Four Accounts Analysis of the Integrated Plan

YRBWEP Work Group Meeting

September 26, 2012

Four-Account Analysis

- 1983 *Principles and Guidelines* establish standards and procedures for use by federal agencies in evaluating alternative plans for water and related land resources

- Created Four-Account Analysis to evaluate projects with goal that projects contribute to national economic development consistent with protecting the environment

Four-Account Analysis

- **National Economic Development (NED)**

  Costs and benefits (value of national goods and services)

- **Regional Economic Development (RED)**

  Impacts of expenditures (jobs, incomes, output)

- **Environmental Quality (EQ)**

  Mechanism for displaying information relative to effects of proposed alternatives on resources significant to decision-making

- **Other Social Effects (OSE)**

  Repository for alternative effects not reflected in the other three accounts

1. National Economic Development (NED)

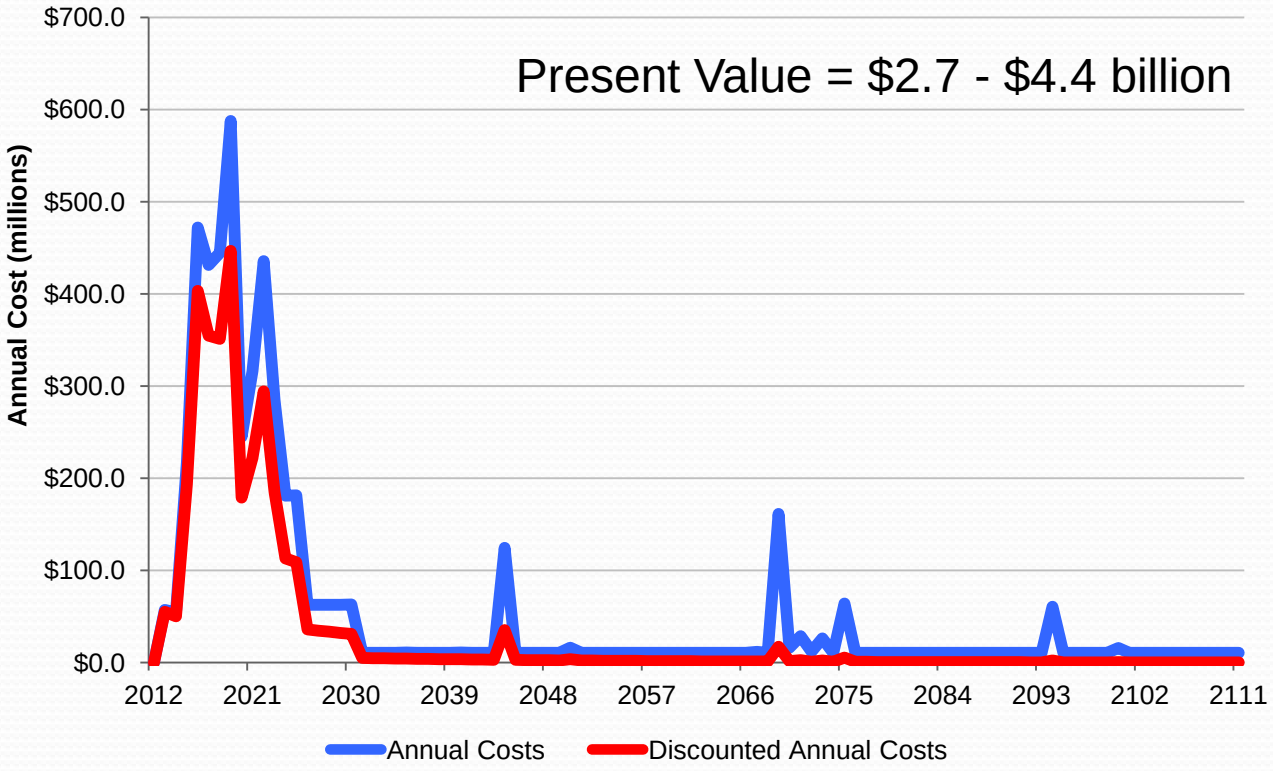
NED Benefits Quantified

- **Fish-Related Benefits**
  - Increases in salmon and steelhead populations
- **Agriculture-Related Benefits**
  - Improved agricultural output during severe droughts
- **Municipal/Domestic Benefits**
  - New water to support anticipated growth
  - Increased security for current municipal/domestic groundwater users above Parker Gage

NED Benefits Not Quantified

- **Cultural/spiritual values**
- **Species other than salmon/steelhead**
- **Agricultural output during less severe droughts**
- **Net increase in recreational opportunities**
- **Improved resiliency and adaptability of the water system**
- **Impacts on water supply and quality with anticipated increases in drought frequency or severity resulting from climate change**

