

# Chehalis Basin Strategy: Reducing Flood Damage and Enhancing Aquatic Species

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*Comparison of Alternatives:  
Methodology Selection Overview & Status*



# Agenda

- Overview of Comparison of Alternatives Timeline
- Past studies and how this is different
- Methodology Selection Overview & Current Recommendations

# Analysis of Alternatives

## Project Timeline

- Methodology Selection
  - Deliverables: Technical Memo – December, 2013
  - Work Group Approve Methodology – December, 2013
- Evaluation of Components
  - Determination of impacts to include
  - Research valuation standards database
  - Consult with technical teams
  - Schedule January 2014 – April 2014
- Comparison of Alternatives
  - Build model based on methodology selected
  - Consult with technical teams
  - Perform base analysis
  - Perform risk & uncertainty analysis
  - Develop qualitative analysis
- Need to Complete Draft Report by June, 2014
- Finalize Report by August, 2013

# Past Studies vs. Current Study

	2007 Analysis - \$938M	2B Study	CBFS & ASEP
<b>Analysis Period</b>	1 event - Historical	Probability - Future	Probability - Future
<b>Floods evaluated</b>	2007	10, 50, 100 & 500	10, 20, 100 & 500
<b>Perspective</b>	State	National, Lewis County	National, State, Basin Wide
<b>Alternative Evaluated</b>	None	Flood Retention	Flood Retention, ASEP, Small Projects, WSDOT
<b>Flood Damage</b>	Yes, 3 counties	Yes, Lewis County	Yes, 3 counties
<b>Storm Damage</b>	Yes, 3 counties	No	No
<b>Environmental Impact</b>	None	Minimal	Yes
<b>Transportation Impacts</b>	Yes, State	Yes, State avoided costs	Yes, National, State & Basin Wide
<b>Building/Inventory damage</b>	As Reported	Depreciated, Lewis County	Depreciated, 3 counties
<b>Agricultural Losses</b>	Yes, 3 counties	Yes, Lewis County	Yes, 3 counties
<b>Emergency Aid</b>	Yes, 3 counties	Yes, Lewis County	Yes, 3 counties
<b>Business Impacts</b>	Yes - State	Yes - Lewis County	Yes, National, State & Basin Wide
<b>Economic benefit of construction</b>	Yes	No	No
<b>Government Revenue Loss</b>	Yes	No	Yes, State & Basin Wide
<b>Economic Impact</b>	Yes - State	Yes, Lewis County	Yes, State & Basin Wide
<b>Risk Profile</b>	No	Minimal	Yes
<b>Qualitative Impacts</b>	Some	Some	Yes

