

Upper Deschutes River Basin Study

Plan of Study

Prepared for the Basin Study Work Group

Attachment to Memorandum of Agreement Between the
Deschutes Basin Board of Control
and the Bureau of Reclamation



U.S. Department of the Interior
Bureau of Reclamation
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1. Introduction

1.1 Purpose of Study

The purpose of the Upper Deschutes River Basin Study is to collaboratively develop options for responding to imbalances in water supply and demands¹. The Basin Study will extend, refine and add additional information to the previously established baseline in order to identify specific options for resolving water supply and demand imbalances. Previous studies in the Deschutes Basin recognize the need for water conservation and improved management to meet current and future water needs. This effort will require coordinated and collaborative projects that could move water between users and uses and potentially include new supply from storage.

To accomplish these goals, the Deschutes Basin Board of Control (DBBC) on behalf of the Basin Study Work Group (BSWG) will enter into a Memorandum of Agreement (MOA) with the Bureau of Reclamation to complete the Basin Study. This Basin Study will:

- Build on existing relationships to ensure collaborative management approaches
- Use previous studies as the foundation for developing tools and options to address water supply imbalances
- Refine and develop additional information, as needed to further understand instream and groundwater demands in the basin
- Develop relevant and detailed climate change projections that will help stakeholders further refine water supply projections
- Identify water management tools and options to help stakeholders sustainably and responsibly manage water supplies for municipal, agricultural, and environmental uses
- Conduct a trade-off analysis of options that assess cost, benefits and environmental impacts

1.2 Basin Study Objectives

The Basin Study will address the following specifically required Basin Study elements:

1. Develop projections of water supply and demand within the basin, including an assessment of risks to the water supply relating to climate change as defined in Section 9503(b)(2) of the SECURE Water Act
2. Analyze how existing water and power infrastructure and operations will perform in the face of changing water realities and other impacts identified within Section 9503(b)(3) of the SECURE Water Act
3. Develop appropriate adaptation and mitigation strategies to meet future water demands
4. Complete a trade-off analysis of the identified options, including an analysis of all options in terms of their relative cost, environmental impact, risk, stakeholder response, or other common attributes.

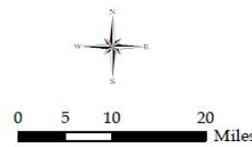
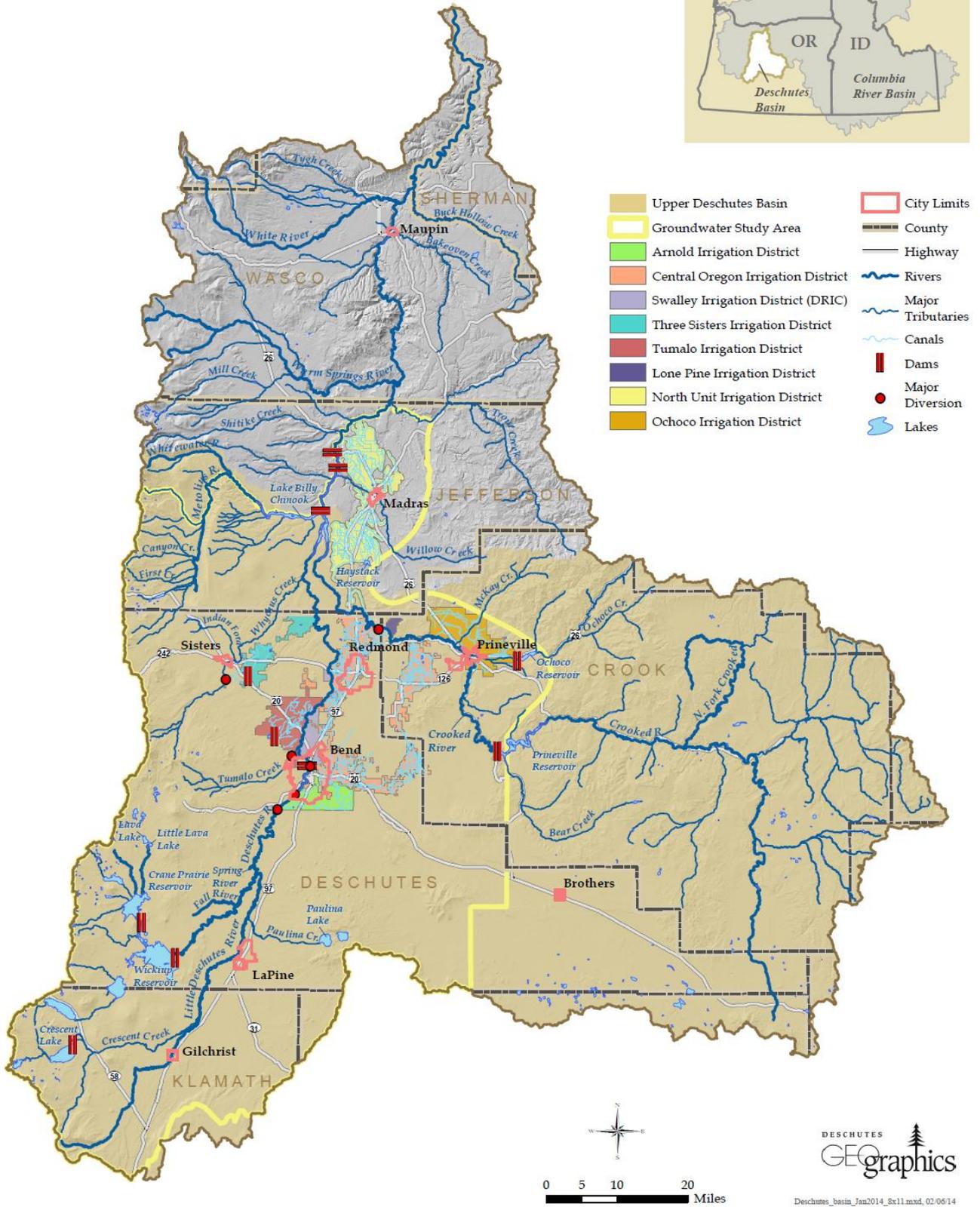
The results of the trade-off analysis will provide specific, collaborative components that can support development of a Water Management Plan in the upper Deschutes Basin subsequent to the completion of the study.

¹ Unless otherwise noted demands refers to instream and out-of-stream demands.

1.3 Description of the Study Area

The geographic extent of the project study area covers the Deschutes Basin upstream from the confluence of the Deschutes, Crooked, and Metolius Rivers, and includes the rivers' associated tributaries and storage projects; collectively referred to as the upper Deschutes Basin. The upper Deschutes Basin covers portions of Jefferson, Crook, Deschutes, and Klamath counties. It also includes the Cities of Redmond, Prineville, Sisters, Bend, Brothers, La Pine, and Gilchrist; and several unincorporated communities. The Deschutes River and its tributaries also supply water to eight irrigation districts in the upper Deschutes Basin. In 2002, the irrigation districts formed the DBBC, a legal entity chartered under Oregon Revised Statutes, Chapter 190. The DBBC irrigators store and divert water to irrigate approximately 150,000 acres. A map of the upper Deschutes Basin is shown in Figure 1.

Figure 1. Deschutes Basin



2. Study Description

2.1 Project Background

Since the early 1900s, surface water in the upper Deschutes Basin has been almost fully allocated, primarily for agriculture. Many stream reaches experience altered flows and water quality issues at different critical times of the year. Furthermore, hydraulic connectivity between surface water and groundwater restricts new groundwater appropriations in the region. Consequently, the State of Oregon requires any new water rights for the use of groundwater in the upper Deschutes Basin to be accompanied with mitigation. In most cases, this mitigation is in the form of instream transfers and leases of existing irrigation water rights. New water demands will have to be met with creative solutions devised through the collaboration of agricultural, municipal and environmental interests. Increased efficiencies, conserved water projects and additional storage will be studied in the Basin Study.

To address these issues, in 2004 the DBBC, Central Oregon Cities Organization, Deschutes River Conservancy (DRC), and the Confederated Tribes of Warm Springs formed the Deschutes Water Alliance (DWA). The purpose of the DWA was to conduct planning studies that provided broad-scale analysis of the present and future water needs for agriculture, municipal, and instream purposes. (In 2010, the DWA evolved into a 22 member organization with a Memorandum of Understanding signed by the elected officials of seven irrigation districts, three counties, all the cities in the three counties, and the organizations mentioned above).

The DWA studies resulted in the implementation of some water management mechanisms and several conserved water projects – for example, the lining or piping of canals with the “conserved water” being placed instream. The DRC, in partnership with the DWA, produced additional analysis of how to meet water supply needs in the mainstem Deschutes River system through the Deschutes Water Planning Initiative from 2012 to 2014. These studies will provide key information bases that this Basin Study will build on.

In 2014, the BSWG was formed to help manage this Basin Study in collaboration with the Bureau of Reclamation (Reclamation). The purpose and list of members is provided in the BSWG Charter in Attachment 1. As stated in the BSWG’s charter, the group will build on the DWA studies, Reclamation studies, and other studies to meet the study objectives and purposes described above.

2.2 Problems, Needs, and Opportunities

The imbalances of water supply and demand are well documented in the upper Deschutes Basin. These imbalances are cause for concern for agricultural, municipal, and environmental water users, with the biggest unmet demand being for instream use. Furthermore, the imbalances could become more pronounced depending on how potential climate change conditions impact future supplies and demand. The following section outlines the identified problems and needs that will be addressed in this Basin Study.

