

RECLAMATION

Managing Water in the West

Klamath River Basin Study Overview



U.S. Department of the Interior
Bureau of Reclamation

Basin Study Program

- Reclamation implements Section 9503 of the Secure Water Act through the Basin Study Program.
- The Basin Study Program includes:
 - Implementation of Basin Studies
 - West-Wide Climate Risk Assessments
 - Landscape Conservation Cooperatives



Basin Studies



- **Purpose**

- **Work with state and local partners in 17 Western States to evaluate future water supply and demand imbalances in a changing climate**

- **Elements**

- **Projections of future supply and demand, including the impacts of climate change**
- **Analysis of how the basin's existing water operations and infrastructure will perform in response to the projections of future water supplies and demands**
- **Development of adaptation strategies to reduce any identified imbalances in water supply and demand**
- **Trade-off analysis of the options identified, findings, and recommendations as appropriate**

Basin Studies

- **Each Basin Study will assess specific risks to water supplies including:**
 - **Changes in snowpack**
 - **Changes in timing and quantity of runoff**
 - **Changes in groundwater recharge and discharge**
- **Each Basin Study will also assess changes in:**
 - **Demand for water due to increasing temperatures and population growth**



Basin Studies

- **Basin Studies may analyze the impacts of potential climate change to:**
 - **Fish & wildlife habitats**
 - **Existing infrastructure**
 - **Water-dependent recreation facilities**
 - **Water quality/salinity**
 - **Flood control management**
 - **Hydropower**
 - **Rates of reservoir evaporation**



Basin Studies

Adaptation strategies developed based on previous studies and input from tribes, stakeholders, and others. Examples may include, but are not limited to:

- **Improved water management, facilities operations, or habitat management**
- **Water conservation measures**
- **Improved understanding of the watershed through use of hydrologic models/other decision support tools**
- **Modifications to reservoir storage**

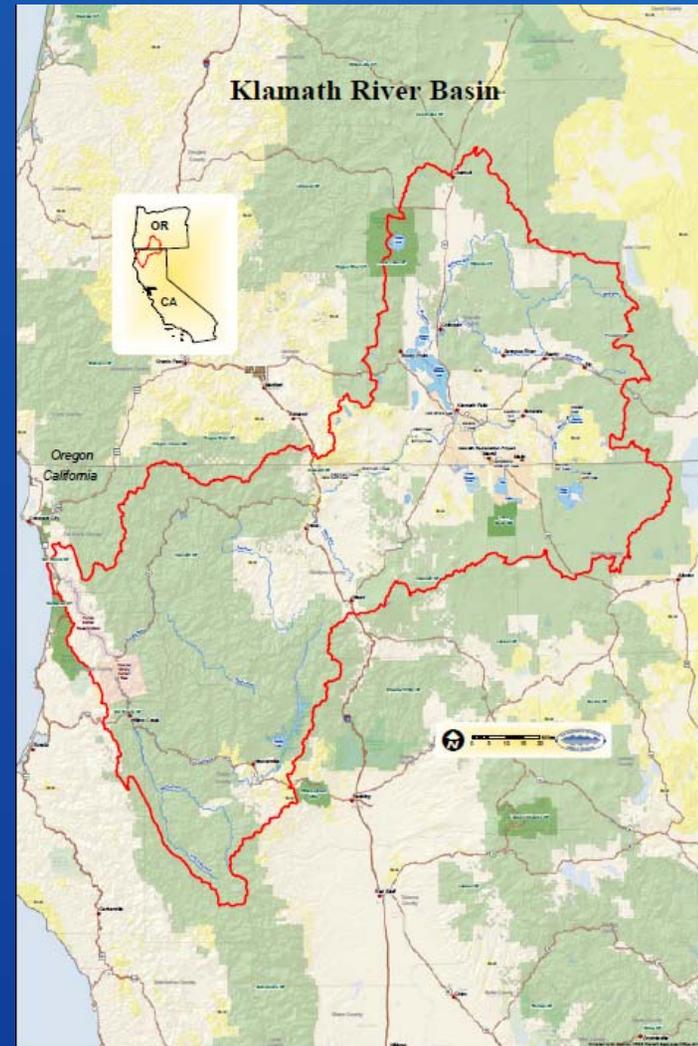
Basin Studies

- **Appraisal level studies that are intended to build upon existing information**
- **Basin Study reports are not considered decision documents**
- **May lead to potential subsequent feasibility-level investigations**



