1. Introduction

Stakeholders in the Upper Sacramento, McCloud, and Lower Pit Region (USR) have worked together since 2009 to implement Integrated Regional Water Management (IRWM) planning. This effort has been enhanced by the regional cooperation and collaboration in previous years among stakeholders working to address resource management and planning, special status species, prioritization of issues and watershed management for national forests, management of groundwater resources, and other related topics. The 2013 IRWM Plan provided the foundation for the USR Regional Water Management Group (subsequently renamed the Regional Watershed Action Group [RWAG]) to identify new opportunities and projects to address regional water management issues. The Plan was updated in 2018 with support from a Proposition 1 IRWM Planning Grant (Department of Water Resources) in order to bring the Plan into compliance with 2016 IRWM Guidelines. This 2018 IRWM Plan update has been carried out with the intent of ensuring continued eligibility for resources to support progress on watershed issues.

1.1 Purpose and Vision

This 2018 update of the adopted 2013 USR IRWM Plan is not a final destination, rather it is the continuation of past discussions and an evolving process that participants will likely continue to follow for years. Stakeholders have voiced the need for continued dialogue as water resource projects are proposed and implemented while further developing communication pathways to address regulatory issues, speak with a unified voice about resource issues of federal and state importance, and make use of the group's collective strength to accomplish objectives identified in this IRWM Plan. As part of this commitment, participants have identified an important expectation of all RWAG members as the IRWM Plan is implemented: Member entities need to contribute some in-kind effort toward the ongoing Plan development and implementation; and signatories that receive IRWM funding need to participate in at least one committee. Members are encouraged to employ locals when possible and communicate productively, always remembering that the IRWM Plan is a living document and management process.

1.2 Regional and Statewide Priorities

In addition to addressing regional issues, there are multiple priorities identified in the IRWM Guidelines that address issues of concern on a statewide basis. These issues were updated by DWR in 2016. Many are relevant to the USR, as described below.

Make conservation a California way of life: Since IRWM Plan adoption, conservation has become more commonplace in the USR communities. In addition to the ripple effect of IRWM, the extreme drought of 2013-2015 helped raise awareness of the importance of water conservation throughout the region. Following are ways in which local communities are embracing the State's conservation priorities:

- *Build on current water conservation efforts and promote the innovation of new systems for increased water conservation:* The first round of DWR IRWM funding in 2015 resulted in the City of Mt. Shasta installing water meters on each household hook-up. This project enabled water users a simple way to measure their use and detect previous unknown leaks. The project resulted in a significant increase in water use efficiency and demonstrated the benefits of metering to communities that still lack the technology to measure water use.

- *Expand agricultural and urban water conservation and efficiency to exceed SB-X7-7 targets:* Due to the region's rural status and low level of agricultural activity, this priority is of little relevance to the USR. It will be taken into account, however, as a growth in cannabis agriculture is anticipated over the coming years.

- *Provide funding for conservation and efficiency:* While the cities of Dunsmuir and Mt. Shasta meter water use, McCloud is as-of-yet unmetered. The McCloud Community Services District (CSD) has installed meter boxes in anticipation of installing meters once funding allows. In addition to metering water use, a wide range of educational campaigns, technological upgrades, and behavioral incentives (e.g., xeriscaping) can be funded through the IRWM Grant Program for empowering conservative water use.

- *Increase water sector energy efficiency and greenhouse gas (GHG) reduction capacity:* Many USR communities are fortunate to rely primarily upon gravity-fed, clean, cold spring water. While there may be opportunities to increase both operational efficiencies and GHG reduction capacity in the region, GHG emissions resulting from municipal water deliveries in the USR are relatively minor.

- *Promote local urban conservation ordinances and programs:* The City of Mt. Shasta is in the process of updating its General Plan with a new focus on climate resilience. The City's plan will include an optional water element and programs to address water conservation. Watershed advocates also attempted to pass an initiative in 2016 that would have amended Siskiyou County's Groundwater Ordinance to require extraction permits for water-bottling industries. While the measure failed at the County level, it passed in the communities of Mt. Shasta and Dunsmuir – indicating local support for and awareness of the importance of the area's water resources.

