UPPER FEATHER RIVER
INTEGRATED REGIONAL WATER MANAGEMENT PROGRAM
Regional Water Management Group

Sharon Thrall, Plumas County Flood Control and Water Conservation District
Paul Roen, Sierra County
Terry Swofford, Plumas County
Russell Reid, Feather River Resource Conservation District
Bill Nunes, Sierra Valley Resource Conservation District
Jim Roberti, Sierra Groundwater Management District
Roger Diefendorf, Plumas County Community Development Commission
Trina Cunningham, Maidu Summit Consortium
Jeffrey Greening, Public Member
Joe Hoffman, Plumas National Forest (Advisory)
Carol Thornton, Lassen National Forest (Advisory)
Quentin Youngblood, Tahoe National Forest (Advisory)

AGENDA FOR REGIONAL WATER MANAGEMENT GROUP MEETING OF OCTOBER 23, 2015 TO BE HELD AT 1:00 P.M. IN THE PLUMAS COUNTY PLANNING CONFERENCE ROOM, 555 MAIN STREET, QUINCY, CALIFORNIA

www.featherriver.org

AGENDA

The Regional Water Management Group of the Upper Feather River Integrated Regional Water Management Program welcomes you to its meetings, which are regularly held on the fourth Wednesday of every other month, and your interest is encouraged and appreciated.

Any item without a specified time on the agenda may be taken up at any time and in any order.

Any person desiring to address the Board shall first secure permission of the Regional Water Management Group Chair. Any public comments made during a regular Regional Water Management Group meeting will be recorded. Members of the public may submit their comments in writing to be included in the public record.

CONSENT AGENDA: These matters include routine administrative actions. All items on the consent calendar will be voted on at some time during the meeting under "Consent Agenda." If you wish to have an item removed from the Consent Agenda, you may do so by addressing the Chairperson.

REASONABLE ACCOMMODATIONS: In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting please contact Randy Wilson at 530-283-6214. Notification 72 hours prior to the meeting will enable the County to make reasonable arrangements to ensure accessibility. Auxiliary aids and services are available for people with disabilities.

STANDING ORDERS

1:00 P.M. **CALL TO ORDER/ROLL CALL**

ADDITIONS TO OR DELETIONS FROM THE AGENDA

PUBLIC COMMENT OPPORTUNITY
Matters under the jurisdiction of the RWMG, and not on the posted agenda, may be addressed by the general public at the beginning of the regular agenda and any off-agenda matters before the RWMG for consideration. However, California law prohibits the RWMG from taking action on any matter which is not on the posted agenda unless it is determined to be an urgency item by the RWMG. Any member of the public wishing to address the RWMG during the "Public Comment" period will be limited to a maximum of 3 minutes.

ANNOUNCEMENTS/REPORTS
Brief announcements.

CONSENT AGENDA
These items are expected to be routine and non-controversial. The RWMG will act upon them at one time without discussion. Any RWMG members, staff member or interested party may request that an item be removed from the consent agenda for discussion.

A) RWMG

Approve RWMG Meeting Summary for the regular meeting held on September 23, 2015.

ACTION AGENDA

1. PROJECT STATUS UPDATE

Update on project schedule, task and budget. Informational.

2. STAKEHOLDER OUTREACH UPDATES

a. Tribal outreach updates. Informational.
b. Workgroup updates. Informational.

3. RESOURCE MANAGEMENT STRATEGIES – PRESENTATION BY FLOODPLAIN, MEADOWS, WATERBODIES WORKGROUP

Presentation of draft resource management strategy recommendations by the Floodplain, Meadows, Waterbodies Workgroup. Carl Felts, Workgroup Chair. Request for discussion and/or direction to staff.

4. SIERRA NEVADA CONSERVANCY WATERSHED IMPROVEMENT PROGRAM AND GRANT OPPORTUNITIES

Presentation on the SNC's Watershed Improvement Program and upcoming grant opportunities through the Sierra Nevada Conservancy. Lynn Campbell, Mt. Lassen Area Representative, SNC. Informational.

5. CLIMATE CHANGE TECHNICAL STUDY AND DRAFT CHAPTER

Presentation on the climate change technical study and draft chapter. Chris Read, PMC/Baker International, and Michael Prezler, ECORP Consulting. Informational.

6. NEXT MEETING

Schedule and tentative topics for next RWMG meeting. Request for discussion and direction to staff.

ADJOURNMENT

Upper Feather River IRWM
Regional Water Management Group

DRAFT SUMMARY MINUTES

September 23, 2015

Meeting materials and video recording link are available on the website at:
http://featherriver.org/rwmg_meetings/

Call to Order and Roll Call
Sherrie Thrall, called the meeting to order on September 23, 2015 at 1 PM at the Plumas County Planning Conference Room, 555 Main Street, Quincy, California.

Members Present:
Sherrie Thrall, Plumas County Flood Control and Water Conservation District
Russell Reid, Feather River Resource Conservation District
Bill Nunes, Sierra Valley Resource Conservation District
Jim Roberti, Sierra Groundwater Management District
Roger Diefendorf, Plumas County Community Development Commission
Trina Cunningham, Maidu Summit Consortium
Joe Hoffman, Plumas National Forest (Advisory)

Members Absent:
Paul Roen, Sierra County
Terry Swofford, Plumas County
Jeffrey Greening, Public Member
Quentin Youngblood, Tahoe National Forest (Advisory)
Carol Thornton, Lassen National Forest (Advisory)

Staff Present:
Randy Wilson, Plumas County Flood Control and Water Conservation District
Uma Hinman, Uma Hinman Consulting
Paul Lackovic, Deer Creek Resources, Inc.
Leah Wills, Uplands and Forest Management Workgroup Coordinator
Terri Rust, Floodplains, Meadows, Waterbodies Management Workgroup Coordinator
Kristi Jamason, Agricultural Land Stewardship Workgroup Coordinator

Additions or Deletions from the Agenda
None noted

Announcements / Reports
None noted

CONSENT AGENDA **(00:1:07)**

a. RWMG Approval of Meeting Minutes for June 15, 2015

Upon motion by Jim Roberti and second by Russell Reid, the RWMG Meeting Minutes for June 15, 2015 were unanimously approved.

REGULAR AGENDA

1. Project Status Updates **(00:1:19)**

Uma Hinman presented an overview of task progress and an update on schedule and budget.

To date, 34 signed Memorandums of Understanding have been received, primarily through the project development process. Interested parties may sign the MOU at any time during the Plan update process.

Randy Wilson, Trina Cunningham and Uma Hinman met with Vicki Newlin of Butte County Water Agency to discuss an MOU for coordination of planning and management activities in the Butte County overlap area. Discussion items included how to coordinate on projects, outreach efforts, and work on the draft of the MOU. Trina Cunningham will look into coordinating with Oroville area Tribes for participation in the UFR IRWM process. Trina noted that the UFR IRWM should look at the significant traditional properties in the overlap area in Butte County. Sherrie noted that she was glad that contact has been made saying that the RWMG has been concerned about the overlap area being missed in the coordination efforts.

Uma Hinman presented an updated schedule with the current status and efforts needed to complete the Plan update before the June 4, 2016 grant deadline. Uma also noted that the Proposition 1 IRWM planning funding is scheduled to be released in May/June of 2016; implementation funding will follow later in the year.

Uma provided a status of the various studies for the Plan update including the Forest-Water Balance Study, Climate Change Technical Study, DAC Assessment and Community Vulnerability Assessment. Sherrie recognized that identification of Disadvantaged Communities (DAC) is defined differently by agency and poses a difficulty in assessment. Uma noted that there are some proposed additional definitions for the Proposition 1 including economically disadvantaged communities (EDA) and severely disadvantaged communities. Randy noted that the Forest Plan Update must also look at disadvantaged communities, although in different terms. **(00:05:27)**

2. Stakeholder Outreach Updates **(00:7:20)**

The UFR IRWM Region was invited to the Sierra Nevada Conservancy's Board meeting in Paradise on September 2, 2015. Uma Hinman attended and shared a map of projects submitted for the Plan update. A benefit was discussing projects and the process with members of the Butte County Fire Safe Council.

Other updates were the interregional outreach with Butte County/Northern Sacramento Valley IRWM, a Municipal Services Workgroup meeting in which the RMS recommendations were finalized, and the completion of the Workgroup Integration and Climate Change Workshop on August 21, 2015.

Trina Cunningham provided an update on Tribal Outreach efforts, which has been focused on forming what Traditional Ecological Knowledge (TEK) is and how it can integrate into the projects and process.

3. Traditional Ecological Knowledge **(00:09:39)**

Trina shared about Tribal Ecological Knowledge (TEK) at the *Workgroup Integration Workshop* on August 21. Trina noted that TEK is defined differently by region. Some of the concepts of TEK is that land has always been manipulated. TEK asks: What is the desired land use? What are the baselines of TEK? Trina

expressed interest in reaching out to other communities and sharing TEK about the region through storytelling, perhaps over the winter.

Trina and Leah Wills also met with Julie Griffith-Flatter, Sierra Valley Conservancy, to discuss a larger template for Tribal engagement and TEK, which will benefit the UFR IRWM Plan update process through added support by the SNC. Tribes see things spatially on a larger level rather than individual project development.

Russell Reid asked how many tribes are in the area. Trina responded that there are four federally recognized tribes; Rancherias; and allotments in the UFR that are held in trust for families through the Bureau of Indian Affairs.

TEK is about going back to the baseline of pre-European contact. The objective of integrating TEK is to foster the optimal health of water and land and having a continuing relationship with Place. Part of the TEK process is about recognizing the leadership of families within the region, identifying those families and how and if they want to be engaged. TEK would be integrated into projects through the TAC, who would access TEK for the region through individuals and families.

Russell Reid asked if TEK evolved/changed through subsequent generations in a tribe. Trina said there was a natural evolution of TEK in part based on the shifting of the Earth, which happens every 11,000 years.

Next steps: 1) Finding leadership in local families and in those who have relocated; 2) reaching out to the other UFR IRWM Workgroups for knowledge about their history here in Plumas County; and 3) plans for a storytelling function during the winter.

4. Chapter Review Process and Schedule (00:22:28)

Uma Hinman introduced an updated process for Chapter reviews. She suggested a streamlined process to meet the overall project timeline.