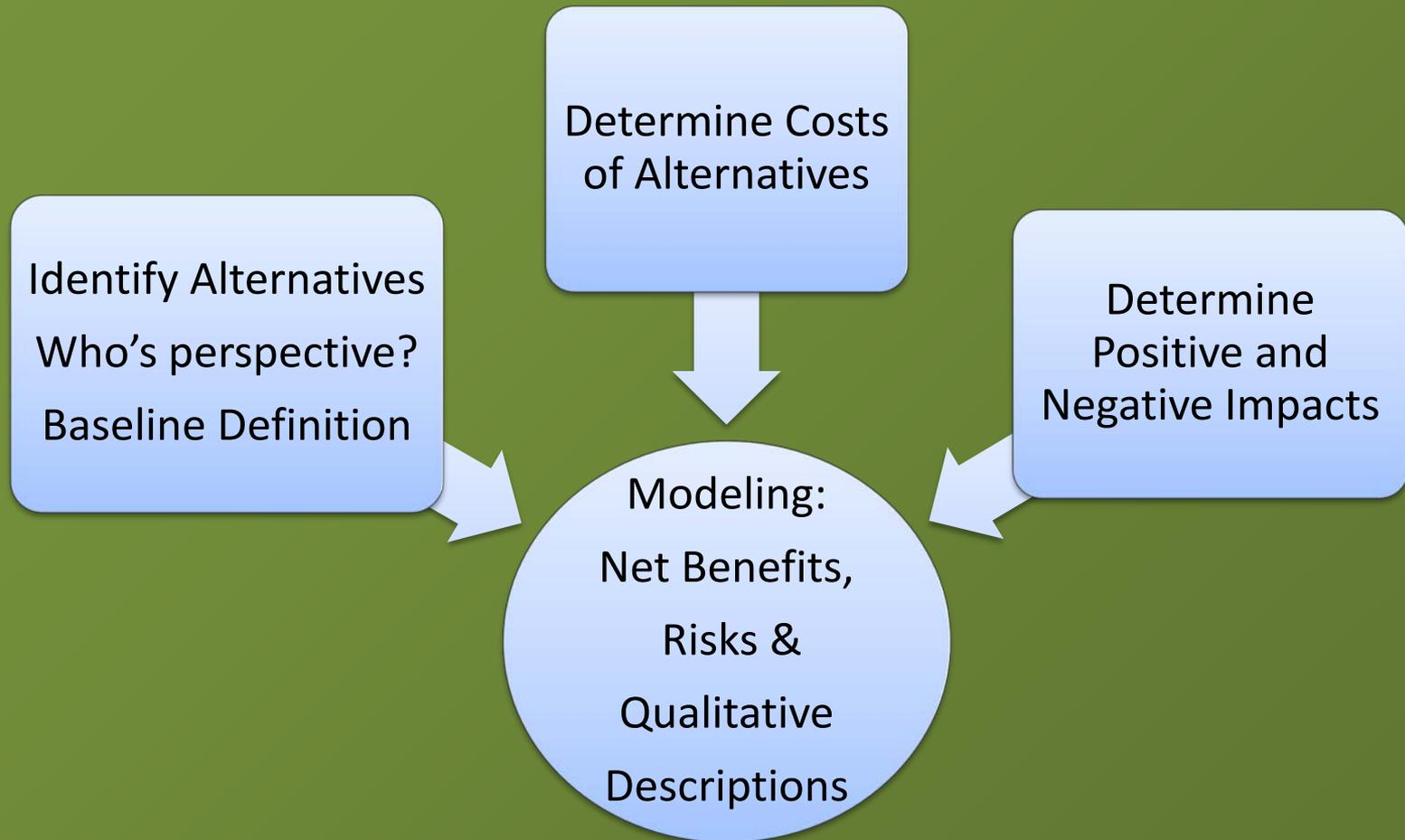
# This Study

- Throughout Address What We are Doing Different
  - Including WSDOT and Small Projects Alternatives
  - Incorporate Aquatic Species Enhancement Plan
  - Incorporating environmental impacts based on studies underway
  - Incorporating uncertainty measures including ranges and probability distributions where available
  - Incorporating qualitative evaluation in addition to quantitative evaluation
  - Allowing for information to be presented based on requirements from funding sources and decision makers
  - The analysis will be transparent with source data and calculation available and explainable

# Initial Factors to be Evaluated

- Commercial fisheries for salmon and steelhead
- Recreational fisheries for salmon and steelhead
- Terrestrial and non-fish aquatic habitat species
- Other fish species (non-salmonids)
- Other environmental benefits such as carbon sequestration and resiliency to climate change
- Building structures, contents and equipment
- Agriculture
- Clean-up costs
- Transportation
- Local employment and business income
- Net value of hydropower and its renewable qualities

# Recommended Methodology for Evaluating Flood Alternatives



# Methodology Selection

## 1) Which Alternatives Do We Model?

- Flood retention facility only
- Multi-purpose flood retention facility (with possible hydro)
- WSDOT alternative
- Suite of Small Projects
- Aquatic Species Enhancement Plan

