RECLAMATION

Managing Water in the West

Willamette River Basin WaterSMART Presentation

September 30, 2013

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U.S. Department of the Interior
Bureau of Reclamation

Overview

- WaterSMART Basin Study Program
- Purpose of our role today
- Objectives of a Basin Study
- Elements of a Plan of Study
- Goal of today based on previous meetings

Purpose of Today

- Complete the Plan of Study outline
- Be clear on what information has been completed, what's underway, and then identity what the gaps are
- In short
  - Get clear on the WHAT not so much about the HOW
- Get feedback from all stakeholders
- Complete the full POS over the next couple of months
- Help determine if Reclamation's program can help support on-going work in the basin

Objectives of a *Basin Study*

1. Define current and future basin water supply and demands, with consideration of potential climate change impacts

2. Determine the potential impacts of climate change on the performance of current water delivery systems (e.g., infrastructure and operations)

3. Develop options to maintain viable water delivery systems for adequate water supplies in the future

4. Conduct an analysis and modeling scenarios of the options developed, summarize findings and make recommendations on preferred options

Elements *Plan of Study*

- Address all four objectives of the Basin Study
- Understand what work that meets the objectives has occurred, what work is still needed, and fill in the gaps
- Discuss what's been done
  - what data, models, and studies are available from that work
- Discuss what the stakeholder needs are
- Get enough information to complete a draft of the potential tasks in a POS (later this afternoon)

Willamette Basin –Developing a Plan of Study
WaterSMART Workshop
September 30, 2013

Oregon Water Resources Department
U.S. Bureau of Reclamation

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Today's Meeting

- **Update from USACE** (small-scale work)
- **WaterSMART Program Refresher**
- **Introduction of the Plan of Study** (purpose, background, challenges)
- **Previous Work: What do we know about our water needs**
- **Current Activities**
- **Tasks: What needs to be done? Who can help?**
- **Meeting Wrap Up/Adjourn**

Goals for Today:

Decide if WaterSMART Program fits our needs
Begin mapping out work that needs to occur

1. Introduction

- Plan of Study
  - Look at existing data, current efforts, and identify gaps
  - Identify gaps in available data
- Four Study Objectives
- Study Area

2. Study Description

Background

- Fastest growing area in the state
- Agricultural commodoties most diverse in the U.S.
- Recreation plays a key role
- Richest in native fish species in the state

2. Study Description

Issues/Challenges

- **Several ESA-listed species**
- **Groundwater restricted areas**
- **Water quality impaired (gw/sw)**
- **Surface water limited during the summer months**
- **Access to USACE stored water is limited**
- **Data gaps: How much stored water do we need?**
- **Climate Change**
  - Ave. air temp increase of 2 to 7 degrees C during next century
  - 60% decrease in Cascade snowpack
  - Reduced summertime streamflows by 20 to 50 percent

2. Study Description (cont.)

NEEDS

- Greater access to stored water to meet multiple uses:

  Agriculture, Municipal, Industrial, Fish & Wildlife, Water Quality, Recreation, Hydropower

OPPORTUNITIES

- There is water.
- WaterSMART: utilize Reclamation's expertise & partner with stakeholders (collaboration is key)
  - Define water needs for the basin
  - Incorporate climate change into the planning process
- Build upon past studies and efforts underway

2. Study Description: Previous Work

Previous Work:
Understanding Willamette Basin Needs

INSTREAM NEEDS
- Established instream water rights & minimum perennial streamflows
- USACE target flows

OUT-OF-STREAM NEEDS
- 1994 Reservation Requests
  - Agricultural Demands
  - Municipal & Self-Supplied Industrial Demands
- 2008 statewide demand study

→ Summarized in the USACE/OWRD Interim Report & Existing and Base Condition Report (2000)

2. Study Description: Previous Work

INSTREAM NEEDS

- **> 200 instream flows established (ISWRs + MPSF + transfers)**
- **State issued "Minimum Perennial Streamflows" that call upon stored water and natural flow**

Willamette Mainstem
Coast Fork
Long Tom
Tualatin
Middle Fork
McKenzie
Santiam

- **2008 WILLAMETTE BIOLOGICAL OPINION**
  - **Federally established target flows: tribs & mainstem**
  - **RPA 2.4.1 Tributary Instream Flow Studies**
  - **RPA 2.9 Protecting Stored Water Released for Fish**