1. Develop chapters
2. Internal staff (Uma and Randy) review
3. Chapters would be released as they are developed, approximately every 2 weeks
4. Released for a 30-day comment period
5. Comments addressed and revisions made as appropriate
6. Complex questions brought to RWMG during chapter presentation

Sherrie agreed that skipping an initial review by the RWMG makes sense. She would prefer looking at comments from the five Workgroups before the RWMG undertakes their reviews.

Uma presented updated Plan targets; noting that it would be prudent to aim for finishing ahead of time.

March/April - Admin Draft Plan completed
April/May - Public Draft Plan completed

Workgroup Coordinators are developing a strategy to encourage workgroup members to review and comment on the chapters.

5. Municipal Services RMS Recommendations (02:13:00)

Frank Motzkus presented the Municipal Services Workgroup resource management strategies (RMS) recommendations for the assigned RMS.

- RMS-2: Urban Water Use Efficiency
- RMS-6: System Reoperation
- RMS-7: Water Transfers
- RMS-11: Municipal Recycled Water
- RMS-14: Drinking Water Treatment and Distribution
- RMS-15: Groundwater Remediation/Aquifer Remediation
- RMS-18: Salt and Salinity Management
- RMS-19: Urban Stormwater Runoff Management
- RMS-23: Land Use Planning and Management
- RMS-27: Economic Incentives
- RMS-31: Other Strategies
- RMS-32: Wastewater/NPDES

Frank noted that in Plumas County alone there are 36 water treatment operators, 51 distribution operators, and 23 waste water treatment operators (6 levels of certification). Higher grade operators are retiring and a fresh labor pool is needed. Frank suggested contacting high schools to inform them of this career path since certifications require a high school diploma. Sherrie recognized the need in the county for training.

Sherrie commended the Municipal Services Workgroup's efforts.

Uma noted the schedule for the next workgroup presentations:

Floodplain/Meadows/Waterbodies – October
Uplands/Forest & Tribal Advisory Committee – November
Agricultural Lands Stewardship - November

6. Workgroup Integration and Climate Change Workshop (00:27:25)

Uma presented an overview of the workshop held on August 21, 2015. The Workgroup Integration portion of workshop was held the morning and was the first opportunity for all the workgroups to meet each other and hear what others have been working on. The session served several purposes:

- Encourage collaboration and cooperation among workgroups
- Hear an overview of each workgroup's efforts
- Hear summary of all projects submitted
- Consider strategic integration of projects for greater impact
- Identification of regional and multi-benefit projects

Sherrie reported that the morning session was valuable and that she noticed a lot of sharing between workgroup members. Frank Motzkus offered that Workgroup members began realizing what other WGs were doing, how the information might/would affect each other's group. Terri Rust agreed with Frank, that there was "lots of energy around how groups tied into each other;" commonality is clearer.

Sherrie expressed appreciation for the map of projects and suggested it be shared through the newspapers.

The Workgroup Coordinators met to discuss next steps on September 9. They will continue to develop project integration and regional project lists based on workshop feedback and their joint discussions. They will incorporate feedback from the workgroups and will present their recommendations to the RWMG.

The Climate Change Workshop was held during the afternoon of August 21, 2015. Uma reported that 30 people attended and participation was good. The purpose of the workshop was to discuss possible climate change scenarios, vulnerability rankings, and regional adaptation strategies. The interactive working session solicited vulnerabilities, regional significance, and regional priorities.

The next steps for development of the climate change efforts consist of the following:

Finalize climate change vulnerability study
Finalize climate change technical study
Draft Climate Change Chapter
Presentation to RWMG (October meeting)

7. Summary of Project Submittals (00:33:12)

Uma reported that there were 81 project submittals for Step 2 that are included in these five categories:

- Agricultural Land Stewardship 13
- Floodplains/ Meadows/Waterbodies 15
- Municipal Services 39
- Tribal Advisory Committee 5
- Uplands/Forest 9

Uma noted that capacity building is still a huge concern across the workgroups. The conceptual project regarding capacity was not submitted for the Step 2, in part because the RWMG encouraged project proponents to build it into their individual applications, which didn't occur.

Capacity Building as it relates specifically to grants includes the technical, managerial, and financial ability to pursue, implement and manage grants and projects. It is also about increasing knowledge, abilities, contacts, referral resources and funding opportunities.

The bigger picture of building capacity includes human resource development, organizational development, and institutional and legal framework development. Uma also noted that Holly George had sent an email expanding the definition of capacity building and encouraging a more expansive and in-depth look at the issue. The email was provided as a handout at the meeting.

8. IRWM Program Implementation (00:37:12)

Elizabeth Betancourt, Watershed Science and Policy Analyst with Forsgren Associates, Inc., presented information about the future the IRWM Program at the State level. She noted that DWR is currently working on strategic planning for IRWMs and has identified draft objectives and strategies.

Strategy 1. Embracing IRWM and sharing successes - publicize the fact that you have successes (i.e., project maps, etc.)
Strategy 2. Aligning government programs to support IRWM.

Strategy 3. Strengthening regional capacity – proposed baseline funding of $250,000/yr per region for IRWM Program administration

Elizabeth confirmed that the proposed baseline funding could be used to put grants together. She noted that legislation would be necessary and may be brought forth in early winter of 2016. She urged the RWMG to participate in the process and in writing guidelines for Prop 1 grants.

Elizabeth encouraged the RWMG participate in advocacy efforts. She suggested a number of opportunities for involvement:

- Roundtable of Regions
- Association of California Water Agencies (ACWA)
- Sierra Nevada Conservancy
- Sierra Water Workgroup

Elizabeth noted that any region in California has the capacity to do these things and that the Finance chapter of the IRWM Plan is very important in moving forward.

9. Project Selection Process (01:13:20)

Uma presented the item, reminding the RWMG that no decisions were being requested at this time. The approach presented was collaborative rather than competitive. It was noted that project selection will vary by grant solicitation and "ranking/selection" and to do so for the Plan could be duplicative. This approach has precedence in the Upper Pit Watershed IRWM and the Yuba County IRWM Plans. Rather than putting projects through the selection process at this time, Workgroup Coordinators would like to further develop projects. Additionally, we are required to prepare a climate change analysis and a greenhouse gas emissions worksheet that Coordinators will work with project proponents to complete. Randy noted that the climate change consultants are working on preparing the worksheets to aid in this effort.

Sherrie expressed approval for the approach of grouping projects rather than ranking; this approach will give the RWMG flexibility. She noted that projects can be identified and combined depending on various grant opportunities.

Russell Reid agreed with Sherrie and noted that it is important to have a means for adding projects into the Plan in the future. Sherrie agreed and suggested the RWMG should review the projects annually. Leah Wills suggested the regional projects are an umbrella that might provide opportunity for adding projects to achieve those regional goals.

Sherrie noted that after we wrap up this Plan in June 2016 and another (non-IRWM) grant comes along, we can promote any of the current projects. It will be important to regularly update the list of projects; to remove those that receiving funding and add new projects.

Terri Rust noted that at the Coordinators meeting upcoming chapter review was discussed and it was suggested that people who haven't been coming to the table, who haven't submitted a project, can be included somehow. There should be a means by which to reach out to these folks can add verbiage to the Plan.

Kristi Jamason asked how far to push for development of refined cost estimates. Sherrie replied that rough estimates are as far as we should go, recognizing that by the time that project submits an

application for actual grant funds, those estimates may have changed. Those proponents that anticipate submitting Proposition 1 applications may require more time.

Sherrie stressed that project proponents should not be going to the level of issuing RFPs and asking consultants to prepare detailed information for the applications for project inclusion in the IRWM Plan. That level of detail isn't appropriate at this time unless they are submitting for actual grant funding in response to a current or anticipated solicitation.

Randy brought up the Brownfields Grant opportunities (e.g., Indian Jim School, local Armory, etc.). How do we bring something in we didn't know about but want to include in the project lists? Bring similar projects in under projects on the list?

Sherrie stated that the Coordinators are the people who know the players and project and will see opportunities for project integration.

Joe Hoffman asked whether there will be any initial ranking for the Plan, noting that it looked like Yuba County IRWM had included some evaluation of projects. Uma responded that the Coordinators would be working with the applications to make sure they met the minimum requirements per the DWR Prop 84 Guidelines for project selection. It is required that the Plan describe how we went about the process for inclusion of projects in the Plan.

Uma added that the Coordinators will also identify those projects that benefit DACs, are regional and/or integrated projects, and those that are multi-beneficial; the intent being to front load the process for the RWMG so as to more easily select projects for grant solicitations.

Jim Roberti asked how the RWMG will disperse available grant money. Uma explained that the Mountain Counties Overlay was allocated $13 million in IRWM funding through Proposition 1. It may be that the RWMGs of the six IRWM regions within the Mountain Counties Overlay area could meet and agree to equally distribute the funding between the regions (i.e., approximately $2 million each). Another approach would be each IRWM region for themselves and competitively apply for the $13 million.

Uma discussed the PowerPoint presentation (meeting handout) from the public scoping meeting hosted by DWR for the Proposition 1 funding. Sherrie noted that we won't know the specific requirements and details for project selection for grants (Proposition 1 IRWM funding) until the draft guidelines come out, which won't be until next year. Leah noted that we are working (updating the Plan) between Proposition 84 and Proposition 1, making it difficult to anticipate what exactly DWR will be requiring.

Motion: Upon motion by Bill Nunes and second Roger Diefendorf, staff is directed to proceed with categorization of projects and further developing projects, putting them in categories, and waiting for DWR solicitations before selecting projects. (1:51:30)

Uma requested some discussion of developing the process by which the project list will be updated in the future (post-Plan approval). Bill Nunes expressed a need to have that process in place and asked staff to develop a draft process for discussion.

Sherrie noted that it has always been the intent of the UFR RWMG that a management or steering group would remain in place and implement the Plan, including the projects and grant opportunities Russell expressed his agreement. Sherrie noted that unless some funding is in place to continue the efforts of IRWMs, most regional IRWM Programs will discontinue.

10. Project Monitoring **(02:00:07)**

Uma presented the item and requested discussion of an approach for plan implementation, performance measures and establishing monitoring protocols.