### ■ How Do We Incorporate Suite of Small Projects/ASEP?

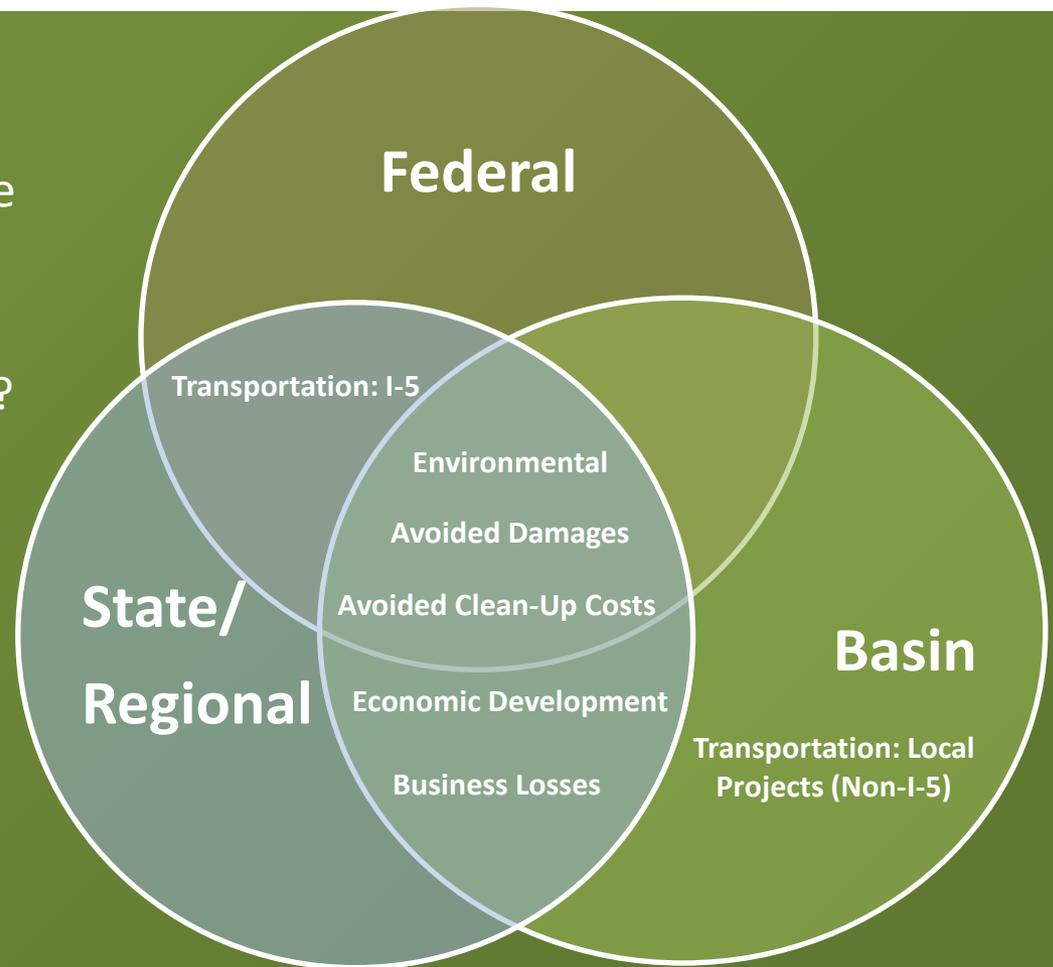
### ■ Recommendation

- If project does not affect the impact analysis of the retention facilities or WSDOT Alternative – add costs and impacts after the fact
- If project does affect the impact analysis of the retention facilities or WSDOT Alternative, the analysis should explicitly ensure that no double counting of impacts occurs

# Methodology Selection (cont'd)

## 2) Analysis Perspective

- Whose costs and benefits are being assessed?
  - Why is this important?
  - How does it impact analysis?
- Recommend 3 Perspectives:
  - National/Federal
  - State/Regional
  - Basin Wide



# Methodology Selection (cont'd)

## 3) Cost of Alternative – Developed by Other Technical Groups

- Costs

- Include capital investments
- Include operating costs
- Include maintenance costs
- Include permitting costs

- **Recommendation** – Costs developed for 50 years (analysis horizon) in today's dollars

# Methodology Selection (cont'd)

## 4) Analyze Incremental Effects of the Alternative

- Need to Develop Baseline for Comparison
  - Options
    - Forecast of future changes if no alternative is selected
    - Status quo – current situation with no changes
    - Current status with known and measurable changes
- **Recommendation** – Current status but include currently funded and approved projects
- **Obtain impacts from studies and analysis**

