

# Department of the Interior Agency Specific Procedures For Implementing CEQ Principles & Requirements for Investments in Federal Water Resources

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***DRAFT***

2/27/15

(NOTE: SEE PAGES 22-23 FOR EDITS TO THE PREVIOUSLY CIRCULATED (2/11/15) DRAFT)

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## ACRONYMS

ABM - Agent Based Modeling

AFRP - Anadromous Fish Restoration Program

ASPs - Agency Specific Procedures

A/S - PMB - Assistant Secretary – Policy, Management and Budget

BCA - Benefit-Cost Analysis

BIA - Bureau of Indian Affairs

BLM - Bureau of Land Management

CE - Categorical Exclusion

CCPs - Comprehensive Conservation Plans

CEQ - Council on Environmental Quality

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act 1980

CGE - Computer General Equilibrium

CV - Contingent Valuation

CVPI - Central Valley Project Improvement

DOI - Department of the Interior

EA - Environmental Assessment

EIS - Environmental Impact Statement

FLPMA - Federal Land Policy and Management Act of 1976

FWS - Fish and Wildlife Service

FY - Fiscal Year

GHGs - Greenhouse Gas Emissions

IGs - Interagency Guidelines

Draft February 12, 2015

IM - Instruction Memorandum

MOU - Memorandum of Understanding

NEPA - National Environmental Policy Act

NOAA - National Oceanic and Atmospheric Administration

NPS - National Park Service

NPV - Net Present Value

NR - Not Required

NRDA - Natural Resource Damage Assessment

O&M - Operations and Maintenance

OIA - Office of Insular Affairs

OPA - Oil Pollution Act of 1990

OS - Office of the Secretary

OSMRE - Office of Surface Mining, Reclamation and Enforcement

P&Gs - *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*

P&Rs - *Principles and Requirements for Federal Investments in Water Resources*

PR&Gs - *Principles, Requirements, and Guidelines (Revised P&Gs)*

Reclamation - Land Bureau of Reclamation

SMCRA - Surface Mining Control and Reclamation Act of 1977

ROD - Record of Decision

SOD - Safety of Dams

WTP - Willingness to pay

## I. Introduction

Principles and Requirements for Federal Investments in Water Resources (P&Rs) are established pursuant to the Water Resources Planning Act of 1964 (Public Law 89-8), as amended (42 U.S.C. 1962a-2) and consistent with Section 2031 of the Water Resources Development Act of 2007 (Public Law 10-114). The P&Rs supersede the March 1983 Economic and *Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (P&Gs) and are available at (<http://www.whitehouse.gov/administration/eop/ceq/initiatives/PandG>). The revised P&Gs have three primary parts:

- 1) the Principles and Requirements (P&Rs, published March 2013) – overarching concepts that the federal government seeks to achieve through policy implementation and requirements for inputs into analyses of federal investment alternatives;
- 2) the Interagency Guidelines (IGs, published December 2014) – guidance in somewhat more detail that applies to all agencies, and designed to assist federal agencies to determine the applicability of the P&Rs and for developing Agency Specific Procedures (ASPs); and
- 3) Agency Specific Procedures (ASPs) – guidance for Department of the Interior (DOI) bureaus.

Together, the revised P&Gs are now known as the Principles, Requirements, and Guidelines (PR&Gs).

The PR&Gs are intended to provide a common framework for evaluating federal water resource investments. The IGs build upon the PR&Gs and should be used in conjunction with that document. The ASPs provide additional and more detailed implementation guidance for the DOI bureaus and offices. The DOI ASPs recognize that the PR&Gs will be implemented somewhat differently across bureaus and that bureaus may supplement this Guidance with bureau-specific guidance as appropriate. The bureau-specific guidance should be developed as bureaus review and revise, as necessary, their existing internal guidance and procedures. Each bureau is expected to develop a process and schedule for reviewing its current internal guidance and procedures for consistency with the PR&Gs. The process/schedule should be developed by December, 2015 and provided to the Assistant Secretary-Policy Management and Budget (A/S – PMB). Bureau-specific guidelines, once developed, are subject to review by the A/S – PMB.

The bureaus with activities covered by the PR&Gs include the Bureau of Reclamation (Reclamation), the Fish and Wildlife Service (FWS), the Bureau of Land Management (BLM), the National Park Service (NPS), the Bureau of Indian Affairs (BIA), the Office of Surface Mining Reclamation and Enforcement (OSMRE), the Office of the Secretary (OS), and the Office of Insular Affairs (OIA). While the nature and scope of the programs administered by the above-mentioned bureaus and offices vary considerably, all of the bureaus and offices have programs or administer grants that have some connections to water resources.

The PR&Gs and IGs are both statements of policy, not regulations, and are intended to articulate expectations for the internal management of the government. The PR&Gs and IGs do not impose any legally binding requirements on federal agencies nor do they create any right or benefit, substantive or

procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person. The PR&Gs do not create any rights regarding third parties. Adherence to the DOI ASPs may be waived or modified in writing by the AS-PMB.

The Departmental-level ASPs recognize that analysis undertaken in support of the PR&Gs depend on the availability of resources.

Pursuant to the Water Resources Development Act of 2007, the PR&Gs establish the following Federal Objectives for federal water resources investments: maximize sustainable economic development; seek to avoid the unwise use of floodplains and flood-prone areas and minimize adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and protect and restore the functions of natural systems and mitigate any unavoidable damage to natural systems. In achieving these objectives, the PR&Gs recognize that federal resources are limited and “...federal investments in water resources as a whole should strive to maximize public benefits, with appropriate consideration of costs” (P&R, p. 3).

The IGs indicate that the term “federal investment” is broad and intended to capture a wide array of activities—projects, programs, and plans—that the Federal government directly undertakes relating to water resources (IGs, p. 4). As stated in the Principles and Requirements, Federal investments are those that by purpose, either directly or indirectly, affect water quality or water quantity, including ecosystem restoration or land management activities” (IGs, p. 4). From this broad suite, the PR&Gs apply to those investments which by purpose, directly or indirectly, alter water resources.

For the purposes of DOI’s ASPs, federal investments shall be considered to be funds appropriated to DOI that fund projects or activities that directly or indirectly affect water quality or quantity. The total level of a given investment shall be determined on a present value basis over the life of the investment.

## **A. General Requirements for a PR&G Analysis**

The general requirements for a PR&G Analysis include the following:

- a. Evaluation framework – the framework should be based on an ecosystem service approach. Changes, relative to a baseline, in the quality or quantity of ecosystem services should be evaluated and presented in monetary terms where possible.
- b. Best Available Science and Commensurate Level of Detail – agencies should seek to use best possible analytic tools, given the scale and scope of the activity being analyzed, to provide information to inform the decision process.
- c. Take advantage of opportunities for collaboration with other federal agencies as well as with tribal and other non-federal entities.
- d. Risk and uncertainty—the analysis should include identifying and quantifying, where possible, areas of risks and uncertainties.
- e. Bureau planning for projects and other activities covered by the PR&Gs should address the “Guiding Principles:” healthy and resilient ecosystems; sustainable economic development;

floodplains; public safety; and environmental justice. A watershed approach should be used.

The PR&Gs also identify a set of “general requirements” that planning for federal water resource investments should include. The following is a short summary of those requirements:

- i. Collaboration – agencies should seek to collaborate “fully” with non-federal entities; the method and scope of the collaborative effort should be driven by the nature of the activity, problems, and likely solutions.
- ii. Risk and Uncertainty – Planning should identify, describe, and consider areas of risk and uncertainty. Risks and uncertainties should be identified and described in a manner that is clear and understandable to the public and decision makers. This includes describing the nature, likelihood, and magnitude of risks (including quantitatively where feasible), as well as the uncertainties associated with key supporting data, projections, and evaluations of competing alternatives. Climate change, future land use, and adaptive management can all be considered in the context of analyzing risk and uncertainty.
- iii. Climate Change – Conditions resulting from a changing climate should be identified and accounted for in the planning process; uncertainties associated with climate change should be identified, described, and quantified where possible.
- iv. Water Use -- Alternative actions or plans, where applicable, should first consider opportunities to improve water use efficiency with respect to existing water infrastructure and supplies. When efficiency alone will not suffice, the reuse and reclamation of water should be promoted.
- v. Water Quality -- The effect of federal investments on water quality should also be considered and evaluated for all alternative plans or actions.
- vi. Nonstructural Approaches -- Full consideration and reporting on nonstructural alternative actions or plans should be an integral part in the evaluation of federal investments in water resources.
- vii. International Concerns -- federal water resources investments must consider treaty and other international obligations and develop alternatives that are consistent with meeting such obligations. Analyses should identify any way in which an international obligation constrains choices or precludes selection of a better plan to meet the Federal Objective.
- viii. Design of Alternatives -- Each alternative plan, strategy or action is to be formulated to consider the following four criteria: completeness, effectiveness, efficiency, and acceptability.
- ix. Transparency -- These modernized Principles, Requirements and Guidelines are intended to significantly increase the transparency of and consistency in the planning and implementation process for federal investments in water resources in this country.
- x. Plan Selection -- Any recommendation for federal investments in water resources to address identified water resources needs must be justified by the value of public benefits as compared to costs. The basis for selection of the recommended plan should be fully



reported and documented, including the criteria and considerations used in the selection of the recommended course of action by the federal government.

## **B. Scale and Scope of Analysis Required**

The PR&Gs envision that the analysis required will vary in scope and magnitude across programs and activities. The PR&Gs identify two levels of analysis: “standard” and “scaled.” In general the level of analysis should be commensurate with the significance of the investment and the potential environmental impacts. While there is clear distinction between the different levels of analysis the two types of analysis can be distinguished in several ways:

- A “Standard analysis” is a comprehensive analysis that seeks to evaluate all of the relevant benefits and costs associated with the project or activity using original or secondary data. The economic analysis techniques used would be those that are normally used in a benefit-cost analysis of programs and activities that have some effect on the environment (e.g., travel cost, hedonics, stated preference approaches).
- A “scaled analysis” is an analysis that is more limited in scope and would typically rely on benefits transfer methods (page 42) and secondary data sources. A scaled analysis may be more appropriate for projects or activities that are low cost/low risk, pose minimal threats to human safety, or have minimal environmental effects.

In many cases professional judgment and available resources will be important factors in determining the appropriate level of analysis. In some cases, activities or programs may be excluded from analysis. Projects or activities can also be excluded based on the thresholds for applicability as defined in the IGs or based on DOI’s determination that the activities/projects are routine and have inconsequential effects on water resources or where an “equivalent pathway” exists. Pages 4-5 of the IGs define “equivalent pathway” as “...any agency-specific processes, planning requirements, or types of analyses that are equivalent to the PR&G.” In addition, bureaus should ensure that cumulative effects of many small, routine actions would not elevate those investments to a scaled or standard analysis.

A number of “investments” have been identified as exempt from the requirements of the PR&Gs. These include: regulatory actions; research or monitoring; emergency actions; and investments that fall under the monetary thresholds. DOI has also identified a small number of activities that will be excluded due to a specific issue(s) DOI has identified or because of the presence of an “equivalent pathway.” These activities and programs are discussed in more detail below. Any additional future exclusions must be justified in writing with a memorandum to the A/S – PMB. This memo must provide the data and rationale for the exclusion or document the equivalent pathway.

The PR&Gs apply only to plans or projects that are initiated after the PR&Gs take effect; the PR&Gs apply to programs or activities beginning at the first program or grant cycle after the PR&Gs take effect.

## II. Level of Analysis for DOI Programs

### A. Introduction

DOI is adopting the baseline threshold criteria established by CEQ for project and programmatic level analysis shown in Table 1. These thresholds represent guidelines for the level of analysis that is likely to be most appropriate for an activity, given the level of investment in, appropriations for, or cost of that activity. For the purpose of determining whether a given activity or project falls under or exceeds the financial thresholds, it is the level of federal investment that is the relevant criterion to use. However, for a particular activity a different level of analysis may be more appropriate, and Bureaus may depart from these guidelines where such a departure is justified.

