

Draft P&G outline

Chapter II—Guidelines for Preparing and Performing Project Evaluations

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I. Introduction

A. Conducting good analysis

1. “You will find that you cannot conduct a good regulatory analysis according to a formula. Conducting high-quality analysis requires competent professional judgment. Different regulations may call for different emphases in the analysis, depending on the nature and complexity of the regulatory issues and the sensitivity of the benefit and cost estimates to the key assumptions.” (A-4, pg. 3)

B. Utilize best available Science, Practices, Analytical Techniques, Procedures, and Tools (*Planning Standard E:*)

1. Circular A-4 (*Planning Standards F, G, L, M*)

C. Apply a level of detail commensurate with the potential decisions (*Planning Standard F:*)

D. Transparency planning standards (*Planning Standard L*)

1. Clear documentation of all data and assumptions
2. Key assumptions regarding option effectiveness
3. Sensitivity analysis
4. Replicability of results

II. Project scoping and options development

A. Identify study objectives (*Planning Standard A:*)

B. Determine project scope and time frame

C. Identify key set of ecosystem services that may be affected by the project (recognizing that not all services may need to be or can be measured) (*Planning Standards B, D, H*)

1. Identify resource problems in terms of diminished ecosystem services
2. Identify resource needs and their relationship with ecosystem services
3. Include at a minimum temporary flood water storage and flood mitigation, nutrient and carbon recycling, wildlife habitat suitability, plant community quality and richness (*Planning Standard C*)
4. Identify or develop metrics for services
5. Estimate reference values for undisturbed system or system prior to major management changes, including role of water flow variability and extent and habitat value

- D. Determine current baseline values for ecosystem services “no action alternative”)
- E. Identify possible and appropriate project alternatives
 - 1. Developing options in consideration of reversibility and the feasibility of Adaptive Management
 - a) The probability that project objectives can be met by the option
 - b) The ability to reverse course in the event of a later failure of the option
 - 2. At least one “Primarily Nonstructural Alternative”
 - a) Develop Non-structural Alternative that manifests itself through modulation or management of ecological processes that underlie key ecosystem services
 - 3. An alternative involving primarily land restoration [restoring wetlands, for example] (*Planning Standards A, C*)
 - 4. Combinations of Structural and Nonstructural Alternatives
 - 5. Identify additional structural alternatives
- F. Evaluation of project alternatives
 - 1. Estimate probability that alternatives achieve study objectives
 - a) Under assumption all else remains equal
 - b) Climate change effects on preconditions
 - c) Changes in effects or ecosystem services that are linked to project performance.
 - 2. Identify uncertainty and their sources of each alternative

III. Project Evaluation –The effect by effect approach within an ecosystem services framework

- A. Identify all benefit categories of actions preferably organized by ecosystem service (Table 1.1) (*Planning Standards B, D, G, H, I, K*)
 - 1. Quantify all significant endpoints possible
 - 2. Estimate the monetary value of potential changes in endpoints possible
 - 3. Quantitatively (when possible) or qualitatively describe the remaining non-monetized endpoint changes
 - 4. Evaluate other considerations
 - a) Timing of benefits and costs
 - b) Use of unemployed or underemployed labor resources
 - c) Climate change impacts
 - d) Environmental justice
- B. Determine Costs
- C. Convert all monetary values to annual benefits
 - 1. Discount rates
- D. Account for uncertainty in Benefits and Costs (*Planning Standard I*)
- E. Report data sources and acknowledge potential shortcomings (*Planning Standard L*)
- F. Report results in their appropriate categories both monetary and non-monetary (*Planning Standards E*)
 - 1. Sustainable economic development (*Planning Standard A*)
 - a) Commercial impacts
 - (1) Tourism
 - (2) Production

- (3) Other forms of economic development
 - b) National versus regional (*Planning Standard G*)
 - 2. Ecosystem services (*Planning Standard B, C, H*)
 - a) Watershed and ecosystem based approaches (*Planning Standard D*)
 - 3. Climate change (*Planning Standard I*)
 - a) Uncertainty and risk involved with projections
 - 4. Public safety and security (*Planning Standard J*)
 - 5. Costs
 - a) Direct costs
 - b) Impacts to natural ecosystems
 - c) Impact on floodplains, flood prone areas, and other ecologically valuable areas
- G. Compare benefits and costs
 - 1. Benefits vs. costs
 - 2. Cost effectiveness
 - 3. Threshold analysis
 - 4. Distributional Analysis
- H. Environmental Justice considerations (*Planning Standard K*)
 - 1. *EJ represents a current priority within EPA, and is a wide topic to be addressed. More information will be provided later.*

IV. Benefits Assessment

- A. Economic valuation (*Planning Standard G*)
 - 1. Theoretical foundations (WTP/utility)
- B. Types of benefits (*Planning Standards A, B, C, D, E, F, G, H, I*)
 - 1. Description of each type of benefit
 - a) Municipal and Industrial (M&I) Water Supply
 - (1) Projection of future water supply and demand
 - b) Agriculture
 - (1) Handling of subsidies
 - (2) Crops
 - (3) Sustainability of soil resources
 - (4) Diversity of income streams
 - (a) Land Value (Market Value)
 - (b) Appraisal data
 - (5) Reduced run-off
 - c) Urban flood damage
 - (1) Projection of future land use
 - (2) Projection of future flood damages
 - (a) Emergency costs
 - (3) Determine market value of land
 - (a) Appraisal data
 - (b) Modeling
 - d) Transportation
 - (1) Inland
 - (2) Deep draft