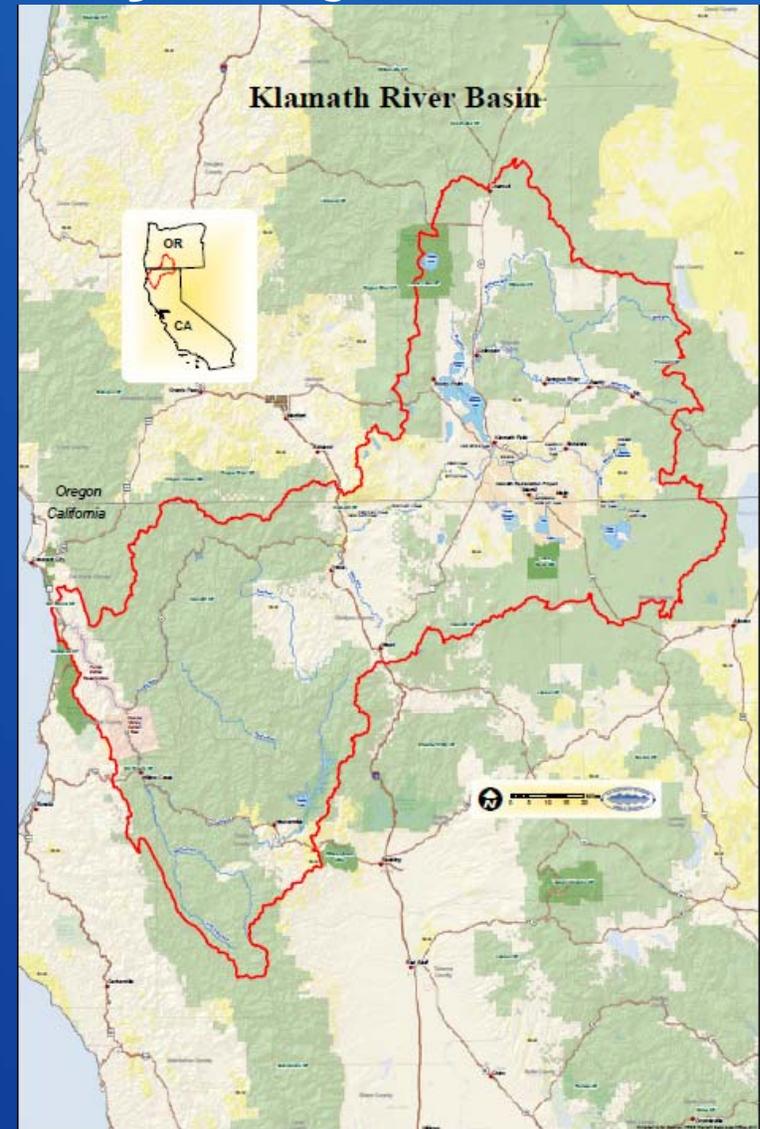
Klamath River Basin Study

- Study area: Klamath River Basin
- Equal 50 percent cost share by Reclamation and non-federal cost-share partners
 - Oregon Water Resources Department
 - California Department of Water Resources



Klamath River Basin Study Objectives

- Assess current and projected water supply and demand, including the impacts of climate change
- Analyze how the basin's existing water operations and infrastructure will perform in response to projections of future water supplies and demands
- Develop adaptation strategies to reduce any identified imbalances
- Evaluate adaptation strategies, findings, and recommendations as appropriate



Klamath River Basin Resources

- **The Klamath River supports the following, including:**
 - **Tribal Trust Resources**
 - **Fish, wildlife, and their habitats (including candidate, threatened, and endangered species)**
 - **Water allocations and deliveries**
 - **Water quality**
 - **Recreation**
 - **Flood control**
 - **Hydroelectric power generation**
- **The study will build on existing information and research in all resource areas**
- **The study will look at system reliability with respect to all resources**

Water Supply and Demand Assessments

- **Assess current and future “natural” water supply**
 - Inflow absent human activities
- **Assess current and future demands**
 - Examples: agricultural, evaporative, environmental, cultural, municipal and industrial
 - Utilize a scenario approach
 - Multiple scenarios of climate and demand
- **Focus on runoff and factors affecting runoff**
 - Examples: climate, snowpack, ET, landscape characteristics