Increase regional self-reliance and integrated water management across all levels of government: Because of the USR endowment of springs derived from volcanic aquifers, local self-reliance as it pertains to water is exceptional.

- *Ensure water security at the local level, where individual government efforts integrate into one combined regional commitment where the sum becomes greater than any single piece:* Water security in the USR is directly related to the vast underground storage capacity of Mount Shasta and reinforced by a historically abundant snowpack. As warming continues, diminishing snowpack may result in decreasing productivity of springs and wells. To enhance water security, natural resource stewardship and low-carbon economic development will be required across public and private sectors. Meaningful coordination with significant stakeholders, such as the Shasta-Trinity Forest Service, U.S. Bureau of Reclamation, Pacific Gas & Electric (PG&E), Hearst Forests, TimberVest, and Sierra Pacific Industries, would greatly assist local efforts.

- *Support and expand funding for Integrated Water Management planning and projects:* The hiring of administrative staff and the establishment of an organizational chart for RWAG will improve operations and thereby expand funding opportunities through IRWM and other sources.

- *Improve land use and water alignment:* The City of Mt. Shasta General Plan update, along with fuels reduction and disaster mitigation planning efforts in the region are anticipated to result in appropriate and durable land-use, water-use and resilient community building.

- *Provide assistance to disadvantaged communities:* The entire USR region qualifies as a disadvantaged community (DAC) under DWR guidelines. By participating in the IRWM DAC Involvement (DACI) program and communicating the benefits of healthy headwaters to downstream communities, the RWAG is attracting interest and investment in and technical assistance for economically disadvantaged communities in the region.

- *Encourage State projects with focus on multiple benefits:* The projects in this IRWM Plan are designed to include multiple environmental and community benefits, including water supply, water quality, flood control, and others. See Chapter 10 for a description of projects.

- *Increase the use of recycled water:* Use of recycled water at the Mt. Shasta Resort and Golf Course is a good example of water recycling in the USR. RWAG can point to this success story when encouraging and developing additional water recycling projects in the region.

Achieve co-equal goals for the Delta:

- Because all surface streams in the USR flow into Shasta Lake Reservoir, USR benefits to the Delta are dependent on management of the federal Central Valley Project (CVP). Infrastructure repair and minimizing degradation, waste, and consumptive uses of water upstream in the USR contribute to water quality and supply reliability for the CVP.

Manage and prepare for dry periods:

- *Effectively manage water resources through all hydrologic conditions to reduce impacts of shortages and lessen costs of state response actions. Secure more reliable water supplies and consequently improve drought preparedness and make California's water system more resilient:* The USR continues to make infrastructure upgrades on local water systems, which improves supply reliability during times of drought. The drought emergency in 2015 resulted in an official curtailment for the community of McCloud, and all communities experienced operational adjustments during dry times.

- Perhaps the most relevant tool to prepare for dry periods is through creating widespread resilient forests. This entails fuels reduction and prescribed fire treatments on public and private lands, in order to encourage healthy soils and safeguard local infrastructure, as well as public health, against the devastating consequences of catastrophic wildfire.

Protect and restore important ecosystems:

- As evidenced in the Region Description and Project chapter, a primary emphasis for USR stakeholders is the restoration of volcanic alpine ecosystems. For instance, multiple projects submitted by the Winnemem Wintu Tribe, including beaver reintroduction, high-elevation meadow restoration, and salmonid habitat restoration, could result in significant aquatic habitat improvements locally, as well as improve cold freshwater habitat downstream.