Russell suggested this was Best Management Practices and requested staff to research that other groups have used so as not to reinvent the wheel. Sherrie agreed and asked staff to identify these aspects (e.g., Who is doing the monitoring?).

Terri Rust asked about what level of 'monitoring the Plan' are we talking about? On the administrative level or scientific level? Uma replied that each type has its own monitoring requirements (i.e., engineering, restoration, etc.). Randy noted that school monitoring, as for the Indian Jim School, might include all sorts of remediation.

Sherrie requested staff develop a proposed approach/method for 1) monitoring specific implementation projects, and 2) monitoring the performance of the IRWM Plan.

11. Next Meeting **(2:34:30)**

The next meeting is scheduled for Friday, October 23, 2015 at 1:00 p.m.

Adjournment **(2:47:00)**

The meeting was adjourned at 3:55pm.

ITEM NO. 1

Upper Feather River
Integrated Regional Water Management

RWMG Meeting No. 7
October 23, 2015

To: Upper Feather River Regional Water Management Group

From: Uma Hinman, Uma Hinman Consulting

Subject: UFR IRWM Plan Update Project Schedule, Task and Budget Update

Date: October 18, 2015

SCHEDULE

Based on the contract date between DWR and the Plumas County Flood Control and Water Conservation District, we are currently in the 15th month of the 2-year project. This is the last of six regular RWMG meetings in the first project year, which has been rescheduled from July 31, 2015. All Workgroups have held at least four meetings; consistent with the grant work plan. The next few months will be focused on the projects and chapter development. See attached schedule.

MEMORANDUM OF UNDERSTANDING (MOU)

The MOU is posted on the website and has been presented at each of the Workgroup meetings. Additionally, copies have been provided to requesting agencies and organizations through the Workgroups. To date, 34 signed MOUs have been returned.

On September 16, 2015, Randy Wilson, Uma Hinman, and Trina Cunningham met with Butte County representatives to discuss an MOU to address planning and management in the overlap area, determine areas of responsibility, and provide for appropriate consultation as needed.

BUDGET AND TASK UPDATE

The overall expenditures on the grant project to date are consistent with the project accomplishments, and demonstrate very efficient use of funds.

In October 2014, Plumas County and its partners provided documentation of $237,489 in match funds, which fulfills the match requirement for the grant contract in its entirety. To date, Uma Hinman Consulting has submitted 12 invoices to DWR totaling $283,299.46 in reimbursable services, equipment purchases, and operating expenses. Approximately 50 percent of project work has been completed and

the $256,078.83 invoiced to date for professional and consultant services represents 42 percent of the $605,708 budget for those services. Additionally, the total grant amount invoiced to date includes county equipment and operating costs, for an overall billing of 42 percent of the total grant budget. See attachment 2 for budget summary.

Looking at the individual grant project tasks, most of the services and budget expenditures have been allocated to tasks one, three and seven. The following are summaries of work completed or initiated by task.

Task 1: Stakeholder Outreach/RWMG/Workgroups/Tribal Engagement/IRWM Coordination
The Stakeholder Outreach efforts have included coordinating, publicizing, and preparing outreach materials and presentations for and conducting the first five regular RWMG meetings and a special meeting to review, discuss and approve the Draft Monitoring Policy and the Draft Project Selection and Scoring Criteria, as well as to review and vet the first phase of Conceptual Project Summary submittals. Past tasks and efforts have included developing the Stakeholder Outreach Plan (SIP), drafting the stakeholder contact lists and an MOU, updating the tribal contact list and drafting the Tribal Engagement Plan, developing and discussing the draft Project Eligibility Worksheet for vetting of Conceptual Projects, review and discussion of draft options for project selection and ranking criteria, as well as coordinating and scheduling individual Workgroup meetings. The Workgroups have held four or five meetings with the recent focus on developing projects proposed for implementation in the IRWM region. In addition a fifth working group was recognized in May: the Tribal Advisory Committee, which has held four meetings to date.

The Joint Workgroup Integration Workshop/Climate Change Workshop was held August 21 from 9am to 4:30pm in the Mineral Building at the Plumas County Fairgrounds. The Workshop had excellent attendance and very productive discussion/participation in both the morning and afternoon sessions.

Staff continues to post articles of interest under the NEWS section of the website, and maintains the calendar and meeting pages with meeting schedules and materials. Please remember to check the website periodically for new posts and information. The subcategory under DOCUMENTS developed for DRAFT IRWM PLAN will contain the draft Plan chapters for review and include deadlines for comments.

Task 2: Baseline Technical Study
The administrative draft Baseline Technical Study has been posted on the website and includes a database of background materials collected and catalogued to date. The draft report is available at http://featherriver.org. Staff is continuing to update the document database as the project progresses. The consultant team has developed a database that is linked via GIS to a map that provides a visual catalog of studies and projects in the region. Time was spent compiling, categorizing, summarizing, and uploading baseline studies. The administrative draft Baseline Technical Study Report was presented at the March 27th RWMG meeting.

Work has also focused on refining the scope for the first deliverable for the Forest-Water Balances Study, a white paper on infiltration potential from forest fuels thinning projects. A memorandum from Plumas Geo-Hydrology, dated February 16, 2015, draws attention to the significance of groundwater recharge related to forest canopy thinning (memorandum attached to this progress report). The memorandum indicates that forest management practices to reduce forest canopy closure will increase groundwater recharge, and thereby increase base flow in streams.

Task 3: Data Management Strategy, System Development and Implementation

The IRWM Plan Update website/web portal for the UFR IRWM Project is being kept current. The RWMG meeting agendas, packets, and archived videos of the meetings are and will be available on the site (featherriver.org), as well as other project information and updates.

During May and June, consultants attended the emergency planning committee meeting regarding the Feather River geographic response plan and communicated with California Department of Fish and Wildlife (CADFW) about parallel data collection efforts, worked on map updates, incorporating new layers into maps, completed land managers, precipitation, fire hazard and severity zone, and fire threat maps, added a Tribal Advisory Committee Workgroup page to the website, and wrote a manual on how to record and stream meetings.

The consultant team has developed an online, map-based catalog of studies and projects in the region. The database is linked via GIS to a map that provides a visual catalog of studies and projects in the region (similar to the SWIM site). Time was spent compiling, categorizing, summarizing, and uploading baseline studies. The catalog is available on the website at: http://featherriver.org/catalog/index.php.

The Step 2 project submittal data has been put into an online map which can be viewed at http://featherriver.org/proposed-projects/. The database includes a summary of the information submitted for each project.

Task 4: Climate Change

The August 21 Climate Change Workshop consisted of a working session to present and discuss climate change scenarios, regional vulnerabilities, and recommended adaptation strategies. The Workshop had excellent attendance and very productive discussion/participation in both the morning and afternoon sessions. Workgroup comments, and those received during the workshop, were incorporated into the vulnerability assessment. The Consultant team has recently focused on developing the vulnerability to climate change assessment and a project worksheet for calculating GHG emissions.

Task 5: Project Development Process

The deadline for the first stage of the project submittal process was June 1, 2015 at 5:00 p.m. Approximately 80 conceptual projects submittals were received. The eligible conceptual project proposals were reviewed by the RWMG during their special meeting on June 15, 2015.

The deadline for Step 2 IRWM Project Information Forms was Monday, August 3, 2015 at 5pm. Eight-one (81) projects were received. The Step 2 project submittals were discussed during the August 21, 2015 Workgroup Integration and Climate Change Workshop with a focus on recommendations for project integration.

Task 6: IRWM Plan Update

The following chapters are in progress: Water and Land Use Chapter, Regional Description, Governance/Stakeholder Participation/Coordination, and Finance. Based on information collected and what is generated through the workgroup meetings, chapters will be drafted by staff and reviewed by workgroups and the RWMG. This process is set for further discussion at the September 23rd RWMG meeting.

Task 7: Grant Administration

Work under Task 7 has included the initial process of documenting the match funding and polishing the invoicing and reporting procedures. We have submitted the first 12 project progress reports and invoices.

REQUEST

Informational.

Attachments: Budget Summary

Agreement No.: 4,600,010,066.00
Grantee: Plumas County Flood Control and Water Conservation District
Awarding Body: California Department of Water Resources
Program: Prop 84
Encumbrance FY: 2012

Award Budget	Match
$679,657.00	$237,489.00

		Personnel Services	Operating Expenses	Equipment	Professional/ Consultant Services	Total	10% Withholding	Overhead	Match Total
Line Item Prop 84 Allotments		$64,220.00	$4,731.00	$4,998.00	$605,708.00	$679,657.00			
Invoice No.	Billing Period								
1	10/1/08-9/30/14	$ -	$ -	$ 4,853.84	$ 30,510.98	**$ 35,364.82**	**$ 3,536.48**	**$ 1,224.98**	$ 237,489.00
2	9/1/14-10/31/14	$ -	$ -	$ -	$ 22,925.60	**$ 22,925.60**	**$ 2,292.56**	**$ 1,675.85**	$ -
3	9/1/14-11/30/14	$ -	$ -	$ -	$ 13,009.60	**$ 13,009.60**	**$ 1,300.96**	**$ 513.61**	$ -
4	12/1/14-12/31/14	$ -	$ -	$ -	$ 4,867.88	**$ 4,867.88**	**$ 486.79**	**$ 255.38**	$ -
5	10/1/14-1/31/15	$ 3,892.97	$ -	$ -	$ 25,774.11	**$ 29,667.08**	**$ 2,966.71**	**$ 1,383.10**	$ -
6	7/1/14-2/28/14	$ 2,971.73	$ 1,427.55	$ -	$ 7,285.95	**$ 11,685.23**	**$ 1,168.52**	**$ 225.20**	$ -
7	11/1/14-3/31/15	$ -	$ -	$ -	$ 40,142.35	**$ 40,142.35**	**$ 4,014.24**	**$ 2,656.35**	$ -
8	3/1/15-4/30/15	$ -	$ -	$ -	$ 12,887.40	**$ 12,887.40**	**$ 1,288.74**	**$ 985.90**	$ -
9	3/1/15-5/31/15	$ 4,963.08	$ 874.41	$ -	$ 15,654.75	**$ 21,492.24**	**$ 2,149.22**	**$ 938.00**	$ -
10	9/1/14-6/30/15	$ -	$ -	$ -	$ 42,778.71	**$ 42,778.71**	**$ 4,277.87**	**$ 2,806.45**	$ -
11	6/1/15-7/31/15	$ 3,926.40	$ 313.37	$ -	$ 18,565.35	**$ 22,805.12**	**$ 2,280.51**	**$ 1,014.35**	$ -
12	3/1/15-8/31/15	$ 3,886.74	$ 110.54	$ -	$ 21,676.15	**$ 25,673.43**	**$ 2,567.34**		$ -
Total Amount Spent		**$ 19,640.92**	**$ 2,725.87**	**$ 4,853.84**	**$ 256,078.83**	**$ 283,299.46**	**$ 28,329.95**	**$ 12,879.17**	
Allotment Remaining		**$ 44,579.08**	**$ 2,005.13**	**$ 144.16**	**$ 349,629.17**	**$ 396,357.54**			
% Budget Invoiced		**30.58%**	**57.62%**	**97.12%**	**42.28%**	**41.68%**			

ITEM NO. 2

Upper Feather River
Integrated Regional Water Management

RWMG Meeting No. 7
October 23, 2015

To: Upper Feather River Regional Water Management Group

From: Uma Hinman, Uma Hinman Consulting

Subject: Stakeholder Outreach Updates

Date: October 18, 2015

INTRODUCTION

Tribal Engagement
An update will be provided during the meeting.