PR&G analyses will vary in scope and magnitude. The level of analysis should be commensurate with the significance of the investment and the potential environmental, social, and economic effects of the project or activity. In general, a scoping effort should be undertaken to evaluate the level of effort needed to analyze the full range of potential effects. Care should be taken to ensure that all potentially affected groups and corresponding social impact areas are included in the analysis since impacts do not necessarily coincide with recognized geographic boundaries. The PR&G analysis should address the primary purpose of the analysis; the geographic size of the study area, number of people potentially affected and anticipated degree of impact, type of impacts, environmental justice considerations; and the size and location of communities potentially affected including the presence of federally recognized tribes or tribal members; and the type of data and information available from collaboration, public involvement, and previous studies, if any.

When collaboration with a federally recognized tribe(s) is involved, the process should consider the federal trust responsibility expressed for the Department of the Interior in Department Manual 512 DM 2 that specifies in 4.A., under "reports" that: "...as part of the planning process, each bureau and office must identify any potential effects on Indian trust resources... [and these] must be explicitly addressed in the planning/decision documents..."

Not all projects or activities require analysis under the PR&Gs. A number of activities have been identified for which application of the PR&Gs is not warranted. These activities have been determined based on the extent to which the project or activity: 1) is below the default investment thresholds established by CEQ; 2) involves only routine maintenance and repairs; 3) involves only emergency actions; 4) is not a water resource investment; or 5) the extent to which an equivalent pathway exists.

Within DOI there are two main categories of projects that will require a PR&G analysis:

- 1) Project level analysis that primarily will concern infrastructure construction, maintenance or removal; and
- 2) Programmatic activities that will primarily include grant administration, programs that may affect water resources, and development of land or resource management plans.

Project level analysis should be used for projects and activities for which the bureaus have the discretion in designing the site –specific alternatives for the water resource investment. When the bureaus do not have discretion over the site –specific alternatives or where multiple actions are being addressed in one document, the bureaus should use a programmatic-level of PR&G analysis. In some cases, even though a project was included in a programmatic -level analysis, a project –level analysis may be conducted if additional information becomes available, or the specific project varies from alternatives evaluated in the programmatic analysis.

**Table 1. Financial Thresholds**

Type of Activity	Federal Investment (\$M, present value basis) <sup>2</sup>	Annual Appropriations or Plan Development Costs (\$M)	Level of Analysis
<b>Projects</b> All new or existing federal investments, such as infrastructure, ecosystem restoration, new construction, modifications or replacements to existing facilities, and operations and maintenance <sup>1</sup> .	>20	--	Standard analysis
	10 – 20	--	Scaled analysis
	<10	--	Excluded
<b>Programs</b> Grant or funding programs	--	>100	Standard analysis
	--	50 – 100	Scaled analysis
	--	<50	Excluded
<b>Plans</b> Management plans, such as watershed, master, landscape, etc.	--	>50	Standard analysis
	--	10 – 50	Scaled analysis
	--	<10	Excluded
<sup>1</sup> Operations and Maintenance (O&M) activities that are included in the original project authorizations do not require separate analysis as long as the activity is carried out in a manner that is consistent with that authorization. Significantly changed O&M plans or those changed to meet new goals generally require a new analysis and authorization. <sup>2</sup> The IGs call for these values to be indexed. An indexing procedure will be identified in the final version of the DOI ASPs.			

The major types of activities that may require project-level PR&Gs analysis are listed, by bureau, in Table 2. The table does not include every type of activity or project that each bureau may undertake, therefore the bureaus may have additional types of activities that require project-level PR&Gs analysis that will be specified in bureau- level guidance.

Grants and programmatic activities should generally be evaluated at program level, as per the IGs. Individual grants should not be evaluated, unless they exceed CEQ financial thresholds. Program-level analysis should generally occur on a regular cycle that is appropriate for the specific program or grant

and should be documented in the analysis document. Where feasible, reviews might be integrated into program or grant cycles. Retrospective reviews are permissible.

The major types of activities that require program-level PR&Gs analysis are also listed in Table 2. Bureaus may have additional activities that require program-level PR&Gs analysis that will be specified in bureau -level guidance. Bureaus shall describe the process for determining appropriate levels of analyses in their ASPs.

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**Table 2. DOI Programs – Level of Analysis**

Bureau	Activity	Approximate Annual Implementation Costs (\$M)	NEPA Analysis (NR=not required)	OMB Review	PR&G Analysis	Applicability/Reasoning
Reclamation	Feasibility Studies	Generally > \$20 million	EIS		Standard/project	Project scope/complexity implies likely “Standard” analysis.
Reclamation	Rural Water Projects	Generally > \$20 million.	EIS		Standard/project	Project scope/complexity implies likely “Standard” analysis.
Reclamation	Decommission/Remove existing facilities	Generally > \$20 million	EIS		Standard/project	Studies to decommission or remove existing dams would typically require the same level of analysis that is required for justifying construction of a facility.
Reclamation	Title XVI Projects	Max \$20 million (typical project)	EIS		Scaled/programmatic	Scope/complexity of most projects implies a “scaled” analysis. Could be evaluated on a programmatic basis (scaled programmatic).
Reclamation	WaterSmart Challenge Grants	Annual federal appropriations < \$50 million/year.	Grant program		Scaled/programmatic	Scaled based on funding levels of less than \$50 million/year.
Reclamation	Basin Studies	Studies typically cost < \$20 million.	Not required until feasibility study.		Scaled/project	Basin studies are usually initiated at an appraisal level of analysis. Could include “scaled” PR&Gs analysis to identify public benefits and costs.
Reclamation	Routine Operation & Maintenance Activities	Variable	varies		Exempt	As per the IGs

Bureau	Activity	Approximate Annual Implementation Costs (\$M)	NEPA Analysis (NR=not required)	OMB Review	PR&G Analysis	Applicability/Reasoning
Reclamation	Changes to project operations	variable	varies		Scaled/project	Depending on the magnitude of the change, could require a scaled analysis.
Reclamation	Replacements, Additions, and Extraordinary Maintenance Activities	Typical project cost > \$20 million	EIS		Scaled/project	Analysis scaled based on project cost.
Reclamation	Safety of Dams Projects	Typical project cost is > \$20 million	EIS		Scaled/project	Analysis scaled based on project cost.
Reclamation	Resource Management Plans	Varies, but typically under \$10 million	EA or EIS		Scaled/program	Depends on scope and complexity
BLM	Resource Management Plans	\$1M-\$2M/planning area	EIS		Equivalent pathway/program	Existing planning process provides an equivalent pathway.
BLM	Watershed Management/Restoration	\$10K to \$500K/project	EA		Exempt	Project costs do not meet PR&Gs thresholds.
BLM	Water Supply Development	\$10K to \$250K/project	EA		Exempt	Project costs do not meet PR&Gs thresholds.
BLM	HazMat-Response	Variable (typically from \$50K to 1M per response)	NR		Exempt	Emergency actions exempt.
BLM	Fire Emergency Stabilization	\$25K to \$250K	NR		Exempt	Emergency actions exempt.
BLM	Land Transfers and other Realty	Variable	EIS or EA		Scaled/project	If these are determined to be federal investments, the level of analysis will

Bureau	Activity	Approximate Annual Implementation Costs (\$M)	NEPA Analysis (NR=not required)	OMB Review	PR&G Analysis	Applicability/Reasoning
	Actions					be scaled based on thresholds.
BLM	Dam Safety/Maintenance	\$50K-\$2M/project	EIS or EA		Scaled/project	Scaled analysis based on project costs.
BLM	Major Rights-Of-Way for Infrastructure	Variable	EIS or EA		Scaled or Standard/project	Scaled analysis based on project costs.
BLM	Fluid/Solid Mineral Production	Variable	EIS or EA		Exempt, Scaled or Standard/project	No federal investment. This is a regulatory program. However, depending upon overall scope of project and degree of impact on water resources, some projects might receive either a scaled or Standard analysis. Equivalent pathways also exist.
BLM	Timber, grazing	Information to be added	Information to be added		Information to be added/project	Generally not federal investments. However, depending upon overall scope of project and degree of impact on water resources, some projects or activities might receive either a scaled or Standard analysis. Equivalent pathways also exist.
BIA	OTS – Water Resources Management, Planning, and Pre-Development	\$6M total – Individual study costs are typically less than \$100K.	Case by case		Exempt	Under theshold.

Bureau	Activity	Approximate Annual Implementation Costs (\$M)	NEPA Analysis (NR=not required)	OMB Review	PR&G Analysis	Applicability/Reasoning
BIA	OTS – Hatchery Maintenance	FY13 - \$1.6M Individual projects are less than \$200,000.	Case by case		Exempt	Under threshold.
BIA	OTS – Hatchery Operations	FY13 - \$4.4M Individual projects are generally less than \$400,000.	Case by case		Exempt	Under thresholds.
BIA	OTS - ESA	FY13 - \$1.2M Individual projects are generally less than \$125,000.	Case by case		Exempt	Under thresholds.
BIA	OTS – Rights Protection Initiative	FY13 - \$29M	Not a project		Exempt	Provides funding for studies.
BIA	OTS – Agriculture, Invasive Species	FY13 - \$3.4M	Case by case		Exempt	Under threshold.
BIA	OTS – Water Rights Negotiation/Litigation	\$8M total – Individual negotiation/litigation projects are typically less than \$300K.	Case by case		Exempt or Scaled	Not a project. Also, provides funding for studies.
BIA	OTS – Safety of Dams (SOD) Projects	Approx \$10M – \$23M for construction, allowing for 1 to 4 major construction projects, and \$12 M for dam safety activities, and \$1M for maintenance of existing facilities.	EA or EIS		Scaled or Exempt	Scaled based on thresholds. Also SOD Program activities are generally covered under a nation-wide 404 permit for rehabilitation. Ongoing O&M activities are exempt.



Bureau	Activity	Approximate Annual Implementation Costs (\$M)	NEPA Analysis (NR=not required)	OMB Review	PR&G Analysis	Applicability/Reasoning
BIA	OTS – Irrigation Project Construction	\$4.4M – Navajo Indian Irrigation Project is funded annually at \$3.4M and \$1M is split among the 15 existing irrigation projects	NEPA Analysis is generally not required.		Scaled or Exempt	Ongoing O&M activities would be exempt. Construction projects would require a scaled analysis at most due to the small individual project size and lack of a detailed NEPA analysis.
BIA	OTS – Agriculture	FY13 - \$25M	Case by case		Uncertain, but probably exempt	
BIA	OTS – Tribal Management Development Program	FY13 - \$7.6M	Not a project		Exempt	This is base funding and is not in itself a project
FWS	Migratory Bird Joint Ventures	\$14M	NR		Exempt	no water projects
FWS	Fish and Wildlife Management Assistance	\$62.5M, largest are \$750k	NR		Exempt	Under threshold.
FWS	Multistate Conservation Grant Program	\$6M total – Individual study costs < \$100K.	NR		Exempt	Under thresholds; not water projects
FWS	Coastal Program	\$6M	NR		Exempt	Under thresholds; not water projects
FWS	Tribal Wildlife Grants Program	\$7M	NR		Exempt	Under thresholds; not water projects
FWS	Alaska Migratory Bird Co-Management	\$0.22M	NR		Exempt	Under thresholds; not water projects

