of targeted species at each site
 - Travel cost and travel time to each site

An application: Barnegat Bay

- **Barnegat Bay recreational species:**
 - **Summer flounder (42% of trips)**
 - **Striped bass (19%)**
 - **Bluefish (7.5%)**
- **Compare catches with actual water quality and dissolved oxygen and chlorophyll a constrained to not fall below sample mean.**

Comparison of summer flounder catch



Why Focus on Recreational Fishing

- An important ecosystem use value in almost every estuary
- At least some recreational species within an estuary are likely to respond to improvements in water quality
 - Abundance
 - Availability
- Data availability
 - MRFSS provides almost daily observations
 - Estuarine water quality monitoring data
- Economic quantification
 - MRFSS economic add-on surveys
 - Benefits transfer

Economic Value of Water Quality Improvement: Barnegat Bay

- **Use Benefits Transfer**
 - **McConnell and Strand (1994) study of the value of Mid-Atlantic recreational fisheries**
 - **\$10.26 benefit to increased catch per trip**
 - **Summer flounder is 42% of 5.9 million inland fishing trips**
 - **\$25.4 million/year is estimated benefit to summer flounder fishermen from improvements in water quality**

Conclusions

- Available data make recreational fishing values an excellent candidate for beginning the process of valuing coastal water quality improvements.
- An estimate of \$25 million per year in one estuary for just one species indicates overall benefits are large, nationwide.
- If improvements are permanent, this increases the asset value of that one resource by \$833 million.
- Coastal monitoring programs should seek to link with monitoring of estuarine uses to facilitate these and similar types of studies.