Source: National Park Service



Source: Oregon Public Broadcasting

Water Supply Assessment

- **Assess current supplies**
 - Using historical climate
- **Develop future climate projections**
 - projected climate scenarios (based on West-Wide Climate Risk Assessment)
 - Paleo-reconstructed climate
- **Assess future water supply under differing scenarios**



Source: milomitchel.com

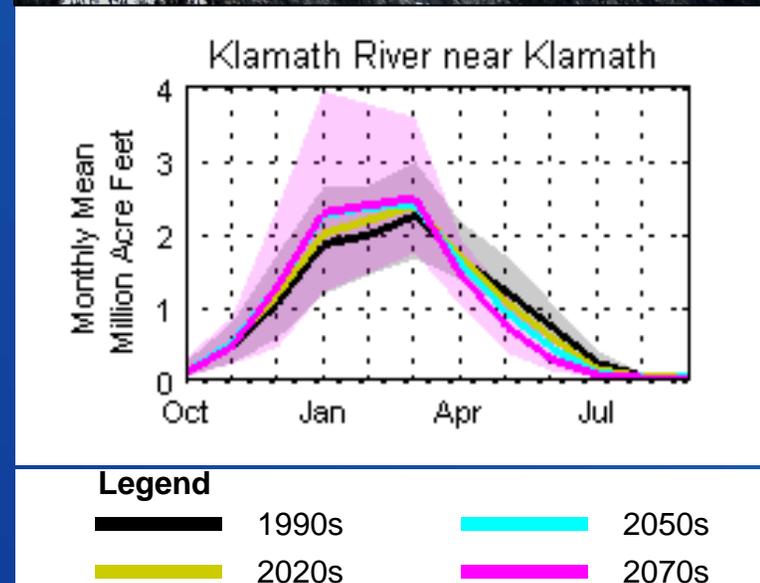


Figure Source: Reclamation's West-Wide Climate Risk Assessment

Water Demand Assessment

- **Assess current consumptive demands**
 - **Using historical climate**
 - **Focus in environmental, cultural, agricultural, evaporative, and municipal and industrial demands**
- **Assess future demands under differing climate projections**



Source: USFWS



Source: US Forest Service

System Reliability Analysis

Identify Reliability
Metrics

What is a metric?

Evaluation criteria that are used to determine baseline and future system reliability

- can be measured for a particular resource to quantify the reliability

Determine Baseline
System Reliability

Develop an analytical framework for evaluating reliability

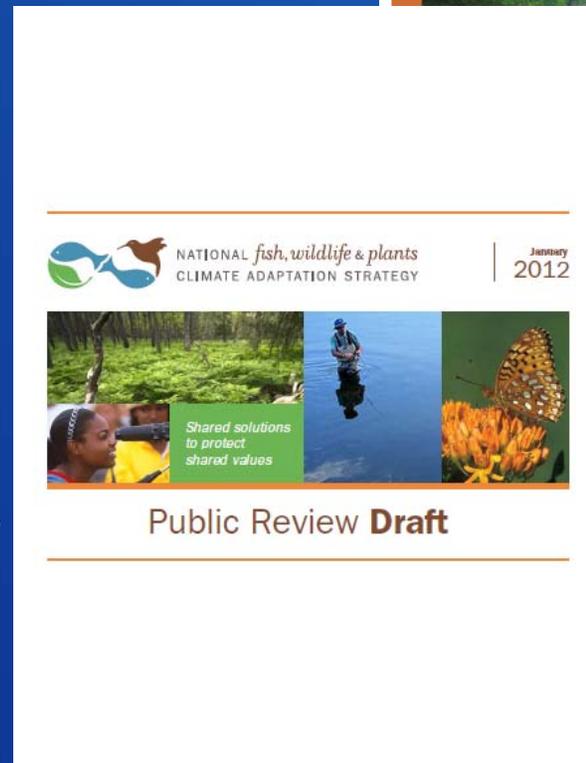
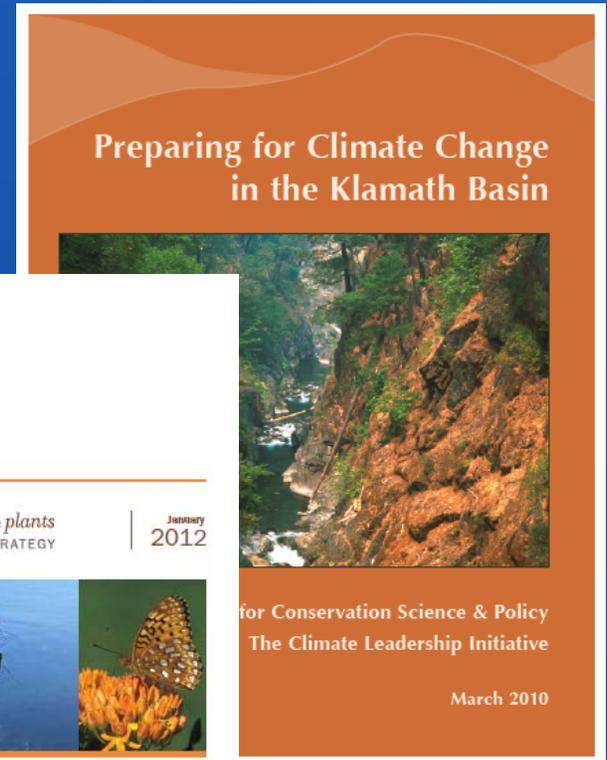
Project Future System
Reliability