Bureau	Activity	Approximate Annual Implementation Costs (\$M)	NEPA Analysis (NR=not required)	OMB Review	PR&G Analysis	Applicability/Reasoning
	Council					
FWS	Migratory Bird Conservation	\$0.3M	NR		Exempt	Under thresholds; not water projects
FWS	Central Valley Project Improvement (CVPI) Anadromous Fish Restoration Program (AFRP)	\$3M	NR		Exempt	Under thresholds; not water projects
FWS	Migratory Bird Monitoring, Assessment and Conservation	\$3.3M	EA		Exempt	research
FWS	Endangered Species Conservation, Recovery Implementation Funds	\$0.5M	NR		Exempt	Under thresholds; not water projects
FWS	Endangered Species – Candidate Conservation Action Funds	\$0.3M	EA		Exempt	Under thresholds; not water projects
FWS	Lower Snake River Compensation	\$24.5M	NR		Exempt	Not an investment; funds restocking

Bureau	Activity	Approximate Annual Implementation Costs (\$M)	NEPA Analysis (NR=not required)	OMB Review	PR&G Analysis	Applicability/Reasoning
	Plan					
FWS	Great Lakes Restoration	\$47M, largest are \$1M	NR		Programmatic /Exempt	possible programmatic; small projects
FWS	National Fish and Wildlife Foundation	\$8.5M	NR		Exempt	possible programmatic; small projects
FWS	Fish and Wildlife Coordination and Assistance Programs	\$0.4M	EIS		Exempt	Under thresholds.
FWS	National Wetlands Inventory	\$0.85M	NR		Exempt	mapping
FWS	Highlands Conservation Program	\$8.1M	NR		Programmatic or Exempt	highland land acquisition; individual acquisitions small.
FWS	Cooperative Landscape Conservation	\$10.1M	NR		Exempt	research
FWS	Adaptive Science	\$1.5M	EIS		Exempt	research
FWS	Natural Resource Damage Assessment, Restoration and Implementation	\$4.8M	CX		Exempt - /Equivalent pathway	court settlements
FWS	Wildlife Restoration and	\$376.3M	EA		Exempt/consider	formula grant to states, projects may not be water related

Bureau	Activity	Approximate Annual Implementation Costs (\$M)	NEPA Analysis (NR=not required)	OMB Review	PR&G Analysis	Applicability/Reasoning
	Basic Hunter Education				programmatic	
FWS	Cooperative Endangered Species Conservation Fund	\$71M	NR		Exempt/consider programmatic	generally not water infrastructure projects
FWS	Recovery Land Acquisition Grants	\$10M			Exempt/consider programmatic	primarily funds permanent habitat protection not water infrastructure
FWS	Sportfishing and Boating Safety Act	\$12.9M	NR		Exempt/consider programmatic	boating access, not water projects
FWS	North American Wetlands Conservation Fund	\$83.6M	NR		Exempt/consider programmatic	usually small land acquisitions.
FWS	Wildlife Conservation and Restoration	\$834.3M	NR		Exempt/consider programmatic	primarily for coordination not projects
FWS	Partners for Fish and Wildlife	\$22M	NR		Exempt/consider programmatic	small projects
FWS	Landowner Incentive Program	\$17.6M	NR		Exempt/consider programmatic	small projects
FWS	State Wildlife Grants	\$85M	NR		Exempt/consider programmatic	small projects

Bureau	Activity	Approximate Annual Implementation Costs (\$M)	NEPA Analysis (NR=not required)	OMB Review	PR&G Analysis	Applicability/Reasoning
FWS	Coastal Impact Assistance Program	\$300M	grant program		Programmatic	Depends on scope and complexity of project
FWS	Comprehensive Conservation Plans (CCPs)	\$502.8M	EA		Scaled/programmatic	Projects are small for any individual refuge and no programmatic oversight
FWS	Sport Fish Restoration Program	\$364.7M, largest projects under \$15m	grant program		Scaled/programmatic	projects are small
FWS	Coastal Wetlands Planning, Protection and Restoration Act	\$19.1M	NR		Scaled/programmatic	projects are small
FWS	National Wildlife Refuge Fund	\$17M	NR		Scaled/programmatic	projects are small
FWS	Service-wide construction program	\$23M, largest is \$4.7 m	varies		Scaled/project	Individual projects under thresholds. Scaled analysis for largest projects
FWS	Fisheries programs (including hatcheries)					Scaled/programmatic/exempt
NPS	Ecosystem restoration projects	\$7-\$10 million/yr; depends on prior year funding obligations and appropriations	varies		Scaled/programmatic	Under thresholds.

Bureau	Activity	Approximate Annual Implementation Costs (\$M)	NEPA Analysis (NR=not required)	OMB Review	PR&G Analysis	Applicability/Reasoning
NPS	Line Item construction	\$100 million/yr; depends on prior year commitments and appropriations.	Varies		Scaled/project	Analysis scaled based on thresholds.
OSM	Abandoned Mine Land (SMCRA Title 4) grants to States and Tribes	FY 2011, grants ranged from \$256K to \$133M and the program total was \$395M. Project costs range from \$1000s to millions	EA or CX; Two programmatic EIS's (OSM EIS-2 &11)		Individual projects exempt/consider programmatic	Project preauthorization decisions primarily reside with States and Tribes; individual projects typically do not reach threshold levels; many projects eligible for categorical exclusion (CE #33).
OS	Indian Water Settlements				Exempt	
OS	Land and Water Conservation Fund (NPS, FWS, BLM, and grants to states).	FY 12: DOI agencies \$147M; state grants \$45M.	Not a project		Exempt or programmatic	Can be land or easements; purpose of acquisitions varies, and could include recreation access, acquisitions within a refuge or park boundary, ESA, etc. State acquisitions have to be for the purposes defined in the LWCF Act. Often not water related.
OS	Wildland Fire					Emergency actions exempt.
OS	Natural Resource Damage Assessment and Restoration				Exempt	
OS	Insular Affairs-Grant Programs	FY2013 - \$530M	varies		Standard or scaled	

## B. Projects and Activities that Do Not Require a PR&Gs Analysis

Projects and activities for which a PR&Gs analysis is inappropriate or not warranted have been determined based on the extent to which the project or activity: 1) is below the default investment thresholds established by CEQ; 2) involves only routine maintenance and repairs; 3) involves only emergency actions; 4) is not a water resource investment; or 5) the extent to which an equivalent pathway exists.

The following process should be used by bureaus for requests for exempting programs or activities (beyond those already identified in this paper) from the PR&Gs:

- PR&Gs analysis not warranted or is inappropriate: A memorandum from the relevant assistant secretary to the Assistant Secretary – Policy, Management and Budget indicating the rationale for not undertaking the analysis should be prepared. This memo must present: summary-level budget and program information on the specific programs/activities for which the request is being sought; the rationale for the request; the implications, if any, associated with the request; and when the request would take effect.
- Equivalent Pathways: The PR&Gs provide that in cases where agencies have “equivalent pathways,” those procedures can be used in place of the PR&Gs. To be considered an equivalent pathway, an existing process must have similar process steps and result in an analysis that is substantially equivalent to what would be produced under the PR&Gs. A memorandum from the relevant assistant secretary to the A/S – Policy, Management and Budget requesting an equivalent pathway exemption should be prepared. The memorandum should document how the existing process meets the Federal Objective, the Guiding Principles, and the General Requirements.
- The following DOI programs will not be subject to the requirements of the PR&Gs:
  - **Natural Resource Damage Assessment and Restoration (NRDAR).** This program is governed by a complex set of federal laws and regulations and the NRDAR process requires different analysis and determinations than those identified in the PR&Gs. Because it is litigation-driven, deviation from this process could conflict with these laws and regulations and will hinder the ability of the federal government to quantify resource injuries, negotiate settlements, obtain rebuttable presumption, and identify appropriate restoration actions.
  - **Indian Water Rights Settlements.** Settlements are not subject to the PR&Gs because the settlement process is litigation-driven. Indian water rights are vested property rights for which the United States has a trust responsibility, with the United States holding legal title to such water in trust on behalf of Indian tribes and their members. Application of the PR&G requirements to the Federal Government’s Indian water rights settlement program could hinder the Federal Government’s ability to achieve settlement and potentially create uncertainty and confusion among Indian tribes, states, and other stakeholders.

### **III. The Planning Process**

The DOI has developed the following planning process to implement the common framework summarized in the IGs for analyzing federal investments in applicable water resources investments and ensure that plan formulation, evaluation, and implementation of agency projects and programs adequately incorporate the Guiding Principles identified in the Principles and Requirements. DOI's planning process consists of a series of steps that identifies or responds to problems and opportunities associated with the Federal Objective, as well as specific state and local concerns, and culminates in the selection of a recommended plan. The process involves an orderly and systematic approach to making determinations and decisions at each step so that the interested public and decision makers in the planning organization can be fully aware of: the basic assumptions employed; the data and information analyzed; the areas of risk and uncertainty; the reasons and rationales used; and the significant implications of each alternative plan. Some bureaus have well established scoping processes that could be used in the course of undertaking a PR&Gs analysis. The PR&Gs require the use of an ecosystem services framework and existing scoping processes may need to be adjusted to accommodate this framework. Such adjustments could include explicit identification of desired environmental conditions. Scoping can also include the social and cultural context of the region and resources.

#### **A. Identify Problems, Needs, and Opportunities**

Specific problems and opportunities within the study area should be identified, planning goals and objectives established, and significant constraints identified. This first step corresponds to the NEPA requirement to define the purpose and need. If an EIS is required, a Notice of Intent will be issued and initial scoping occurs. In addition to the requirements of the PR&Gs:

1. The planning goals and objectives should reflect the direction provided in the authorizing legislation, as well as the views of the study team, the study cost-share partner, cooperating agencies, various stakeholders, and the public;
2. This step should identify the purpose of the feasibility study and the federal government's involvement in the study;
3. This step should define the study area and describe how the affected stakeholders will be involved;
4. Problems and opportunities should be incorporated into a brief statement specifying the underlying need for water and related resources, to which the agency is responding; and
5. A brief summary of the process used to define the problems, opportunities, planning objectives, and constraints should be developed to aid in the analysis of the federal investment. This summary should include a discussion of stakeholder, partner, and public inputs.



## B. Inventory Existing Resources and Forecast Future Conditions

Starting with conditions that exist at present in the planning area, projections of the future “without” and “with” the alternative projects or programs under consideration are made to delineate costs and benefits. The primary function of an alternative must be to alleviate unsatisfactory conditions or satisfy a need that exists or will exist in the future without the programs or projects under consideration. A summary of the specific economic, environmental, and social setting within the study area should cover the condition and functional relationships of affected resources; their development potentials and possible conflicts in producing affected ecosystem services; and the local situation with respect to investment, climate, markets, and basic economic productivity.

“Inventory Existing Resources” corresponds to the NEPA requirement to identify the affected environment. “Forecast Future Conditions” generally relates to the NEPA requirement to identify the No Action Alternative.

This step will quantify relevant water and related resource conditions as they currently exist within the study area and forecast future conditions over the period of analysis. This step confirms the problems, needs, and opportunities to be addressed in the subsequent steps. The inventory and forecast will provide information for understanding existing conditions and establishing a baseline for forecasting with- and without-plan conditions.

1. Without-project condition. The without-project condition is the most likely condition expected to exist in the future in the absence of the project or program under consideration given current laws, policies, projects under construction or authorized, and any existing resources/conditions.
2. With-project condition. The with-project condition is the most likely condition expected to exist in the future with a specific federal project or program in place.
3. Within the context of analyzing federal investments in water resources, “Forecast Future Conditions” (also termed “without-plan conditions”) is defined as characterizing future conditions without this federal action, but includes actions that may be expected by others.
4. The inventory used to describe existing conditions and to provide a baseline for forecasting future with- and without-plan conditions will also be used to verify that the initially identified problems and opportunities are relevant to the water and related resources of the study area.
5. The existing conditions baseline will be established using peer-reviewed and accepted projections of income, employment, output, and population that are national, state, or regional in scope.
6. The potential impacts of climate change should be considered when developing projections of environmental conditions, water supply and demand, and operational conditions at existing facilities as part of the without-plan future condition. Climate change impacts

should be further analyzed, as appropriate, as part of the analysis when the following conditions are true:

- a) There is a reasonable likelihood of significant variation in hydroclimatic conditions over the planning horizon, between alternatives, or both; and
  - b) Available regional models have been down-scaled to a resolution adequate for the study area, or can be produced within reasonable time and cost constraints.
7. To ensure that the appropriate criteria and issues are incorporated into the analytical framework, a brief summary of the process used to define the relevant existing conditions and reasonably foreseeable future conditions should be prepared. This should include discussion of stakeholder, partner, and public inputs.

