Measuring the social benefits of water quality improvements to support regulatory objectives: Progress and future directions

50th Anniversary of the Clean Water Act:
The Role of Environmental Economics in Improving Regulatory Analysis,
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Outline

- Some history
- STAR grants
- Commodity definition
- Spatial issues
- Other issues

History of BCA for CWA

- Executive Orders: 12291 (1981), replaced by 12866 (1993), updated by 13563 (2011)
- Early evolution of benefit categories: recreational benefits via revealed preference; including nonuse benefits implies stated preference methods
- Benefit transfer: unit transfer in 1990s; functional transfer (meta-analysis) beginning in 2009

Science to Achieve Results (STAR) Grant

- Began in 1995, with over $350 million in grants on water, generally
- WQ valuation work is part of $18.6 million in economics grants in 1995-2001 and 2003-2006, and specific to water in 2015 and 2021*
  - $10.5 million and 34 grants specifically for water (surface water is a subset)
  - 293 publications, including 66 journal articles
  - Also, 8 grants were methodological, not specific to water
  - Over a dozen EPA public workshops at which grantees present results
  - 2015 grants spurred collaboration to raise profile of integrated assessment models for measuring the social costs of water pollution
  - One STAR grant, 3 other grants, 3 cooperative agreements and a white paper with partial funding are part of EPA's meta-analysis
  - Meta-analysis and preference calibration research also supported

Commodity Definition

- Services
  - How does WQ affect human well-being?
  - How to capture values from multiple services in one study?
- Metrics
  - How to communicate different levels of water quality?
  - Tradeoffs between ordinal and biophysical measures, and what people value
  - RFF water quality ladder and Water Quality Index (WQI)
- Magnitude
  - Scale and scope of change in WQ across study areas

Spatial Issues

- Distance from the valued resource
- Complexities in defining spatially varying water quality changes
- Quantity of the commodity affected within varying distances
- Proximity to available substitute and complementary resources
- How the above vary for use versus nonuse values
- Evidence for preferences over patchy, spatial clusters
  - As people move or are shaped by surrounding environment
- How best to address for use in benefits transfer?

Other Issues

- Ecological production functions – great in theory, difficult in practice
- Integrating ecological, economic, and hydrological modeling
- Iconic vs. run-of-the-mill waters
- Dynamic baselines
- Irreversibility
- Big data approaches

Actions-to-Benefits Figure