NED Costs

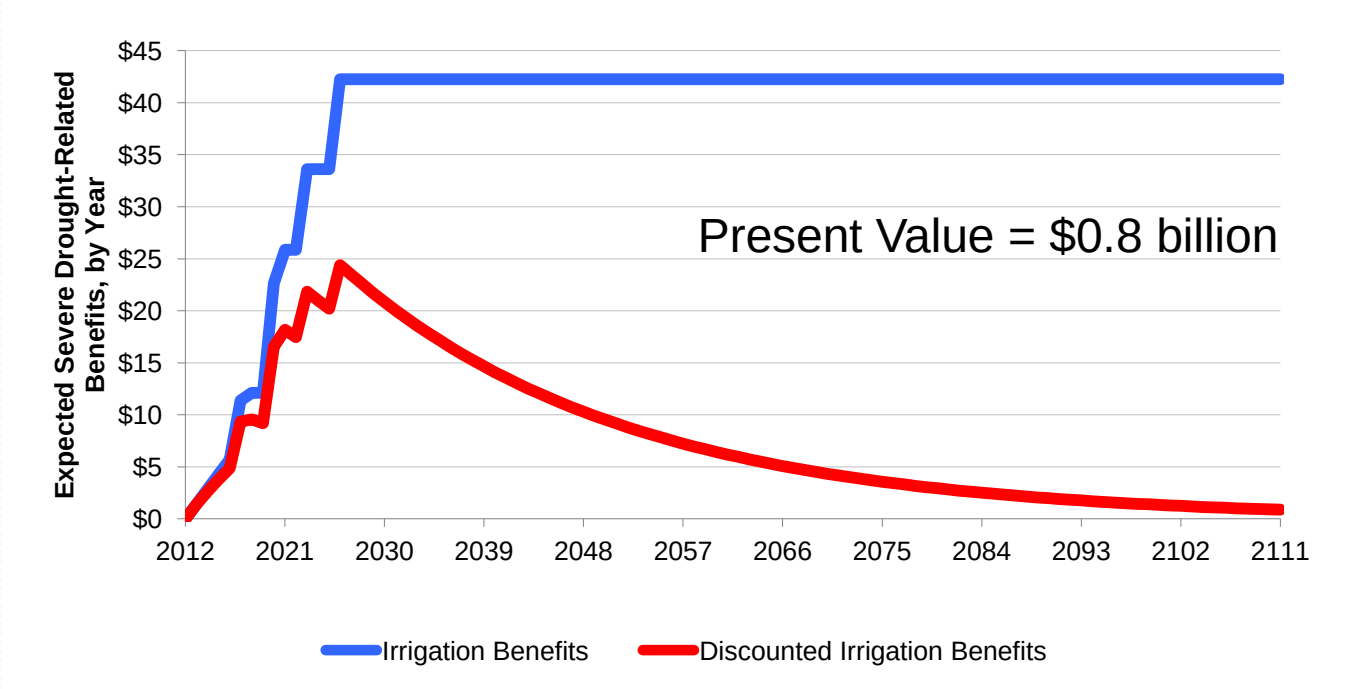

Present Value = $2.7 - $4.4 billion
Annual Cost (millions)
$700.0
$600.0
$500.0
$400.0
$300.0
$200.0
$100.0
$0.0
2012
2021
2030
2039
2048
2057
2066
2075
2084
2093
2102
2111
Annual Costs
Discounted Annual Costs

NED Fish-Related Benefits

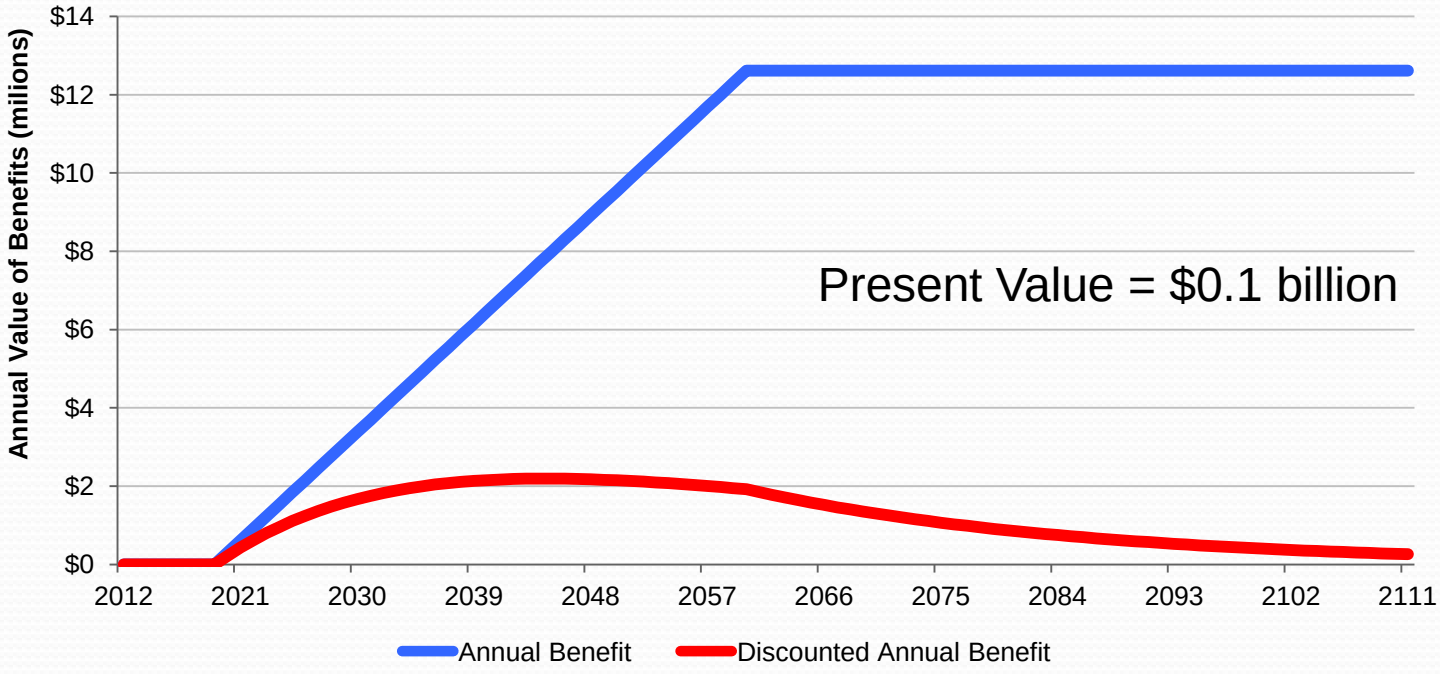
Region	Households (millions)	Total Present Value (billions)
WA only	2.66 - 3.23	$3.1 - $4.6
WA and OR	4.21 - 5.20	$5.0 - $7.4