### **C. Formulate Alternative Plans**

Alternative plan formulations should focus on solutions that are practicable, feasible, and meet the planning objectives. A reasonable range of potential plans are initially investigated, and as those plans are refined, some should be eliminated. The plans that are retained for additional analysis are termed the “analyzed alternatives.” The analyzed alternatives developed at this stage should determine the range of reasonable alternatives, as required for the NEPA analysis.

1. Alternative plans should clearly identify and evaluate the trade-offs among stakeholders and resources. The viability of an alternative should be determined through an evaluation of its acceptability, efficiency, effectiveness, and completeness as required in the PR&Gs. Alternative plans should be formulated based on most likely future conditions expected with and without implementation of a plan.
2. Full consideration of nonstructural alternative actions or plans that meet the planning objectives should be an integral part in the evaluation of federal investments in water resources.
3. Each alternative plan formulated for the PR&Gs analysis should be included in the NEPA document, or the differences should be explained and justified. The period of analysis should be the same for each alternative plan. Documentation of the rationale for eliminating any alternative plan should be provided.
4. Investigations, data collection, and analysis should be ongoing and integrated early in the planning process. Investigations should be relevant to the planning objectives and constraints. The interdisciplinary study team should consider the following areas for investigation: engineering and design; surface water and groundwater hydrology; hydraulics; geology; operations; water quality; land resources and irrigability; power generation and conservation; economics; financing; environmental, social, and cultural impacts and mitigation; opportunities for recreation; and cost estimation for construction, operation, maintenance, replacement, and energy consumption. Additional investigations should be performed as necessary.

## **D. Considerations for Developing and Evaluating Alternatives**

Alternatives should be developed that 1) address the defined water resource challenge or function that is the subject of the analysis, and 2) achieve multiple objectives as outlined in the Principles and Requirements. At a minimum, a without- and a with-project alternative should be evaluated and compared for a specified period of time into the future. More often, it is appropriate to evaluate and compare a full range of alternatives.

### **1. Watershed Approach**

When developing alternatives, the water resource challenge or function being addressed should be analyzed on a watershed level to facilitate inclusion of a complete range of solutions that achieve multiple objectives. A watershed approach facilitates the proper framing of a problem, incorporates a wider range of stakeholders, and allows for the root causes of the problem being addressed to be identified and the interconnectedness of problem symptoms to be elucidated. The watershed approach allows for consideration of upstream and downstream conditions and needs, as well as a means to more thoroughly address the potential impacts of a proposed action. The scale and scope of the watershed used to develop alternatives can vary. The watershed used to develop alternatives should encompass a geographical area large enough to ensure plans address cause and effect relationships among affected resources and activities, both upstream and downstream that are important to gaining public benefits from the project.

### **2. Floodplains**

Floodplains connect land and water ecosystems and support high levels of biodiversity and productivity. Alternatives should be developed that avoid the unwise use of floodplains and/or flood-prone areas. If the areas cannot be avoided then the alternatives should address how adverse impacts to these areas can be minimized. For more information, go to:

<http://www.archives.gov/federal-register/codification/executive-order/11988.html>

### **3. Resilient Ecosystems**

When possible, alternatives should avoid adverse environmental impacts, and when not possible alternatives should minimize environmental impacts. When a particular alternative will cause unavoidable damage to the environment, mitigation to offset damages should be incorporated into that alternative and evaluated as part of that alternative.

### **4. Water Use**

Water supplies will continue to be subject to variability in precipitation and runoff and subject to the uncertain effects of a changing climate. Water availability and efficient use of water should be considered in alternative designs. Alternatives should first consider opportunities to improve water efficiency with respect to existing water infrastructure and supplies. When efficiency alone is not

practicable, the reuse and reclamation of water should be promoted and evaluated. The alternatives should also address the sustainable use and management of water resources that improves or maintains water quality.

## **5. Nonstructural Approaches**

Nonstructural approaches can often be the most cost-effective and environmentally protective alternative to implement. Nonstructural alternatives include but are not limited to modification of public policy, regulatory policy, and pricing policy, as well as best management practices including utilization of green infrastructure. Nonstructural measures may be combined with fewer or smaller traditional structural project components to produce a complete alternative plan. Full consideration and reporting on nonstructural alternative actions should be an integral part of the evaluation water resource investment alternatives.

## **6. International Concerns**

Alternatives for water resource investments must be consistent with meeting treaty and other international obligations. Analyses should identify international obligation constraints that preclude selection of an otherwise viable alternative.

## **7. Public Safety**

Alternative solutions should avoid, reduce, or mitigate risks to public safety and include measures to manage and communicate residual risks. The impact and reliability of alternatives on threats to public safety must be evaluated and documented.

## **8. Environmental Justice**

Any disproportionately high and adverse public safety, human health, or environmental burdens of project alternatives on minority, tribal or low-income populations should be avoided.

## **9. Final Array of Alternatives**

Alternatives are to be formulated in a systematic manner to ensure that a range of reasonable alternatives are elevated. Each alternative is to be formulated to consider the following four criteria: completeness, effectiveness, efficiency, and acceptability. In order to support full disclosure and promote transparency in the decision making process, the final analysis should include at a minimum, the following:

- A without and a with-project alternative.
- Changes in existing statutes, implementation authority administrative regulations and or law or policies that are incorporated into the alternatives should be identified.
- Alternatives that can effectively address a problem through the use of nonstructural approaches, if they exist, must be fully considered and carried forward into the final array of

solutions. Such solutions must be given full and equal consideration in the decision making process.

- An alternative that maximizes net economic benefits.
- An alternative that is preferred by a local interest with oversight or implementation responsibilities must be included in the analysis.
- The environmentally preferred alternative where required by NEPA must be included in the final analysis.

Mitigation of unavoidable adverse effects associated with each alternative must be included in the alternative and analyses.

## **10. Evaluation of Alternatives**

Chapter Three of the IGs includes requirements for evaluating the final array of alternatives selected. At a minimum, the cost of each alternative must be compared to the value of the benefit to the public, and each alternative's performance in regard to the Guiding Principles must be assessed. In addition to the requirements outlined in Chapter Three of the IGs, the following requirements should be incorporated into the analysis of projects alternatives:

### ***a) Best Available Science***

Analysis to support the water resources alternatives should utilize the best available science, data, analytical techniques, procedures, models, and tools in ecology, hydrology, economics, engineering, biology, and other disciplines to the extent that sufficient funding is available. To the extent feasible, the effects of the alternatives should be quantified. Established tools may be appropriate to use for quantification as use of those tools can promote consistency and comparability among projects, but new and evolving tools and methods may also be necessary to use in analyses in order to fully inform the decision making process.

The level of detail required to support alternative analyses may vary, but should not be greater than needed to inform the decision making process efficiently and effectively. The level of detail, scope, and complexity of analyses should be commensurate with the scale, impacts, costs, scientific complexities, uncertainties, risk, and other aspects (e. g. public concern) inherent in potential decisions.

### ***b) Risk and Uncertainty***

An analysis of risks and uncertainties should describe the nature, likelihood and magnitude of risks and uncertainties associated with the project alternative or activity, including quantitative information where feasible. When there are considerable uncertainties concerning the ability of an alternative to function as desired (e.g., produce desired outputs, and/or the general acceptability of the alternative) the option of pursuing improved data or models should be considered. Reducing risk and uncertainty may involve increased costs or loss of benefits. The advantages and costs of reducing risk and uncertainty should be explicitly considered in formulating alternatives and the overall decision making process.

When analyzing potential investments in water resources areas of risk and uncertainty should be identified, described, and considered as part of the decision. Knowledge of risk and uncertainty and the degree of reliability of the estimated effects will better inform decision making. Risk and uncertainty that is inherent in the analyses performed, as well as risk and uncertainty associated with the future conditions and potential effects of alternatives, should be identified. Decisions should be made with knowledge of the degree of reliability and the limits of available information, recognizing that even with the best available engineering and science, risk and uncertainty will always remain.

The items below should be evaluated as part of the PR&Gs analysis:

- **Climate change:** Conditions resulting from climate change should be accounted for and addressed. This includes addressing the extent to which varying degrees of uncertainty are associated with climate change impacts on water resources. The increased variability in temporal and spatial patterns of precipitation, evaporation, and water availability will challenge water resource systems serving all human and ecological needs. Analysis of climate change impacts should be informed by both historical records and models of projected future impacts of an altered climate on water resources.
- **Future Land Use:** Future land use patterns should be assessed and analyzed as part of the evaluation process and the best available data and forecast should be used to complete an analysis of these uncertain conditions. Future land use patterns should be evaluated based on historical trends and projections. An assessment of any approved local master plan or other land use plans that guide management, conservation, population growth and development should be included in the evaluation in order to promote full disclosure of effects.
- **Adaptive Management:** Adaptive management is a deliberate, iterative and science-based process of designing, implementing, monitoring and adjusting an action or project component to reduce uncertainty and maximize achievement of project goals. Adaptive management should be evaluated and incorporated into alternatives where warranted to avoid and minimize adverse impacts on the environment. Adaptive management measures should be clearly identified and evaluated as part of alternatives in order to further reduce uncertainty particularly when more detailed information concerning the alternative is lacking. Adaptive management approaches be used to the extent that implementing such approaches is commensurate with the significance of the proposed activity and available resources.

### *c) Timing*

Generally, alternatives should be evaluated for at least 50 years into the future, unless project specific conditions dictate analysis should include a greater or lesser time period. The time period selected should be documented clearly and with the appropriate justification in the analysis, and used to evaluate each alternative.

## **E. Evaluate Effects of Alternative Plans**

The beneficial and adverse effects of each alternative plan should be evaluated through comparison to the without-plan scenario in accordance with the PR&Gs. The evaluation of alternatives is part of the NEPA alternatives analysis, in which the No Action Alternative and Action Alternatives are described, evaluated, and compared. The effects of alternative plans are displayed in terms of public costs and benefits.

## **F. Compare Alternative Plans**

Alternative plans should be compared to each other and to the without-plan scenario and should compare the ability of the alternative plans to respond to changing conditions, including climate change. The comparison of alternatives is part of the NEPA alternatives analysis. The plan that reasonably maximizes net public benefits should be identified.

## **G. Select the Recommended Plan**

The agency should recommend a decision to either: 1) implement an alternative project or program, or 2) take no federal action. The recommended plan must provide net public benefits, in accordance with the PR&Gs.

1. A recommended plan that does not provide net public benefits requires a Secretarial Exception. Requests for Exceptions should be in the form of a memorandum from the bureau director through the relevant assistant secretary to the A/S – PMB. The memorandum should describe the project or activity, the rationale for the exception, and relevant data and analysis to support the request.
2. The major structural and non-structural features of the recommended plan, any special considerations for implementation, and the estimated cost of implementation will be provided in the analysis.
3. The identification of an environmentally preferred alternative is required in the Record of Decision (ROD). The environmentally preferred alternative identified for the NEPA analysis is not required to be the same as the recommended plan.
4. If the cost-share partners/local sponsors prefer an alternative plan that is different from the recommended plan, it will be identified as the locally preferred plan. The locally preferred plan will be required to have a comparable level of detail and follow the same analytical framework as the recommended plan to allow close comparison by decision makers.