Develop adaptation strategies that may improve system reliability

Projections of Future
Reliability with
Adaptation

Identification of Adaptation Strategies

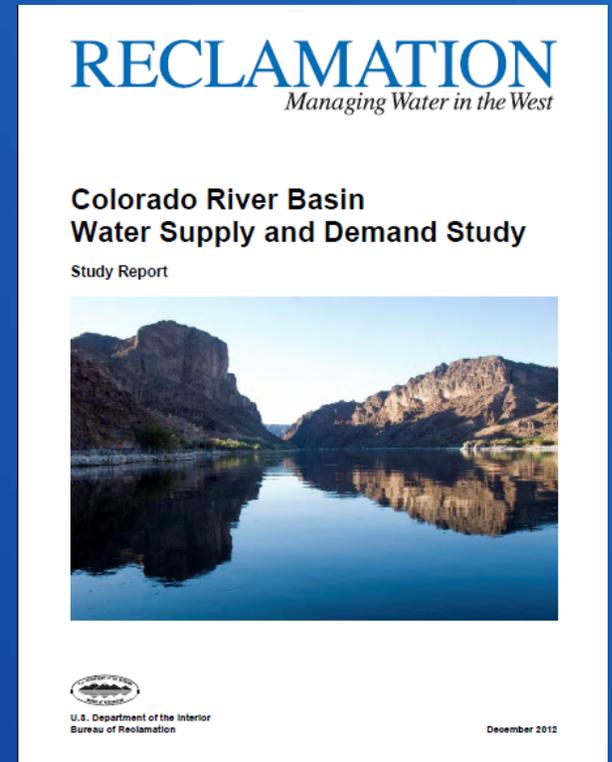
- Compile identified strategies from existing studies and solicit additional potential strategies from the public
 - Screen strategies for those that can be evaluated (quantitatively or qualitatively) using the reliability framework
- Assess the multi-resource reliability of adaptation strategies



Examples of existing literature that identifies potential adaptation strategies

Evaluate Supply and Demand Adaptation Strategies

- Consider a broad range of strategies which respond to future climate uncertainties
- Group strategies into potential portfolios of mixed adaptation strategies, which may include categories such as
 - Reduce water demand
 - Increase water supply
 - Modify operations
 - Governance and implementation
- Evaluate system reliability under climate change, employing potential portfolios of adaptation strategies
- May lead to potential subsequent feasibility-level investigations



Example of a recently completed Basin Study in which portfolios of adaptation strategies were evaluated for system reliability