(Quantifiable use-value = $0.1 - $0.3 billion of the total present value)

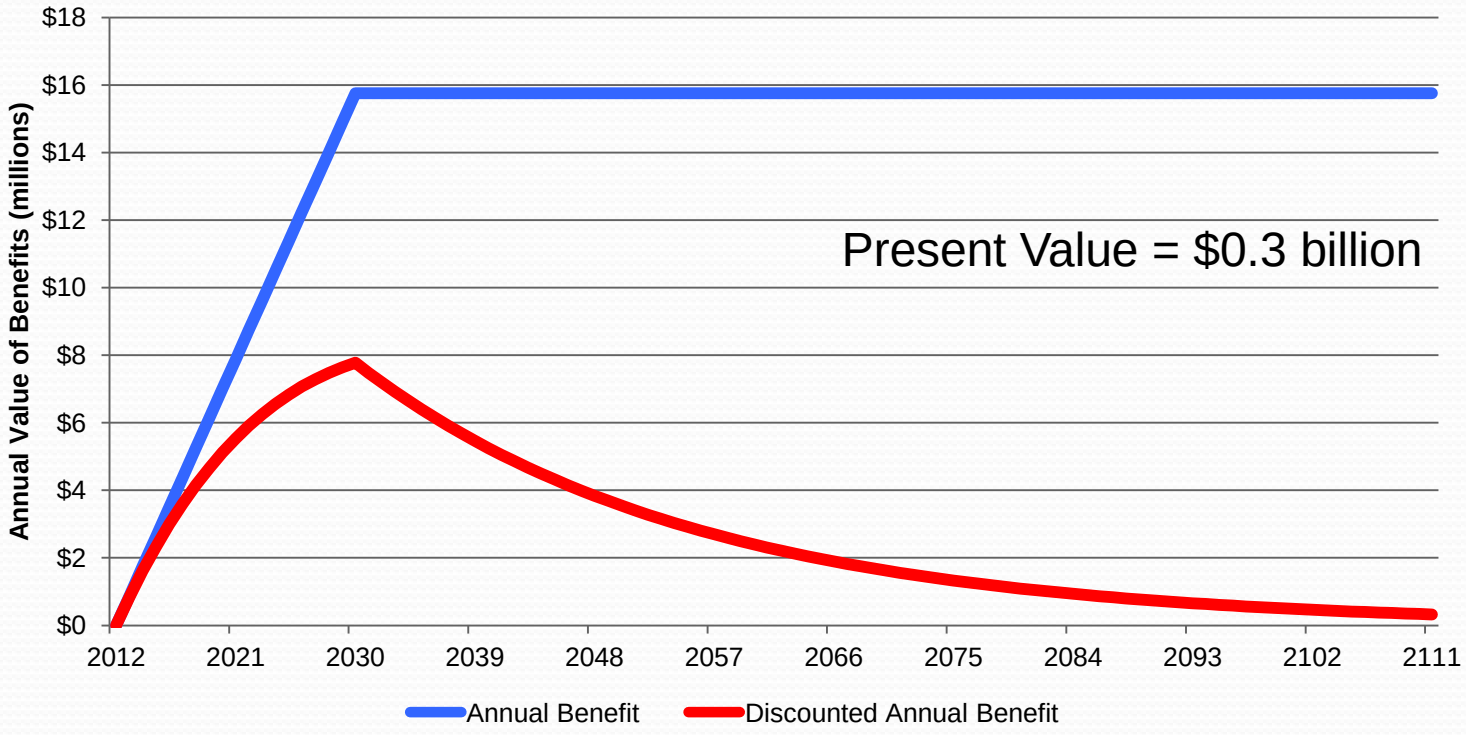
NED Irrigation-Related Benefits



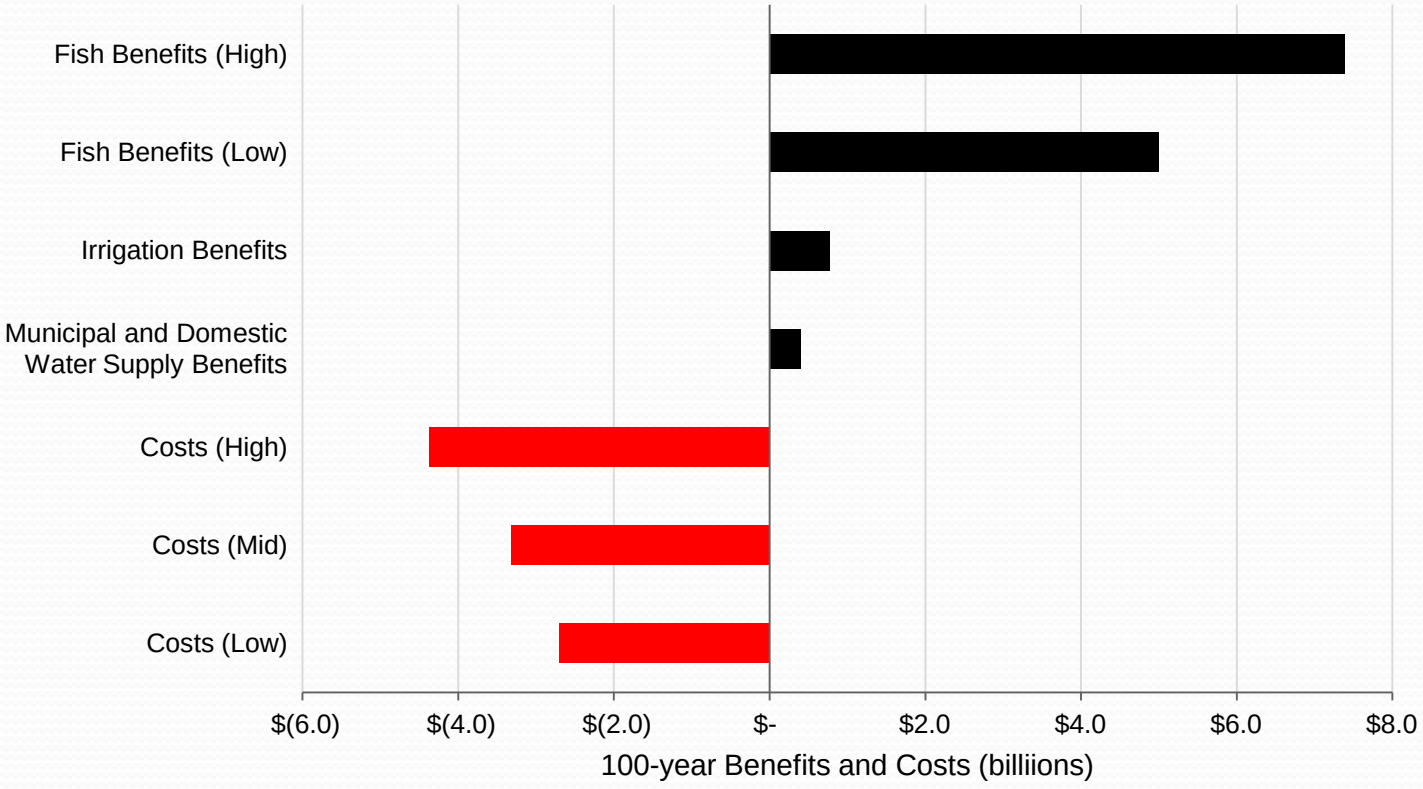
