RECLAMATION

Managing Water in the West

Economic Evaluation of Public Benefits in Reclamation Studies

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Economic evaluation of Federal water projects

- Based on application of Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G's).
- P&G's include National Economic Development (NED) and Regional Economic Development (RED) accounts.
- NED represents the traditional measure of economic benefits for a variety of benefit categories while RED represents economic impacts. NED benefits are based on willingness to pay.
- For the remainder of this presentation the term public benefits will be used even though they are not specifically identified as a separate category of benefits in federal water project evaluation

Public Benefits

Although an economic evaluation of federal water projects does not specifically identify public benefits, categories of public benefits correspond closely with purposes that are at least partially non-reimbursable for a federal project. These purposes include:

- **Flood control**
- **Fish and Wildlife enhancement (Ecosystem enhancement)**
- **Recreation**

Public Benefits - continued

- Security-related, Safety of Dams (Emergency response)
- Archeology, cultural, historical
- Other specific programs – e.g. Title XVI water reuse, rural water
- Note: Water quality as a benefit is generally tied to other benefit categories, such as fish and wildlife, municipal and industrial water supply, recreation, irrigation.

Measurement of benefits included in Reclamation evaluations have used:

- Revealed preference – Based on observed market behavior
- Benefits transfer – Based on previously completed studies
- Alternative costs – Based on cost of other alternatives that achieve desired result
- Avoided costs – Based on damages avoided
- Stated preference methods – Use of surveys
- Methods generally conform with tools and methods described in draft DWR report

Factors that determine methods used to evaluate public benefits

- Budget and Time Constraints
- Type of planning study
- Relative importance of public benefits compared to other benefit categories
- Data availability

Feasibility Studies

- Based on application of the P&G's
- Requires detailed/rigorous enough analysis to justify project (B/C analysis)
- Requires detailed evaluation of changes in resources supporting economic activity
- Collection of primary data if required

Appraisal/Basin Studies

- Less rigorous than a feasibility study
- Intent is to screen out less desirable alternatives
- Requires reconnaissance level evaluation of changes in resources supporting economic activity
- Generally based on secondary data

Special Studies, EIS's, Other

- Level of analysis depends on study purpose.
- Some examples:
  - Klamath Restoration - detailed
  - Odessa Subarea Special Study Final Environmental Impact Statement - detailed
  - Arizona Water Settlements Act (AWSA), New Mexico Unit of the Central Arizona Project Tier-2 Studies - appraisal
  - Aspinall Unit Operations Final Environmental Impact Statement
  - Colorado River Salinity Control Program – Salinity Economic Impact Model

Other important factors that influence approach used to evaluate public benefits

- Comparability of project alternatives – May limit cost-based approaches
- Likelihood of other project alternatives – May limit cost-based approaches if other alternatives are not reasonably foreseen or are otherwise unacceptable.
- Motivation for project – Mandated requirement

Example – Klamath Restoration

- **Benefit estimation methods used:**
  - **Commercial fishing - based on P&G type of analysis of change in net revenues.**
  - **Recreation – physical impact based on modeling and expert opinion, values based on benefits transfer values.**
  - **Non-use benefits - based on a national stated preference survey.**
  - **Non-use benefits were estimated to be over 90% of total benefits.**
  - **Note: Different approaches for different magnitudes of benefits.**

Example – Aspinall Unit EIS recreation benefits

Data from an intercept survey at Blue Mesa Reservoir were used to estimate:

- **A model of visitation probability indicating changes in recreation visitation as a result of changes in reservoir elevation.**
- **A travel cost model of consumer surplus to value recreation visits.**
- **Note: Non-use benefits were not estimated but magnitude was indicated based on other studies.**

Example – AWSA Tier-2 projects (ongoing)

- A wide variety of project proposals in southwest New Mexico that will provide a wide variety of services.
- Analysis requires ranking of projects based on economic benefits and costs to assist in selection of best proposals.
- A strictly cost-based analysis of benefits is not possible due to variety and level of services.
- Therefore, benefits as represented by willingness to pay must be estimated.

Example – AWSA Tier-2 projects (ongoing) - continued

- Budget and time constraints will not allow recreation or non-use surveys.
- Recreation – Values based on benefits transfer. Visitation based on proportional increase in surface area or stream flows.
- Ecosystem benefits – Benefited/increased acres. Values based on benefits transfer.
- Erosion control – Avoided cost.
- M&I – Benefits transfer for value of increased supply, avoided cost for improved quality.

Other Issues

- **Regardless of the economic valuation approach, the link between the project/alternative and resource changes is essential to estimates benefits.**
- **Role of benefits in allocating project costs among project purposes/beneficiaries**
  - **Lesser of benefits or single purpose alternative cost determines the maximum cost assigned to each project purpose (justifiable expenditure).**

Summary

- Public benefits, although not identified as a separate benefit category, have been estimated in previous Reclamation studies.
- Several approaches have been used to estimate public benefits, which have a wide range of rigor.
- The approach used depends on available time and budget as well as the type of study.
- Cost-based approaches are useful when assumptions of similar outputs and likely alternatives are met.
- When the level of service or project outputs vary, cost-based approaches may be problematic.