Problems and Needs

Water Shortages

Studies conducted by the DWA in 2006 projected water demands through 2025 and showed a 260,000 acre-foot (AF) unmet annual average imbalance between supply and demand for all uses below the major reservoirs in the upper Deschutes Basin. A 2013 update revised the annual

average imbalance between supply and demand to 230,000 AF, with the reduction due to the implementation of conservation projects. According to the studies, this imbalance represents approximately 30 percent of total water demands. This current imbalance is based on expected water supply and demand under historic climate conditions. Climate change projections may increase the magnitude of this imbalance.

The failure to address existing and future imbalances will affect all basin stakeholders:

- Inadequate instream water supplies jeopardize restoration efforts, impair ecosystem functions, and limit recreational and economic opportunities including angling and other water dependent activities.
- Inadequate agricultural water supplies would affect landowners within, and beyond, the basin, and limit existing in-conduit hydropower production.
- Inadequate potable water supplies (municipal and quasi-municipal water supplies) will limit economic development and threaten public health and safety.

Developing options for addressing these imbalances is critical.

There are sufficient data available on the effects the imbalances have or will have on instream flows, irrigated agriculture, groundwater supplies, existing hydropower, and water quality. The objective of this study is to take that information and evaluate the options for managing and addressing these water supply imbalances. This study will identify, evaluate, and provide a common basis for understanding the interconnected effects of various water management projects.

Instream Flows

Although irrigators have reduced their diversions and made significant infrastructure improvements in the last 40 years, the cumulative impacts of irrigation storage and diversion operations have altered winter and summer stream flows from pre-development levels. Past studies estimated that the Deschutes River and its tributaries in the upper Deschutes Basin require an additional 160,000 AF annually to meet minimum flow targets set by the Oregon Department of Fish and Wildlife (ODFW [Newton 2013²]).

Furthermore, the current instream flow demand is based on studies that are twenty years old, but physical conditions have changed in some reaches and there are new priorities due to the reintroduction of anadromous fish and the listing of the Oregon spotted frog as Threatened under the Federal Endangered Species Act (ESA).

These studies need to be refined and updated where possible based on changed physical conditions and the prioritization of new species (i.e. reintroduced anadromous fish and the Oregon spotted frog, listed under the ESA). The probability of meeting minimum flow targets vary by reach and by month. Meeting instream water demands will provide ecosystem resiliency necessary to maintain fish and wildlife populations as water supplies shift with changes in climate.

Irrigated Agriculture

The DWA estimated an additional agricultural demand of 55,000 AF (Newton 2013). The majority of this agricultural demand comes from unmet or unreliable irrigation water rights. For instance, North Unit Irrigation District (part of Reclamation's Deschutes Project) holds junior

² Newton Consultants, Inc. (2013). Deschutes Water Alliance Accomplishments Upper Deschutes Basin, Oregon.

water rights and depends on storage in Wickiup Reservoir for supply to irrigate 59,000 acres of agriculture in Jefferson County. However, the District's supply is unreliable and inadequate on an annual basis, with water shortages averaging 20,000 to 25,000 acre-feet. Chronic shortages impede district patrons in their efforts to more fully develop the land's economic potential. Scenarios for meeting unmet agricultural demands needs to be evaluated and resolved to ensure long term sustainability.

Groundwater

Nearly all future water supplies for municipal, industrial, domestic and some new agricultural demands will be met with groundwater. In 2013, the DWA estimated that the imbalance in groundwater demands and supply in 2050 could be as much as 15,000 AF annually (Newton 2013).

The Deschutes Basin Groundwater Mitigation Program requires new groundwater users to mitigate for the impacts of their use on stream flows. In order to mitigate for currently projected groundwater demands, groundwater users would need to obtain access to or conserve the equivalent of 8,000 to 10,000 acres of land currently served by surface water rights. The limited availability of water rights to serve as mitigation for new groundwater rights has increased water rights costs, impaired water and land use planning, and resulted in a lack of water supply certainty needed for sound economic development. This demand needs additional analyses to represent a more refined groundwater demand value for the basin.

Hydropower

There are several hydropower projects currently operating in the upper Deschutes Basin:

1. Pelton-Round Butte Project on the Deschutes River (376.3 MW)
2. PacifiCorp's Mirror Pond Dam on the Deschutes River (1.1 MW)
3. Deschutes Valley Water District on Lower Crooked River (4.3 MW)
4. Central Oregon Irrigation District (COID) Siphon Power Plant on the Deschutes River at Bend (5.4 MW)
5. COID Juniper Ridge in-conduit project (5.0 MW)
6. Swalley Irrigation District's Ponderosa Power Plant project on its Main Pipeline. (0.75 MW)

Seventeen additional projects have been proposed on existing irrigation conduits. Also, a hydropower proposal for Wickiup Dam is several years into a FERC application, and recent Federal legislation will facilitate potential hydropower development on Bowman Dam.

Further analyses of hydropower opportunities have been pursued through the Basin Scale Opportunity Assessment Initiative undertaken by the US Department of Energy's Pacific Northwest National Lab, Oak Ridge National Lab, the U.S. Army Corps of Engineers, and Reclamation.

Hydropower water demand is significant, although most of the existing facilities use water for hydropower as a secondary source, and as such, hydropower is synergistic with existing uses rather than a driver for new water supplies. Hydropower projects along existing canals complement canal piping projects. Together, these projects provide a sustainable revenue source, which is often used to reinvest in water conservation efforts, and a source of water for new uses, such as instream restoration. Climate change impacts could have significant effects on the water availability, future performance, and output and economic benefits of these hydropower projects.

Water Quality

Water quality and quantity are inextricably linked in the upper Deschutes Basin. Imbalances in the water supply in the basin can also directly affect the quality of water instream thus impacting aquatic habitat and recreation. In the river systems, there are numerous State water quality parameters not being met (303[d] listed) and many of these issues could be affected by changes in water management. Low flows at certain times of the year are a major limiting factor for water quality throughout the upper Deschutes Basin and conditions could be improved by increased stream flows, especially during hot summer months. Conversely, altered (high) summer flows can cause water quality issues. Changes in the quantity of water being released from reservoirs at different times of year could also affect water quality downstream depending on water quality characteristics of the reservoir water. Changes in water management that impact groundwater discharges to surface water may also affect water quality.

A comprehensive evaluation of climate change projections and water management changes on water quality will not be undertaken in this study. However, existing data and draft models do exist that could be used to better understand the relationship of stream flow and water temperature. There is a need for further evaluation of this existing information, which can be used in the trade-off analyses described below.

Climate Change

The 2013 DWA report (Newton 2013) updated water demand projections, but did not account for climate change projections. An increase in temperatures may create earlier annual warm periods, decreases in April 1st snow water equivalents, earlier snowmelt runoff, and more precipitation falling as rain rather than snow. All of these trends could substantially modify the timing and quantity of river discharge and thus availability. Climate change projections can be used to update the supply and demand numbers to account for anticipated changes in the snowpack, timing and quantity of runoff, groundwater recharge and discharge, and potential increased rates of evapotranspiration.

In order to accurately analyze how water and power infrastructures will be affected by climate change, climate projections specifically for the Deschutes Basin need to be developed. Once the basin specific climate change projections are available, the study team will have to analyze the effects of climate change on how the existing water and power infrastructure operates. Because existing operations are well-monitored and well-understood, the study team has a solid foundation from which to analyze future impacts. Climate change projections will inform the water management options.

Opportunities

Basin partners have already developed and implemented many individual water transactions and conservation projects that have reduced the existing water imbalance (i.e. the “low-hanging fruit”). However, meeting future water demands will require coordinated, collaborative efforts addressing water management, re-allocation (including water banking), conservation projects, and potentially new supply from storage. Over the last two years, basin stakeholders have worked together as part of the Deschutes Water Planning Initiative to further develop water supply options and to package them into scenarios that move water between users and purposes creating multiple benefits. The Basin Study will leverage this foundational work and the collaboration that has been built throughout the process, providing -additional analytical and modeling resources and climate change analysis to advance the development and understanding of water supply options.

The BSWG members, and the Deschutes Basin as a whole, have demonstrated the ability to work together to develop and implement agreed upon goals. Within the BSWG, there is the ability to analyze stakeholder response and discuss contentious issues to find collaborative solutions. The basin partners intend to use previous work, and analysis produced in the Basin Study, as the foundation for agreement and development of long-term water management solutions in the basin.

2.3 Previous Work and Available Data Models

The study will draw from several data sources across the Deschutes Basin, including but not limited to:

Data

- Natural Resources Conservation Service (NRCS) sites provide precipitation and snowpack data to allow for an understanding of primary basin inflows.
- Oregon Water Resources Department (OWRD) offers extensive surface water data and has recently completed groundwater studies in the basin. OWRD maintains stream and canal gauging network across the region, with historic data stretching back over 100 years. It also maintains storage records for the major reservoirs in the upper basin, including Crane Prairie, Wickiup, Crescent Lake, and Prineville.
- Water supply and demand data exist for individual uses and users within the basin. Each irrigation district maintains GIS data outlining their delivery system, water rights, and irrigated lands. Municipal and quasi-municipal water providers track their demands and deliveries. Municipalities projected their demands over 50 years under historic climate conditions for the 2006 DWA studies.
- Instream flow targets, based on requested instream water rights from ODFW, provide initial targets for environmental water demands. Additional information about instream flows is available in Wild and Scenic Management Plans, IFIM studies, water quality studies, and other documents.
- The Upper Deschutes Watershed Council and Crooked River Watershed Council collect continuous temperature data and a variety of other water quality data across the Deschutes River and its tributaries.
- Oregon Department of Environmental Quality (DEQ) collects water quality data every other month at several sites in the basin and has previously collected more intensive Total Maximum Daily Load data. Collection of additional TMDL data is underway in the Upper Deschutes.
- The 2006 DWA studies and subsequent studies have compiled and summarized instream water demands under historic climate conditions into a useable and critical data set.