2. Study Description: Previous Work

State issued Minimum Perennial Streamflows (from Storage)

		Source	Tributary to	Rate From Storage	Notes
		Main Stem			
MF	181	Willamette River	Columbia	4700 cfs	Measured @ Willamette Falls in Oregon City
MF	182	Willamette River	Columbia	4700 cfs	Measured @ USGS gage 14198000 (3S1W23SE) at Wilsonville
MF	183	Willamette River	Columbia	4700 cfs	Measured @ USGS gage 14191000 (7S3W22SW) at Salem
MF	184	Willamette River	Columbia	3140 cfs	Measured @ UGSG gage 14174000 (11S3W6SW) at Albany
		Santiam			
MF	141	North Santiam	Santiam	640 cfs	Measured @ USGS gage 14184100 (10S2W7) near Jefferson, OR
MF	142	North Santiam	Santiam	640 cfs	Measured @ USGS gage14183000 (9S2E18NW) at Mehama, OR
MF	143	North Santiam	Santiam	640 cfs	Measured @ USGS gage 14181500 (9S4E34NENE) at Niagara, OR
MF	130	Middle Santiam	Santiam	260 cfs	Measured @ USGS gage 14181500 (13S1E24NESE) near Foster, OR
MF	159	S. Santiam River	Santiam	930 cfs	Measured @ USGS/USACE gage 14187500 (12S1W28SWNW) at Waterloo, Oregon
MF	167	Santiam River	Willamette	1570 cfs	Measured @ Santiam R & Willamette R confluence
MF	168	Santiam River	Willamette	1570 cfs	Measured @ USGS gage 14189000 (10S3W11SE) at Jefferson, OR
		McKenzie			
MF	75	Blue River	McKenzie	350 cfs	Measured @ Blue R. & McKenzie R. Confluence
MF	126	McKenzie	Willamette	700 cfs	Measured @ I-5
MF	127	McKenzie	Willamette	580 cfs	Measured @ gage near Vida (14162500) in 17S3E5NE1/4
MF	158	S. Fork McKenzie	McKenzie	230 cfs	Measured @ South Fork & McKenzie R confluence
		Long Tom			
MF	114	Long Tom	Willamette	370 cfs	Measured @ the Monroe USGS Gage 14170000 (NE1/4, 14S5W33)
		Coast Fork			
MF	84	Coast Fork Willamette	Willamette	250 cfs	Measured @ the Coast Fork & Middle Fork Confluence
MF	85	Coast Fork Willamette	Willamette	100 cfs	Measured @ the Coast Fork & Row River Confluence
MF	156	Row River	Coast Fork	150 cfs	Measured @ Row River & Coast Fork confluence
		Middle Fork			
MF	128	Middle Fork Willamette	Willamette	1475 cfs	Measured @ Middle Fork & Coast Fork confluence
MF	129	Middle Fork Willamette	Wilamette	690 cfs	Measured @ Middle Fork & N. Fork of the Willamette Middle Fork
MF	98	Fall Creek	Middle Fk. Willlamette	470 cfs	Measured @ the Fall Creek & Middle Fork Confluence
		Tualatin			
MF	174	Tualatin R	Willamette	varies by month	Measured @ USGS gage 14207500 (2S1E34SW) at West Linn; some storage releases from Scoggins Reservoir
MF	175	Tualatin R	Willamette	varies by month	" "

2. Study Description: Previous Work

BiOp Mainstem Flow Targets at Albany and Salem

Table 5.10-2 Mainstem Willamette Flow Objectives

Time Period	7-Day Moving Average [1] Minimum Flow at Salem (cfs)	Instantaneous Minimum Flow at Salem (cfs)	Minimum Flow at Albany (cfs) [2]
April 1 - 30	17,800	14,300	---
May 1 - 31	15,000	12,000	---
June 1 - 15	13,000	10,500	4,500 [2]
June 16 - 30	8,700	7,000	4,500 [2]
July 1 – 31	---	6,000 [1]	4,500 [2]
August 1 – 15	---	6,000 [1]	5,000 [2]
August 16 – 31	---	6,500 [1]	5,000 [2]
September 1 – 30	---	7,000 [1]	5,000 [2]
October 1 – 31	---	7,000	5,000

[1] An average of the mean daily flows in cubic feet per second (cfs) observed over the prior 7-day period.
[2] Congressionally authorized minimum flows (House Document 531). September flows were extended into October.