Workgroups
The workgroups have all held their fourth meetings consistent with the grant work plan for the first year. The next meetings will focus on developing resource management strategies.

Project Development
Workgroup Coordinators continue to support project proponents in the further development of the project applications. Staff remained in contact with project proponents, providing updates on process and next steps. The Workgroup Coordinators will be working with project proponents to ensure project applications address the required review factors and include completed GHG emission worksheets.

Resource Management Strategies
The Floodplains, Meadows, Waterbodies Workgroup will be presenting draft RMS recommendations to the RWMG in Item No. 3. The Municipal Services Workgroup presented draft RMS recommendations to the RWMG at the September 23, 2015 RWMG meeting. Staff anticipates that the Agricultural Stewardship Workgroup presenting at the November RWMG meeting. The Uplands and Forest Workgroup and Tribal Advisory Committee will be working together on the developing recommendations and will also present at the November RWMG meeting.

Assignment/Task Strategy
A total of eight workgroup meetings are identified in the Plan Update work program over the course of the two-year project.

The following table summarizes Workgroup meeting schedules.

Workgroup	Chair	Alternate	Meeting Schedule
Agricultural Land Stewardship	Willo Vieira		January 22, 2015 March 11, 2015 May 26, 2015 July 20, 2015
Floodplains, Meadows and Waterbodies	Carl Felts	Cindy Noble	December 5, 2014 February 13, 2015 April 24, 2015 June 26, 2015 October 16, 2015
Municipal Services	Frank Motzkus	Robert Meacher	November 20, 2014 February 19, 2015 April 17, 2015 June 17, 2015 July 15, 2015
Uplands and Forest	Mike DeLasaux	John Sheehan	January 29, 2015 March 13, 2015 April 24, 2015 June 30, 2015
Tribal Engagement Committee	Trina Cunningham		January 13, 2015 March 20, 2015 May 18, 2015 July 13, 2015

The fifth round of workgroup meetings will focus on developing RMS recommendations. After recommendations have been developed and presented to the RWMG, the next tasks for the workgroups will primarily be chapter review and comment.

Chapter Review

The first staff draft Plan chapters have been released for review and comment: the Governance, Stakeholder Involvement, and Coordination Chapter and the Climate Change Chapter. Comments are due by 5:00pm on the date indicated in the table below. All comments should be submitted to UFR.contact@gmail.com. Chapters and timelines are posted on the website: http://featherriver.org/draft-irwm-plan/.

Staff Draft Chapter	Release Date	Deadline for Comments
Governance, Stakeholder Involvement, Coordination	October 8, 2015	November 11, 2015
Climate Change	October 14, 2015	November 13, 2015

REQUEST

Informational.

ITEM NO. 3

Upper Feather River
Integrated Regional Water Management

RWMG Meeting No. 7
October 23, 2015

To: Upper Feather River Regional Water Management Group

From: Uma Hinman, Uma Hinman Consulting

Subject: Resource Management Strategies Presentation – Floodplains, Meadows, Waterbodies Workgroup

Date: October 18, 2015

INTRODUCTION

The intent of developing RMS specific to the region is to intentionally find ways to diversify the region's water management portfolio. The RMS selected for inclusion in the Plan should support and be consistent with the issues identified within the region and Plan objectives.

The Floodplains, Meadows, Waterbodies Workgroup was assigned responsibility for developing recommendations for 11 resource management strategies (RMS), identified as follows:

- RMS-3: Flood Management
- RMS-8: Conjunctive Management
- RMS-9: Precipitation Enhancement
- RMS-13: Surface Storage – Regional/Local
- RMS-17: Pollution Prevention
- RMS-21: Ecosystem Restoration
- RMS-23: Land Use Planning and Management
- RMS-24: Recharge Area Protection
- RMS-26: Watershed Management
- RMS-30: Water-Dependent Recreation
- RMS-31: Other Strategies

The Floodplain, Meadows, Waterbodies Workgroup Chair, Carl Felts, will present the Workgroup's draft recommendations (also attached).

REQUEST

Discussion and/or direction to staff.

Attachments: Floodplains, Meadows, Waterbodies Workgroup Draft RMS recommendations

UFR IRWM Resource Management Strategy Recommendations – FMW Workgroup

Floodplains, Meadows & Waterbodies Workgroup Selections

RMS 3 – Flood Management

- Floodplain function restoration to preserve and/or restore the natural ability of undeveloped floodplains to absorb, hold, and release floodwaters

RMS 8 Conjunctive Management

- Implementation of monitoring, assessment, and maintenance of baseline groundwater levels;
- Encouraging local water management agencies to coordinate with tribes and other agencies involved in activities that might affect long term sustainability of water supply and water quality; and
- Local groundwater monitoring and management activities and feasibility studies to increase the coordinated use of groundwater and surface water.
- Restore wet meadows to full biological function to enhance storage and more continuous release of shallow groundwater.
- Implement a program to promote public education about groundwater and surface water connectivity.

RMS 10 Precipitation Enhancement

- Collect data and evaluate existing California precipitation enhancement projects within the UFR region on their effectiveness and impact on water quality and human health.
- Collaborate with academic institutions, agencies, and local citizen groups on research.

RMS 13 Surface Storage – Regional/Local

- Increase surface storage and timed releases for agricultural and natural resource purposes.
- Increase water-holding capacity of riparian vegetation and wetlands.
- Development of a comprehensive methodology for analyzing project benefits and costs by local agencies
- Continued studies, research, and dialogue to identify a common set of tools for determining costs and benefits of local surface storage projects, and assess need for determining need for future projects.

RMS 17 Pollution Prevention

- Developing proper land management practices that prevent sediment and pollutants from entering source waters and waterbodies
- Restore degraded riparian habitats where elevated sediment or turbidity cause nuisance or adversely impact beneficial uses per the Basin Plan
- Assess the costs and impacts of current water quality management activities and use this assessment to guide future implementation programs
- Identify abandoned mines throughout the region and assess the level to which these sites contaminate regional waters
- Construct and maintain livestock exclusions around sensitive meadow and riparian habitats, particularly in areas that are important for groundwater recharge or source water protection.
- Assess and Identify source(s) of pollutants to waterbodies
- Establish monitoring protocol for marinas and recreational boating facilities
- Establish criteria for preventing/monitoring invasive aquatic species introduction to waterbodies
- Identify where recreational development has harmed water quality in the region and take action to remediate it

RMS 21 Ecosystem Restoration

- Creating programs that support and fund the identification of stream flow needs
- Establishing biological reserve areas that connect or reconnect habitat patches
- Expanding riparian habitat
- Devising climate change adaptation plans that benefit ecosystems, water, and flood management
- Reproducing natural flows in streams and rivers
- Controlling non-native invasive plant and animal species
- Filtering of pollutants and recharging aquifers
- The protection and preservation of springs as water supply sources as well as valuable ecological and spiritual resources in the region
- Encourage a natural sediment transport regime through minimizing areas of excessive erosion and sedimentation and encouraging the transport of substrate through habitat restoration and changes in reservoir and hydrologic system management
- Remove barriers to fish migration in rivers and streams; assess culverts for adequate passage of aquatic organisms as appropriate

RMS 23 Land Use Planning & Management

- Increase communication between land use planners and water managers.
- Plan for growth in a way that considers water resource features such as streams, wetlands, and groundwater recharge areas, water quality and flooding.
- Direct development away from undeveloped mountain meadows

RMS 24 Recharge Area Protection

- Restore and, where possible, protect meadows as recharge areas.
- Encourage the preparation of and implement groundwater basin management objective plans to monitor and/or minimize water transfers to protect groundwater supplies and recharge zones.
- Encourage science-based ecological restoration on public and private lands to maximize watershed function and recharge.
- Identify and inventory actual and potential recharge areas throughout UFR region.

RMS 26 Watershed Management

- Creating a scientifically valid tracking and reporting method to document changes in the Watershed
- Establish a scientifically valid means of tracking and reporting changes in the UFR region's major sub-watersheds that provide reliable, current information to local communities, State and federal agencies, and others, regarding the net effects of management against the background of external change.
- Restore and preserve stream channel morphology to provide floodwaters access to the floodplain and to encourage stable banks and channel form.
- Assessing the performance of projects and programs
- Providing watershed information to better inform local land use decision makers on how to maintain and improve watershed functions
- Using watershed approaches in which all RMS strategies are coordinated
- Preserve habitats and ecosystems that provide functions essential to water management

  These include :

  a. erosion prevention, healthy sedimentation levels, water temperature preservation, and the provision of a cold-water pool in the summertime

  b.Promote conservation of terrestrial and aquatic habitat connectivity

  c.Protect, preserve, and restore, where appropriate, the riparian zone

- Identify where noxious weeds may become a serious problem for recreational use, water quality, ecosystem integrity, or other reasons and manage those infestations accordingly
- Improve data collection and sharing amongst/between watershed stakeholders and outside entities
- Increase levels of community knowledge regarding their watershed and encourage responsible stewardship and protection
- Coordinate with and between stakeholders where appropriate
- Build regional capacity through stakeholder partnerships and collaboration
- Assess the connection between groundwater and spring and surface water sources to better understand their interactions
- Proactively address the recovery of special-status species, at both watershed and population scales, and incorporate measures to avoid future listing of other at-risk species
- Protect soil resources and restore the functions of drastically disturbed soils, to slow runoff and increase rainfall infiltration.
- Retain intact floodplain and other wetlands, to the extent possible, to maintain or increase residence time of water in the watershed.

