Human Use Indicators of Eutrophication: Recreational Fishing in Barnegat Bay

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May 10, 2006
Linthicum, MD

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 changes 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

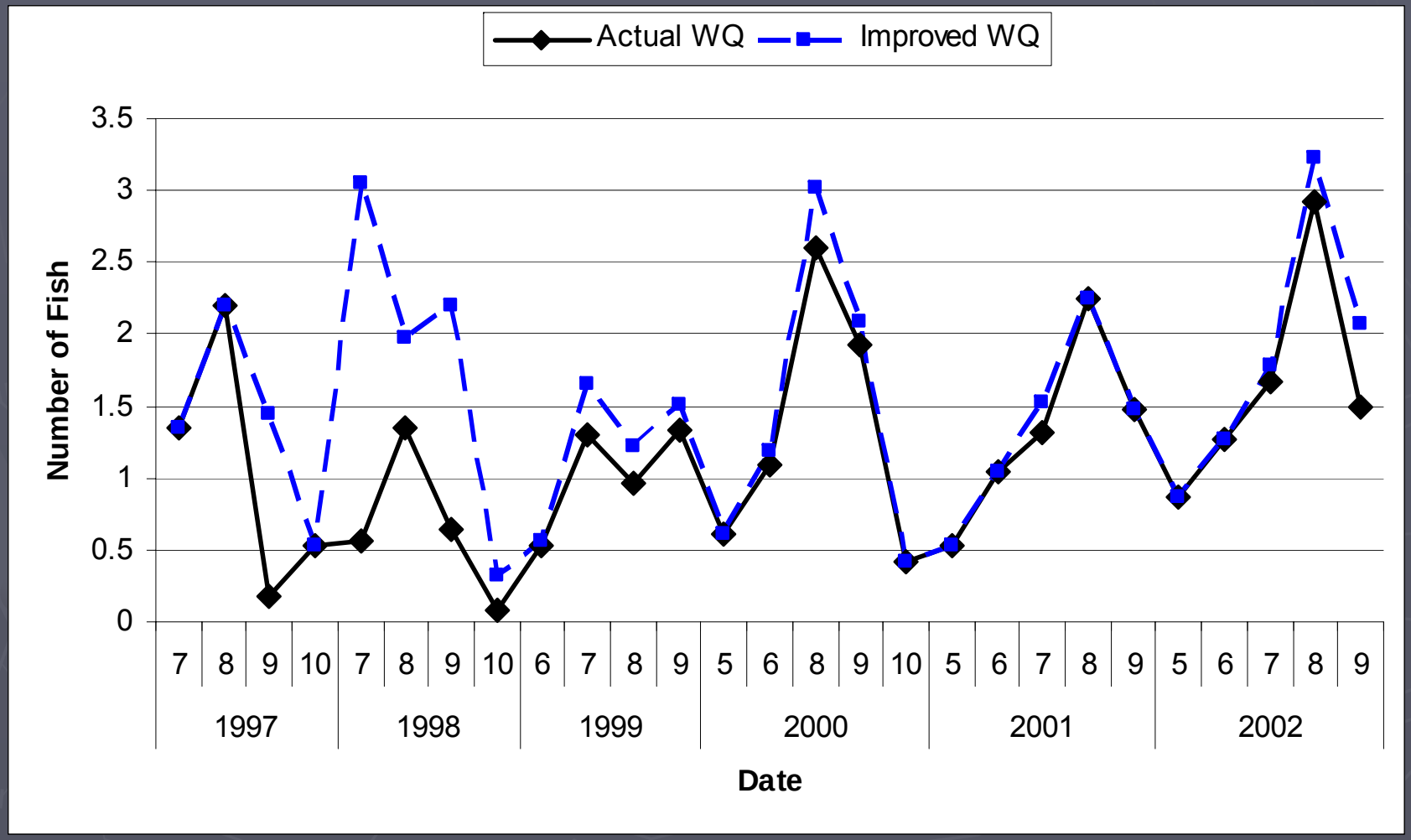
An Individual-Based Model of Angler Catch

- 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)

An application: Barnegat Bay

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

Comparison of summer flounder catch



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 as a component of a series of socio-economic indicators.
- An estimate of $25 million per year in one estuary for just one species indicates costs of eutrophication are large, nationwide.
- If improvements are permanent, this increases the asset value of that one resource (Barnegat Bay summer flounder) by $833 million.
- Coastal monitoring programs should seek to link with monitoring of estuarine uses to facilitate these and similar types of studies.