# Methodology Selection (cont'd)

## 5) Gather Data About Value of Impacts

- Keep impact results disaggregated for input into overall BCA framework
- WSDOT will provide analysis of value of the impact of transportation changes
- Environmental Impact analysis framework matched up with output framework developed by the ASEP group
  - Quantitative outputs used to monetized ecosystem benefits
  - Qualitative outputs used in a cost-effectiveness analysis (no-monetization of impacts)
- State & Basin Wide perspectives will include
  - Business losses
  - Income effect

# Methodology Selection (cont'd)

## 6) Deterministic Model Development

- Net Benefit = Benefits – Costs
  - Will be developed for each alternative for each perspective
  - Possible to group benefits and costs in different manner
- **Recommendation** – Results will be presented on a Net Present Value (NPV) basis summarizing 50 years of net benefits in today's dollar; impacts will be disaggregated for each alternative so decision makers can understand the contribution to overall net benefits from each impact

# Methodology Selection (cont'd)

## 7) Risk/Uncertainty Evaluation

- Risk or uncertainty associated with each variables will be included based on available data
- **Recommendation** – Use probability distributions where data is available and use deterministic analysis (high/medium/low) and ranges where data is not available to understand the probability distribution

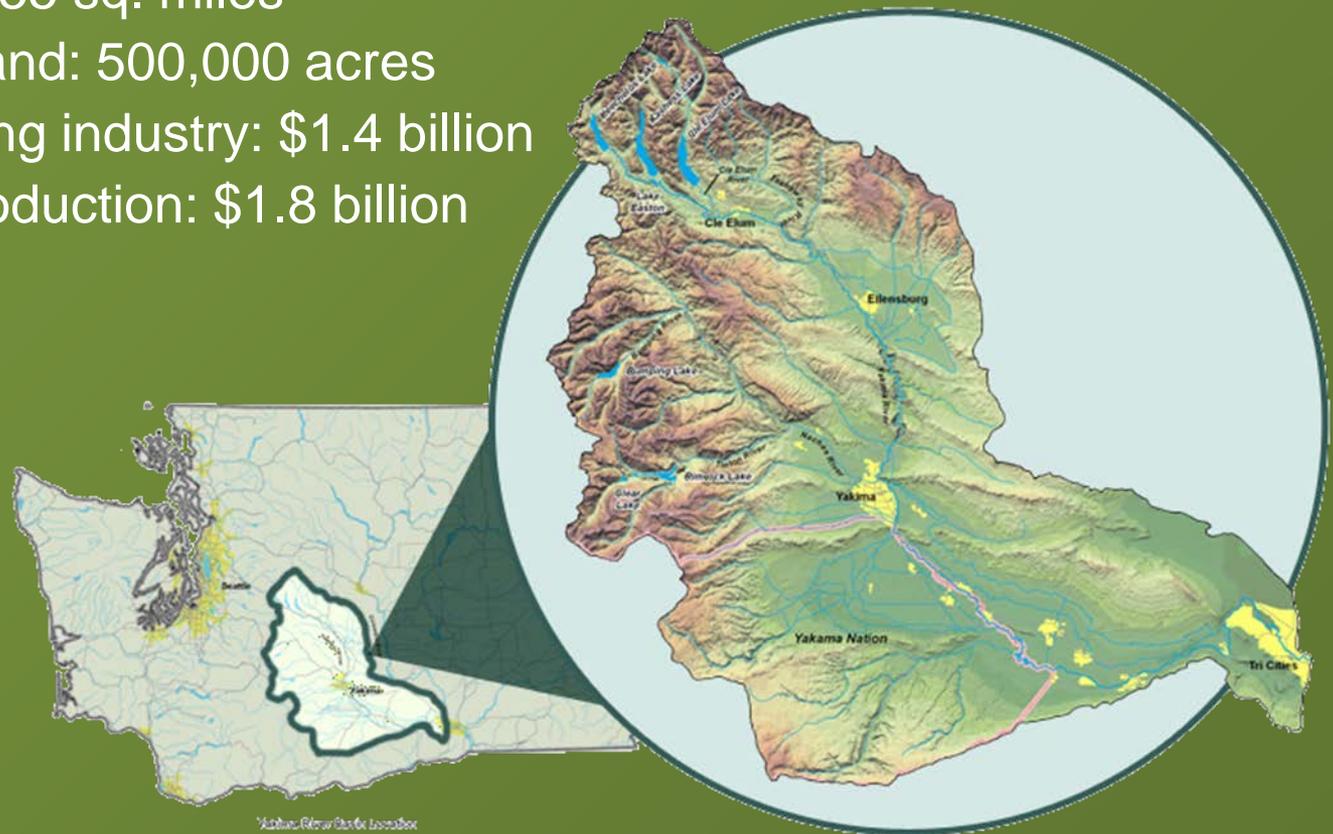
# Methodology Selection (cont'd)