RMS 30 Water Dependent Recreation

- Developing invasive species prevention measures.
- Enhance the educational qualities of recreational activities throughout the region
- Work with a variety of stakeholders (USFS, power providers, educational institutions, non-profits) to identify recreational and educational opportunities
- Ensure that current and future recreational developments do not endanger water quality and/or environmental characteristics
- Develop a plan to resolve legacy pollution impacts on recreational waters.
- Develop best management practices guidance for reducing recreation-based water quality impacts, including impacts from recreation vehicles — such as reduced pollution of marine engines and parking lot runoff.
- Test surface water quality more often and make real-time water quality information for surface waters more accessible online and at recreation sites.
- Educate residents and businesses in the watershed about their role in protecting water quality and recreational opportunities. Explain water quality issues to the public in more understandable and compelling ways.
- Restore sustainable populations of native and/or game fish.
- Maintain and restore vegetation along rivers and streams that support and enhance outdoor recreation.
- Participate in the National Water Trails System.

RMS 31 Other Strategies

Other strategies include the following (no relevant recommendations for FMW):

- crop idling for water transfers,
- dew evaporation or atmospheric pressure desalination,
- fog collection,
- irrigated land retirement,
- Rain fed agriculture,
- snow fences
- waterbag transport/storage technology.

ITEM NO. 4

Upper Feather River
Integrated Regional Water Management

RWMG Meeting No. 7
October 23, 2015

To: Upper Feather River Regional Water Management Group

From: Uma Hinman, Uma Hinman Consulting

Subject: Sierra Nevada Conservancy Presentation

Date: October 18, 2015

INTRODUCTION

Lynn Campbell, Mt. Lassen Area Representative for Sierra Nevada Conservancy, will speak with the group about funding opportunities through the Sierra Nevada Conservancy. She will also present information about the Sierra Nevada Watershed Improvement Program.

The Sierra Nevada Watershed Improvement Program (WIP) is a coordinated, integrated, collaborative program to restore the health of California's primary watershed through increased investment and needed policy changes. The effort is organized and coordinated by the State's SNC and the federal USFS, in close partnership with other federal, state and local agencies, and diverse stakeholders. The SNC is requesting endorsement of the WIP.

REQUEST

Informational.

Attachments: SNC Funding Opportunities Newsletter October/November 2015
SNC Grant Calendar
Sierra Nevada WIP Fact Sheet
Sierra Nevada WIP Endorsement Form

Sierra Nevada Conservancy
FUNDING OPPORTUNITIES NEWSLETTER
October/November 2015

This month's research memo: A new research memo covers funding for CEQA and NEPA costs associated with restoration projects. In addition, four of the grant research memos on the funding opportunities website have been updated:

- Riparian and wetland restoration
- Recreation and tourism development
- Habitat preservation and restoration funding
- Parks and trails funding

There are several new grant programs in these memos, including Proposition 1 funding for streamflow enhancement and environmental restoration. Also keep an eye out for an upcoming research memo on funding for fuel reduction on public and private property.

Want to know what grants are coming up? The Funding Webpage has an updated calendar of funding opportunities expected over the several months.

Upcoming grants that might be of interest:

- The Museums for America program provides up to $150,000 in funding for educational programs, collections, and community programs. Requests under $25,000 do not require a match. The deadline is December 1.
- The National Forest Foundation's Community Capacity and Land Stewardship program provides $24,000 grants to help collaboratives and community-based organizations address capacity building needs that will further their on-the-ground watershed restoration projects. The deadline is December 16.
- The Max and Victoria Dreyfus Foundation provides small grants to support projects or general operating costs to community-based organizations throughout the United States for which a small amount of funding would make a big difference. Target areas include museums, cultural programs, environmental and wildlife protection activities. The deadline for applications is November 10.

Congratulations to the Kern River Valley Heritage Foundation! The Sierra Nevada Conservancy funded the initial feasibility and design work for their Bob Powers Gateway Preserve near Lake Isabella in Kern County. After many years of hard work to reconstruct the wetland habitat, they were recently awarded grants from the National Audubon Society and from the Department of Fish and Wildlife to complete a second ponding basin at the preserve. In addition they have secured a contract to purchase the adjacent 189-acres to expand the wetlands project and are working on a fundraising campaign to complete the purchase. Future plans include walking trails, information kiosks, interpretive signage, development of a docent/volunteer corps, and youth education programming.

Your SNC Area Representative can help you set up an individual consultation with the SNC Funding Team to give you advice about specific funding opportunities or general fund development strategies. To take advantage of this resource, contact your Area Representative.

Listserv: You are receiving this e-mail because you joined the SNC Funding Opportunities listserv. If you no longer want to receive email notifications you can unsubscribe by sending a blank email to funding-leave@list.sierranevada.ca.gov.

SIERRA NEVADA CONSERVANCY FUNDING TEAM: CALENDAR OF UPCOMING GRANTS OCTOBER/NOVEMBER 2015

Deadline	Deadline accuracy	Grant Name	Funder	Purpose	Maximum grant	Match?	Eligible Applicants	Link
10/01/2015	Estimated	Habitat Conservation Fund	CA Department of Parks and Recreation	Eligible projects: nature interpretation programs to bring urban residents into park and wildlife areas, protection of various plant and animal species, and acquisition and development of wildlife corridors and trails.	$2,000,000	50% match required	Cities, Counties and Districts	http://www.parks.ca.gov/?page_id=21361
10/30/2015		Every Day Capacity Building Grant	National Environmental Education Foundation	Program provides 'Friends of...' Groups with grant funds of up to $5,000 to help build their capacity to serve public lands.	$5,000	no	'Friends of...' groups focused on public lands	http://publiclandseveryday.org/grants/capacity-building-grants
10/30/2015	Accurate	Tribal Wildlife Grant Program	Fish and Wildlife Service	Development and implementation of programs for the benefit of wildlife and their habitat, species of Tribal cultural or traditional importance, including species that are not hunted or fished.	$200,000	Not required but projects with match may score higher	Federally recognized tribes	http://www.fws.gov/naiveamerican/grants.html
10/30/2015	Accurate	Wood Innovations Grant	US Forest Service	Increase or stimulate markets for wood energy and wood products by providing pre-development funding, market evaluations, new financing mechanisms, and otherwise overcoming barriers to new market development or market expansion.	$250,000 with some flexibility if impact is significant.	35%	for-profit entities, state, local and tribal governments, nonprofits, special districts	http://www.na.fs.fed.us/werc/wip/2015-rfp.shtm
11/01/2015	Accurate	The Conservation Alliance Grants	The Conservation Alliance	The purpose of this program is to engage businesses to fund and partner with nonprofit organizations to protect wild places and waterways for their habitat and recreational value. Supported projects will meet the following criteria: Seek to secure permanent and quantifiable protection of a specific wild land or waterway; Engage grassroots citizen action in support of the conservation effort; Have a clear recreational benefit; Have a good chance of final success within four years; Landscape-scale projects that have a clear benefit for habitat will be given priority. Prospective applicants are required to obtain a nomination from a funding agency member company prior to submitting a proposal. A list of member companies can be found online at *www.conservationalliance.com/members/* .	Not stated. Most grants are $25,000 - $35,000	not required	nonprofit organizations	http://www.conservationalliance.com/grants/?yearly=2015
11/05/2015	Accurate	North America Wetlands Conservation Act (NAWCA) Standard or Small Grants Program	US Fish and Wildlife Service	Long-term protection, restoration, and/or enhancement of wetlands and associated uplands habitats for the benefit of all wetlands-associated migratory birds.	Standard grants - over $75,000, Small Grants under $75,000	1:1	Contact area coordinator for more information	http://www.fws.gov/birdhabitat/Grants/NAWCA/Standard/US/index.shtm
11/1/2016	Estimated	Electric Program Investment Charge (EPIC) Demonstrating Bioenergy Solutions That Support California's Industries, the Environment, and the Grid	CA Energy Commission	The Electric Program Investment Charge (EPIC) Program supports investments in clean energy technologies that provide benefits to the electricity ratepayers of PG&E, SDG&E, and SCE.. The EPIC program funds research, demonstration and deployment projects. NOTE -This information is out-of-date; the CEC comes out with new EPIC grant programs every year. Check the website for new program specifics.	$5 million	20%	All public and private entities and individuals.	http://www.energy.ca.gov/contracts/epic.html
11/10/2015	Accurate	Max and Victoria Dreyfus Foundation	Max and Victoria Dreyfus Foundation	To provide project-specific and/or general operating support to community-based organizations throughout the United States for which a small amount of funding would make a big difference. Support may be provided for Museums; Cultural and performing arts programs; Programs for youth, seniors, and the handicapped; Environmental and wildlife protection activities; Other programs of community-based organizations	$20,000	No	Nonprofit organizations and schools	http://www.mvdreyfusfoundation.org/#!application-guidelines
11/20/2015	Estimated	Fire Prevention Fund grants	CAL FIRE	Reduce wildfire threat to habitable structures in State Responsibility Areas (SRA). Funding is for fire prevention projects related to fuel (vegetation) hazard reduction, fire prevention education, and fire prevention training.	$500,000	Match is a selection criteria but no specific percentage required	local government, fire districts, other districts, certified local conservation corps, Fire Safe Councils, nonprofit organizations	hhttp://calfire.ca.gov/fire_prevention/fire_prevention_fund_grants.php
11/21/2015	Estimated	Greenhouse Gas Reduction Forestry Projects	CAL FIRE	For forestry projects which reduce or avoid GHG emissions. Several programs are available including urban forestry, fuels reduction, reforestation, conservation easements, forest pest control, forest practices, and demonstration state forest research.	no maximum	depends on program	depends on program	http://calfire.ca.gov/resource_mgt/GGRF.php
12/01/2015	Accurate	Museums for America	Institute for Museums and Library Services	Funding to enhance learning experience, community anchors, and collections	$5,000 - 150,000	not for under $25,000, otherwise 1:1	A museum existing on a permanent basis that owns or uses tangible objects exhibited to the public on a regular basis A public or private nonprofit agency responsible for the operation of a museum	https://www.imls.gov/grants/available/museums-america
12/02/2015	Accurate	Sustainable Agriculture Research and Education (SARE): Research and Education Grants	US Department of Agriculture, National Institute of Food and Agriculture (NIFA) Western Sustainable Agriculture Research and Education (SARE)	Conducting research and education on sustainable agriculture topics	$20,00 - $50,000 depends on subprogram	no match required	Agricultural producers, consultants, coop extension, etc.	http://www.westernsare.org/
12/16/2015	Estimated	Community Capacity and Land Stewardship	National Forest Foundation	The purpose of this grant program is to provide the tools and support necessary to achieve watershed and landscape scale restoration while also furthering goals that contribute to the economic sustainability of communities. Through this grant program the National Forest Foundation will administer funds to help collaboratives and community-based organizations address their capacity building needs that further their on-the-ground watershed restoration goals.	$24,000	No, but leverage encouraged	nonprofit organizations	https://www.nationalforests.org/grant-programs/ccls
12/19/2015	Estimated	Wetlands Restoration for Greenhouse Gas Reduction Program	CA Department of Fish and Wildlife	To support projects that reduce GHGs and provide co-benefits such as enhancing fish and wildlife habitat, protecting and improving water quality and quantity, and helping California adapt to climate change. The 14-15 Solicitation was focused on GHG emission reduction through restoration or enhancement of Delta and coastal wetlands and mountain meadow habitat.	not set	Not required but adds to point score	Public agencies, Recognized Tribes, and qualified nonprofit organizations	https://www.wildlife.ca.gov/Conservation/Wetlands-Restoration