Models

Numerous models have been developed for use in the Deschutes Basin. These models include but are not limited to:

- The USGS and OWRD developed a MODFLOW groundwater model in the late 1990s. This model was developed to better understand groundwater and surface water connections in the Basin. MODFLOW simulates groundwater flow through aquifers. USGS recently updated their MODFLOW model of the basin, refining the grid to allow for better stream definition and higher resolution on flow estimates.

- The USGS and OWRD are developing a Groundwater and Surface Water FLOW (GSFlow) model of the basin to conduct a more complete evaluation of groundwater/surface water interaction. GSFlow combined elements of PRMS (Precipitation Runoff Modeling System) and MODFLOW to simulate both groundwater and surface water flows. This approach better represents stream flows that are heavily influenced by groundwater.
- OWRD coordinated with basin stakeholders to develop a MODSIM for the upper Deschutes River (upstream of Tumalo Creek) in 2001. MODSIM is a surface water accounting and basin-wide decision support system. Reclamation developed a MODSIM model for the Crooked River in the early 2000s. Reclamation then combined the two models and extended the combined version downstream to Lake Billy Chinook. This model allowed stakeholders to estimate changes to water supply reliability under different management options.
- Researchers simulated regional groundwater system response to climate change in the Deschutes Basin (Waibel, et al 2013³). The simulation applied climate projections from existing global climate models (GCMs) to a groundwater flow model based on the existing MODFLOW model of the basin. The results of the study can help inform the effects of climate change on groundwater in the basin.
- OWRD developed the Deschutes mitigation model in 2008 to estimate the impact of mitigation projects on stream flow.
- Pacific Northwest National Laboratory (PNNL) developed a RiverWare model during their Basin Scale Assessment study. The model was shared with Reclamation and since that time, Reclamation has made minor improvements to the model. Like MODSIM, Riverware is a surface water accounting and basin-wide decision support system, but Riverware flow simulations have finer temporal resolution than MODSIM (daily, as opposed to monthly).
- OWRD, Ochoco Irrigation District, and Reclamation use statistical water supply models developed by Natural Resource Conservation Service (NRCS) for water supply forecasting and reservoir management.
- Draft models exist for several stream reaches of interest, which could be used to assess temperature affects under different flow scenarios. These models include draft Heat Source models develop by DEQ and regression models developed by the Upper Deschutes and Crooked River Watershed Councils.

2.4 Study Approach

This Basin Study is unique given the large amount of information that has already been developed and the strong collaborative foundation that has been built. Moreover, the emphasis of this study will be on developing implementable solutions to the identified water supply and demand imbalances.

³ Waibel, M. S., Gannett, M. W., Chang, H., & Hulbe, C. L. (2013). Spatial variability of the response to climate change in regional groundwater systems—Examples from simulations in the Deschutes Basin, Oregon. *Journal of Hydrology*, 486, 187-201

Water management options -will be developed and evaluated using existing information and information developed through the Basin Study. These options will be “packages” of activities that equitably address water supply imbalances for irrigation, instream and municipal/water supply needs. The goal is to develop two sets of options: one that is for a short term planning horizon, lower cost and does not include the construction of new above ground storage facilities; and one that is a longer-term planning horizon, higher cost and includes the construction or enhancement of above ground storage facilities. These options will then be evaluated to document expected changes in supply and demand and the efficacy of the option to address identified water supply imbalances. Following a rigorous trade-off analysis, the project partners and basin stakeholders will prioritize options as recommendations for the *Final Basin Study Report*. A more detail description of the specific tasks is in section 4 below.

3. Study Management Requirements

3.1 Basin Study Management Structure

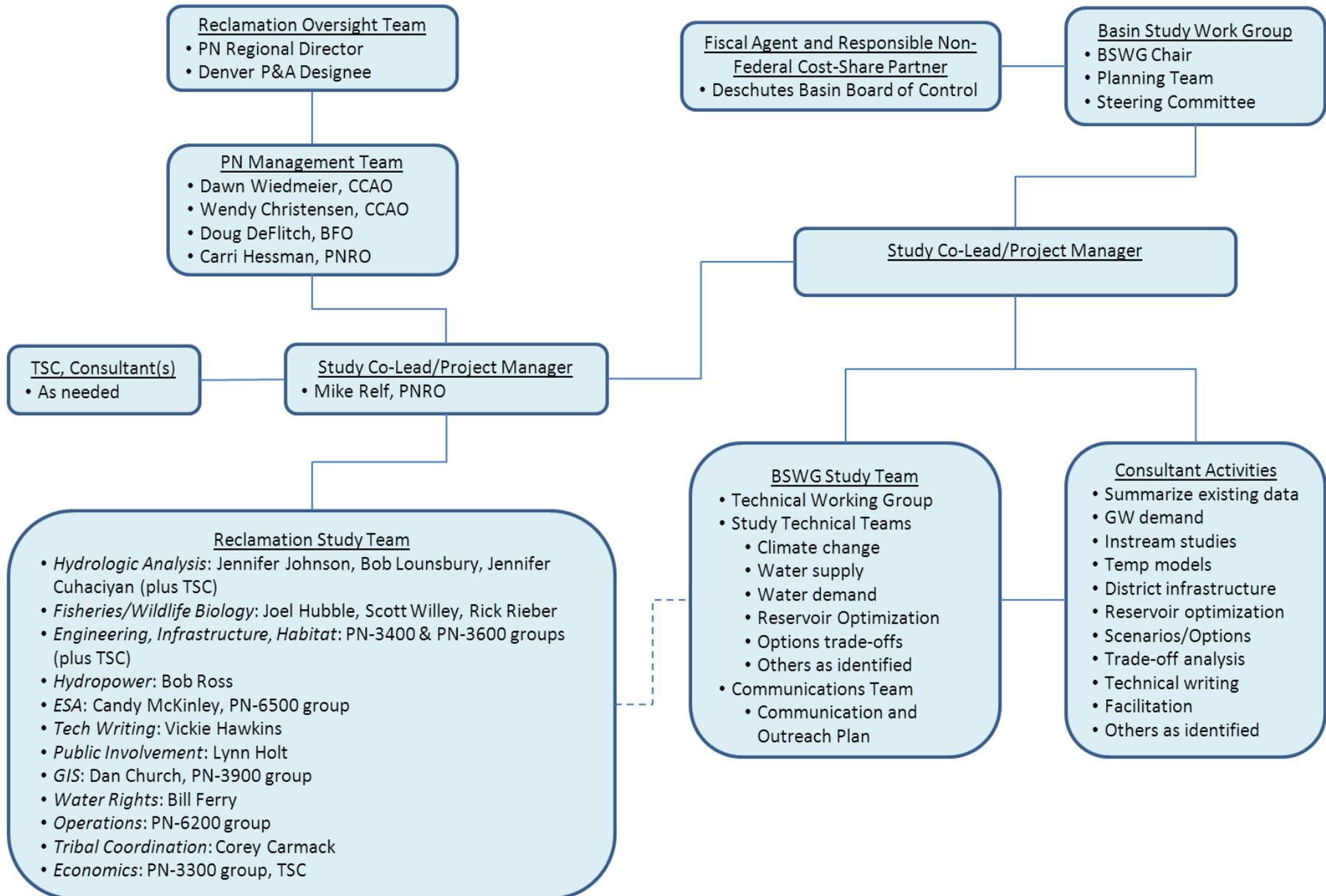
The total cost of the Basin Study is \$1.5 million. Reclamation will provide \$750,000 as the federal cost-share partner, and DBBC is the responsible non-federal cost-share partner on behalf of the BSWG. The DBBC’s contribution uses State of Oregon funds designated specifically for a Reclamation Basin Study under Senate Bill 839 (2013). Additional non-Federal funding may be raised for additional work products with the understanding that Reclamation will likely not match these funds.

Basin Study Cost-Share Partner Contact Information		
Entity	DBBC	Reclamation
Contact Person	Mike Britton President, DBBC	Wendy Christensen Technical Projects Program Manager
Address	Deschutes Basin Board of Control P.O. Box 919 Madras, OR 97741	Columbia-Cascades Area Office 1917 Marsh Road Yakima, WA 98901

The BSWG is a collaborative entity that has been meeting regularly and includes numerous and varied stakeholders in the upper Deschutes Basin. Its members represent the interests of the three main components of water demand: agriculture, instream and municipal. The BSWG charter members are provided in the Charter in Attachment 1. It is anticipated that additional stakeholders, including elected officials and their staff, will be invited to participate in this process as appropriate.

The purpose of study management is to ensure completion of the Basin Study in an effective, cost-efficient, and timely manner. Figure 2 illustrates the proposed management structure of the Basin Study. The study management structure is designed to facilitate direct communication among participating stakeholders and to provide for efficient decision-making by the non-Federal partner consistent with the BSWG charter (Attachment 1). Study team members will be identified and engaged as needed to implement the Plan of Study; preliminary team members are shown in Figure 2 as available.

Figure 2
Upper Deschutes River Basin Study – Study Team Organization



3.2 Roles and Responsibilities of the Study Team

US Bureau of Reclamation

Reclamation will be responsible for execution of the tasks assigned to its staff and IDIQ or other contractors. The Reclamation study co-lead/project manager will be responsible for day-to-day management of the Basin Study, ensuring communications with its over-sight and management teams, coordination of the Reclamation study team, coordination of the Communication and Outreach Plan in Attachment 2, and coordination with the non-Federal cost-share partner study co-lead/project manager (referred to as the BSWG study co-lead/project manager hereafter).

Fiscal Agent and Responsible Non-Federal Cost-Share Partner on behalf of the BSWG

As described in the Basin Study Work Group Charter in Attachment 1, the DBBC Chairman (or designee) is the official point of contact with OWRD and Reclamation regarding funding agreements and fiscal management for the Basin Study. DBBC will be serving as the fiscal agent for the Basin Study on behalf of the BSWG, and is the legal entity responsible for the execution of the MOA with Reclamation and the grant agreement with OWRD.

