Stated Preference Study of the Chesapeake Bay TMDL

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Stated & Revealed Preference

- Revealed preference valuation methods rely on observable behavior to infer peoples' willingness to pay (WTP) for environmental amenities
  - Travel cost
  - Hedonic property value

- Stated preference methods rely on answers to carefully constructed surveys to estimate WTP
  - Contingent valuation
  - Choice experiment

- EPA's benefits study of the Chesapeake Bay TMDLs employs both types of nonmarket approaches plus market based analyses.

Why conduct a stated preference study?

- Stated preference is the only way to capture “nonuse” or “existence” value

- Existence values arise when people care about the condition of a resource whether they use it or not

- The motivation could be
  - A sense of stewardship for the resource
  - Preservation of the resource for future generations
  - The option to use the resource in the future

- Existence values are valid for use in benefit cost analysis and can be a significant fraction of total benefits (e.g. Smith 1987, Kopp 1992, Loomis 1996)

- Several features of the Chesapeake Bay suggest existence values could be important in an analysis of the TMDL

Best practice in survey development

- Draw on peer reviewed literature

- Conduct focus groups and cognitive interviews
  - 10 focus groups and 40 interviews within and outside the watershed
  - Identify most salient policy outcomes for valuation questions
  - Test information treatment for completeness and clarity

- Design survey to allow validity testing and identification of protest responses, scenario rejection, etc.

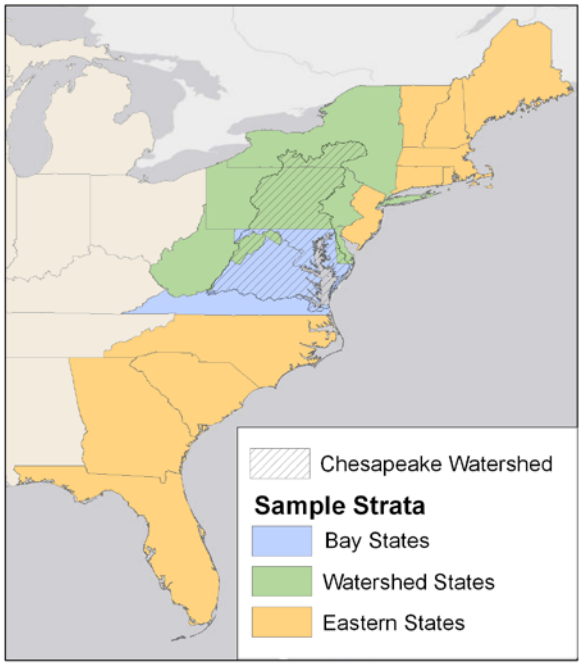
- Small scale pretest of survey and data collection surveying full sample

- Conduct peer review of study design
  - Three leading experts in stated preference wrote peer review reports on the survey instrument, sampling plan, and analysis plan

Key elements of the study design

- Survey Mode: Mail survey following Dillman's method

- Sample Frame and Stratification
  - Maryland, Virginia and Washington DC
  - Other watershed states
  - Other east coast states



- Policy outcomes in valuation questions (based on focus groups and interviews)
  - Water clarity
  - Striped bass
  - Blue crab
  - Oysters
  - Algae levels in lakes (related to clarity, appearance, and fish types)

Example of a choice experiment question

	Conditions in 2025 (% change compared to today)		
Environmental Outcomes	**No Additional Action**	**Program A**	**Program B**
Water Clarity Average visibility	**4 feet** (33% increase)	**5 feet** (67% increase)	**6 feet** (100% increase)
Striped Bass Population	**26** million fish (8% increase)	**30** million fish (25% increase)	**35** million fish (46% increase)
Blue Crab Population	**260** million crabs (4% increase)	**280** million crabs (12% increase)	**340** million crabs (36% increase)
Oysters Abundance	**4,300** tons (30% increase)	**4,300** tons (30% increase)	**5,250** tons (59% increase)
Lakes Percent with low or moderate algae	**58%**	**58%**	**74%**
Cost of Living Permanent cost increase for your Household	**$0 every year**	**$180 every year** or $15 every month	**$500 every year** or $41.67 every month
Your Vote Please mark one of the boxes to the right	No Further Action ☐	Program A ☐	Program B ☐

Preliminary and subject to change

Water quality and ecological projections

- Chesapeake Bay Watershed Model
  - Nutrient and sediment loadings to the Bay
  - Nutrient loadings to lakes of the watershed
  - Water clarity in the Bay
- Northeast Lakes Model
  - Nutrient and chlorophyll-a concentrations
  - Trophic states
- Chesapeake Bay Fisheries Ecosystem Model
  - Relative changes in biomass for 3 chosen species

Valuing environmental changes

- Random Utility Model (RUM)
  - Utility theoretic framework for analyzing stated preference data
  - A person's choice is a function of observable characteristics, policy outcomes and cost, plus a random unobservable component of utility
  - Respondents' choices among policy alternatives allow us to estimate the relative importance of different policy outcomes and cost

- Statistical analysis
  - Assumptions about the form of the utility function and how the random unobservable component is distributed determine the specific statistical model used to analyze the data
  - Results of the statistical model allow us to estimate welfare impacts of changes in different policy outcomes

Milestones in stated preference study

- ✓ Focus groups and interviews
- ✓ Peer review of survey, sampling plan and data analysis plan
- ✓ First federal register notice and public comment period
- ❑ Second federal register notice and comment period
- ❑ Approval of information collection request by Office of Management and Budget
- ❑ Pretest of survey and data collection
- ❑ Full scale survey and data collection
- ❑ Data analysis
- ❑ Report results