## 8) Incorporate Qualitative Analysis

- Not all impacts can be measured quantitative, i.e., be assigned a dollar value
- Methodology for incorporating qualitative analysis depends on how important the impact is – would it alter the decision?
  - **Recommendation** – Provide description of qualitative measures and impact; the methodology will provide information on both qualitative and quantitative impacts separately, so the decision makers can apply their own weighting to the information

# Yakima Basin Integrated Water Resource Management Plan

- Basin size: 6,155 sq. miles
- Irrigated cropland: 500,000 acres
- Food processing industry: \$1.4 billion
- Agricultural production: \$1.8 billion



# Yakima Basin Integrated Water Resource Management Plan (Cont'd)

- Reservoir Fish Passage
- Habitat/Watershed Protection
- Surface storage
- Enhanced conservation
- Groundwater storage
- Market Reallocation
- Structural & Operational Changes





# BUILDING A FUTURE FOR WATER, WILDLIFE AND WORKING LANDS

YAKIMA RIVER BASIN INTEGRATED WATER RESOURCE MANAGEMENT PLAN

## Reservoir Fish Passage

Provide fish passage at:

1. Clear Lake
2. Cle Elum
3. Bumping
4. Tieton (Rimrock)
5. Keechelus
6. Kachess

## Enhanced Water Conservation

1. Implement an agricultural water conservation program designed to conserve up to 170,000 acre-feet of water in good water years.
2. Create a fund to promote water use efficiency basin-wide using voluntary, incentive-based programs. Focus on outdoor uses as top priority.

## Habitat/Watershed Protection & Enhancement

1. Protect ~70,000 acres of land by acquiring high elevation portions of the watershed and forest and shrub steppe habitat.
2. Evaluate potential wilderness area and wild and scenic river designations to protect streams and habitat.
3. Create a habitat enhancement program to address reach-level floodplain restoration priorities and restore access to key tributaries.

## Market Reallocation

Employ a water market and/or a water bank to improve water supply in the Yakima River basin. Market reallocation would be conducted in two phases:

The near-term phase would continue existing water marketing and banking programs in the basin, but take additional steps to reduce barriers to water transfers.

The long-term program would focus on facilitating water transfers between irrigation districts. This would allow an irrigation district to fallow land within the district and lease water rights for that land outside the district.