- State priorities listed in the 2016 IRWM Grant Program Guidelines identify the Klamath and Lake Tahoe basins as important ecosystems. While these areas have important ecological values, neither of these watersheds provides water to substantial portions of California's human population. In contrast, the forests and rivers of the USR provide highly strategic sources of California's freshwater, while serving as a land bridge and wildlife corridor between the Klamath Cascades and Sierra Nevada mountain ranges. RWAG is working to raise awareness of the hydrological contribution of Mount Shasta and the USR to the state, and hopes to accelerate restoration project implementation to enhance water supply reliability, climate adaptability, and cold freshwater habitat in the USR.

- RWAG intends to develop a better understanding of the contribution of Mount Shasta's aquifers to Groundwater Dependent Ecosystems (GDEs). RWAG will use this information to increase statewide appreciation and attract funding for protection and restoration of the region's critical volcanic alpine ecosystem.

Expand water storage capacity and improve groundwater management:

- *Increase water storage for widespread public and environmental benefits, especially in increasingly dry years and better manage our groundwater to reduce overdraft:* The cities of Mt. Shasta and Dunsmuir both need to expand water storage capacity. These storage tank expansion projects are listed in Chapter 10.

- *Improve Sustainable Groundwater Management:* Mount Shasta's volcanic aquifers do not have well-defined boundaries; therefore, they do not fit within the State's definition of groundwater basins. Although volcanic aquifers were previously included in the State's inventory of groundwater resources known as Bulletin 118, they were eliminated when Bulletin 118 was updated in 2003. As a result, a small percentage of USR groundwater is subject to monitoring under the Sustainable Groundwater Management Act (SGMA), and these basins are designated low priority. Members of RWAG are working to improve evaluation of the region's groundwater resources, as demonstrated by the initial groundwater elevation dataset established in 2017 to inform local understanding of groundwater dynamics and natural groundwater storage.

Provide safe drinking water to all communities:

- USR communities enjoy water so clean it typically does not need chemical treatment before delivery through pipes to homes and businesses. All communities are equipped with chlorinators for occasional use in the event of coliform or pathogen detection. Water main, spring vault and pipeline repairs and replacement have been supported by funding gained through the USR IRWM process. These projects are reducing local water systems' vulnerability to contamination and ensuring provision of safe drinking water to all communities. Further improvements are anticipated if future funding becomes available through IRWM.

Increase flood protection:

- Multiple green infrastructure repair projects listed in Chapter 10, including Panther Creek and high-elevation alpine meadow restoration will naturally regulate water release timing and flow paths, providing flood protection for local and downstream communities.

Increase operational and regulatory efficiency:

- Creation of an administrative support staff for RWAG will improve internal operational efficiencies, as well as increase capacity for partnerships with forest and water managers. Efficient operations may also improve USR representation in local and regional oversight of water, forest and land-use practices. Operational and regulatory efficiency have been improved by IRWM funding in Mt. Shasta, Dunsmuir, and McCloud (e.g., pipeline replacement and metering) and further improvements are planned if more IRWM funds become available.

1.3 IRWM Plan Organization

The elements of this IRWM Plan were guided by the 2012 IRWM Program Guidelines, the updated 2016 Guidelines, as well as the priorities and preferences of participating stakeholders and RWAG. The chapters are described in order below.

Chapter 2: USR Planning Framework, Stakeholder Involvement, and Integration

This chapter describes the history of watershed planning in the USR and how that planning was integrated into this IRWM Plan. It describes the process of stakeholder outreach and inclusion, and introduces the

decision-making process identified by stakeholders for preparation of the IRWM Plan. As part of document development, stakeholders identified how local, state, and federal priorities fit into the USR itself, as well as the IRWM Plan document.

Chapter 3: Region Description

The region description describes in general terms the natural resources, stakeholders, communities, and native habitats throughout the USR. It draws on many local, state, and federal documents to complete this description, and serves to inform related planning objectives (Chapter 7) directly.

Chapter 4: Relation to Local Water Use Planning

Because of the nature of the USR as a headwaters region, the relationship of the water management plans of local jurisdictions and water purveyors to regional resource issues is quite different from other parts of California. This chapter describes how local jurisdictions and water authorities consider and plan for water use within the USR.