- e) Recreation
- f) Commercial fishing
- g) Environmental quality
 - (1) Improved water quality
 - (2) Decreased downstream treatment costs
- h) Public health or safety
- i) Ecosystem functions
 - (1) Groundwater recharge
 - (2) Temporary water storage
 - (3) Wildlife Habitat
 - (4) Nutrient and carbon recycling
 - (5) Clean water provisioning
 - (6) E.g. other services
- j) Non-use values
- k) Property prices
- 2. Special considerations for each benefit category
 - a) Double counting in valuation methods
- C. Valuation Methods (*Planning Standards E, F, G*)
 - 1. Description of each method
 - a) Revealed preference methods
 - (1) Production or cost functions
 - (2) Travel cost models
 - (3) Hedonic models
 - (4) Averting behavior models
 - b) Stated Preference
 - (1) Contingent valuation
 - (2) Conjoint analysis
 - (3) Contingent ranking
 - c) Benefit Transfer
 - (1) Point estimate
 - (2) Function transfer
 - (3) Meta-analysis
 - 2. Special considerations for each method

V. Costs

- A. Conceptual basis
- B. Construction costs
 - 1. Planning and design costs
 - 2. Labor costs
 - 3. Materials Costs
 - 4. Administrative services Costs
 - 5. Mitigation costs
 - 6. Relocation costs
- C. Operating and maintenance costs
 - 1. Labor costs
 - 2. Materials costs

Planning Standards

- A. Protect and restore natural ecosystems and the environment while encouraging sustainable economic development
- B. Account for Ecosystem Services
- C. Avoid the Unwise Use of Floodplains and Flood-prone Areas
- D. Utilize Watershed and Ecosystem Based Approaches
- E. Utilize Best Available Science, Practices, Analytical Techniques, Procedures and Tools
- F. Apply a Level of Detail Commensurate with the Potential Decisions
- G. Account for the National Benefits and Costs in Appropriate Monetary and Non-monetary Terms
- H. Account for Significant Effects and Mitigate Unavoidable Impacts to Ecosystem Services
- I. Address Risk and Uncertainty, Including the Effects of Climate Change and Future Development
- J. Incorporate Public Safety
- K. Ensure Environmental Justice for Low Income, Tribal and Minority Communities
- L. Ensure the Planning Process is Fully Transparent
- M. Collaborate Implementation Study Activities Broadly

Table 1-1: Potential Benefit Categories and Valuation Methods

POTENTIAL CATEGORIES	EXAMPLES OF TYPES OF EFFECTS	EXAMPLES OF VALUATION METHODS
Municipal and Industrial (M&I) Water Supply	<ul style="list-style-type: none">• Provision on new service• Decreased operating costs	<ul style="list-style-type: none">• Production or cost Functions
Agriculture	<ul style="list-style-type: none">• Increased production per acre• Increased number of acres in production• Increased diversity of income streams• Soil sustainability	<ul style="list-style-type: none">• Production or cost Functions
Urban Flood Damage	<ul style="list-style-type: none">• Reduction in flood severity and duration	<ul style="list-style-type: none">• Hedonics
Power (Hydropower)	<ul style="list-style-type: none">• Decreases in energy costs• Changes in the reliability of energy availability	<ul style="list-style-type: none">• Production or cost Functions• Stated Preference
Transportation – Inland or Deep Draft Navigation	<ul style="list-style-type: none">• Decreased transportation costs	<ul style="list-style-type: none">• Production or cost Functions
Recreation	<ul style="list-style-type: none">• Changes in the number of recreation alternatives• Changes in the quality of recreation alternatives	<ul style="list-style-type: none">• Travel Cost Models• Stated Preference• Hedonics• Averting Behaviors
Commercial Fishing	<ul style="list-style-type: none">• Changes in fishing output	<ul style="list-style-type: none">• Production Functions• Market Methods
Environmental Quality	<ul style="list-style-type: none">• Changes in water quality• Restoration of natural environments	<ul style="list-style-type: none">• Production Functions• Travel cost models• Hedonics• Averting behaviors• Stated preference
Ecosystem Functions	<ul style="list-style-type: none">• Climate Moderation (carbon and nitrogen sequestration)• Groundwater Recharge• Sediment Trapping• Soil Retention• Nutrient Cycling• Water Filtration• Wildlife habitat suitability and diversity• Floodwater storage	<ul style="list-style-type: none">• Production Functions• Averting Behaviors• Stated Preference
Public Health or Safety	<ul style="list-style-type: none">• Changes in risk	<ul style="list-style-type: none">• Averting Behavior

		<ul style="list-style-type: none"> • Stated Preference
Non-Use Values	<ul style="list-style-type: none"> • Preservation of species populations, communities, or ecosystems 	<ul style="list-style-type: none"> • Stated Preferences