## Structural & Operational Changes

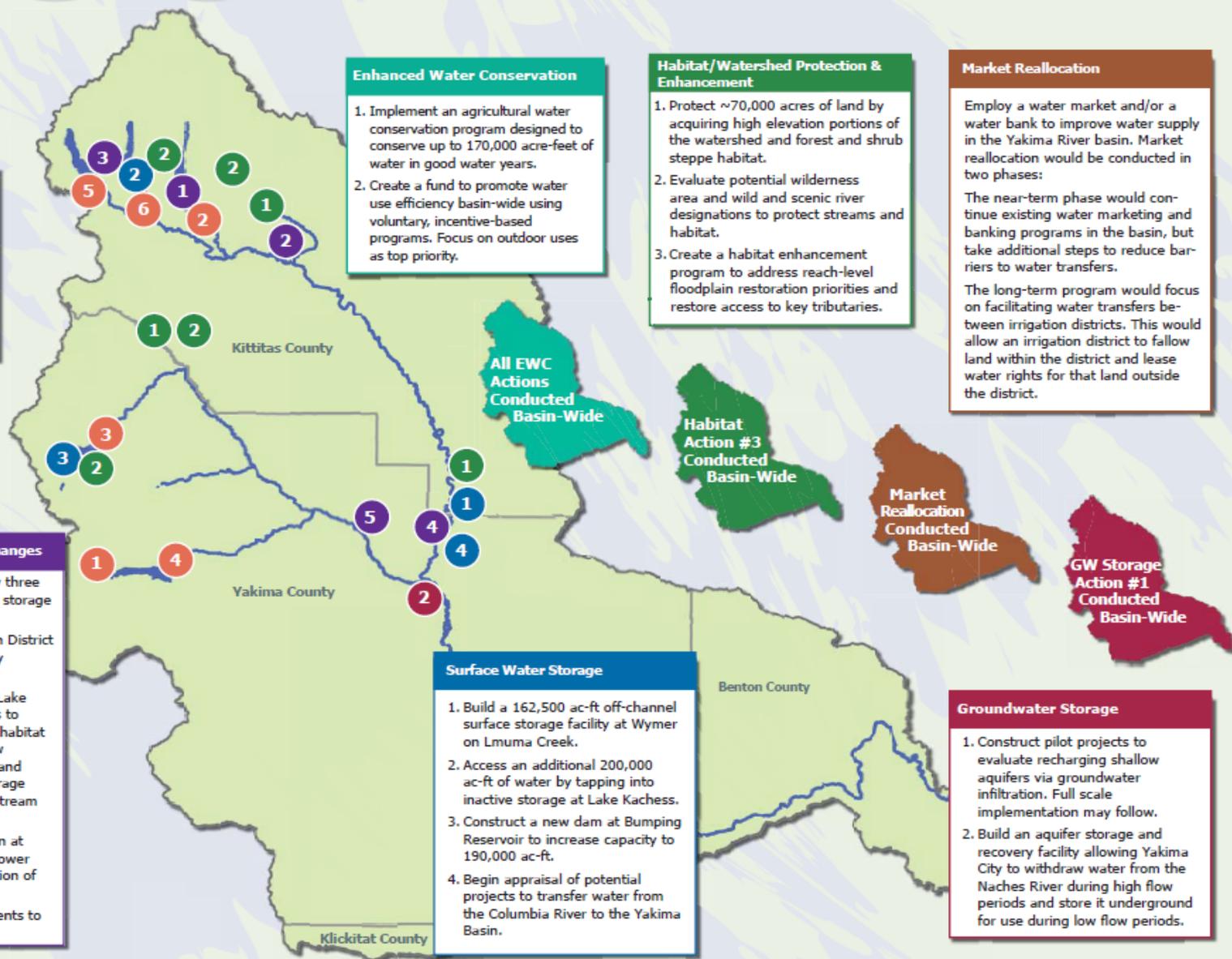
1. Raise the Cle Elum Pool by three feet to add 14,600 ac-ft in storage capacity.
2. Modify Kittitas Reclamation District canals to provide efficiency savings.
3. Construct a pipeline from Lake Keechelus to Lake Kachess to reduce flows and improve habitat conditions during high flow releases below Keechelus and to provide more water storage in Lake Kachess for downstream needs.
4. Decrease power generation at Roza Dam and Chandler power plant to support outmigration of juvenile fish.
5. Make efficiency improvements to the Wapatox Canal.