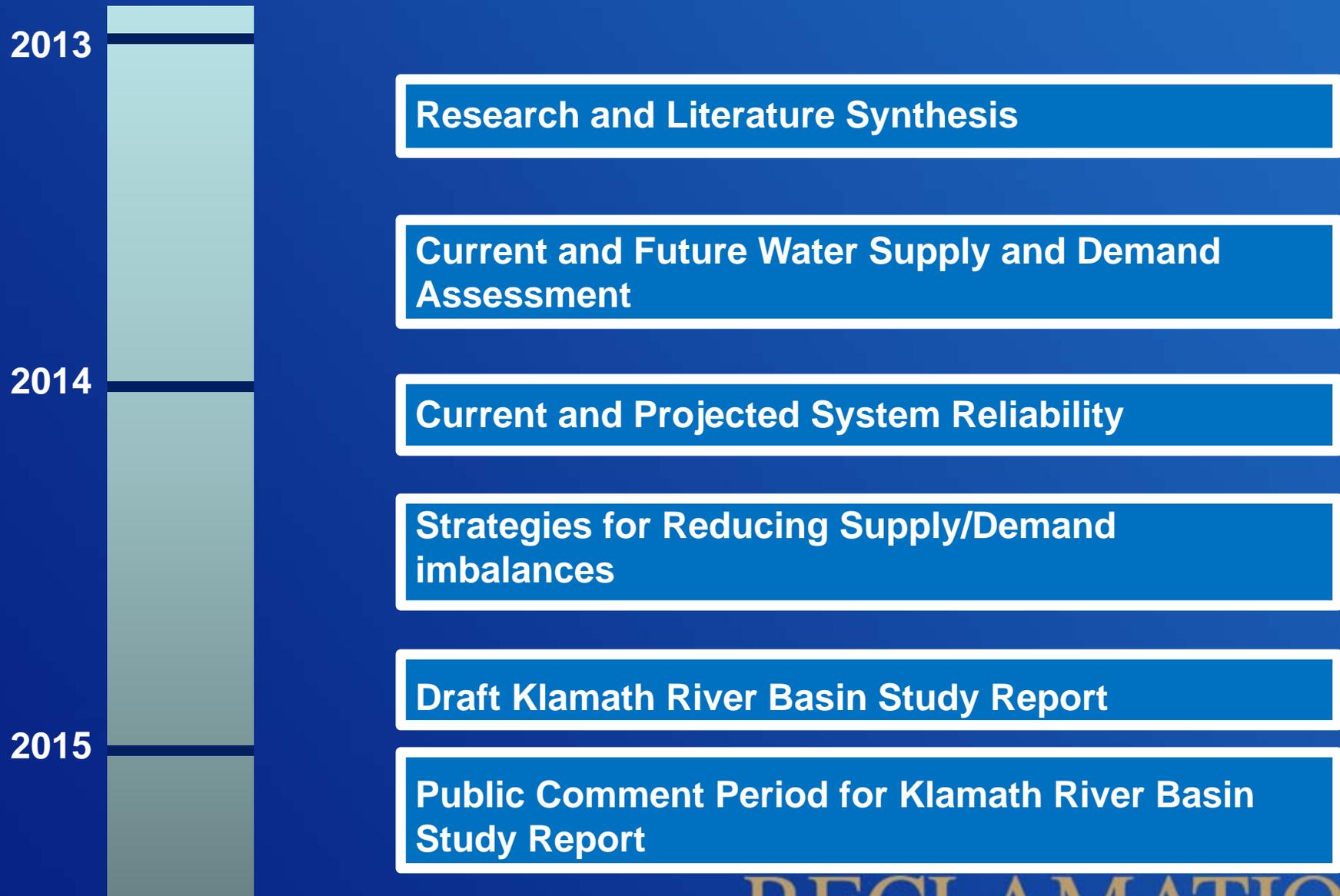
Public, Stakeholder, and Tribal Involvement

- Identification of issues that should be considered during study development
- Assistance with identification of relevant past and ongoing studies
- Input on current water supply/demand imbalances
- Proposed adaptation strategies for reducing water supply/demand imbalances
- Participation in development of system reliability metrics
- Review and comment on Basin Study Report

Basin Study Report Review

- **Providing Input on the Basin Study Report**
 - The Basin Study Report will be posted on the Klamath River Basin Study website at <http://www.usbr.gov/mp/KBStudy> for review upon completion
 - Written comments will be accepted via email at bor-mpr-klamathbasinstudy@usbr.gov
 - All comments received will be summarized and posted to the website

Proposed Timeline



Study Information

- Reclamation's Basin Study Website
 - <http://www.usbr.gov/WaterSMART/bsp/>
- Klamath River Basin Study Website
 - <http://www.usbr.gov/mp/KBStudy>
- Questions or comments
 - Shelley McGinnis, Project Manager
 - Phone: (916) 978-4349
 - Email: bor-mpr-klamathbasinstudy@usbr.gov