Assessing Economic Cost & Benefits of Nutrients & Water Quality

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Overview

- What is economic benefit-cost analysis (BCA) and how are costs and benefits defined?
- Why should we be looking into the costs and benefits of reducing nutrients flowing into Utah’s surface waters?
- Where does BCA fit into nutrients and water quality?
- What are the major cost and benefit categories from implementing nutrient criteria?
- Status of Utah BCA study
What is Economic Benefit-Cost Analysis (BCA)?

- An accounting framework with rules, tools and analysis methods to make economic efficiency evaluation

- BCA Compares the $ value “with project” to the $ value “without project”
  - Includes goods and services exchanged in the market (capital, materials, labor) & non-market goods and services (e.g., recreation, aesthetics, ecosystem support services)
  - Sums the discounted stream of Bs and C’s over time

- “Benefits” are defined as amounts society is willing to pay for the action rather than forego the good or service
$B$ Are Derived from Services

Indirect Human Uses

"The functions a natural resource provides for other resources and for humans"

Water & Water Resources

Passive Use

Ecological

Direct Human Uses

Drinking Water
Wastewater Discharge
Cooling & Processing
Irrigation
Recreation, Aesthetics

Existence value
Preservation of diversity
T&E species

Nesting Area for Birds
Breeding Area for Fish
Sediment Stabilization
Water Quality Enhancement
$Cost is Opportunity Cost

- “Costs” are defined as the opportunity cost to society of goods that are not produced due to the action

  - Direct costs of implementing the action (Planning, design, construction, contingency, replacement capital, O&M, administration costs)

  - Other direct costs (Donated land, interest during construction)
Is there a reason to believe that nutrients are adversely affecting Utah’s waters resulting in economic losses to society?

- 164 TMDLs performed or are being performed
- 35 (21%) of the waters are “listed” due to phosphorus problems

East Canyon Creek
Utah Lake and Reservoirs

- 97% of Utah’s lakes and reservoirs are assessed
- 48 of 132 priority lakes and reservoirs (36%) are not meeting their beneficial uses; all but 5 are “listed” due to nutrient pollution
- Matt Warner Reservoir – 2004
  18 cattle died due to ingesting blue-green Algae
- Water Quality is getting worse
Where does BCA fit into nutrients and water quality?

- Refine *statewide numeric criteria* so that $B > C$ and economic efficiency is improved

- **Develop site-specific standards** for sites where regional criteria are over- or under-protective (i.e., modify the criteria based upon the site-specific Bs and Cs)

- **Find least cost solutions**
  - Inform “best” combination of point and non-point source control measures
  - Motivate analysis of facility improvements

- Inform *restoration* activities
Costs and Benefits of Nutrient Criteria Implementation – Status of Utah Study

**Economic Cost Categories:**

1) Publicly Owned Treatment Works (POTW) upgrades (Utah study completed by UDWQ & CH2M).

2) Industrial dischargers water treatment (TBD).

3) Non-point source and stormwater treatment (UDWQ Literature Placeholder Values).

4) Total Maximum Daily Load (TMDL) administration and compliance (TBD).

**Economic Benefit Categories:**

1) Recreation value – fishing, hunting, boating swimming and near water (UDWQ & CH2M Team) - Nanette Nelson/WYSAC).

2) Non-use value (UDWQ & CH2M HILL Team - Nanette Nelson/WYSAC).

3) Property value (TBD).

4) Drinking water & industrial in-take water treatment cost savings (UDWQ).
Next Steps

• Complete data collection and analysis for the preliminary high priority cost and benefit categories
• Quantify the net present value of “No New Action” on statewide nutrient criteria
• Quantify the Net Present Value of one “New Action” alternative
• Identify Key Data Gaps and Uncertainties
• Develop a site-specific tool for evaluating Bs and Cs at the site level
• Populate the tool with data collected in this study and identify data gaps
Questions?