As the legal fiscal entity, non-Federal contractors for the Basin Study will be procured through a contract with DBBC.

Basin Study Work Group

As described in the Basin Study Work Group Charter in Attachment 1, the BSWG's purpose is to co-manage this Basin Study with Reclamation. The goal of the BSWG structure is to promote completion of the Basin Study, to be open and inclusive, and to encourage diverse viewpoints. The BSWG Steering Committee (BSC) operates by consensus and has a process to address disagreement. The BSWG Steering Committee will be called on to make various decisions throughout development of the basin study, including the procurement of consultants.

The BSWG study co-lead/project manager will be responsible for the day-to-day management of the basin study (schedule, cost, contract administration, reporting to OWRD on use of state funds, etc.), ensuring communications with the BSC, coordinating the activities of the BSWG study teams, coordinating the Communication and Outreach Plan in Attachment 2, and coordinating and overseeing consultants that will be engaged to execute specific work items, and coordinating with the Reclamation study co-lead/project manager.

3.3 Change Management Plan

Change occurs on all projects as additional information is obtained and when conditions differ change from those assumed during scoping. The procedures to be followed for documenting and executing change are described in this section.

A potential need for change in scope, schedule, and/or budget may be identified by any member of the study team. Identified issues will be raised to both the Reclamation study co-lead and the BSWG study co-lead. The study co-leads will jointly assess the relevance of the proposed change and develop a proposed approach for resolution. Minor adjustments that can be accommodated without affecting scope, schedule, and/or budget for major tasks may be approved by the study co-leads. More significant changes that could affect scope, schedule, or budget for major tasks will be documented in a change management form for review by Reclamation management and the BSC.

For any change request that is approved by the study co-leads, an associated change management form will be prepared to document:

- The nature of the requested change (changes will be numbered and dated).
- Amount of budget impact, if any.
- Length of schedule impact, if any.
- Reason for change.
- Associated impacts and risks.

Change control forms will be retained in the project records by the study co-leads and tracked through to completion regardless of approval. Upon approval of change requests by Reclamation management and the BSC, the study co-leads will update relevant project documents and communicate the change to the relevant project team members and any key stakeholders.

A change request that involves deviation from scope, schedule, or budget understandings established in the MOA and Plan of Study (POS) will be documented in a memorandum from Reclamation's Regional Director to the Director, Policy and Administration. Changes approved by Policy and Administration will be documented in an amendment to the MOA.

3.4 Risk Management Plan

New projects involve uncertainties associated with developing new and unique products or services. In implementing projects, organizations make judgments about relevant uncertainties which result in risk playing a significant role in project implementation.

In project terms, a risk is an uncertain event or condition that, if it occurs, has an effect (usually negative) on one or more project objectives. The purpose of the risk management plan is to establish a framework for identification of risks and development of strategies to mitigate or avoid those risks.

The scope, schedule, and budget described in this POS provide the basis for developing a risk management approach. The approach for this project will be to implement a process for the study team to proactively identify and assess various risks in order to implement mitigation strategies as early as possible. The most likely and highest impact risks will follow a mitigation process in which the risk is accepted, removed via adjustment to the study design, or mitigated utilizing a risk response. Risk management will involve the following steps:

- Include an agenda item for discussing risk at study team meetings.
- Record identified risks in project records.
- Utilize the experience of the study team to review the history of similar projects in order to determine common risks and strategies used to mitigate those risks.
- For identified risks, the Reclamation and the BSWG study co-leads will work with study team members to assess probability and impact for each risk. This process will allow the study co-leads to prioritize risks based on the effect they may have on the project.
- Risks determined to be most likely and to have the greatest potential impact will be documented and reported to the BSC and monitored during the time the project is

exposed to each risk. Risk monitoring will be a continuous process throughout the life of the project.

- The Reclamation and the BSWG study co-leads will lead the project team in developing responses to each identified risk. Responses may involve: avoidance (choose to take a different approach); mitigation (take action to reduce probability and/or impact); or acceptance (carry the risk and develop a contingency plan).

3.5 Technical Sufficiency Review Plan

This Technical Sufficiency Review plan outlines the approach and methods for reviewing technical information, data, models, analyses, and conclusions of the Basin Study. The plan involves:

- Timing – Individual reviews will be conducted at several steps during performance of the five major study tasks, i.e., to correspond to key modeling and analytical phases of the work such as: climate change and surface water analysis; groundwater modeling and analysis; and water resource management modeling.
- Scope – Reviews will focus on the technical information, data, models, analyses, and conclusions as developed for each of the relevant phases. The volume and detail of information relevant for each phase of the Technical Sufficiency Review will vary in accordance with the specific content of the corresponding technical memorandum.
- Process – Reviews will be conducted largely through email transmittals of draft reports and associated data. Review comments will be requested within a specific time frame, as agreed to in advance with reviewers, with the objective of maintaining progress and meeting schedule targets. Reviewers will also be requested to clearly identify and characterize scientific uncertainties and limitations. Comments received from reviewers will be recorded along with descriptions of how each comment was resolved, and any remaining technical uncertainties will be documented in the *Final Basin Study Report*. All results from Technical Sufficiency Reviews will be documented and made available to Reclamation, the BSWG, and study team members. It is possible that previously-completed peer reviews and/or comparable review processes completed by contractors and/or non-Federal parties may be sufficient for some portions of the Basin Study information and/or analyses; such reviews will be documented and thereby incorporated into the Technical Sufficiency Review.
- Number and Selection of Reviewers – It is anticipated that two reviewers will be identified for each Technical Sufficiency Review phase. If feasible, one reviewer will be from within Reclamation and one from outside of Reclamation. Potential reviewers with appropriate technical expertise and experience may be identified by study team members. Individuals to be considered will not have been directly or indirectly involved with conducting the specific analyses under review. Final selection of reviewers will be confirmed by Reclamation management and the BSWG Planning Team.

4. Study Tasks

4.1 Study Tasks

This section presents a description of the major Basin Study work tasks and milestones. The Basin Study will begin in April 2015, and be completed by February 2018. The final documentation for the Basin Study will be a *Final Basin Study Report*, along with technical memoranda that will be developed during the progress of the Basin Study.

The preparation of the Basin Study will follow a planning process that addresses the required Basin Study elements. The proposed approach will consist of the following major tasks:

- Task 1** *Analysis of Existing Water Supplies*
- Task 2** *Analysis of Current and Future Water Demands*
- Task 3** *Analysis of How Existing Water and Power Infrastructure Will Perform in the Face of Changing Water Realities*
- Task 4** *Develop Options to Meet Future Water Supply Needs*
- Task 5** *Conduct Evaluation and Trade-Off Analysis of Options Identified*
- Task 6** *Develop Draft and Final Basin Study Report*
- Task 7** *Project Management*

Completion of each major task will culminate in the preparation of a Task Completion Memorandum. In addition, it is anticipated that at least four technical memoranda will be developed as technical work is completed in specific subject areas. Currently, the contemplated technical memoranda include:

- Climate Change Projection Selection and Flow Generation
- Water Resources Modeling
- Groundwater Modeling, and
- Needs Assessment (developed by the BSWG)

In general, each task builds on the information developed in the preceding tasks; however, several task activities may be occurring simultaneously. The final Task Completion Memoranda and technical memoranda will be used as the foundation of the *Final Basin Study Report* (during Task 6).

Description of Tasks

Following is a summary of the activities to be conducted under each task and projected timelines for completing the work. A summary table of the tasks, estimated budgets, and projected timelines is in Table 1 (Section 4.2).

Project Management Plan

Given the magnitude of tasks to be executed, the need to confirm scheduling, sequencing of work activities and development of technical and summary memoranda, and availability of contractors and other resources, Reclamation and the BSWG intend to develop a detailed Project Management Plan, consistent with the tasks described below. During the Plan of Study development, Reclamation and the BSWG developed detailed task lists and budgets for three sub-groups (Deschutes River, Whychus Creek, and Crooked River). This detailed information will be used to guide the execution of the tasks described below and in the development of the Project Management Plan.

Task 1 – Analysis of Existing Water Supplies

Under this task, the BSWG will take the lead in characterizing existing water supplies in the basin. To the extent possible, the effort will be based on existing data and analysis to evaluate existing water supplies. Coupled with this analysis of existing supplies, Reclamation will take the lead in developing and applying climate change projections to the existing water supplies. The culmination of this task will be completion of the *Task #1 Completion Memorandum - Existing and Future Water Supplies*, and associated technical memoranda, as applicable.

The activities projected under this task include the following:

- Summarize and characterize existing water supplies using existing information, including but not limited to: NRCS snowpack and precipitation data, stream and canal gage records, reservoir storage records and reports, records maintained by Oregon Water Resources Department, USGS data regarding groundwater flows, and Deschutes Water Alliance Synthesis Document.
- Reclamation staff will use existing regionally downscaled CMIP3 and/or CMIP5 climate projections along with hydrologic and groundwater models to assess climate change effects within the upper Deschutes Basin. This includes selecting appropriate climate projection ensembles, selecting the number and types of climate scenarios, generating projected stream flows, and coordination with stakeholders to describe efforts.
- Apply climate change projections to existing water supplies to project water supply over the future planning period.
- Develop Task #1 Completion Memorandum

Estimated Timeline for Task 1: April 2015 – December 2015

Task 2 – Analysis of Current and Future Water Demand

Under this task, the BSWG will take the lead in characterizing existing instream and out of stream water demands in the basin. To the extent possible, this work will be based on existing data and analysis. Future instream and out of stream water demands will also be characterized to the extent possible using existing data and analysis. Additional information will be developed regarding instream and groundwater demands as part of the Basin Study. Finally, Reclamation will apply climate change projections to projections of future instream and out of stream water demands to inform options for addressing supply imbalances. The information summarized and developed under this task will be incorporated into the *Task #2 Completion Memorandum - Existing and Future Water Demands*, and associated technical memoranda, as applicable.