NED Municipal/Domestic Supply Benefits



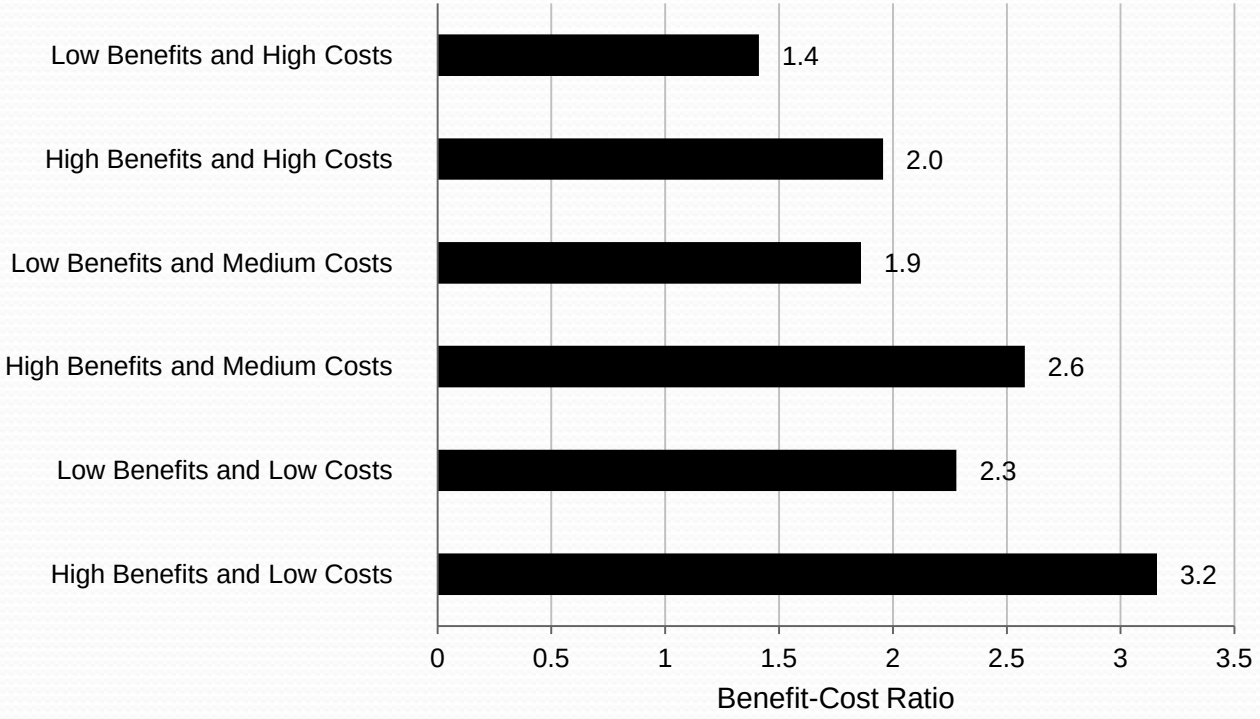
NED Municipal-Domestic Security Benefits



NED Benefits and Costs



NED Benefit-Cost Ratios



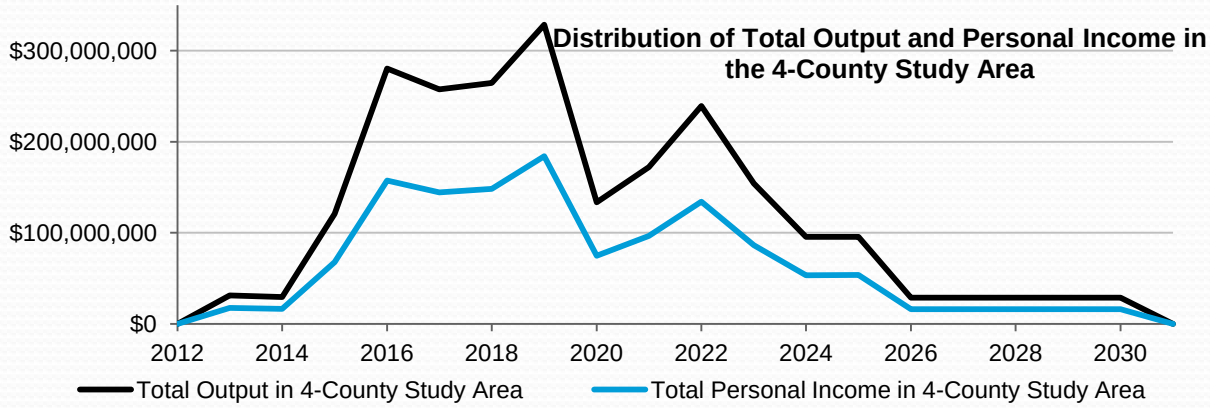