## IV. NEPA

### A. Introduction

The National Environmental Policy Act of 1969 (NEPA) requires federal agencies to consider and disclose to the public the environmental effects of a proposed federal action and alternatives before making a decision or taking action. The PR&G acknowledges that many federal investments in water resources through projects, programs, or activities require analysis under NEPA. An agency's ASPs for implementing the PR&Gs will "complement its existing NEPA processes, although the analyses conducted under NEPA and the PR&Gs processes may not always overlap" (IGs, p. 8). This section of the DOI Guidance: summarizes the connections between the PR&Gs and NEPA; highlights common aspects of PR&Gs and NEPA analyses and the importance of consistency; and discusses the analytical requirements of the PR&Gs that differ from those normally completed under NEPA. Finally, this section includes suggestions for incorporating a PR&Gs analysis into your agency's NEPA practice.

Where federal investments in water resources require analysis under NEPA and the PR&G agencies, "should integrate, to the extent possible, their PR&G analysis into existing planning processes, in the same way the NEPA process and land management planning are integrated into larger planning processes" (IGs, p. 8). Agencies may "integrate the PR&G and NEPA analyses by producing an analytical document that reflects both analytic processes, if that is the most efficient method for fulfilling NEPA and the PR&G" (IGs, p. 8). The PR&Gs suggest that agencies "facilitate the production of a single recommendation and/or decision document that fulfills the requirements of both processes" (PR&Gs, p. 6). Note that NEPA may be a component addressed during a planning process but is not a substitute for project planning.

While this section focuses on integrating NEPA and PR&Gs analysis, it is important to remember that PR&Gs applicability and NEPA compliance are based on different criteria. This means that if a proposed activity, program or grant is described as exempt from the PR&Gs, NEPA compliance still may be required. Conversely, a proposed activity, program or grant for which NEPA analysis is not necessary (e.g., because a bureau can tier to an existing NEPA document) may require PR&Gs analysis.

### B. NEPA and the PR&Gs

The procedural requirements of NEPA found in Council on Environmental Quality (CEQ) (40 CFR pts. 1500-1508) and DOI (43 CFR pt. 46) regulations apply to each bureau proposed action that 1) would cause effects on the human environment and 2) is subject to bureau control or responsibility, considering the need for federal funding or approval (43 CFR § 46.100). For each such proposed action, the lead agency under NEPA typically prepares an environmental impact statement (EIS) or an environmental assessment (EA) that analyzes the direct, indirect, and cumulative effects of the proposed action and alternatives, including mitigation, on the human environment. Potential social or economic effects themselves do not require NEPA analysis; however, where NEPA analysis is conducted, social and economic effects that are interrelated with natural or physical environmental effects should



be discussed (40 CFR §§ 1508.8 and 1508.14). The NEPA document informs the bureau’s decision, which is grounded in relevant legal authorities (e.g., the Federal Land Policy and Management Act or the Endangered Species Act) and policy objectives and is memorialized in a separate decision document.

The PR&Gs apply to a subset of the federal proposed actions that are subject to NEPA, those “Federal investments that by purpose, either directly or indirectly, affect water quality or water quantity, including ecosystem restoration or land management activities” (PR&Gs, p. 1). The IGs and DOI ASPs refine the applicability of the PR&Gs (see Table 2. DOI Programs – Level of PR&Gs Analysis). Moreover, PR&Gs analysis is more focused than NEPA analysis, although the analyses overlap. PR&Gs analysis under these ASPs is based on the Federal Objective, Guiding Principles, and General Requirements of the PR&Gs (IGs, p. 3) as described elsewhere in these DOI ASPs.

To encourage efficiencies and foster understanding, bureaus generally should integrate PR&Gs analysis into NEPA analysis for a proposed action by presenting the PR&Gs analysis in the NEPA document.<sup>1</sup> For most proposed actions, the EA or EIS should include a description of each step of the PR&Gs analysis and clear explanations of any requirements, considerations, and choices that are specific to the PR&Gs (i.e., not otherwise required under NEPA). Some examples of such requirements, considerations, and choices are described in the “Analytic Requirements Specific to PR&G Analysis” section below. For proposed actions for which new NEPA analysis is not necessary (e.g., where a bureau can comply with NEPA by tiering to an existing NEPA document), bureaus may present the PR&Gs analysis in a stand-alone document. Upon completing the required NEPA and PR&Gs analyses, bureaus should describe the resulting decisions and outcomes, including any mitigation commitments, in a single decision document (e.g., a Record of Decision following an EIS).

### C. Consistency in PR&Gs and NEPA Analyses

Several aspects of a PR&Gs analysis are consistent with aspects of NEPA analysis. For instance, an ecosystem service approach as described in section VI of these DOI ASPs is consistent with and may inform NEPA analysis. One of the purposes of NEPA itself is to “encourage productive and enjoyable harmony” between people and their environment (42 USC 4321; see 42 USC 4331(a)), and NEPA affirms the federal government’s responsibility to “use all practicable means, consistent with other essential

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<sup>1</sup> The IG explain that while the PR&Gs do “...not substitute or supersede any NEPA requirements or any other planning requirements,” integrating PR&Gs analysis into existing project planning “reduces the risk of duplicative analyses.” Moreover, “[a] single analytical document could help ensure consistency across the alternatives analyzed and the other components common to the two processes, as well as reduce the workload for reviewers” (IGs, p. 8). Such integration is consistent with CEQ NEPA regulations directing Federal agencies, “to the fullest extent possible,” to “[i]ntegrate the requirements of NEPA with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently rather than consecutively.” 40 CFR § 1500.2(c); see also 40 CFR §§ 1500.4(k) and 1500.5(g) (directing agencies to reduce paperwork and delay by “[i]ntegrating NEPA requirements with other environmental review and consultation requirements” and citing § 1502.25); 40 CFR § 1501.2 (directing agencies to “integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts”) and 40 CFR § 1506.4 (providing that “[a]ny

considerations of national policy, to improve and coordinate federal plans, functions, programs, and resources” in order for the Nation to “attain[ing] the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences” (42 USC 4331(b)(3)).

In addition, agencies may consider benefit-cost analysis under NEPA in certain circumstances. NEPA does not require agencies to use a monetary benefit-cost analysis when comparing alternatives, and such analysis “should not be [used] when there are important qualitative considerations” (40 CFR 1502.23). Yet, NEPA allows agencies to consider a benefit-cost analysis “relevant to the choice among environmentally different alternatives [that] is being considered for the proposed action,” provided the EIS incorporates by reference or appends the analysis and discusses its relationship to “any analyses of unquantified environmental impacts, values, and amenities” (40 CFR § 1502.23). Thus, a PR&Gs analysis can build on agencies’ consideration of social and economic effects under NEPA (40 CFR §§ 1508.8 and 1508.14) and incorporate appropriate benefit-cost analysis.

The guiding principles and general requirements of the PR&Gs also align with considerations under NEPA. For instance, the P&Rs indicate that agencies should “provide opportunities for effective public participation by minority, Tribal, and low-income communities in federal planning and decision making processes,” including by “identifying potential effects and mitigation measures in consultation with affected communities...” (PR&Gs, p. 5). NEPA analysis includes such analysis and mitigation of effects related to environmental justice where relevant. In addition, the general requirements of the PR&Gs ask that agencies identify, describe, and consider areas of risk and uncertainty for potential investments in water resources, including climate change (PR&Gs, Chapter II, § 1.D.i., pp. 9-10). NEPA analysis encompasses the potential effects of a proposed action and alternatives related to climate change, as indicated by its greenhouse gas (GHG) emissions, as well as the effects of climate change on a proposed action and alternatives, where relevant.<sup>2</sup> Bureaus generally should discuss common requirements of the PR&Gs and NEPA together in one or more sections of a NEPA document. (Section E below provides suggestions for doing so.) In doing so, bureaus should explain any differences in focus or outcomes of the PR&G and NEPA analyses.

Where the requirements of PR&Gs and NEPA analyses overlap assumptions, alternatives, and baseline conditions should be consistent between the two analyses. Consistency will facilitate efficiency and public involvement in the PR&Gs and NEPA processes, and it will help to ensure that bureau decision makers receive a coherent analysis that informs a single, integrated decision document. If consistency is not feasible or appropriate for every aspect of the PR&Gs and NEPA analyses, the NEPA document should explain the need for and value of any assumptions, alternatives, or baseline conditions used in the PR&GS analysis that differ from those used in the NEPA analysis.

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<sup>2</sup> See CEQ, *Revised Draft Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews*, 79 Fed. Reg. 77802, 77823 (Dec. 24, 2014).

## D. Analytic Requirements Specific to PR&Gs Analysis

The PR&Gs and the IGs contain several specific requirements for PR&Gs analysis that are not included in the requirements of NEPA and the CEQ and DOI NEPA implementing regulations. When preparing a NEPA document (or a separate PR&Gs document if no new NEPA document needs to be prepared), bureaus should indicate which analytical requirements or discussions are specific to the PR&Gs analysis. The explanation will help the public and decision-makers to use the NEPA analyses to inform the resulting decisions. In particular, bureaus should identify the following analytical requirements specific to the PR&Gs where they are relevant.

- **Federal Objective.** Under the PR&Gs, Federal investments are evaluated with respect to the Federal Objective and should promote the guiding principles (PR&Gs, Chapter I, §§ 2-3 (pp. 3-4)). By contrast, under NEPA a lead agency's purpose and need for the proposed action (40 CFR § 1502.13) frames the analysis, and it is grounded in other statutory authorities (e.g., the Federal Land Management Policy and Management Act (FLPMA)).
- **Alternatives.** The requirements for analyzing alternatives under the PR&Gs differ from the requirements for analyzing alternatives under NEPA, although both authorities ask agencies to consider a reasonable range of alternatives (IGs, p. 20). The alternatives analyzed under NEPA, which must meet the purpose and need for the proposed action (43 CFR § 46.100) and reflect underlying legal authorities and policy objectives, likely will be similar to those analyzed under the PR&Gs for proposed actions that focus on water resources. However, the NEPA alternatives may differ somewhat from the PR&Gs alternatives for proposed actions with a different purpose and need, where water resources are a minor consideration. In such situations, the proposed action likely would be eligible for scaled PR&Gs analysis (see Table 1., Financial Thresholds) or excluded from PR&Gs analysis altogether.

The PR&Gs and the IGs also contain specific requirements for analyzing alternatives, in contrast to the more general NEPA requirement that a lead agency consider a reasonable range of alternatives (see 40 CFR § 1502.14). Unique requirements of the PR&Gs include "full consideration and reporting on nonstructural alternative actions or plans" (PR&Gs, Chapter II, § 1.F., p. 11) and a specific, final array of alternatives (PR&Gs, Chapter II, § 1.H., p. 12). The IGs (Chapter III, § 7.a.iv., p. 20) explain that "[a]lternatives should comprehensively integrate multiple objectives for water resources investments" and "should reflect a range of scales and management measures, and be assessed against the formulation criteria" in the PR&Gs: completeness, effectiveness, efficiency, and acceptability.

The PR&Gs also call for a transparent comparison of the effects of alternatives for their contribution to the Federal Objective and each of the Guiding Principles, using an ecosystem service approach and including a discussion of trade-offs in documentation provided in display and narrative form (see IG, Chapter III, § 7.a.v and 7.a.vi, pp.21-24). While an ecosystem service approach may be used in NEPA analysis, NEPA does not require this explicit comparison.

## E. NEPA Practice

Bureaus should consider describing and requesting public input on the PR&Gs analysis in the Notice of Intent to prepare an EIS (43 CFR § 46.435(a)). Bureaus also should consider using the NEPA scoping process to inform state, local, and tribal governments and the public of the need for PR&Gs analysis, where applicable, and to learn of any information or concerns relevant to the analysis.