The projected activities under this task include the following:

- Summarize and characterize existing instream and out of stream water demands using existing information, including but not limited to: DWA planning studies, Deschutes Water Planning Initiative Preliminary Report, Water Management and Conservation Plans, Water System Master Plans, studies developed by U.S. Forest Service, ODFW and U.S. Fish and Wildlife Service, streamflow data, and water quality and temperature analyses from the Upper Deschutes Watershed Council, the Crooked River Watershed Council and DEQ, and irrigation district water right certificates.
- Use existing information to evaluate current and future groundwater demands that may require associated mitigation under the Deschutes Basin Groundwater Mitigation Rules. Use existing information to estimate groundwater demand from “exempt” well users.

- Assess data availability and implement appropriate analytical approaches to evaluate temperature issues affecting stream water quality.
- Develop additional information regarding instream demands, including:
 - Specific activities in the upper Deschutes Basin:
 - Conduct studies and/or build on existing information to evaluate the ecological conditions at the baseline stream flow targets (State of Oregon Instream Water Rights) and at a range of flow conditions exceeding the baseline stream flow targets in the upper Deschutes Basin (i.e., Crescent Creek, Little Deschutes and Upper Deschutes). Specific activities in the Whychus Creek Basin:
 - Conduct analysis to determine the amount and type (priority date) of water rights needed to meet baseline (instream) flows.
 - Expand existing flow/temperature analysis to include additional life cycle periods for fish between April and October.
 - Specific activities in the Crooked River Basin:
 - Evaluate/update existing models to evaluate year-round flow/temperature relationships in the Crooked River from Bowman Dam to Osborne Canyon and in Ochoco Creek from Ochoco Reservoir to the mouth.
- After completing the above-activities, summarize the projected instream and out of stream demands over the future planning period.
- Apply climate change projections to projected water demands over the future planning period.
- Develop Task #2 Completion Memorandum.

Estimated Timeline for Task 2: April 2015 – September 2016

Task 3 – Analysis of How Existing Water and Power Infrastructure Will Perform in the Face of Changing Water Realities

Under this task, Reclamation and the BSWG will evaluate existing water and power infrastructure in order to develop baseline reliability metrics. Climate change projections will then be applied to baseline metrics to evaluate future performance. The information summarized and developed under this task will be incorporated into the *Task #3 Completion Memorandum – Current Infrastructure and Climate Change* and associated technical memoranda, as applicable.

The projected activities under this task include the following:

- Evaluate baseline system reliability for existing water and power infrastructure
- Specific activities in the upper Deschutes Basin:
 - Conduct an in-depth and comprehensive assessment of the water delivery and conveyance infrastructure used by Central Oregon Irrigation District (directly linked to addressing water supply imbalances below). Develop an infrastructure assessment framework for other upper Deschutes Basin irrigation districts, as appropriate.

- Project future system reliability based on metrics developed and application of climate change projections developed by Reclamation.
- Develop Task #3 Completion Memorandum

Estimated Timeline for Task 3: June 2015 – April 2016

Task 4 – Develop Options to Meet Future Water Supply Needs

Under this task, Reclamation and the BSWG would jointly evaluate options and packages of options/projects to address water supply imbalances, including water conservation, innovative water transactions and agreements, and additional supply from new storage. Leveraging existing studies, and the information gathered above, Reclamation and the BSWG will identify viable options for meeting the water supply needs for irrigation, instream and municipal/water suppliers. Moreover, the study partners will identify legal and administrative requirements for option implementation, as applicable. The information summarized and developed under this task will be incorporated into the *Task #4 Completion Memorandum - Water Supply Options for the Future*, and associated technical memoranda, as applicable.

The projected activities under this task include the following:

- Specific activities in the upper Deschutes Basin:
 - Summarize and characterize existing information on water conservation opportunities, delivery system and on-farm, opportunities (i.e. Deschutes Water Planning Initiative findings)
 - Evaluate upper Deschutes Basin reservoir optimization opportunities - optimization of reservoir storage, use, maintenance and administration for Crane Prairie, Wickiup and Crescent Reservoir. This effort may include a) modeling, b) operations, and c) governance, legal and administrative constraints.
 - Evaluate inter-district management agreements, and governance structures.
 - Evaluate storage options at a reconnaissance level (location, potential viability, regulatory and legal constraints). It is anticipated that this evaluation will support more specific assessment of the opportunity to develop additional off channel storage (water supply) at the Monner Dam and Reservoir site studied by Reclamation in 1972. In that event, reconnaissance-level analysis of the Monner site will be conducted to provide information on cost/benefits of additional storage to address instream and out of stream demands and to generate hydro power revenue, as well as to comment on other associated community benefits (e.g., flatwater recreation, tourism, etc.). As part of the evaluation, determine the legal and regulatory constraints to developing off channel storage and outline potential issues and next steps should this option be further pursued.
- Specific activities in the Whychus Creek Basin:
 - Evaluate water conservation and re-allocation options and packages of options/projects; identify viable options for meeting the water supply needs for irrigation, instream and municipal/water suppliers; identify legal and administrative requirements for option implementation. These options/projects may include:

- Document groundwater capacity within Three Sisters Irrigation District (TSID) to support potential use of groundwater (in lieu of surface water) to augment stream flows in dry years (analysis of impacts to water quantity and quality at springs included in the tradeoff analysis).
 - Evaluate water conservation opportunities (TSID canal efficiencies; on-farm efficiency; municipal conservation); water rights transfers; tools for managing water resources in drought; TSID instream leasing program in order to optimize; and aquifer recharge and non-structural storage.
 - Conduct reconnaissance-level evaluation of off-channel storage options with an evaluation of legal constraints to help guide level of analysis.
 - Specific activities in the Crooked River Basin:
 - Evaluate options/projects to address water supply imbalances. These options/projects may include:
 - Document the existing instream leasing program and potential improvements as a supply option; document cost-benefit of the McKay Creek Switch, Ochoco Irrigation District (OID) diversion switch, North Unit Water Supply Program, and piping OID’s conveyance system; document City of Prineville wetlands project and associated water quality/quantity benefits.
 - Evaluate non-structural storage, reconnaissance level evaluation of potential structural storage opportunities (identify legal constraints first to guide analysis), upland management activities, structural modifications to better manage reservoir releases and to improve forecasting, and opportunities to increase on-farm water use efficiencies.
 - Develop a water use measurement plan for all points of diversion and evaluate addition legal constraints not addressed under other options (e.g., modifying rule curves)
 - Develop Task #4 Completion Memorandum

Estimated Timeline for Task 4: June 2015 – October 2016

Task 5 – Conduct Evaluation and Trade-Off Analysis of Options Identified

Task 5 is the culmination of all the tasks and activities described above. Under this task, Reclamation and the BSWG will develop and evaluate options based on information developed regarding: instream and out-of-stream supply and demand; conservation and reallocation; reservoir optimization; additional supply; updated models; and climate change projections. These options will be “packages” of activities that equitably address water supply imbalances for irrigation, instream and municipal/water supply needs. The information summarized and developed under this task will be incorporated into the *Task #5 Completion Memorandum – Recommended Options*, and associated technical memoranda, as applicable.

The activities under this task may include the following:

- Develop two sets of options: one that is for the near term at relatively lower cost and does not include the construction of new above ground storage facilities; and one that is for the long-term at relatively higher cost and includes the construction of new above ground storage facilities, or the augmentation of storage at existing sites.

- Model/evaluate the outcome of the identified options to document expected changes in supply and demand and the efficacy of the option to address identified water supply imbalances.
- Develop preliminary cost estimates for the options developed and assess implementation factors.
- Conduct trade-off analysis of options accounting for cost, environmental impacts (including but not limited to impacts associated with stored water releases, additional water storage, additional groundwater pumping, and additional hydro power generation), risk, stakeholder response and other potential attributes.
- Work with the BSWG Steering Committee and basin stakeholders to prioritize options as recommendations for inclusion in the *Final Basin Study Report* in Task 6.
- Develop Task #5 Completion Memorandum

Estimated Timeline for Task 5: November 2016 – July 2017

Task 6 – Develop Draft and Final Basin Study Report

Under this task, Reclamation and the BSWG will consolidate the Task Completion Memoranda, the technical memoranda, and stakeholder comments into a *Draft Basin Study Report* and *Final Basin Study Report*.

The activities under this task may include the following:

- Develop *Draft Basin Study Report*.
- Reclamation to document completion of the Technical Sufficiency Review per Technical Memoranda produced during the progress of the study.
- Develop and publish *Final Basin Study Report*.

Estimated Timeline for Task 6: August 2017 to February 2018.

Task 7 – Project Management

Reclamation, the BSWG and DBBC activities under this task include designing the project management plan, day-to-day coordination, communication, status reporting, contract management, reporting to OWRD on the use of state of Oregon match funds, study team management, accounting, and reporting; facilitation; and POS development. DBBC activities will be related to its role as fiscal agent and responsible non-Federal cost share partner on behalf of the BSWG.

Estimated Timeline for Task 7: April 2015 to February 2018.

Scope Reserve

In order to be prepared for task and budget modifications, Reclamation and the BSWG have identified scope reserves as described in Table 1 below. Modifications to tasks and budgets will be addressed under the Change Management process outlined in section 3.3 above.

4.2 Study Tasks

Table 1. Summary of tasks, estimated budgets, deliverables, and projected timelines.