2. Regional Economic Development (RED)

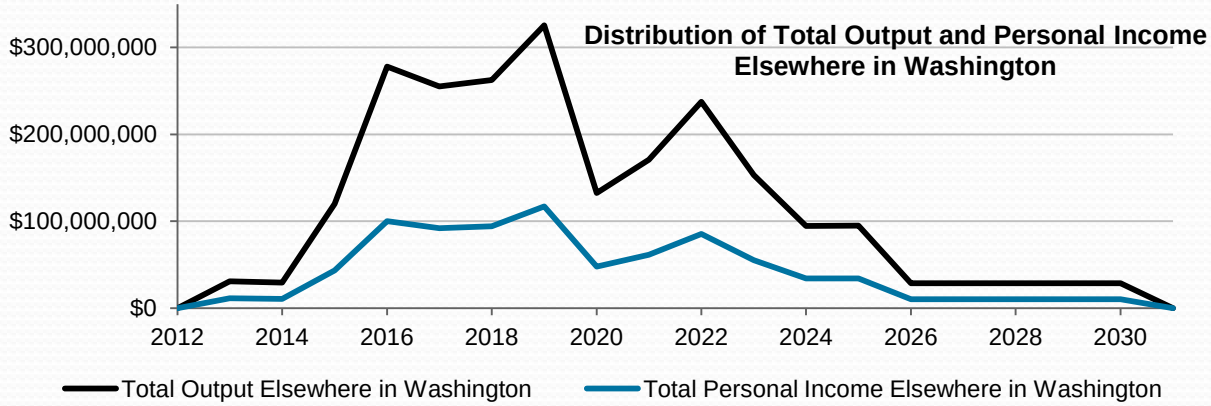
RED Impacts

- **Types of Impacts:**
  - Output (2012 dollars)
  - Personal income (2012 dollars)
  - Jobs (job-years)