12/19/2015	Estimated	EPA Brownfields Assessment and Cleanup Grants	Environmental Protection Agency	These brownfields grants may be used to address sites contaminated by petroleum and hazardous substances, pollutants, or contaminants (including hazardous substances co-mingled with petroleum).	$200,000	20%	State, local governments, tribes, nonprofit organizations	http://www.epa.gov/brownfields/applicat.htm
02/012016	Estimated	Sustainable Agricultural Lands Conservation Program	CA Strategic Growth Council	Making strategic investments to protect agricultural lands; Protecting critical agricultural lands from conversion to urban or rural residential development, promoting smart growth within existing jurisdictions, ensuring open space remains available, and supporting a healthy agricultural economy and resulting food security. Program includes three components for sustainable ag land planning, conservation easements, and land management practices.	depends on component	depends on component	depends on component	http://www.sgc.ca.gov/s_salcprogram.php
02/03/2016	Accurate	Land and Water Conservation Fund	CA Department of Parks and Recreation	Acquisition or development of outdoor recreation areas and facilities. Priority development projects include trails, campgrounds, picnic areas, natural areas and cultural areas for recreational use.	$2 million	1:1 Match required	Cities, counties and districts authorized to acquire, develop, operate and maintain park and recreation areas	http://www.parks.ca.gov/?Page_id=21360
02/03/2015	Accurate	CalRecycle Farm and Ranch Cleanup Grants	CalRecycle	Clean up illegal dumping on farm and ranch properties	$200,000 with $50,000 max per project	none	cities, counties, resource conservation districts and federally recognized Native American tribes	http://www.calrecycle.ca.gov/LEA/GrantsLoans/FarmRanch/FY201415/NOFA.htm
02/06/2016	Estimated	The Disney Worldwide Conservation Fund	Walt Disney Company	Recognizing that ecosystems are the basis of the planet's health, the Disney Worldwide Conservation Fund provides financial support for the study of wildlife, the protection of habitats and community conservation and education. The goal is to support conservation organizations focused on long-term positive impacts for wildlife and habitats.	$25,000	unknown	Nonprofit organizations	http://thewaltdisneycompany.com/content/conservation-funding
02/07/2016	Estimated	Urban Streams Restoration Grant	CA Department of Water Resources	Projects must involve on-the-ground restoration work and focus on ecological viability, flood management, and promotion of local stewardship. They are also rated on how much community support and collaboration is present.	$1,000,000	No specific match but must be some local contribution	All proposals must have two applicants, a sponsor and co-sponsor, one applicant must be a local public agency and the other a citizens' group or nonprofit organization.	http://www.water.ca.gov/urbanstreams/
02/19/2016	Estimated	State Fire Assistance Funds (USFS)	CA Fire Safe Council	Funds are available for all fire management activities including training, planning, hazardous fuel treatments, and fire prevention education programs. This program emphasizes fire risk reduction activities by landowners and residents in at-risk communities to restore and maintain resilient landscapes and create fire-adapted communities.	$100,000 (avg)	50% match required	Fire Safe Councils and other local organizations	http://grants.firesafecouncil.org/
02/24/2016	Estimated	Conservation Innovation Grant	Natural Resources Conservation Service	Fund on-the-ground conservation demonstration projects using innovative (neither widely used nor experimental) technology and approaches to address pressing natural resource concerns.	$1,000,000 for national competition, $75,000 for state competition	50% match required, can be cash or in-kind	State and local governments, federally recognized tribes, NGOs and individuals	http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/cig/
03/01/2016	Estimated	Community Economic Development grants	HHS Office of Community Services	Projects designed to address the economic needs of low-income individuals and families through the creation of employment and business opportunities.	$800,000	Not required	Community Development Corporations	http://www.acf.hhs.gov/grants/open/foa/index.cfm?switch=foa&fon=HHS-2014-ACF-OCS-EE-0817
03/04/2016	Estimated	Sustainable Employment and Economic Development Strategies (SEEDS)	Administration for Native Americans	One of ANA's primary goals is to promote economic self-sufficiency for American Indians. In pursuit of this goal, four priorities that ANA will promote through the SEEDS initiative are: 1) creation of sustainable employment opportunities; 2) professional training and skill development that increases participants' employability and earning potential; 3) creation and development of small businesses and entrepreneurial activities, and; 4) a demonstrated strategy and commitment to keeping the jobs and revenues generated by project activities within the native communities being served.	$500,000	20% of total project, may include some in-kind but cash preferred	Federally recognized Indian tribes; Incorporated non-federally recognized tribes; Incorporated state-recognized Indian tribes; etc.	http://www.acf.hhs.gov/grants/open/foa/view/HHS-2014-ACF-ANA-NE-0779
03/05/2016	Estimated	Off Highway Vehicle Grant	CA Department of Parks and Recreation	O&M, development, planning, restoration, law enforcement, etc.	Varies with category of funding	25% match	depends on grant category	http://ohv.parks.ca.gov/?page_id=1164
03/06/2016	Estimated	Environmental Education Local Grants Program	Environmental Protection Agency	To support locally-focused environmental education projects that increase public awareness and knowledge about environmental issues and provide the skills that participants in its funded projects need to make informed environmental decisions and take responsible actions toward the environment. Note that each recipient (i.e., the "prime" recipient) of a grant under this solicitation will be required to award exactly 25% (no more and no less) of the funds received from EPA to eligible sub-recipients in the form of sub-grants of $5,000 or less.	$91,000	25% non-federal match required	Any local education agency, college or university, state education or environmental agency, nonprofit organization 501(C)(3), or a noncommercial educational	
04/10/2016	Estimated	Wildlife Conservation Society North America Program: Climate Adaptation Fund	Wildlife Conservation Society	The Wildlife Conservation Society (WCS) North America Program is dedicated to saving wildlife and wild places in North America. The WCS Climate Adaptation Fund, with funding from the Doris Duke Charitable Foundation, supports projects that demonstrate effective interventions for wildlife adaptation to climate change. Grants of $50,000 to $250,000 are provided to nonprofit conservation organizations for applied, on-the-ground projects focused on implementing priority conservation actions for climate adaptation at a landscape scale. The Fund prioritizes projects that manage dynamic ecological processes, landscape functionality, and species assemblages, rather than those aimed at maintaining historic conditions or individual species. Grants are provided to U.S.-based nonprofit conservation organizations for projects within the 50 states and six U.S. territories. Pre-proposal application forms are due April 10, 2015. Visit the WCS website to download the Request for Proposals.	$250,000	1:1 match required, slight possibility of waiver	Nonprofit conservation organizations	http://www.wcsnorthamerica.org/ClimateAdaptationFund/tabid/4813/Default.aspx
04/30/2016	Estimated	Patagonia Foundation	Patagonia Foundation	Grants help local groups working to protect local habitat, and take on individual battles to protect a specific stand of forest, stretch of river or indigenous wild species which are effective in raising more complicated issues – particularly those of biodiversity and ecosystem protection – in the public mind.	$12,000	unknown	nonprofit organizations	http://www.patagonia.com/us/patagonia.go?assetid=2942
04/30/2016	Estimated	Every Day Capacity Building Grant	National Environmental Education Program	Provides grant of up to $5,000 for 'friends of....' groups to build their capacity to serve public lands.	$5,000	none	'Friends of' organizations	http://publiclandseveryday.org/grants/capacity-building-grants