Basin Study Element	Task	Description	Budget – Reclamation and IDIQ Contractors	Budget – Non-Federal Cost-share Partner	Deliverables	T
Analyze Existing Supplies and Future Projections	1	Characterize existing water supplies in the basin; develop and apply climate change analysis to existing water supply data.	\$126,000	\$11,100	<i>Task #1 Completion Memorandum - Existing and Future Water Supplies*</i>	Apr Dece
Analyze Existing and Future Water Demands	2	Summarize information on current and future water demand and apply climate change analysis to projected future demands.	\$115,500	\$138,500	<i>Task #2 Completion Memorandum - Existing and Future Water Demands*</i>	Apr Se
Analyze How Existing Water & Power Infrastructure Will Perform in the Face of Changing Water Realities	3	Identify and evaluate current water and power infrastructure in the basin; evaluate expected performance of water and power infrastructure based on climate change analysis and future demand projections.	\$35,000	\$89,500	<i>Task #3 Completion Memorandum - Current Infrastructure & Climate Change*</i>	Jun Ap
Develop Options to Meet Future Water Supply Needs	4	Identify options for meeting the water supply needs for irrigation, instream and municipal/water suppliers.	\$148,500	\$149,300	<i>Task #4 Completion Memorandum - Water Supply Options for the Future*</i>	Jun Oct
Conduct Evaluation and Trade-off Analysis of Options Identified	5	Develop options to meet water supply and demand imbalances based on future projections and conduct trade-off analysis of options accounting for costs, environmental impact, risk, stakeholder response and other potential attributes.	\$75,000	\$80,000	<i>Task #5 Completion Memorandum - Recommended Options*</i>	Nov - J
Draft and Final Basin Study Developed	6	Incorporate completion memoranda, technical memoranda, and comments into <i>Final Basin Study Report</i>	\$65,000	\$40,000	<i>Draft Basin Study Report and Final Basin Study Report</i>	Aug Febr
Project Management and Administration	7	Develop project management plan, day-to-day coordination, communication, status reporting, contract management, change and risk management, study team meetings, accounting, reporting, facilitation, communication and outreach plan implementation, web page maintenance, and POS development.	\$135,000	\$196,600	N/A	Apr Febr
Scope Reserve	-	Budget resources to address potential modifications to tasks or budgets.	\$50,000	\$45,000	N/A	
Total			\$750,000	\$750,000		

*Technical Memoranda will be produced in addition to summary reports, as appropriate.

NA = Not Applicable

5. Communication and Outreach Plan

A Communication and Outreach Plan has been developed to ensure that all stakeholders in the upper Deschutes Basin and the general public are informed and that their input is sought and considered throughout the Basin Study development. The Communication and Outreach Plan is provided in Attachment 2.

Attachment 1. Basin Study Work Group Charter

Basin Study Work Group Charter

Approved by the BSWG Steering Committee on September 23, 2014

1. Purpose

BSWG's purpose is to manage a Basin Study with the Bureau of Reclamation that builds upon past work to update groundwater and surface water models, develop a basin-specific climate analysis, update supply and demand projections, and identify specific actions that can be taken to resolve water issues in the basin. Study results will be used to build a long-term basin water management plan to guide sustainable water management actions in the future. The study brings together a diverse set of stakeholders to seek specific solutions for resolving water supply and demand imbalances for agriculture, municipal, and instream uses in the Upper Deschutes River Basin.

Basin Studies address basin-wide efforts to evaluate and address the impacts of climate change. The Bureau of Reclamation funds comprehensive water studies that define options for meeting future water demands in river basins in the western United States where imbalances in water supply and demand exist or are projected. Each study includes four key segments:

- State-of-the-art projections of future supply and demand by river basin.
- An analysis of how the basin's existing water and power operations and infrastructure will perform in the face of changing water realities.
- Development of options to improve operations and infrastructure to supply adequate water in the future.
- Recommendations on how to optimize operations and infrastructure in a basin to supply adequate water in the future.

All references to supply and demand in this document include agricultural, municipal, and instream.

2. Structure and Function

- a. The goal of the BSWG structure is to promote completion of the Basin Study, to be open and inclusive, and to encourage diverse viewpoints.
- b. BSWG consists of a Steering Committee, a Planning Team, and Subgroups.
- c. Steering Committee
The Steering Committee has a defined membership that includes agriculture, municipal, and instream interests.
- d. Planning Team
 - i. The Planning Team for the Steering Committee is comprised of the Chair, the Co-Coordinator(s), the Chair of the Deschutes Basin Board of Control, the Executive Director of the Deschutes River Conservancy, a representative of municipal water users, and the Facilitator.
 - ii. The Planning Team will suggest to the Steering Committee the design of process, meetings, and agendas; may offer recommendations to the Steering Committee on issues or procedure; and will provide other support to the BSWG as outlined in this Charter or as appropriate.
 - iii. The DBBC Chairman (or designee) is the official point of contact with the Oregon Water Resources Department and the Bureau of Reclamation regarding funding agreements and fiscal management for the Basin Study.
- e. Subgroups
 - i. Subgroups send recommendations to the Steering Committee for consideration.
 - ii. The three current Subgroups are Upper Deschutes Basin, Whychus Creek Basin, and Crooked River Basin.

- iii. Subgroups can create and disband subcommittees and technical committees.
- iv. The Steering Committee can create and disband Subgroups.
- f. Fiscal agent and applicant
The Deschutes Basin Board of Control, on behalf of BSWG, is the applicant for the Basin Study, and will serve as fiscal agent for the Basin Study.

3. Representation

- a. Steering Committee Members
Each of the following organizations will be formally invited to be a member of the BSWG Steering Committee and to designate a representative and an alternate to represent it at Steering Committee meetings. Alternates are expected to have an up-to-date understanding of the work of the Steering Committee so they can fully participate when called on to do so.

Once a member agrees to join, the Co-Coordinator and the Facilitator will communicate with any member whose representative(s) do not attend a meeting(s). If a member organization does not participate in decision-making at two consecutive meetings by attendance or by email (see 4.a.vi), that organization cannot participate in decision-making until after it participates at two of the prior four meetings. The Process Co-Coordinator or Facilitator is responsible for keeping track of members, approved representatives, and attendance records.

Irrigation Districts

Arnold Irrigation District
Central Oregon Irrigation District
Lone Pine Irrigation District
North Unit Irrigation District
Ochoco Irrigation District
Swalley Irrigation District
Three Sisters Irrigation District
Tumalo Irrigation District

Local Government

Central Oregon Cities Organization
City of Bend
City of Culver
City of La Pine
City of Madras
City of Maupin
City of Metolius
City of Prineville
City of Redmond
City of Sisters
Crook County
Deschutes County
Jefferson County

Water Providers

Avion Water Company
Deschutes Valley Water District

Tribal Government

Confederated Tribes of Warm Springs

Interested Organizations

Bend Paddle Trail Alliance
Central Oregon Flyfishers
Crooked River Watershed Council
Deschutes River Conservancy
Economic Development for Central Oregon
Native Reintroduction Network
Portland General Electric
Trout Unlimited
Upper Deschutes River Coalition
Upper Deschutes Watershed Council
Water for Life
WaterWatch of Oregon

Federal Government

National Marine Fisheries Service
Natural Resources Conservation Service
U.S. Forest Service
U.S. Fish and Wildlife Service
U.S. Bureau of Reclamation

State Government

Oregon Department of Environmental Quality
Oregon Department of Fish and Wildlife
Oregon Water Resources Department

Terrebonne Domestic Water District

- b. One representative or alternate from each member organization will sit at the table, participate in the discussion, and participate in decision-making. The representative at the table may call on her or his alternate to speak when that representative is recognized by the Chair or Facilitator.
- c. Subgroup Members
Subgroups may include Steering Committee members as well as others who have relevant expertise and/or interest in the topic or geography.

4. Decision-Making

a. Steering Committee

Goal

- i. The goal of the Steering Committee decision-making process is to promote completion of the Basin Study as described in the Purpose statement in Section 1 above, to be open and inclusive, and to encourage diverse viewpoints.

Consensus Decision Rule

- ii. The Steering Committee operates by consensus. No member has the authority to make decisions for the Steering Committee. In the spirit of collaboration, Steering Committee members agree to do their best to meet the interests of all members.
- iii. No formal votes will be taken. Each member organization receives one set of red, yellow, and green cards at each Steering Committee meeting. When asked by the Chair or Facilitator to indicate their level of agreement for a proposal, members will hold up one card. The green card indicates the member fully supports the proposal, the yellow card indicates that the member can accept the proposal, and the red card indicates that the proposal is not acceptable because the member has serious reservations.
- iv. Consensus means that no more than one member holds up or sends in a red card, after every attempt has been made to address the concerns of all members.
- v. Only consensus agreements will move forward under the Basin Study. (See the exception under 4.a.x).

Absences

- vi. If a decision is made at a Steering Committee meeting from which a member(s) was absent, the Facilitator or Process Co-Coordinator will send the decision language to absent member(s) via email within five working days after the meeting, with a deadline of five additional working days to respond with a virtual green, yellow, or red card. At the close of the response period, the Facilitator or Process Co-Coordinator shall report the results to all members of the Steering Committee.

Addressing Disagreement

- vii. When a member holds up a yellow or red card in a meeting, the group will immediately or as soon as possible make every attempt to address the member's concerns. When a member who was absent sends in a virtual yellow or red card, the group will make every attempt to address the member's concerns at its next meeting or via email. In either case, all Steering Committee members will make every effort to offer alternatives satisfactory to all members.
- viii. If further discussion does not resolve the concerns expressed, the Chair can appoint a small group to address the concerns outside the meeting and attempt to reach

agreement on a proposal for the full group to consider. The Chair can request that the Facilitator to work with the small group.