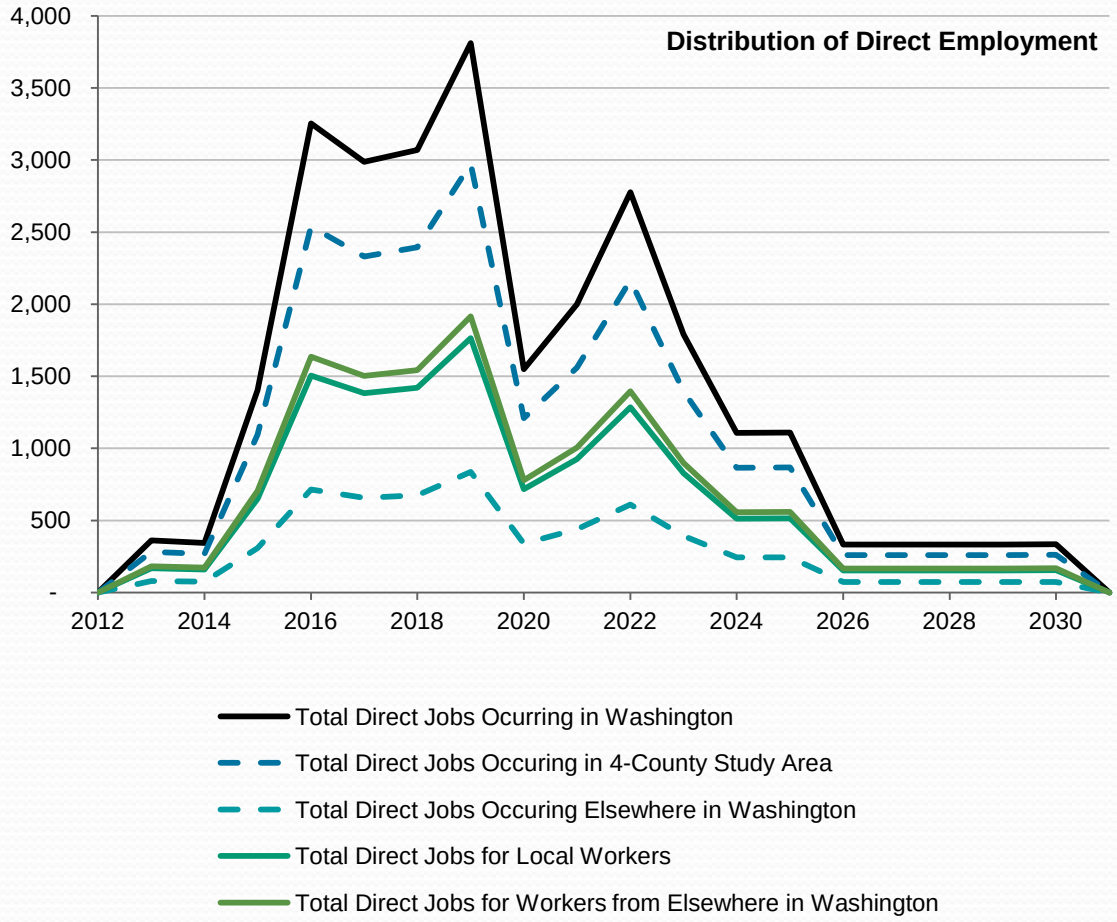
- **Resulting from:**
  - Construction expenditures
  - O&M expenditures
  - Increased agricultural production during severe drought years

Construction-Related Output and Personal Income





Construction-Related Jobs



RED Impacts

	4-County Study Area		Washington	
Type of Expenditure	**Total Impacts**	**Total Impacts as a Percentage of Overall Economy**	**Total Impacts**	**Total Impacts as a Percentage of Overall Economy**
Construction (2013-2030 average)				
Output	$130,000,000	0.4%	$260,000,000	< 0.1%
Personal Income	$73,000,000	0.7%	$120,000,000	< 0.1%
Jobs	1,500	0.6%	2,300	< 0.1%
O&M (maximum annual)				
Output	$20,000,000	< 0.1%	$20,900,000	< 0.1%
Personal Income	$7,000,000	< 0.1%	$7,200,000	< 0.1%
Jobs	110	< 0.1%	120	< 0.1%
Agricultural Production (severe drought year only)				
Output	$690,000,000	2.1%	$790,000,000	0.1%
Personal Income	$185,000,000	1.7%	$208,000,000	0.1%
Jobs	10,100	3.9%	10,800	0.3%

Questions/Discussion on NED and RED

3. Environmental Quality (EQ)
4. Other Social Effects (OSE)

Environmental Quality and Other Social Effects

- Separate from NEPA analysis
  - Part of the Four-Account Analysis
- Environmental Quality (EQ)—Mechanism for displaying information relative to the effects of proposed alternatives on "significant" resources
  - Resources likely to have bearing on decision-making
- Other Social Effects (OSE)—Repository for alternative effects that are not reflected in the other three accounts

Methods for Evaluations

- Workshop to evaluate EQ and OSE
  - Reclamation, Ecology and senior consultants
  - Expertise in environmental analysis, engineering, Yakima Project operations
  - Group consensus decisions
  - Same process used for Storage Study
- Process:
  - Identified resource categories
    - How did they meet Purpose and Need
    - What would be most affected
  - Prioritized and weighted