2. Study Description: Previous Work

BiOp Tributary Flow Targets

Table 2-10 Minimum and Maximum Tributary Flow Objectives Below Willamette Dams (Donner 2008).

DAM	PERIOD	PRIMARY USE	MINIMUM FLOW (CFS) [1]	PERCENT OF TIME FLOW IS EQUALED OR EXCEEDED [4]	MAXIMUM FLOW (CFS) [2]	PERCENT OF TIME FLOW IS EQUALED OR EXCEEDED [4]
Hills Creek	Sep 1 - Jan 31	Migration &	400	99.9		
	Feb 1 - Aug 31	Rearing	400	99.9		
Fall Creek	Sep 1 - Oct 15	Chinook spawning	200	95	400 through Sep 30, when possible	25
	Oct 16 - Jan 31	Chinook	50 [3]	99.9		
	Feb 1 - Mar 31	Rearing	50	99.9		
	Apr 1 - May	Rearing	80	99.9		
	Jun 1 - Jun 30	Rearing/adult	80	99.9		
	Jul 1 - Aug 31	Rearing	80	95		
Dexter	Sep 1 - Oct 15	Chinook spawning	1200	99.9	3,500 through Sep 30, when possible	10
	Oct 16 - Jan 31	Chinook	1200 [3]	99.9		
	Feb 1 - June	Rearing	1200	99.9		
	Jul 1 - Aug 31	Rearing	1200	99.9		
Big Cliff	Sep 1 - Oct 15	Chinook spawning	1500	95	3,000 through Sep 30, when possible	5
	Oct 16 - Jan 31	Chinook	1200 [3]	98		
	Feb 1 - Mar 15	Rearing/adult	1000	99.9		
	Mar 16 - May	steelhead	1500	99.9	3,000	25
	Jun 1 – Jul 15	steelhead	1200 [3]	99.9		

N. Santiam MPSF
640 cfs from storage, measured at Niagara, Mehama, & Jefferson

2. Study Description: Previous Work

BiOp Tributary Flow Targets (cont.)

DAM	PERIOD	PRIMARY USE	MINIMUM FLOW (CFS) [1]	PERCENT OF TIME FLOW IS EQUALED OR EXCEEDED [4]	MAXIMUM FLOW (CFS) [2]	PERCENT OF TIME FLOW IS EQUALED OR EXCEEDED [4]
	Jul 16 - Aug	Rearing	1000	99.9		
Foster	Sep 1 - Oct 15	Chinook spawning	1500	75	3,000 through Sep 30, when possible	1
	Oct 16 - Jan 31	Chinook	1100 [3]	80		
	Feb 1 - Mar 15	Rearing	800	95		
	Mar 16 - May	steelhead	1500	80	3,000	30
	May 16 - Jun	steelhead	1100 [3]	95		
	Jul 1 - Aug 31	Rearing	800	99		
Blue River	Sep 1 - Oct 15	Chinook spawning	50	99.9		
	Oct 16 - Jan 31	Chinook	50	99.9		
	Feb 1 - Aug 31	Rearing	50	99.9		
Cougar	Sep 1 - Oct 15	Chinook spawning	300	99.9	580 through Sep 30, when possible	60
	Oct 16 - Jan 31	Chinook	300	99.9		
	Feb 1 - May	Rearing	300	99.9		
	Jun 1 - Jun 30	Rearing/adult	400	99.9		
	Jul 1 - Jul 31	Rearing	300	99.9		
	Aug 1 - Aug	Rearing	300	99.9		

[1] When a reservoir is at or below minimum conservation pool elevation, the minimum outflow will equal inflow or the Congressionally authorized minimum flows, whichever is higher.

[2] Maximum flows are intended to minimize the potential for spawning to occur in stream areas that might subsequently be dewatered at the specified minimum flow during incubation.

[3] Incubation flows are intended to be no less than ½ the maximum 72-hour average discharge observed during the preceding spawning season. Efforts will be made to avoid prolonged releases in excess of the recommended maximum spawning season discharge to avoid spawning in areas that would require high incubation flows that would be difficult to achieve and maintain throughout the incubation period.

[4] Flow duration estimates are based on HEC-ResSim model output data for the BiOp operation. Period of Record of model data is Water Years 1936-2004.

2. Study Description: Previous Work

INSTREAM NEEDS SUMMARY

- Flow values differ (state vs. federal)
- Not all flows protected by ISWR; no contracts exist
- Natural vs. Stored Water Component
- How much storage is needed for instream uses?