- ix. In the rare instances when a final decision is made with a member showing a red card, that person will be invited to write up her or his concerns so they can be included in the minutes.

Special Circumstance

- x. For grant administration and fiscal decisions made by the DBBC, if:
 - the Steering Committee is unable to reach consensus on an item, and there is an upcoming deadline that makes a decision on that item urgent, and
 - if action is not taken on that item by that deadline, the DBBC would be in violation of the terms of one or more of its funding agreements that would put it in jeopardy of violating its fiduciary responsibility as fiscal agent, or the DBBC would be put in a position of having to repay grant funds already disbursed, then the Reclamation Study Manager will be asked to help the Steering Committee address that item. If the Reclamation-facilitated process is not successful, the DBBC, only after giving notice to the full Steering Committee with as much advance notice as possible, will make the decision regarding that item. In its deliberation, the DBBC will consider all points of view that were expressed on the subject by Steering Committee members. The Steering Committee anticipates that this clause will be used rarely, if at all.
- b. Subgroups
 - i. Subgroups operate by consensus, with the same definition of consensus as described above in 4.a.iv.
 - ii. No member has the authority to make unilateral decisions for the Subgroup.
 - iii. No Subgroup has the authority to make decisions for the Steering Committee.
 - iv. If a Subgroup is unable to agree on a proposal, it can send alternatives to the Steering Committee for a decision.

5. Roles and Responsibilities

- a. Steering Committee and Subgroup members agree to:
 - i. Attend meetings, or arrange for another representative of the organization to attend, as much as possible.
 - ii. Fully participate in meetings and articulate the views of their organization and constituents. (Constituents are stakeholders, members, or board members of an organization; or colleagues, subordinates, and superiors at an agency.)
 - iii. Keep their constituents fully informed about the deliberations and actively seek their input, so they can understand and support the decisions made by the group.
 - iv. Strive to bridge gaps in understanding, seek creative resolution of differences, and commit to the goal of achieving consensus.
 - v. Be willing to engage in respectful, constructive dialogue with other members.
 - vi. Recognize that open discussion is vital to a collaborative process, and commit to expressing their views and concerns in advance of a decision being made.
 - vii. Arrive at the meetings fully prepared to discuss items on the agenda. Preparation includes reviewing meeting notes and other materials sent in advance.
 - viii. Support any consensus decisions made, and refrain from negative comments about items that were agreed to by consensus.
 - ix. Bring copies of their meeting agenda and materials to the meetings to save on copying expenses.
 - x. Comply with the provisions of this Charter, and help remind others of its provisions to encourage compliance by everyone.

- b. Members of the public
 - i. Steering Committee meetings are open to the public. Anyone is welcome to attend and observe the meetings.
 - ii. Seating away from the table will be provided for members of the public.
 - iii. At designated times during meetings, members of the public may be invited to address the Steering Committee. The Steering Committee may also elect to solicit written comments from the public.
- c. Steering Committee Chair (as chosen by the Steering Committee)
 - i. Presides over Steering Committee meetings.
 - ii. Is a member of the Planning Team.
- d. Process Co-Coordinator (as appointed by the Steering Committee)
 - i. Is a member of the Planning Team.
 - ii. Invites representation and participation from all interests.
 - iii. Sets meetings and circulates agendas and other meeting materials in coordination with the Chair.
 - iv. Coordinates Subgroups and their meetings, including coordinating technical input and recommendations from Subgroups.
 - v. Coordinates with stakeholders as necessary.
- e. Technical Co-Coordinator (as appointed by the Steering Committee)
 - i. Is a member of the Planning Team.
 - ii. Generates draft technical documents for consideration by the Steering Committee, such as the Letter of Interest, Proposal, and Plan of Study.
 - iii. Assists the Chair with communications with Reclamation.
- f. Facilitator (as appointed by the Steering Committee)
 - i. Is a member of the Planning Team.
 - ii. Assists in addressing conflict between and among Steering Committee and Subgroup members, during and between meetings.
 - iii. Facilitates Steering Committee meetings and, as requested, Subgroup meetings.
 - iv. While facilitating meetings, may ask questions and follow up.
 - v. Keeps notes on flipchart paper or on screen to ensure that decisions being made are clear to everyone.
 - vi. Generates draft meeting notes for review by the Steering Committee, ensuring they include key points of discussion as well as items of agreement and disagreement.
 - vii. Keeps a “parking lot” for issues that are not addressed in a meeting.
 - viii. Assists in building consensus among members.
 - ix. Reminds members of the provisions of this Charter to encourage compliance.
 - x. Serves as a confidential channel of communication for members and observers who wish to express views and do not wish to address the full group.
 - xi. Advocates for a fair, effective, and credible process, while remaining completely neutral as to the outcome of the deliberations.

6. Communication

- a. Steering Committee and Subgroup members agree to:
 - i. Recognize that all members bring with them their own legitimate purposes and goals from their perspective or on behalf of their organizations.
 - ii. Recognize the legitimacy of the goals of others, and assume that their goals will also be respected.
 - iii. Get curious, instead of irritated, when someone says something they disagree with.
 - iv. Listen carefully; ask questions to understand and to get others’ perspectives.

- v. Make statements to explain or educate, and help others understand their perspective, assumptions, reasoning, and intent.
 - vi. Share all relevant information.
 - vii. Use specific examples and make sure everyone agrees on the meaning of important words.
 - viii. Request a break if needed. Stakeholder groups can request a break in order to caucus among themselves.
 - ix. Avoid engaging in side conversations and working on email or texting during meetings.
 - x. Bring it up at a meeting, or talk privately with the Chair or Facilitator, if they are having difficulty with another member or with the process.
- b. Other communication
- i. Steering Committee and Subgroup meetings are open to the public and are noticed to Steering Committee members, Subgroup members, and others who indicate an interest.
 - ii. Steering Committee and Subgroup final meeting notes will be sent to all Steering Committee and Subgroup members and other interested parties.
 - iii. Draft Steering Committee meeting notes, including a list of those who attended, will be sent to all Steering Committee members after each meeting. Approval of the notes will occur at the following meeting, with changes made by consensus of the Steering Committee.
 - iv. Draft Subgroup meeting notes, including a list of those who attended, will be sent to that Subgroup's members after each meeting. Approval of the notes may occur via email.

7. News Media

- a. All meetings are open to the news media.
- b. Outside of meetings, members are free to make statements to the media regarding their own opinions and consensus decisions by the Steering Committee; however, they agree not to attribute statements to others involved in the process or represent others' interests.
- c. If members of the media interview Steering Committee or Subgroup members, those Steering Committee or Subgroup members are encouraged to alert the Steering Committee through the Process Co-Coordinator or Facilitator. They are also encouraged to recommend that the reporter talk to the Steering Committee Chair, provide the Chair's phone number, and notify the Chair.
- d. If an article or report appears that misquotes or inaccurately represents a member, that individual should inform the group of that occurrence as soon as possible.

8. Changes to the Charter

This Charter can be amended at any time by consensus decision of the Steering Committee.

Attachment 2. Communication and Outreach Plan

Communication and Outreach Plan for the Upper Deschutes Basin Study

Development of Communication and Outreach Plan

For over a decade there have been numerous studies and initiatives focused on understanding and managing the Upper Deschutes river system to meet a broad range of needs. Being able to communicate this history and technical detail to a broad group of stakeholders is critical not only to completing this study but also to implementing solutions developed in these studies. This Communication and Outreach Plan is the BSWG's approach to creating and maintaining stakeholder engagement.

The Bureau of Reclamation, Pacific Northwest Region, Columbia-Cascades Area Office (CCAO), and Deschutes Basin Study Work Group (BSWG) Steering Committee (BSC) have developed this COP for the Upper Deschutes Basin Study (Basin Study).

The CCAO (in consultation and coordination with Reclamation's Pacific Northwest Regional Public Affairs Office) and the BSWG will be responsible for implementation of the COP. This Plan is part of the Plan of Study for the Basin Study.

Thirty-two member organizations of the BSC are already deeply involved in the Deschutes Basin Study and are charged with designing and managing the Basin Study. (See Attachment 1 for a list of BSC member organizations.) Even more organizations and individuals participate in Subgroups. The focus of this COP is to continue to engage the BSC's member organizations and others currently involved in BSWG, and to engage stakeholders not currently represented.

For the purpose of the COP, a stakeholder is defined as anyone who is potentially affected by or interested in the Study, including participants actively engaged in the BSWG process and those who have interest but have not been engaged thus far (e.g., the public, residents in the basin, and other interest groups). The Communications Subgroup (to be established following the approval of the Plan of Study) will be charged with identifying and engaging stakeholders in the Basin Study to ensure a meaningful process.

Public involvement is not a vote-counting exercise, but rather an effort to obtain and use information from the public that the BSC and CCAO may not otherwise have. The COP is intended to be flexible, recognizing that various stakeholders may have different expectations from the Basin Study. The COP is designed with the intent to expand upon the cooperative spirit and holistic teamwork developed within the BSWG. Embracing, valuing, incorporating, and encouraging public input and involvement are of paramount importance.

Background of Basin Study

As part of its *WaterSMART program*, Reclamation chose the Upper Deschutes Basin to be funded through Reclamation's Basin Study Program. The Upper Deschutes Basin Study is a three-year technical Study that will incorporate information from the latest science, engineering technology, climate models, and innovations, to better define options for future water management of the Upper Deschutes River Basin. The Basin Study will take a collaborative approach to foster stakeholder participation and input throughout the Study, and is expected to enhance communication and improve the understanding of water management issues among the stakeholders.