EQ Categories and Rankings

- Categories:
  - Highest priority:
    - Most affect Purpose and Need
      - Water resources, fish, and threatened and endangered species
  - Secondary priority:
    - Most likely to be affected by Integrated Plan
      - Vegetation and wildlife, hydropower, land use, recreation
- Subcategories and weighting

EQ Categories and Weighting

Category	Weight	Sub-categories	Weight	Final Weight
Water Resources	0.2	Prorationing	0.7	0.14
		Municipal	0.3	0.06
Fish	0.2	Fish Numbers	0.25	0.05
		Flows	0.5	0.1
		Fish Passage	0.25	0.05
Threatened and Endangered Species	0.2	Spotted Owl	0.3	0.06
		Steelhead	0.3	0.06
		Bull Trout	0.3	0.06
		Greater Sage-Grouse	0.1	0.02
Vegetation and Wildlife Habitat	0.1	Shrub Steppe	0.333	0.033
		Old Growth Forest	0.333	0.033
		Riparian	0.333	0.033
Hydropower	0.1	Overall Impacts	1	0.1
Land Use	0.1	Designations	0.5	0.05
		Private Property Acquisition	0.5	0.05
Recreation	0.1	Water-Based	0.2	0.02
		Land-Based	0.5	0.05
		Public Accees	0.3	0.03
TOTALS	1			1

OSE Categories and Rating

- Categories
  - Cultural resources—broader than just physical environment
  - Environmental stewardship benefits
  - Sustainability benefits
  - Equal priority
- Subcategories and weighting

OSE Categories and Rankings

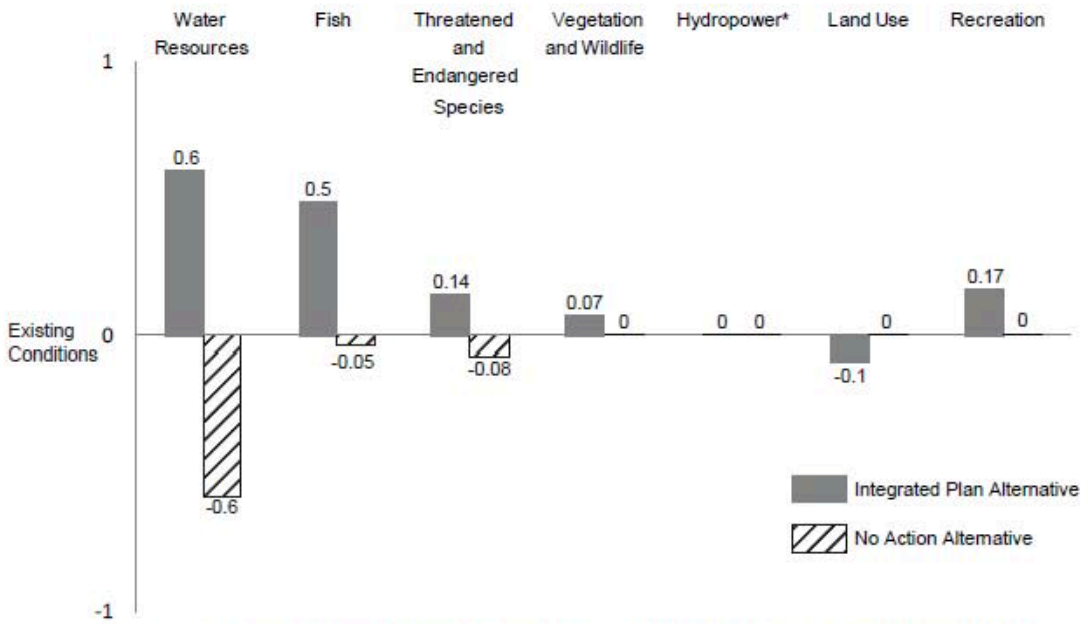
Category	Weight	Sub-categories	Weight	Final Weight
Cultural	0.33	Historic Properties	0.33	0.11
		Cultural and Archaeological Resources	0.33	0.11
		Subsistence Resources	0.33	0.11
				0
Environmental Stewardship Benefits	0.33	Protection and Enhancement of Ecosystems and Biodiversity	1	0.33
Sustainability Benefits	0.33	Improve Water Supply Reliability	0.5	0.17
		Overall System Resilience to Climate Change	0.5	0.17
				0
TOTALS	1			1

EQ and OSE Display

- Rated impacts
- Comparison between Integrated Plan and No Action Alternative
  - Remember No Action includes ongoing projects
- Scale ranging from +3 to -3, 0=no impact