Bureaus should consider engaging other government agencies, including NEPA cooperating agencies, on PR&Gs analyses. Collaboration is one of the general requirements of the PR&Gs, which call on federal agencies to “collaborate fully on water resources related activities with other affected federal agencies and with Tribal, regional, state, local, and non-governmental entities,” as well as other groups (PR&Gs, Chapter II, § 1.C, p. 8). DOI NEPA regulations require that bureaus “whenever possible consult, coordinate, and cooperate with relevant State, local, and tribal governments and other bureaus and federal agencies concerning the environmental effects of any federal action within the jurisdictions or related to the interests of these entities” (43 CFR § 46.155). This is one avenue for collaboration on PR&Gs analyses.

In addition, bureaus are required to invite eligible cooperating agencies, those federal, state, tribal, or local agencies with jurisdiction by law or special expertise (see 43 CFR § 46.225(a)), to serve as cooperating agencies in the preparation of a NEPA document. Like NEPA analysis, PR&Gs analysis that is integrated into the NEPA process could benefit from lead agency-cooperating agency relationships. While cooperating agency status is not available to all stakeholders, it offers another avenue for bureaus to collaborate with eligible and willing federal agencies or state, tribal, or local governments on PR&Gs analysis through the NEPA process.

To facilitate integration of PR&Gs analysis into NEPA analysis, bureaus should alert direct or third-party contractors preparing NEPA documents to the requirements for PR&Gs analysis. Bureaus also may need to include elements of PR&Gs analysis in statements of work. Contractor awareness will facilitate the timely and efficient integration of PR&Gs analysis into NEPA and decision documents.

Finally, bureaus should document their PR&Gs and NEPA analyses throughout the NEPA process and include the relevant documentation in the administrative record. These practices will support the preparation of sound documents that integrate PR&Gs and NEPA analyses.

## V. Environmental Justice

Guidance and useful information on addressing environmental justice considerations can be found in the 2011 interdepartmental Memorandum of Understanding (MOU) on Environmental Justice and Executive Order 12898 (<http://www.epa.gov/environmentaljustice/resources/publications/interagency/ej-mou-2011-08.pdf>).

In particular, the MOU provides:

In its Environmental Justice Strategy, Annual Implementation Progress Reports and other efforts, each federal agency will identify and address, as appropriate, any disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations, including, but not limited to, as appropriate for its mission, in the following areas: (1) implementation of the National Environmental Policy Act; (2) implementation of Title VI of the Civil Rights Act of 1964, as amended; (3) impacts from climate change; and (4) impacts from commercial transportation and supporting infrastructure (“goods movement”). These efforts will include interagency collaboration. At least every three (3) years, the Interagency Working Group will, based in part on public recommendations identified in Annual Implementation Progress Reports, identify important areas for federal agencies to consider and address, as appropriate, in environmental justice strategies, annual implementation progress reports and other efforts.

## VI. Existing Guidance

Existing guidance should form the basis for the analysis done to satisfy the requirements of the PR&Gs. In some cases, bureaus may wish to develop more specific guidance.

Guidance that might be of interest to all bureaus includes recent BLM Instruction Memorandum (IM) No. 2013-131, *Guidance on Estimating Nonmarket Environmental Values* ([http://www.blm.gov/wo/st/en/info/regulations/Instruction\\_Memos\\_and\\_Bulletins/national\\_instruction/2013/IM\\_2013-131\\_Ch1.print.html](http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2013/IM_2013-131_Ch1.print.html) (Guidance)). This guidance directs BLM staff to utilize estimates of nonmarket environmental values in NEPA analysis supporting planning and other decision-making where relevant and feasible. The Guidance calls for at least a qualitative description of the most relevant nonmarket values to be included for the affected environment and the impacts of alternatives in NEPA analyses involving environmental impact statements (EIS), for both resource plans and project-level decisions. A quantitative analysis of nonmarket values in EIS-level NEPA analyses is strongly encouraged where one or more of the criteria identified in the IM apply.

Reclamation has an extensive collection of reports and publications that address the economic analysis of various aspects of water projects: <http://www.usbr.gov/pmts/economics/reports.html>.

DOI also has established guidance on issues associated with environmental justice. A collection of resource materials is available at: <http://www.doi.gov/pmb/oepec/environmental-justice.cfm>.

## VII. Ecosystem Services

### A. Introduction

The PR&Gs require an analysis of water projects in terms of the expected change in ecosystem service flows over time. Ecosystem goods and services are those things provided by nature that are of use to humans. While a distinction is sometimes made between ecosystem goods (tangible commodities produced by nature, e.g., timber production) and ecosystem services (less tangible benefits of well-functioning natural systems, e.g., wetland water quality), often the phrase ecosystem services refers collectively to all of these benefits. At the root of the ecosystem service concept is the connection between the biophysical elements of an ecosystem and the health and well-being of the human populations that depend on that ecosystem. Ecosystem services can be described as the elements that make explicit this connection, as they are dependent on the structure and processes of the ecosystem, but are directly valued by humans.

The ecosystem service concept provides an analytical framework which can be commonly used across agencies, fully articulates the tradeoffs inherent in a decision, and provides additional information to the decision maker. This framework is well suited for trade-offs that involve many competing values associated with the natural resource, as it starts from the assumption that all ecosystem services should be evaluated. This framework equally considers services that are market commodities and those that are not, as well as services that provide use and non-use values. An ecosystem service approach can be used to address the full range of benefits and costs associated with a proposed alternative. In addition, the scale of an ecosystem service analysis can be adjusted to meet the needs of an individual project. While all ecosystem service analyses should share common elements, as described below, how these elements are achieved can depend on the needs of the project. For example, while it is important to estimate how ecosystem service values vary across alternatives, there are many different metrics and methods that might be used, including qualitative or quantitative, and monetary or non-monetary approaches. The best approach will depend on the needs and scale of the project. In general terms, ecosystem services can be characterized in quantitative or qualitative terms and, depending on the availability of data and resources available for the analysis, can be monetized. The PR&Gs analysis should quantify as many effects as possible, and monetize as many of the quantified effects as possible given the data and resource constraints.

### B. Guidelines for Ecosystem Service Analysis

There are many ways in which the concept of ecosystem services can be used to organize an analysis of trade-offs and inform decision making. The purpose of this section is to identify key aspects of an ecosystem service analysis in the context of the PR&Gs that should be considered and documented. Both quantified and unquantified effects should be considered as part of an ecosystem services analysis. Effects should be monetized to the greatest extent possible. Projects/activities that fall into the category of “standard analysis” should make significantly greater efforts to quantify and monetize impacts. The extent to which effects can and should be monetized should be made on a resource-by-

resource basis and considering the estimated present value cost of the project/activity and the significance of the effects. Qualitative descriptions/analysis may be used as part of the ecosystem service framework. However, if initial analysis indicates that qualitative benefits represent a significant proportion of the total project benefits, then additional analysis must be undertaken to quantify the non-quantified services. Lack of resources alone is not a sufficient rationale for the lack of quantification and monetization of benefits. Efforts must be taken to quantify and monetize benefits for all projects/activities that exceed the financial thresholds for “standard analysis” identified in Table 1.

### **C. Social Assessments**

The PR&Gs analysis should connect ecological and social analyses in order to provide decision makers with additional information as they select among alternative management actions, choose among sites, consider which projects to fund or conduct, and contemplate different policy options or scenarios. Early stakeholder engagement may be helpful in obtaining information that might be helpful in linking management actions to desired social benefits. The PR&Gs analysis should identify desired social outcomes which will be considered along with desired ecological conditions and then connected with potential management options to achieve the ecological and social objectives. Effects on individuals and communities to consider often include: social well-being; quality of life; safety, health, family and individual well-being; attitudes, beliefs and values (includes culture and religion); interaction with the environment; and other factors. Social impact assessments can include the following basic elements:

- (1) Description of the setting - Relevant history of the area and/or of the project or program, social history (including socio-cultural and socioeconomic factors) of the area, population and demographic trends.
- (2) Characterization of present conditions - current social conditions (i.e., social groups, socio-cultural values, issues, population, demographics, etc.)
- (3) Impact Analysis - forecast future social conditions without the plan and the potential social impacts under the plan’s alternatives.
- (4) Display Results. Provide a comparison of the “with” and “without” project impacts and display tradeoffs.

### **D. Selecting Services for Evaluation**

The specific ecosystem services and metrics considered in the analysis will depend on the specifics of the actions and resources evaluated. The analysis should consider, at a minimum on a qualitative basis, those ecosystem services important to the area and those most affected by the proposed action. The process of identifying ecosystem services and metrics should be well documented in the analysis.

### **E. Measuring Changes in Services Based on Changes in Ecosystem Structure or Function**

- Final and intermediate goods and services: For a proper accounting of changes in ecosystem service value, it is important to fully articulate the processes and functions that relate ecosystem

structure and processes to the benefits directly enjoyed by humans. The evaluation of benefits should then focus on the final endpoints of this relationship, which are sometimes referred to as Final Ecosystem Goods and Services. These final services might be produced by one or more intermediate ecosystem services and supported by other ecological processes.

- Provision of services over time: The analysis of ecosystem service impacts should describe how these impacts are expected to change over time. This relationship can be complex, but should be described as completely as feasible. At a minimum, expected differences in short-term and long-term impacts should be identified.
- Uncertainty: There is often significant uncertainty in quantifying the impact of an action on ecosystem service production. The results should describe the sources and level uncertainty as completely as possible.

## **F. Identify Beneficiaries**

- Location of Beneficiaries: The beneficiaries of ecosystem services are not always obvious. Many ecosystem services provide benefits indirectly, for example to those who live downstream from a wetland, or view scenic landscapes from a distance. Services that provide non-use values might provide benefits to individuals across the U.S., with no clear relationship between distance to the resource and value. An important aspect of evaluating ecosystem services is to identify those populations who will be impacted by a change in the resource. The results of this analysis should clearly define these groups and describe how the groups were identified.
- Distributional differences: In identifying beneficiaries, it is also important to identify subgroups within the population that may be affected differently. The stakeholder groups considered in the analysis will likely be defined by geographic location and other characteristics.

## **G. Analyze Relative Change in Ecosystem Service Value for each Alternative**

Describing Values: The PR&Gs require an analysis of water projects in terms of changes to ecosystem service flows over time. There are many different approaches to describing and measuring the change in ecosystem service value under each alternative. At a minimum, a qualitative discussion of the relative value of each alternative should be included. This discussion should include an assessment of all components of the total economic value, including both use and non-use value. In many cases, a qualitative assessment of ecosystem service values will provide additional information that can more fully describe the trade-offs among alternatives. Qualitative assessments of ecosystem services values may or may not include monetary estimates.

- Distributional Differences: Regardless of how ecosystem service values are measured, the analysis should clearly identify any subpopulations that may experience relatively greater or fewer net benefits under each alternative.
- Discounting: The analysis should describe when benefits are likely to be realized, and when costs are likely to be incurred. To enable comparison of benefits and costs occurring at different times, appropriate discounting methods should be used when feasible. When discounting is not



feasible, such as when benefits are not described monetarily, a discussion of the impact of waiting for future benefits should be included.

- Uncertainty: As with other stages of the analysis, there is often significant uncertainty in estimating the value of ecosystem services, particularly monetary values. The results should describe the level of uncertainty and the sources of uncertainty as completely as feasible.