06/01 and 11/01 for pre-proposals	Estimated	Sierra Nevada Meadow Restoration	National Fish and Wildlife Foundation	Implement Sierra Meadow Restoration Business Plan. Quantifying ecosystem service benefits; Building organizational capacity where restoration planning and implementation is limited; Repairing meadow degradation; Ensuring long-term protection: supporting land protection and deploying best management practices; Garnering support of ranching community; and Monitoring and documenting ecological and biological responses to meadow restoration	Not stated.	1:1 match is preferred.	Not stated	http://www.nfwf.org/sierranevada/Pages/home.aspx#.VNJAoi4Wct1
06/01/2016 for pre-proposals	Estimated	Bring Back the Natives/More Fish	National Fish and Wildlife Foundation	Protect and maintain intact and healthy aquatic systems; Reverse declines in the quality and quantity of aquatic habitats to improve overall health of native fish and other aquatic organisms. Sierra Nevada priorities focus on McCloud River redband trout, Eagle Lake rainbow trout, California golden trout, and Little Kern golden trout recovery.	$25,000 to $100,000 although grants greater than $100,000 can be considered.	1:1 non-federal match required, 2:1 preferred.	Local, state, federal, and tribal governments and agencies (e.g., counties, townships, cities, boroughs), special districts (e.g., conservation districts, planning districts, utility districts), non-profit 501(c) organizations, schools and universities.	http://www.nfwf.org/bbn/Pages/home.aspx#.VNI7Jy4Wct0
06/21/2016	Estimated	Rural Business Enterprise Grant	US Department of Agriculture	Technical assistance (including feasibility studies), training programs, small business lending programs, rural distance learning networks. Focus on projects that finance and facilitate development of small and emerging private rural businesses. NOTE THAT NOFAs ARE NOT DISTRIBUTED FOR THIS PROGRAM, YOU MUST ASK YOUR LOCAL USDA RURAL DEV. REP.	No maximum, but smaller grants preferred	Not required but adds points	Public bodies and private nonprofit corporations, serving rural areas	http://www.rurdev.usda.gov/bcp_rbeg.html
06/24/2016	Estimated	Matching Awards Program	National Forest Foundation	Outdoor experiences: projects that improve the quality, condition, and care of outdoor experiences by: Improving or maintaining recreation resource connectivity, including and similar to trail maintenance, bridge and crossing construction or repair, and installation of train drainage structures Engaging youth (15-25) volunteers, or diverse, underserved, or underengaged populations in hands-on stewardship activities Employing youth (15-25) and/or veteran crews to implement on-the-ground conservation, stewardship, and/or restoration work Forest health: results-oriented, on-the-ground, citizen-involved projects that maintain and/or restore forest resiliency Promoting forest structural complexity, function, and diversity over time Promoting forest health through the removal or control of non-native invasive species, and/or reintroduction of native plants and trees	$100,000	1:1 match required	Non-federal partners, community-based organizations, Native American tribes and 501(c)(3) nonprofit organizations	http://www.nationalforests.org/conserve/grantprograms/onthegroundmap/application#
08/01/2015	Estimated	NPS Rivers and Trails Conservation Grant - TA and Facilitation Assistance	National Park Service	Develops and/or improves connections to parks, rivers, trails, and greenways; Advances the protection and stewardship of open spaces through partnerships; Expands public access to water resources and the development of water trails.	TA only	Not required, community and stakeholders must agree to participate	State or local agencies, tribes, nonprofit organizations, or citizen groups.	http://www.nps.gov/orgs/rtca/apply.htm
09/30/2016	Estimated	CA Stream Flow Enhancement Program	Wildlife Conservation Board	Projects that result in enhanced stream flows in those streams that provide support for anadromous fish; support for special status, threatened, endangered or at risk species; provide wildlife corridors; provide resilience to climate change. The goals of the program are: 1) Support projects that lead to meaningful increases in the availability and quality of water in streams, particularly by protecting and restoring functional ecological flows for streams and wetlands identified as priority for fish and wildlife. 2) Support those projects by working to remove key barriers to securing enhanced flows for nature. 3) Support projects that allocate resources for infrastructure (e.g., gauges) for evaluating streamflow conditions in California's streams that help us better understand how streamflow conditions respond to efforts to improve flows.	not stated	not required, but leveraging funding increases competitiveness	Public agencies, nonprofit organizations, public utilities, federally recognized Indian tribes, state Indian tribes listed on the Native American Heritage Commission's California Tribal Consultation List, and mutual water companies.	https://www.wildlife.ca.gov/Grants
ongoing	Accurate	NRCS EQIP programs	US Department of Agriculture	The Natural Resources Conservation Service has a variety of programs funding wetlands and riparian projects. These programs, and the funding authorized for them through the Farm Bill, change periodically. Usually they are cost-share programs focused on privately owned land, though sometimes they can be applied to the watershed in general, particularly in emergency watershed restoration circumstances.	This is cost share, depends on project	Yes, land-owner must provide remainder of project funds	Private landowners meeting EQIP criteria	http://www.nrcs.usda.gov/wps/portal/nrcs/main/ca/programs/financial/
ongoing	Accurate	Hind Foundation	Hind Foundation	Ecosystem conservation, Plant and wildlife protection. Focus on implementation projects.	$100,000	Preference for projects with most of the funding in place.	Nonprofit Organizations	http://www.hindfoundation.org/
ongoing	Accurate	Bella Vista Foundation	Bella Vista Foundation	Under the Ecosystem Restoration Grant program, the foundation focuses on protecting, restoring and revitalizing high priority watershed ecosystems in CA and OR. Priorities are promoting the sustainable management of forest and agricultural land, revitalizing streams, and restoring riparian areas, with the goal of enhancing and maintaining self-sustaining watershed ecosystems. Target watersheds in California include: The Mattole River watershed; the mid-Klamath/Scott/Shasta rivers; the McCloud tributary of the Sacramento River; and in the Sierra Nevada, the Truckee River watershed and Yuba/Bear/American rivers.	Around $100,000	No specific match is required but the foundation strongly prefers not to be the sole or primary source of funding.	nonprofit organizations	http://www.pfs-llc.net/foundations/bella-vista-foundation
ongoing	Accurate	Community Facilities Grants	US Department of Agriculture Rural Development	To construct, enlarge, or improve community facilities for health care, public safety, and community and public services. This can include the purchase of equipment required for a facility's operation (could include biomass heating systems).	None - loans and grants	no	to public entities such as municipalities, counties, and special-purpose districts, as well as non-profit corporations and tribal governments.	http://www.rurdev.usda.gov/HAD-CF_Grants.html
ongoing	Accurate	PVBLIC Foundation Media Grants	PVBLIC Foundation	The purpose of this program is to support nonprofit organizations and other business entities with advertisement and other media resources and services. The funding agency's goal is to increase awareness around important causes and empower organizations to create campaigns with a measurable impact.	provides services and consultations, not funding		Eligible applicants are nonprofit organizations and other entities that have a program focus of social impact.	http://pvblic.org/

ongoing	Accurate	Community Facilities Grant Program	US Department of Agriculture	The purpose of this program is to support the development of essential community facilities in rural areas and towns. Funding can be used to construct, enlarge, or improve community facilities, and for the purchase of equipment essential to a facility's operation. Examples include: Fire, rescue, and public safety; Health services; Community, social, or cultural services; Transportation facilities such as streets, roads, and bridges; Land acquisition and necessary site preparation for industrial park sites, including access ways and utility extensions to and throughout the site. Usually grants are provided in conjunction with USDA loans.	Unspecified - the lower of: Between 15 and 25% of the total project costs, 50% of the annual allocation to the applicant's state, or $50,000	Required matching contributions range from 25% to 85%	Public entities, nonprofit corporations, Tribal governments	http://www.rd.usda.gov/programs-services/community-facilities-direct-loan-grant-program
ongoing	Accurate	Waste Management, Inc.: Charitable Giving	Waste Management Charitable Foundation	The purpose of this program is to support causes that promote civic pride, economic development, and revitalization. The funding agency focuses support to specific projects or programs that enhance the scope of services offered by an organization. The funding agency is most committed to supporting projects in the following areas: Environment: Projects should support renewable resources to reduce dependence on fossil fuels, thereby conserving and maintaining wetlands, wildlife habitats, and green spaces. Environmental education: Projects should support environmental education targeted at middle and high school students, including environmental and science-related projects, science fairs, Earth Day projects, and others.	unspecified	There are no stated matching requirements for this program; however, preference is given to organizations that have a broad base of funders and volunteers.	Local governments, nonprofit organizations	https://www.wm.com/about/community/charitable-giving.jsp
On-going. Board meets quarterly. Contact Program Officer.	Accurate	Habitat Enhancement and Restoration Program	Wildlife Conservation Board	Riparian restoration, inland wetlands, and other habitat restoration and improvement projects. Acquisition, restoration, and enhancement.	Wide range of funding, no specific limits.	Some landowner contribution required.	Nonprofit organizations [501(c)(3)], local governmental agencies, State departments and federal agencies.	https://www.wcb.ca.gov/Programs
Quarterly	Estimated	EDA Economic Assistance Programs	Economic Development Administration	Grants made under these programs leverage regional assets to support the implementation of regional economic development strategies designed to create jobs, leverage private capital, encourage economic development, and strengthen America's ability to compete in the global marketplace. Grant deadlines are quarterly	No maximum	1:1 match required unless community is very disadvantaged	Cities, counties, nonprofits, districts	http://www.eda.gov/funding-opportunities/
rolling	Accurate	CDFW Habitat Enhancement and Restoration Program	CA Department of Fish and Wildlife	The purpose of this program is to support habitat enhancement and restoration projects that fall outside the Wildlife Conservation Board's other mandated programs. Intended to improve native habitat quality in California, restoration projects may involve native fisheries; fresh water habitats; and threatened and endangered species habitats. This program will also fund in-stream projects that remove fish passage barriers and obstructions. Recipients will be expected to carry out long-term maintenance of completed projects. Projects must receive a letter of recommendation from the California Department of Fish and Wildlife (CDFW). Projects may be located on CDFW lands, or other public or private lands.	not stated	priority will be given to applicants providing matching cash and/or in-kind contributions.	federal, state, and local governments; nonprofit organizations	https://www.wildlife.ca.gov/Grants
rolling	Accurate	MillionMile Greenway: Community Starter Grants	MillionMile Greenway	To assist young organizations in identifying, building, and conserving greenways and trail projects.	$1,500 plus PR and geospatial consulting services	$1,500 cash match	Local governments, nonprofit organizations, community groups	http://millionmilegreenway.org/
rolling	Accurate	California Riparian Habitat Conservation Program - FY 2016	Wildlife Conservation Board	The purpose of this program is to protect, restore, and enhance riparian habitat throughout California. Program goals include assessing the current amount and status of riparian habitats, identifying critical and endangered riparian areas, prioritizing protection needs, supporting riparian habitat conservation strategies, and providing a focal point for statewide riparian habitat conservation efforts.	not stated	Projects providing matching cash and/or in-kind contributions will be given priority	State, local, and federal agencies, nonprofit organizations	https://www.wildlife.ca.gov/Grants
rolling	Accurate	Conservation Fund: Land Conservation Loan Program	The Conservation Fund	The purpose of this program is to assist and empower conservation organizations to accelerate the pace of conservation in their operating regions. Awards will provide recipients with flexible financing and capacity to swiftly purchase high-priority lands that come up for sale. In the past, purchase lands have included historic battlefields, state parks, natural areas for wildlife, forests, farms, historic sites, trails, and open space areas. Ultimately, the goal of the program is to conserve America's legacy of land and water resources, and to strive to achieve balanced conservation solutions that emphasize the integration of economic and environmental goals.	loans, minimum $200,000, also do straight acquisition	not stated, but loans must be collateralized	nonprofit land conservation organizations	http://www.conservationfund.org/what-we-do/land-conservation-loans
rolling	Accurate	Forest Conservation Program	Wildlife Conservation Board	The purpose of this program is to promote the ecological integrity and economic stability of California's diverse native forests for all of their public benefits. This program supports the conservation, preservation, and restoration of productive managed forest lands, forest reserve areas, redwood forests, and other forest types, including the conservation of water resources and natural habitat for native fish, wildlife, and plants found on these lands.	not specified	not required, but leverage adds to scoring	Willing landowner, a local governmental entity, special district, resource conservation district, joint powers authority, nonprofit organization (501(c)(3), or state agency.	https://www.wcb.ca.gov/Programs/Forest

The Sierra Nevada Watershed Improvement Program

The Sierra Nevada Region provides more than 60% of California's developed water supply, but a four-year drought, a century of fire suppression, widespread tree mortality due to insect attacks and disease, and a changing climate have led to an increased risk of large, damaging wildfires.