Comparative Display of EQ

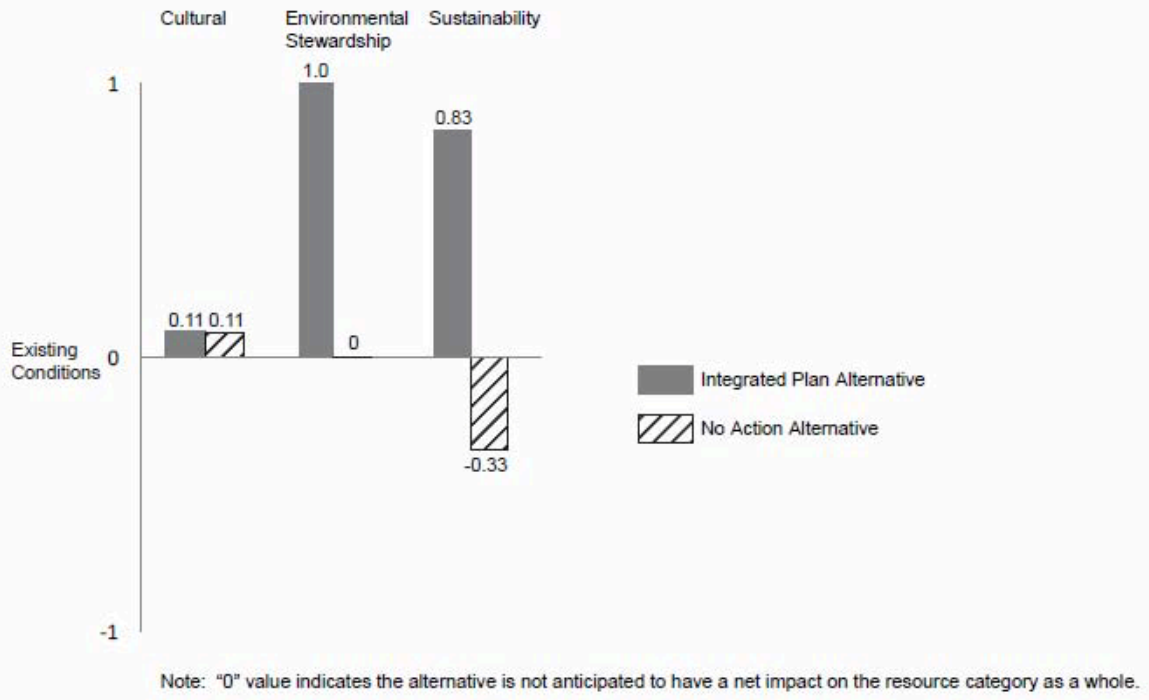
COMPARATIVE DISPLAY OF ALTERNATIVES						
EQ RESOURCE CATEGORY			**No Action Alternative**		**Integrated Plan**	
		Weight	**Significance**	**Score**	**Significance**	**Score**
Water Resources	Prorationing	0.14	-3	-0.42	3	0.42
	Municipal	0.06	-3	-0.18	3	0.18
	Subtotal			**-0.6**		**0.6**
Fish	Fish Numbers	0.05	1	0.05	3	0.15
	Instream Flows	0.1	-1	-0.1	2	0.2
	Fish Passage	0.05	0	0	3	0.15
	Subtotal			**-0.05**		**0.5**
Threatened and Endangered Species	Spotted Owl	0.06	-1	-0.06	-1	-0.06
	Steelhead	0.06	0	0	2	0.12
	Bull Trout	0.06	0	0	1	0.06
	Greater Sage-Grouse	0.02	-1	-0.02	1	0.02
	Subtotal			**-0.08**		**0.14**
Vegetation and Wildlife Habitat	Shrub Steppe	0.033	-1	-0.03	1	0.03
	Old Growth Forest	0.033	0	0.00	-2	0
	Riparian	0.033	1	0.03	3	0.10
	Subtotal			**0.00**		**0.07**
Hydropower	Overall Impacts	0.1	0	0	0	0
Land Use	Designations of wilderness, wild and scenic rivers, or national recreation areas	0.05	0	0	0	0
	Private Property Acquisition	0.05	0	0	-2	-0.1
	Subtotal			**0**		**-0.1**
Recreation	Water-Based	0.02	0	0	2	0.04
	Land-Based	0.05	0	0	2	0.1
	Public Access	0.03	0	0	1	0.03
	Subtotal			**0**		**0.17**
Total		1		**-0.73**		**1.38**



*No changes are anticipated because subordination would not take place until alternative power sources are found to mitigate subordination.

Note: "0" value indicates the alternative is not anticipated to have a net impact on the resource category as a whole.

OSE RESOURCE CATEGORY		Weight	No Action Alternative		Integrated Plan	
			Significance	Score	Significance	Score
Cultural	Historic Properties	0.11	0	0.00	-1	-0.11
	Cultural and Archaeological Resources	0.11	0	0.00	-1	-0.11
	Subsistence Resources	0.11	1	0.11	3	0.33
	Subtotal			**0.11**		**0.11**
Environmental Stewardship Benefits	Protection and Enhancement of Ecosystems and Biodiversity	0.33	0	0	3	1
				0		**1**
Sustainability Benefits	Improve Water Supply Reliability	0.17	-2	-0.333	3	0.50
	Overall System Resilience to Climate Change	0.17	0	0.00	2	0.33
	Subtotal			**-0.33**		**0.83**
Total		1		**-0.22**		**1.94**



Note: "0" value indicates the alternative is not anticipated to have a net impact on the resource category as a whole.

Questions/Discussion on EQ and OSE