## VIII. Economic Analyses

### A. Introduction

As stated in the PR&Gs *it is intended that Federal investments in water resources as a whole should strive to maximize public benefits, with appropriate consideration of costs. Public benefits encompass environmental, economic, and social goals, include monetary and non-monetary effects and allow for the consideration of both quantified and unquantified measures.* The focus of this section is to discuss the estimation of benefit values and impacts which can be monetized, including environmental and social effects, resulting from activities covered by the PR&G's. This section provides brief descriptions of the economic analyses that are commonly used to evaluate federal investments. The information presented in this section is not intended to be a "how to guide" or provide specific instructions on how to implement any particular analytical method but rather provide general concepts. While these Guidelines do not prescribe the techniques to be used to quantify and monetize benefits, information must be provided to justify the use of any particular technique as the most appropriate given the circumstances. In particular, use of the benefit transfer technique must be well documented. The justification of any economic valuation techniques used should include discussion on why the method is the most appropriate for the analysis, how it compares to other methods that could have been used (pros vs. cons), and what are the risks and uncertainties inherent in using that particular technique. The ASPs allows for the use of new analytical techniques and methodologies, as they become available and cost effective. The economic analyses discussed in this section include:

- Benefit Cost analysis
- Regional Impact analysis
- Cost Effectiveness analysis
- Break-even Analysis

### B. Benefit-Cost Analysis

The objective of a national economic benefit-cost analysis (BCA) is to evaluate the derived/estimated economic benefits and costs of an action and its effects on the national economy. Beneficial and adverse effects are evaluated in monetary terms and are measured in terms of changes in national income, thus accounting for offsetting gains and losses across different regions of the nation. Beneficial effects in a BCA are net increases, after accounting for costs, in the value of the national output of goods and services resulting from a plan, and improvements in national economic efficiency. Economic efficiency may be defined as maximizing output per unit of resource input, or conversely minimizing

resource inputs per unit of output. Costs are represented as a loss in utility as measured by the opportunity cost (value of resources forgone) from an action. In theory, a BCA takes into account all quantitative and qualitative benefits and costs that accrue to society. However, in practice, due in part to a lack of information and technical limitations, it is rarely possible to quantify all of the costs and benefits. The exclusion of relevant costs and benefits biases the results and reduces the robustness of a BCA.

The results of the BCA are discounted to the net present value (NPV) in accordance with economic theory, for comparability. If the NPV is demonstrated to be positive, implying that present value of the benefits exceeds the present value of the costs, the project is considered to be economically justified given the capability to quantify available information and valuation methods employed.

## 1. Economic Values – Benefits

Economic values represent the utility (welfare or satisfaction) received or lost by an individual or society resulting from peoples' preferences and their resource utilization. The general measurement standard of the value of goods and services is defined as the willingness to pay (WTP) for each increment of output from a plan. Such a value would be obtained if the "seller" of the output were able to apply a variable unit price and charge each user an individual price to capture the full value of the output to the user, also known as "perfect price discrimination." Since it is not possible in most instances for the planner to measure the actual demand situation, various techniques, as presented below, are used to obtain an estimate of the total value of a plan. Some methods are more complex, data-intensive, and time-consuming than others to implement. The complexity of the analysis should match the scale, scope, and cost of the proposed project or plan. Note that the list of methods in the following sub-sections is not all-inclusive and other methods may be utilized under certain circumstances.

Monetized economic values can be categorized into two broad classifications of use and non-use. The delineation between these two value categories is due in part to preference, proximity, and timing.

### a) Use Values

**Types of Use Values:** Use values are derived from the use or consumption of specific resources or ecosystem services. Use values include both direct and indirect utilization of resources or ecosystem services.

- *Direct Use.* Direct use values encompass the values associated with human physical interaction and involvement with resources (e.g., timber harvested from the forest, water extracted from a stream for irrigation, and tourism). Direct use values can further be disaggregated into the subsets of "consumptive" use in which resources are actively consumed (e.g., logging, fishing) and "non-consumptive" use which do not deplete resources (e.g., certain types of recreation such as enjoying the scenic beauty of a natural vista).

- *Indirect Use.* Indirect use refers to the category of resources that are passively used to support humans or intermediary to what humans directly use, including: climate regulation, carbon sinks, flood control, animal and fish refugia, pollination, and waste assimilation from wetlands.

#### (1) Methods for Estimating Use Values

- *Actual or Simulated Market Price.* If, in an efficient market, the additional output from a plan is too small to have a significant effect on price, actual or simulated market price will closely approximate the marginal value of the output and may be used to estimate WTP. If the additional output is expected to have a significant effect on market price then an attempt should be made to estimate the marginal effects of the added output. As stated in the assumptions below, in this context projection planning is generally based on full employment economy; assumption of a full employment economy establishes a rationale for general use of market prices in estimating economic benefits and costs.
- *Change in Net Income.* When outputs of a plan are intermediate goods or services, the net income of the direct user may be increased. Where changes in net income of each individual user can be estimated, a close approximation of the total value of the output of the plan will be obtained. An example of this method is the increase in net farm income received from the use of irrigation water to produce agricultural commodities.
- *Cost of the Most Likely Alternative.* The costs associated with obtaining the desired output by the most likely alternative can be used to approximate total value. This method lacks the robustness of WTP or change in net income methods and should typically only be applied as a stopgap. The cost of the most likely alternative will indicate the value of the output of a plan to the users assuming that society would, in fact, undertake the alternative. This method should only be used where a realistic alternative is available and there is a reasonable expectation that it would be undertaken in the absence of the federal project. Adequate consideration should be given to nonstructural and demand management measures as well as structural measures. This method can be used in evaluating the benefits of projects for hydropower, municipal and industrial water supply, or for ecosystem services that can be replicated through mechanical means, such as water quality improvements. This approach might encompass avoided costs.
- *Avoidance Expenditure Method.* This method considers the cost of actions taken to avoid harm as a way to value the experience of some current condition, absent the harm. For example, the expenditures a homeowner makes to reduce the risk of flood damage provide a lower bound estimate of the value placed on the current condition of the property and its setting.
- *Travel Cost Method.* Travel cost methods attempt to infer the value of a resource (such as a park or lake) by using information of the visitor's costs and tradeoffs in traveling to the site. With the cost information obtained a demand curve for WTP can be constructed and the values under study estimated. This method is useful for valuing recreation benefits.
- *Hedonic Valuation Method.* Hedonic valuation models gather exogenous market data and utilize multiple regression analysis techniques to analyze the data in order to predict/forecast the significance and impact of the variable(s) under examination. Hedonic models allow for the

measurement of the marginal WTP for discrete changes in an attribute. An example of this method is a study that examines the effects of a proposed project or plan on property values.

- *Agent Based Modeling (ABM)*. An ABM is a computational model for simulating the actions and interactions of autonomous individuals. The model attempts to represent the simultaneous actions of multiple agents, in an attempt to recreate and predict the actions of complex phenomena. ABMs are particularly valuable because they can be used to assess the effects of aggregate behavior on the system as a whole. ABMs combine some elements of game theory, complex adaptive systems, sociology and evolutionary programming. As an example, an ABM could be utilized to quantitatively estimate the extent of recreation use and the net increase in economic value which results from a park that does not currently exist.
- *Contingent Valuation (CV)*. The contingent valuation method is based on survey responses to a proposed change in resource use or a change in the distribution of use. For example, the benefits to water users of converting from groundwater to surface water supplies could be estimated by asking water users their WTP for the project given improvements in municipal and industrial water quality and reliability that would result. In addition, other questions such as household income, current water costs, perceptions of current water quality and supplies, and other measures of need could be asked to understand the factors that influence WTP. The responses to some of these other questions can also be used to evaluate the representativeness or demographics of the survey respondents.
- *Conjoint Analysis (Choice Experiments)*. Conjoint analysis is similar to contingent valuation in that it is a survey-based technique, but instead of asking participants to state their WTP, respondents choose between alternate states of the world. Each state of the world has a set of attributes, and a price. For example, a questionnaire on forest management might describe alternative management prescriptions with different options for the spacing of roads, treatment of dead and dying trees, and techniques of riparian protection, as well as the hypothetical payment the respondent would make to value each alternative. This method elicits economic values for sets of choices that more closely resemble management decisions than contingent valuation, but such surveys are correspondingly more complex to design and interpret.
- *Administratively Established Values*. Administratively established values are proxy values for specific goods and services cooperatively established by the resource management agencies. An example would be the range of unit-day values established for recreation by state or federal agencies.

## **b) Non-Use Values**

Non-use values reflect the common observation that people are WTP for resources, especially those involving changes in unique natural resources, which they may never directly or indirectly use. Non-use values include existence values and bequest values. Types of non-use values include:

- *Existence values*. Existence values are not derived from either direct or potential use and arises from the value placed on the intrinsic value of a resource apart from its use (e.g., individuals get pleasure from knowing a wilderness or animal and fish refugia exist).

- *Bequest values.* Bequest values arrive from and are based on the ideas of altruism. Bequest values are derived from individual's WTP for the pleasure they get from knowing that a resource is used by others, either currently or by future generations.

#### (1) Methods for Estimating Non-Use Values

- *Contingent Valuation (CV).* This approach was discussed above. It is designed to estimate values for individuals who may never actually use or interact with the resource. The simplest version of this approach merely asks respondents what value they would place on an environmental change (such as the loss of a wetland) or preserving the resource in its current state. Use of this method needs to address hypothetical bias and other issues that arise in the context of implementing this method.
- *Conjoint Analysis.* Again, this is the same method as defined under use values, but the survey is conducted on participants whom do not directly use the resource. This is a complex and evolving analysis approach that has great potential in mitigating some of the concerns with the robustness of the CV method.

#### c) *Benefit Transfer*

Another economic benefit valuation method that applies to both use- and non-use values is the benefit transfer method. The benefit transfer method uses results from other similar studies to estimate benefits. Site-specific and project-specific variables and assumptions used in an economic analysis cause results of the benefit transfer method to be less reliable and more uncertain when applied to other studies. Therefore, additional justification is required when the benefit transfer method is used, and caution should be observed when interpreting or reporting results. The justification should include a discussion on what method was originally used to derive the benefits that are being transferred. Preferably, benefit transfer should primarily be used in lesser-scale projects or plans that are employing a "scaled analysis" instead of a "standard analysis," or only for specific effects that have limited impact.

#### d) *Other Direct Benefits and Externalities*

Many economic activities provide incidental benefits which represent net increases in national economic efficiency to parties other than those for whom the project was intended. The occurrence of these benefits are considered incidental or external to the main project beneficiaries and the purpose for which the plan is being formulated.

A beneficial externality can be defined as an increase in utility or welfare due to the increase in output of goods and services and incidental reductions in production costs to indirect beneficiaries under conditions with the project. The increase or reduction is compared to conditions without the project less the opportunity cost of any additional factors of production employed by the indirect beneficiaries to determine the net effects.

The term "indirect beneficiaries" in this definition means firms or individuals benefitting from the project other than the direct users of project outputs. "Opportunity cost" means the income, produced by a factor of production in its next best alternative use. This concept is a critical part of the definition because only the increase in goods and services of production over its return without the project may be properly identified as an externality. For example, the return to labor and capital resources imported into the project area would not be considered an externality because presumably these resources could have earned an approximately equal return elsewhere in the national economy.

There are no uniform factors which can be applied to direct benefits to estimate other direct benefits/externalities, but the same methods or procedures used to measure direct benefits can be used. Identification and measurement must be treated on a case-by-case basis and care should be taken to eliminate the possibility of any double counting.

## 2. Economic Values – Costs

The discussion on values would be incomplete without a discussion of the cost aspects of a BCA. The basis of valuing costs originates in the theory of "opportunity costs," which is defined as the forgone value that would have resulted from the utilization of resources in the next-best alternative, given the preference of the individual or populace under study. An example of opportunity cost, as it relates to time, is the value of work or leisure activities foregone when traveling to a recreation site. The associated costs are broadly defined to include all aspects of the economic value of the resources required to construct, manage, operate, maintain, or replace the features of a project whether structural or nonstructural throughout the period of analysis. BCA costs should reflect the salvage value of land, equipment, and facilities that may have value at the end of the analysis period. Consideration should be given to the direct private and public uses that producers and consumers are currently making of available resources or are expected to make of them in the future.

If market prices reflect the full economic value of a resource to society, they are to be used to determine project costs. When market prices do not reflect these values then an estimate of other direct costs should be included. Surrogate values can be used appropriately to adjust or replace market values. Surrogate values are an approximation of opportunity costs based on an equivalent use or condition in restricted markets or non-market situations.