The Basin Study will evaluate information previously developed in the basin as well as integrate new data and information as a means to refine water supply and demand estimates of the basin. Additionally, the Basin Study will assess the potential impacts of climate variability and climate change on both water supplies and demands. The Study is cost-shared on a 50/50 basis between the Deschutes Basin Board of Control (DBBC), on behalf of the BSWG, and Reclamation. This process will culminate in a Basin Study Report (Report). It is anticipated that the final Report will be completed by early 2018.

The BSWG consists of a diverse set of stakeholders who are committed to seek solutions for resolving water supply and demand imbalances and enhance the outcomes for agriculture, municipal, and instream sectors in the Upper Deschutes River Basin. The BSWG is also committed to reach out to stakeholders not yet involved in the BSWG throughout the duration of the Basin Study.

Core Values, Purpose, Goals, and Objectives of the COP

Core Values

Reclamation and the BSWG endorse the following Core Values for their outreach and involvement efforts under this COP:

1. Stakeholders should have a say in key water management issues that could affect their lives.
2. Stakeholder participation includes the promise that their contribution will influence the Study.
3. Stakeholder participation promotes sustainable directions for the Study by recognizing and communicating the needs and interests of all participants.
4. Stakeholder participation seeks out and facilitates the involvement of those potentially affected by or interested in the Study.
5. Stakeholder participation seeks input from participants in designing how they participate.
6. Stakeholder participation provides participants with the information they need to participate in a meaningful way.
7. Stakeholder participation communicates to participants how their input affected the Study.⁴

Outcomes

The desired outcome of this COP is an open and visible Study management process that builds

- awareness and understanding of the water-related challenges in the Upper Deschutes Basin,
- credibility and accountability for the Basin Study process and the Report, and
- support for implementation of the Report's recommendations.

Goals and Objectives

The goal of this COP is to involve stakeholders by obtaining feedback on analyses, alternatives, and outcomes. This includes a promise to the public to keep them informed, listen to and acknowledge their concerns and aspirations, and to provide feedback on how their input influenced the Study.

Objectives of this COP are to:

1. Provide factual, accurate, and consistent information to stakeholders.
2. Identify stakeholder concerns and values.
3. Provide meaningful opportunities for stakeholders to participate and provide input to the problems, issues, and possible solutions considered by the BSWG, in advance of decisions made about the Study.
4. Evaluate input received by stakeholders for full and effective consideration during the Study.

⁴ Adapted from the International Association for Public Participation (IAP2).

Target Constituents

In September 2014, the BSC adopted a Charter that addresses a number of topics, including structure and function, representation, and decision-making. As noted above, the BSC includes 32 organizations from a wide range of interests including irrigated agriculture, local governments, potable water providers, interested nonprofit organizations, targeted interest groups, and State and Federal agencies. The Confederated Tribes of Warm Springs are apprised of BSWG actions and have an open invitation to participate whenever they wish. Reclamation will also seek to engage the Tribes to coordinate on the Study.

Through cooperative and open participation in the BSWG process, the Basin Study will be conducted with significant public involvement. Target constituents of the COP are all basin stakeholders that are not actively participating in the BSWG. Specifically and at minimum, the plan is designed to reach the following constituents:

- Non-commercial and commercial farmers, within and outside of irrigation districts
- Land or business owners with a water right or that pump groundwater
- Potential funding sources for implementation of Study recommendations
- Political decision-makers (elected and appointed officials)
- Confederated Tribes of Warm Springs
- Recreation interests
- Riverfront property owners
- Irrigators
- Instream flow advocates
- Municipalities and other water providers
- Angler groups
- Other interested citizens

As a part of the COP and as described below, public meetings will be scheduled throughout the basin to keep the targeted constituents, as well as the broader public, well informed of the process and Study findings. The BSWG Project Manager and/or BSWG Steering Committee will consider public input received and determine how it will be incorporated in its work.

Key Messages

Key Messages will be developed after the Plan of Study is approved and a Memorandum of Understanding (MOA) is signed in spring 2015. At that time, a diverse Communications Subgroup from BSC will be selected to fully develop Key Messages.

Implementation of the Outreach and Communication Plan

Effective and consistent communication is essential to the ongoing success of the Basin Study. Below is a description of the communication vehicles planned for the Study. As the Basin Study progresses, stakeholder involvement will be regularly assessed to determine whether the methods of communication in use are effective, whether targeted constituents are being reached, and what adjustments are needed. Implementation of the COP will involve the components identified below.

BSWG Steering Committee (BSC) and Subgroup Meetings: It is anticipated that BSC will continue to meet on a monthly basis until the Plan of Study is established and the Study is underway. At that time, the BSWG will continue to meet on at least a quarterly basis; additional meetings will be held as needed to augment ongoing efforts by Study teams, subgroups, etc.

All the meetings of the BSC and its Subgroups have been and will continue to be open to the public, with opportunities for public comments and questions at each meeting. Anyone who requests is put on the

mailing list to receive meeting notices and meeting materials. Outreach efforts will be made to publicize the meetings and obtain names for the mailing list. A Reclamation-sponsored website contains agendas, minutes, and meeting materials from past meetings.

In addition, the BSC may establish working technical subgroups to provide input regarding different aspects of the Study and will make all information and those meetings open to the public.

Website: A webpage for the Upper Deschutes Basin Study has been created on the Bureau of Reclamation's website. It will continue to be used to post up-to-date Study information and links to pertinent documents, BSWG meeting agendas, handouts, and meeting summaries. The web page URL is: www.usbr.gov/pn/studies/Deschutes.

The goal of the website is to keep stakeholders, including the public, informed about the Basin Study process. The content will be updated as Basin Study milestones are reached, before and after BSWG and/or public meetings, and as necessary. For questions or comments on the material posted on the website, Reclamation's Study Lead will be the primary point of contact with the BSWG Project Manager also available to address inquiries.

Social Media: The goal of the social media platform is to keep stakeholders, including the public informed about the Basin Study process and provide another vehicle for the public to engage with the process and provide direct input. The content will be updated as Basin Study milestones are reached, before and after BSWG and/or public meetings, and as necessary. For questions or comments on the material posted on the social media platform, Reclamation's Study Lead will be the primary point of contact with the BSWG Project Manager also available to address inquiries.

Email: A primary method of communication of the Basin Study will be via email. An inclusive distribution list will be utilized for informational updates and dissemination of documents for review, etc. For incoming comments or questions, it is anticipated that an email Study address will be established. All comments and questions will be professionally responded to in a timely manner.

Media News Releases: In an effort to maximize public outreach, media news releases will occur throughout the project to inform stakeholders including the public of upcoming informational/special meetings and milestones reached.

Public Outreach Meetings: Once the Plan of Study is established and the Study is underway, public outreach meetings will be organized and facilitated by the BSWG Communications Subgroup. They will be publicized with media releases, email notices, and other methods to be developed by the Communications Subgroup. Efforts will be made to hold meetings or other input opportunities throughout the Upper Deschutes basin. Timing of the meetings will be based on when input is needed in advance of important decisions, including (at the end of the process) release of the draft and final Report. These meetings will provide an opportunity for the public to learn about and provide input to the process. Ideally, a representative from Reclamation and the DBBC will be present at each public outreach meeting along with the BSWG Communications Subgroup.

Specific Actions and Sequence of Activities

Following are the specific actions and sequence of activities for the COP. Items marked with a "❖" are ongoing. Reclamation's CCAO Technical Projects Office staff maintains detailed records for each action. This list of activities will be reviewed and refined by the Communications Subgroup at its inception and on an ongoing basis.

1. **Prepare text/develop Upper Deschutes Basin Study website**
Completed
Lead responsibility: Relf/Holt, with input from BSWG Planning Team
- ❖2. **Update Upper Deschutes Basin Study website with meeting agendas, handouts, meeting summaries, relevant documents.**
Completion date: ongoing
Lead responsibility: Relf, BSWG Project Manager
3. **Obtain Reclamation and BSC concurrence on Communications and Outreach Plan.**
Completion date: Projected April 2015
Lead responsibility: Relf, Holt, BSC Chair
4. **Finalize Key Messages and COP timeline.**
Completion date: June 2015
Lead responsibility: Communications Subgroup, BSC
5. **Develop PowerPoint presentation to broaden awareness and explain the Basin Study.**
Completion date: July 2015
Lead responsibility: Communications Subgroup, BSC Chair, Relf/Holt to review.
6. **Create displays, graphics, maps, handouts, and draft Basin Study chapters, etc., for BSWG and public meetings. These items will also be available on the Upper Deschutes Basin Study website.**
Completion date: July, August 2015
Lead responsibility: Communications Subgroup, BSWG Chair, BSWG Process Co-Coordinator, Relf/Holt

NOTE: This Communication and Outreach Plan is meant to be a dynamic document. It can and will be revised as needed, with changes suggested by the Communications Subgroup and approved by the BSC.

Attachment 2.A: BSWG Steering Committee Member Organizations

Arnold Irrigation District
Avion Water Company
Bend Paddle Trail Alliance
Central Oregon Cities Organization
Central Oregon Flyfishers
Central Oregon Irrigation District
City of Bend
City of Madras
City of Prineville
City of Redmond
Crooked River Watershed Council
Deschutes County
Deschutes River Conservancy
Lone Pine Irrigation District
Native Reintroduction Network
Natural Resources Conservation Service
North Unit Irrigation District
Ochoco Irrigation District
Oregon Department of Environmental Quality
Oregon Water Resources Department
Portland General Electric
Swalley Irrigation District
Three Sisters Irrigation District
Trout Unlimited
Tumalo Irrigation District
U.S. Bureau of Reclamation
U.S. Fish and Wildlife Service
U.S. Forest Service
Upper Deschutes River Coalition
Upper Deschutes Watershed Council
Water for Life
WaterWatch of Oregon