## Surface Water Storage

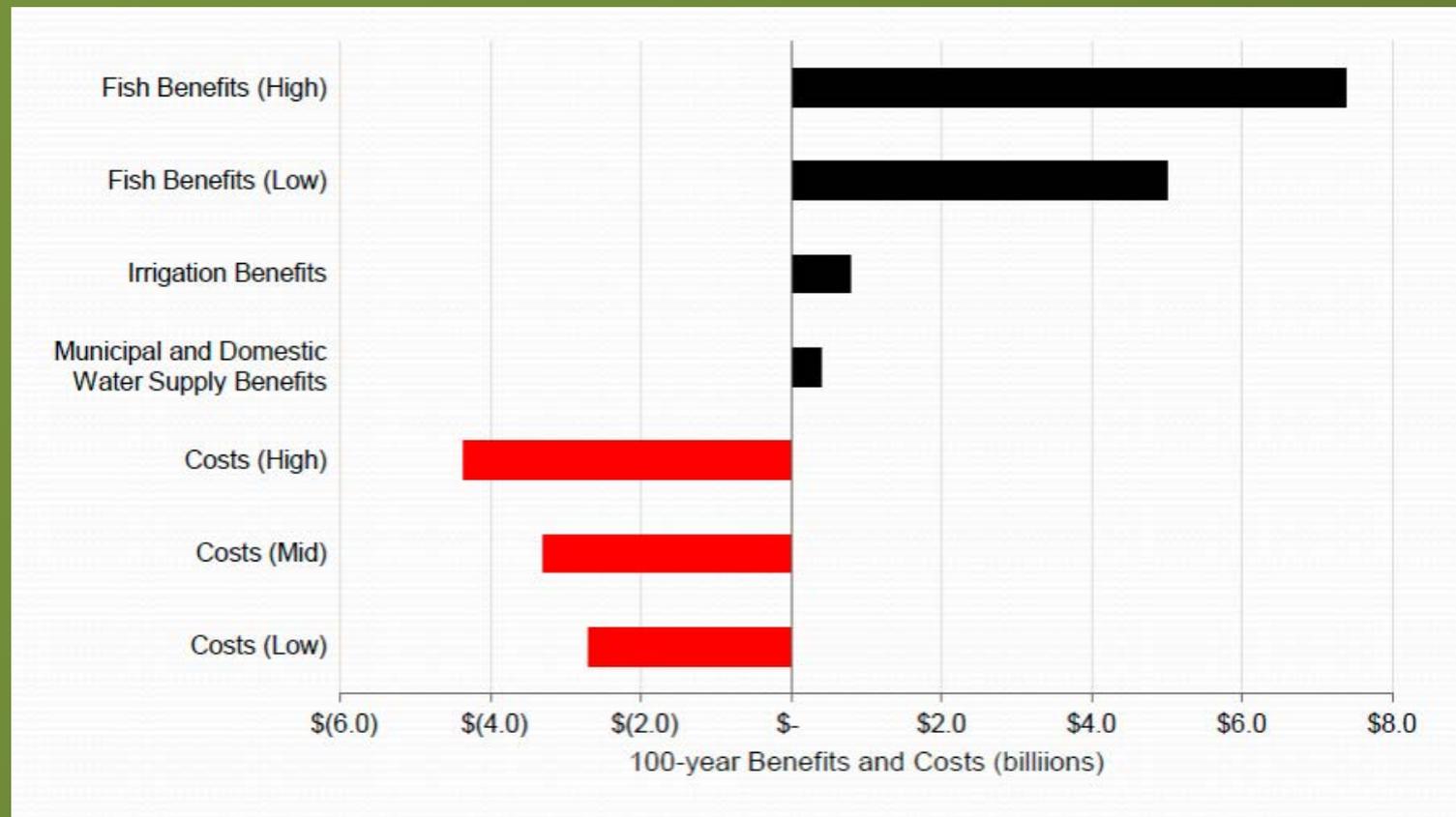
1. Build a 162,500 ac-ft off-channel surface storage facility at Wymer on Lmuma Creek.
2. Access an additional 200,000 ac-ft of water by tapping into inactive storage at Lake Kachess.
3. Construct a new dam at Bumping Reservoir to increase capacity to 190,000 ac-ft.
4. Begin appraisal of potential projects to transfer water from the Columbia River to the Yakima Basin.

## Groundwater Storage

1. Construct pilot projects to evaluate recharging shallow aquifers via groundwater infiltration. Full scale implementation may follow.
2. Build an aquifer storage and recovery facility allowing Yakima City to withdraw water from the Naches River during high flow periods and store it underground for use during low flow periods.



# Yakima Basin Integrated Water Resource Management Plan (Cont'd)



# Questions/Comments