### a) Cost Categories

(1). **Implementation Outlays.** These are financial outlays incurred by the organization and, where appropriate, contributed by other federal or non-federal entities incurred for the implementation of a project and/or to place it in operation. They include estimates of construction costs; corollary costs, such as transitional development costs; transfers of investment costs from related projects; interest during construction; operation, maintenance, and replacement costs; and any other implementation cost, such as relocating facilities, archeological and historical salvage costs, or mitigating damages.

(2). **Associated Costs.** These are costs associated with the project in addition to the implementation outlays which are needed to achieve the benefits claimed during the period of analysis. An example would be on-farm irrigation water supply costs that are necessary for the realization of irrigation benefits.

(3). **Other Direct Costs/Negative Externalities.** Other direct costs/negative externalities are the reverse of other direct benefits/externalities as discussed previously. The concept is the same except in this instance the effect is harmful. Other direct costs/negative externalities include costs for which no implementation outlays are made. Those costs that are uncompensated become project costs and are included in the economic analysis of a plan. Other direct costs include losses in production efficiency due either to some harmful product of the project (e.g., pollution) or reduction in the scale of output due to displacement of some activity by the project. One example would be the loss of existing project irrigation benefits if a project is re-operated to maintain instream flows for environmental purposes. Another example would be lost power generation ability downstream due to a plan for increased upstream water depletions. External costs may also be imposed directly on consumers such as the effect of a project-induced road relocation which results in increased transportation costs to users of the route.

## **C. Regional Impact Analysis**

### **1. Introduction**

The regional impact analysis measures the effect of the alternatives on the region's local economy. This analysis is completed by measuring the changes in the distribution of regional economic activity as a result of an action and does not account for gains or losses outside the region of study. The regional analysis typically measures the changes in employment, income, and industry output resulting from an action.

The regional analysis is important to local interests where an action is under consideration. An action that will attract new sources of revenues and activities to a region may result in increased employment, income, and production to that region. Local government officials, business leaders, and the general population would likely want to know the extent of these impacts for future planning purposes and how their community would be affected. If the local economy is currently experiencing high unemployment and low income levels, then the action may be encouraged locally. However, if the action is perceived as causing growth related problems such as overcrowding and high housing costs with little benefit, then the action may be opposed locally. The regional analysis provides information to local parties most affected by a proposed action and estimates the effect of the action on the local economy.

A regional analysis is distinctly different from an economic benefit-cost analysis (BCA). The regional impact analysis is a measure of regional activity, whereas the economic benefit cost analysis is a

measure of economic benefits to the nation as a whole. The results of the BCA and the regional impact analysis are not directly comparable because they do not measure the same effects. As stated earlier, the BCA measures net benefits, which represent the value of a resource or resource-related activity to society. The regional impact analysis measures regional impacts, which are flows of money (or employment) into or out of a defined region. The regional impacts from an action may result in substantial increases in income or employment within a specific region, but may generate little or no benefits to society at the national level. It is also possible that an action may result in reduced regional output and income in a particular area, while generating positive benefits to the nation as a result of potential environmental enhancement activities or other improvements which are not translated into actual money flows.

## 2. Regional Impact Methods

A variety of regional impact methodologies are available, each having distinct advantages and disadvantages. The choice of a regional impact estimation method depends ultimately on the size and complexity of the region under consideration, the magnitude and types of changes in expenditures associated with the action under consideration, the time and budget available to complete the impact analysis, the level of detail required, and the information available. The four commonly used methods are 1) economic base, 2) income-expenditure, 3) input output, and 4) computer general equilibrium (CGE). New analytical techniques and methodologies may become available and cost effective in the future, these guidelines allow for their adoption.

The economic base and income-expenditure methods are the most simplistic approaches and are generally best used in analyses that require less precision in the estimated impacts, in analyses of regions that are relatively small and uncomplicated, and in cases where the study budget is insufficient to fund a more sophisticated analysis.

Input-output analyses are better for larger impact regions that have more complicated trade patterns and more complex production and consumption relationships. The input-output method is presented in the greatest detail because it is currently the most widely used technique for estimating regional impacts and is most applicable to the types of analyses performed for evaluating alternatives.

CGE models can account for price changes related to changes in input requirements and substitution of inputs that may occur as a result of the impacts under consideration in the analysis. As a result, an analysis based on a CGE model is most appropriate when impacts are estimated for a large change in production and output that would affect regional input and output prices.

Regardless of the method used to estimate impacts from a project or action, there are three basic steps in a regional impact analysis:

- Determine the impact region of concern.
- Identify the types of activities that will be affected by the action under consideration and the level of expenditures associated with each. Activity categories could include construction,



agricultural production, recreation visitation, power generation, municipal and industrial water supplies, direct government payments to households or businesses in the region, and many others. Expenditure categories, for example, may include items such as groceries, gasoline, utilities, vehicles and other equipment.

- Determine the changes in expenditures that represent a true change in final demand. That is, expenditures that occur in the region must be separated from expenditures that occur outside the region.

#### **D. Cost Effectiveness – Incremental Cost Analysis**

The cost effectiveness is a method that seeks to identify the least-cost way to achieve a given objective, without considering whether there is any economic justification for achieving that objective. Cost effectiveness is derived by dividing the total discounted costs by the physical output or service that is generated by the project over the period of analysis. A cost-effective plan is one that, for a given level of output, there is no other plan that costs less.

A cost effectiveness analysis should be used when a level of service is mandated and thus the objective of the analysis is to determine which program or alternative under consideration achieves the mandated level at the lowest cost (e.g. dam safety projects). When projects or alternatives are mandated it is assumed that the economic benefits outweigh the costs. However the limitation of a cost effectiveness analysis is that the analysis does not provide the necessary information to determine if project or alternative is economically justified.

Incremental cost analysis is a process to identify efficient alternative plans by comparing the additional costs to the additional outputs of an alternative. It is particularly useful when evaluating quantified, but non-monetized benefits. It can be applied when the purpose of the plan is to maximize a particular output at the lowest cost possible. The subset of cost effective plans are examined sequentially (by increasing scale and increment of output) to ascertain which plans are most efficient in the production of benefits. Those most efficient plans provide the greatest increase in output for the least increases in cost. They have the lowest incremental costs per unit of output. Usually, the incremental analysis by itself will not point to the selection of any single plan. The results of the incremental analysis must be synthesized with other decision-making criteria (for example, significance of outputs, risk and uncertainty, reasonableness of costs) to help the planning team select and recommend a particular plan.

#### **E. Break-Even Analysis**

The term break-even point is used to describe the point at which benefits exactly equal costs. A break-even analysis can be used as a method of quasi-monetization, when applying it to a plan that has both monetized and non-monetized benefits, and requires the inclusion of non-monetized benefits for the plan to be economically justified. The break-even analysis determines how large or small the monetary value of an impact would need to be to have a material effect on the alternative plan, i.e. switching the plan from economically unjustified to justified, in a traditional benefit-cost analysis.

Break-even analysis enables a fully monetized decision making process, in cases where monetization of previously non-monetized benefits is necessary for economic justification. If certain categories of

benefits or costs are not monetized, a separate calculation should be performed to display the magnitude of the present value costs that would be required to switch the project between economically unjustified (benefit-cost ratio less than 1:1) and justified (benefit-cost ratio greater than or equal to 1:1). The accompanying text to this analysis should provide a discussion regarding the extent to which the value calculated for the non-monetized benefits is reasonable.

## **F. Common Assumptions**

The purpose of this section is to identify a set of common assumptions that would be used across all of the bureaus. Common assumptions could include the following:

### **1. Full Employment**

Full employment will be assumed except in regional planning areas with persistently high rates of chronic unemployment. Plans and project evaluation will be based on projections of income, employment, output, and population, and the amounts of goods and services that are likely to be demanded. Actual or projected needs for ecosystem services will be related to these projections (which are often subject to considerable uncertainty).

### **2. Period of Analysis**

The period of analysis should be the shorter of (1) the period of time over which the plan, project, or activity being analyzed can reasonably be expected to have beneficial or adverse effects, or (2) a period of time not to exceed 100 years. The analyst should also consider environmental factors that may extend beyond the period of analysis.

### **3. Prices**

The prices used in evaluation should reflect the real exchange value expected over the period of analysis. For this purpose, relative price relationships and the general level of prices prevailing during the planning study will be assumed to hold generally for the period of analysis, except where specific studies and considerations indicate that prices will increase or decrease at a rate different than the overall national inflation rate (an increase in real prices).

### **4. Technology**

Benefits and costs may change over time due to such causes as technological advances, population growth, and changes in use. The assumed period for projecting growth in benefits may vary among purposes/activities/programs depending upon the reliability of data and other pertinent factors in a given situation. However, because of the inherent uncertainties of future projections and the effect of discounting, caution should be exercised in extending the assumed period of growth in benefits beyond 20-25 years. Although the period of analysis may be longer (up to 100 years), the annual amount of benefits should remain constant after a buildup period of 50 years or less.

## 5. Discount Rates

The rate at which future costs and benefits are discounted is called the discount rate. Net benefits are to be adjusted for time of occurrence to annual equivalent values over the period of analysis by use of the interest or discount rate. For analysis of federal investments the discount rate is often prescribed in the federal requirements pertaining to the analysis. Where not precluded from doing so, real interest rates should be used. Generally the established rates must be used, with a few exceptions such as safety of dams. Note that discounting is the method for converting costs and benefits that occur at different points in time to a present value.

## G. Risk and Uncertainty

Risk and uncertainty is inherent in economic analyses, no matter the technique or methodology employed. Risk and uncertainty can be caused by unpredictability of future events and by limitations in the availability or precision of data. The analyses should identify areas of risk and uncertainty and describe them clearly, so that decisions can be made with knowledge of the degree of reliability of the estimated results and of the effectiveness of alternative plans.

The economic analyses need to reflect the uncertainty inherent in the data or various assumptions as to future economic, demographic, environmental, and technological trends. Various projections and assumptions of reasonable alternative forecasts, if realized, should be analyzed to determine if they would appreciably affect estimated results.

## IX. Decision-Making and Display of Tradeoffs

A key component of the PR&Gs is to display tradeoffs in a manner that informs decision making. Such displays should be understandable, transparent, and constructed in a generally consistent fashion for all PR&Gs analyses. A PR&Gs analysis should include a combination of both tables and explanatory materials to help inform a decision.

### A. Components of the analysis

To promote consistency across bureaus the following tables and information should be included in the analysis:

- A matrix summarizing the tradeoffs, relative to the baseline, resource-by-resource. This matrix should include: the annual and total estimated physical changes in the quantity and/or quality of each affected resource relative to the baseline; relevant time periods over which the changes are anticipated to occur; and the level of certainty associated with each estimate.
- The matrix must include information on the financial elements of a project/activity. For example, if the project or activity involves repayment by non-federal entities, lease payments, or other financial considerations are required, then, the table must display the magnitude of the

annual payments as well as the present value of the payments over the life of the project/activity.

- A summary table displaying the present value of benefits, costs, and net benefits (benefits less costs). Include all benefit estimates, regardless of the technique used to estimate them, in the table. To the extent feasible, all cost and benefit estimates should be accompanied by either quantitative or qualitative estimates or descriptions of the certainty of the estimate. The benefit-cost table should identify and include information on benefits and costs that are not monetized.
- A table indicating the extent to which the PR&Gs “guiding principles” have been achieved. The information in this table may be qualitative in nature.

## **B. Peer Review**

Each bureau must establish a peer review process for PR&Gs analyses. Peer reviewers may be drawn from the Department or any bureau. The Peer Review must accompany the final PR&Gs analysis. Projects/activities that are associated with costs that are estimated to exceed \$100 million (present value) must include at least one peer reviewer selected by the DOI. Peer review is especially important in cases where non-quantified benefits play a role in project justification.