2. Study Description: Previous Work

AGRICULTURAL DEMANDS TODAY (from USACE storage)

Reclamation's Water Marketing Program

2012: 61,000 acre-feet (209 contracts), for 34,000 acres

2013: 72,000 acre-feet (216 contracts)

BiOp limits contracts to a total 95,000 acre-feet

Demand Projections from Storage

2020 Ag Demands = 96,388 acre-feet

2050 Ag Demands = 550,000 acre-feet
(Source: ODA 1994 reservation request)

2. Study Description: Previous Work

AGRICULTURAL DEMANDS (2020)

- Irrigation water use = 401,459 acre-feet annually (basin wide)

Table 16. Monthly Water Withdrawals from Storage for Projected Increases (acre-feet)

Month	Upper Basin (above Harrisburg)	Mid-Valley (Harrisburg to Salem)	Lower Basin (above Oregon City)	Total
May	1,663	6,177	745	8,585
June	4,989	18,532	2,234	25,755
July	5,913	21,964	2,647	30,524
August	4,250	15,786	1,903	21,939
September	1,663	6,177	745	8,585
Total	18,479	68,636	8,273	95,388

- Some assumptions:
  - Irrigated lands will increase by 2,348 acres/year
  - 2.5 acre-feet per acre from Corps storage

Source: 2000 OWRD/USACE Base Condition Report

2. Study Description: Previous Work

Municipal Demands from Storage

2020 = 58,116 Acre-Feet

2050 = 132,920 Acre-Feet

Self-Supplied Industrial Demands from Storage

2020 = 44,896 Acre-Feet

2050 = 74,908 Acre-Feet

Source: Interim Report
& Existing and Base Condition Report (2000)

2. Study Description: Previous Work

Statewide Water Needs Assessment

Oregon Water Supply and Conservation Initiative

FINAL

September 2008

Prepared for:

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, OR 97301

Prepared by:

HDR Engineering, Inc.
1001 SW Fifth Avenue
Suite 1800
Portland, OR 97204-1134

2. Study Description: Current Activities

Current Activities

- Review of Municipal and Industrial Demands (2013)
- Willamette Water 2100 (2010-2016)
- BiOp Instream Flow Studies (ongoing)

3. Study Description: Current Activities

Willamette BiOp
RPA 2.4.1 Tributary Instream Flow Studies

Schedule:

- North and South Santiam (completed July 2013)
- Middle Fork
- McKenzie

Scheduling now, selecting contractor

- Fall Creek (not scheduled)

3. Study Approach and Interested Parties

Past Participants in Reallocation Discussions (2011-2013)

Agriculture/Irrigation
Oregon Water Resources Congress
Santiam Water Control District
OR. Assoc. of Nurseries
Oregon Farm Bureau

Instream/Environmental Interests
WaterWatch of Oregon
The Nature Conservancy

Other Partners
Willamette Water 2100
Oregon's Congressional Delegation
Various consultants

Cities/Municipalities
Eugene Water & Electric Board
City of Salem
City of Hillsboro
Tualatin Valley Water District
Oregon Water Utilities Council
Special Districts Assoc. of Oregon

Federal/State/Local Govt
Corps
Reclamation
NOAA - NMFS
Water Resources Department
Fish & Wildlife Department
Dept. of Agriculture
League of Oregon Cities
Assoc. of Oregon Counties

2. Available Data

OWRD Data to Support Development of Demands

- Water Rights Information System (WRIS db)
- Water Availability Model
- Streamflow data (120+ gages)
- Water Use Data & WMCPs
- 2008 OWSCI Demand Study
- Other agency data?

4. Study Management Requirements

PROJECT MANAGEMENT PLAN

- Study Management Structure
- Decision Making Process
- Roles and Responsibilities
- Study Team Coordination
- Administrative Record
- Schedule and Cost Control
- Quality Control Plan
- Deliverables and Project Documentation Requirements
- Review Process
- Project Communication Plan
- Public Involvement Plan

4. Study Tasks

- Willamette Draft POS outlines some very basic tasks:
  (example: Develop POS, Define Roles)

- Needs work! Major purpose of this meeting.

Major Tasks to Outline:

- Climate Change
- Consumptive Demands
- Instream Needs

- Can we meet the basin study requirements?

Closing Thoughts & Next Steps