Chapter 5: Relation to Local Land Use Planning

Land use planning is an important component of water resource management. Except for limited specific areas, the USR has not experienced extensive amounts of growth or development.

Due to various development constraints, extensive growth is not expected in the near future. However, the USR has the natural capacity to serve as a climate refuge (see Chapter 9), and land use planning can be affected by the planning conducted for natural resources, including resources on public lands. This chapter identifies the various forms of land use planning occurring in the USR and how they relate to water resources in the region.

Chapter 6: Issues and Interests

As represented in this chapter, the process by which issues, interests, and challenges are identified represents a significant amount of work and negotiation on the part of participating stakeholders. The identified challenges stem largely from topics on which there has been significant disagreement or from processes that are outside the scope of IRWM planning. Related concerns are identified and described, and possible opportunities for continued discourse and engagement are noted.

Chapter 7: Objectives

The objectives of the Plan are described in this chapter, along with two overarching goals that were identified to guide implementation and tracking. The objectives are accompanied by measurable components that can also serve as performance metrics (see also Chapter 12).

Chapter 8: Resource Management Strategies

The resource management strategies (RMS) identified in Chapter 8 represent those identified in the 2009 California Water Plan, developed in the 2013 IRWM Plan, and updated according to the 2016 IRWM Program Guidelines. These RMS will help guide identification of priorities, the activities, and suite of options discussed by stakeholders as the IRWM Plan is implemented.

Chapter 9: Climate Change

As a heavily-forested source water area with several communities reliant upon spring water sources, the USR faces potentially significant changes as the climate continues to warm. An analysis of climate trends

and projections for the region is provided in this chapter along with a discussion of potential vulnerabilities and adaptation strategies.

Chapter 10: Project Review Process and Implementation

Projects identified by the RWAG to implement this IRWM Plan are identified and described in this chapter along with the process by which projects are solicited, submitted, developed, reviewed, prioritized, and publicized. General and projected outcomes of project implementation are described as well as the process by which stakeholders will revise the project implementation list in the future.

Chapter 11: Impacts and Benefits

Discussing and identifying IRWM planning impacts and benefits on various stakeholder groups throughout the USR was an important component of the planning process and is represented in this chapter. The benefits and impacts of regional planning are identified for the region as a whole as well as for interregional relationships. A process by which adaptive management may be implemented is also described.

Chapter 12: Plan Performance and Monitoring

The Plan Performance and Monitoring chapter describes how progress and success of IRWM implementation will be tracked. This chapter also describes the process by which this evaluation will occur and the responsibility for implementation.

Chapter 13: Data Management

Data collection and management is an important consideration for a region that has undertaken and completed significant planning efforts. This chapter describes RWAG's interactive map and web-based data management system, process for reporting to California Statewide Groundwater Elevation Monitoring (CASGEM) program, as well as specific data gaps and information needs of the region.

Chapter 14: Technical Analysis

This chapter describes the process by which stakeholders assessed technical data and information and how the analyses feeding the development of the IRWM Plan was developed and used. This section also identifies important data gaps for the USR and includes a table representing the key reference documents used in development of this IRWM Plan.

Chapter 15: Financing IRWM Implementation and RWAG Operations

Planning for IRWM Plan implementation requires consideration of financial needs and the operations of the RWAG. This chapter outlines existing processes, stakeholder preferences, options, and will serve as the guiding document for RWAG identification and recruitment of implementation funding.

Chapter 16: Governance and Next Steps

This chapter provides further information on many of the general topics identified in Chapter 2. The RWAG, which is the group responsible for IRWM Plan development, is described in Chapter 16, as well as how the formation of that group occurred. The governance structure for the RWAG going forward is identified and described. Communication, coordination, and collaboration efforts are described for both historical reference and as a plan for ongoing implementation of the IRWM Plan.