The Sierra Nevada Watershed Improvement Program will:

- *Restore Sierra forests and watersheds to a healthier state*
- *Improve the quantity and quality of water throughout the year*
- *Reduce greenhouse gas emissions and stabilize carbon storage*
- *Improve local socio-economic conditions and public safety*
- *Improve habitat for wildlife, fish, and plant species*
- *Reduce the risk of large, damaging wildfires*
- *Preserve working landscapes*
- *Protect air quality*

Wildfires in the Sierra Nevada are getting bigger and more intense. Extreme drought and record-low snowpack are leaving forests and meadows stressed, compromising the Region's ability to filter and store water for use later in the year. Greenhouse gasses are being released at a higher rate than previously expected due to drought and insect-related tree mortality, and high-intensity fire events. California needs a well-coordinated, comprehensive program that increases the pace and scale of restoration in the Sierra Nevada to address the conditions that currently exist.

The Sierra Nevada Watershed Improvement Program (WIP) is a coordinated, integrated, collaborative program to restore the health of California's primary watershed through increased investment and needed policy changes. This effort is being organized and coordinated by the state's Sierra Nevada Conservancy (SNC) and the federal United States Forest Service (USFS), in close partnership with other federal, state and local agencies, and diverse stakeholders.

Photos courtesy of the U.S. Forest Service

The Sierra Nevada Watershed Improvement Program will be implemented by federal, state, and local partners working together to analyze restoration needs at the watershed level, with the goal of matching funding and addressing policy barriers in order to complete projects that restore the Region to a healthier state.

SIERRA NEVADA CONSERVANCY

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

Pacific Southwest Region

There is growing consensus that more must be done to increase the pace and scale of forest restoration in the Sierra Nevada, but a number of policy-related barriers need to be addressed in order to restore our forests and watersheds to a healthier state.

- Controlled burns, under appropriate conditions, help to thin overgrown forests and reduce the risk of large, damaging fires. However, air quality regulations often restrict the available days that forest managers can conduct such burns.
- Policies related to federal funding for fire suppression often result in funds that would otherwise be available for restoration being "swept" to pay for suppression.
- Completion of environmental assessment processes under federal and state regulations can take a year or more, and can be costly. Developing projects on a larger landscape scale may provide greater efficiency in complying with regulations.
- The lack of wood and biomass processing infrastructure in the Sierra Nevada is a significant impediment to forest restoration efforts. Recent state policy efforts such as the Bioenergy Action Plan and SB 1122 (2012) provide direction on increasing the use of forest biomass for energy production. However, a number of challenges still remain.

Opportunities to establish more reliable funding sources for restoration in the Sierra exist, but coordination among federal, state, and local agencies, and private partners is necessary.

- California voters approved the $7.5 billion water bond last year, with a significant amount of funding available for projects that restore California's primary watershed. State agencies are coordinating efforts to maximize the impacts of Proposition 1, including efforts in the Sierra Nevada.
- Sierra Nevada forests are huge carbon reservoirs for the state, but high intensity wildfires are turning those storage pools into emissions sources. Identifying opportunities to increase investment in the Sierra Nevada Region through the Greenhouse Gas Reduction Fund will be critical as California works to meet greenhouse gas emission reduction goals.

Sierra Nevada Watershed Improvement Program Online Endorsement Form

INSTRUCTIONS

Endorse the Sierra Nevada Watershed Improvement Program by filling out the form below. Supporters of the Sierra Nevada Watershed Improvement Program will be featured on the Supporters page.

If endorsing the Sierra Nevada Watershed Improvement Program requires approval by a board or leadership committee, download a Word version of the Statement of Endorsement here. Return to this page and fill out the form below, or email the completed statement to Autumn.Hutchings@sierranevada.ca.gov.

STATEMENT OF ENDORSEMENT

California is on the brink of losing significant benefits from one of its most important ecosystems, the Sierra Nevada Region. Without immediate action, our primary watersheds – providers of more than 60 percent of California's developed water supply and the primary source of fresh water that flows into the Sacramento-San Joaquin Delta – will be dramatically transformed forever.

The Sierra Nevada Watershed Improvement Program (WIP) is the solution. The Watershed Improvement Program will restore the health of California's primary watersheds through an integrated and collaborative program of increased investment and needed policy changes, and will facilitate the implementation of the on-the-ground, ecologically sound restoration required to return our watersheds to a state of resilience. This program is organized and coordinated by the Sierra Nevada Conservancy and the U. S. Forest Service, Pacific Southwest Region, in close partnership with state, federal, and local agencies and diverse stakeholders spanning the range of Sierra interests.

As stewards of the Sierra Nevada Region, we, the undersigned, endorse the Sierra Nevada Watershed Improvement Program. We are committed to working with other WIP partners in identifying the level of ecologically sound restoration activities needed to return Sierra Nevada watersheds to a state of resilience, and quantifying the cost of implementing these activities. We will work collaboratively and in good faith to overcome barriers to large scale landscape restoration; increase state, federal, and private investment in restoration activities; and secure support from those who benefit from the variety of resources that the Sierra Nevada provides to all of California.

Organization: ✱

Contact Person Name: ✱

Contact Person Email: ✱

Contact Person Phone: ✱

Mailing Address: ✱

Website: ✱

QUICK LINKS

- Board Meetings
- Staff Directory
- Grants and Funding Sources
- Our Region
- Our Offices

Website:

http://www.example.com

Description of Organization:

SNC and the U.S. Forest Service, Pacific Southwest Region, will continue to act as the primary coordinators of the Watershed Improvement Program, but, given the scope and scale of this program, we are heavily reliant on the active engagement and participation of our partners.

Please select your main interests as our partner in the WIP:

- [ ] Work with partners in the development of ecologically sound projects needed to restore the watersheds of the Sierra Nevada to a state of resilience.
- [ ] Work with partners to focus existing funding, and identify and secure new funding sources for projects needed to restore Sierra Nevada watersheds to a state of resilience.
- [ ] Work with partners in the collection, synthesis, or development of scientific research to help overcome policy barriers to large-scale restoration, increase investment in the Sierra Nevada, and implement ecologically sound projects to restore its watersheds to a state of resilience.
- [ ] Join a communications network that will positively impact barriers to large-scale watershed restoration and bring more resources into the Region to implement restoration projects.
- [ ] Work with partners to overcome policy barriers to large scale watershed restoration and bring more resources into the Region to implement ecologically sound restoration projects. (If you have interest in a specific barrier, please list it below.)

Please indicate which watershed assessment area's, if any, in which you have a particular interest:
A map of the watersheds assessment areas is available here (WIPWatershedAssesmentAreaMap.jpg)

- [ ] Sierra-wide
- [ ] Pit River Watershed
- [ ] Upper Sacramento River Watersheds
- [ ] Feather River Watershed
- [ ] Eastern Sierra Watersheds
- [ ] Yuba/Bear River Watersheds
- [ ] American River Watershed
- [ ] Mokelumne River Watershed
- [ ] Calaveras River Watershed
- [ ] Stanislaus River Watershed
- [ ] Tuolumne River Watershed
- [ ] Merced River Watershed
- [ ] San Joaquin River Watershed
- [ ] Kings/Kaweah/Tule/Kern River Watersheds
- [ ] Owens River Watershed

If you would like your organization or agency logo to appear on our Supporters page, please upload it here:

Organization/Agency logo

Choose File No file chosen

.jpg or .png only, 2MB file size or less

If your board or leadership acted to endorse the Sierra Nevada Watershed Improvement Program, please upload the signed document here.

Signed Endorsement Letter

Choose File No file chosen

.doc, docx, pdf

Submit

ITEM NO. 5

Upper Feather River
Integrated Regional Water Management

RWMG Meeting No. 7
October 23, 2015

To: Upper Feather River Regional Water Management Group

From: Uma Hinman, Uma Hinman Consulting

Subject: Climate Change Technical Study and Draft Chapter Presentation

Date: October 18, 2015

INTRODUCTION

Chris Read (PMC/Baker International) and Michael Prezler (ECORP Consulting) will be presenting the deliverables for the Climate Change Technical Study and Draft Climate Change Chapter. The documents address the climate change assessment and analysis required by the Proposition 84 Guidelines.

Background

The IRWM Planning Act, CWC §10541(e)(10), states that IRWM plans must include an evaluation of the adaptability to Climate Change of water management systems in the region. The Table below provides direction as to the steps IRWM groups should take to address Climate Change adaptation within existing plan standards.

Table 7 – Addressing Climate Change Within Existing IRWM Plan Standards	
Region Description	IRWM plans must contain language in their Region Description Section that describes likely Climate Change impacts on their region as determined from the vulnerability assessment.
Plan Objectives	*Adapting to Climate Change:* In developing plan objectives, IRWM regions must consider the following: • IRWM Plans should address adapting to changes in the amount, intensity, timing, quality and variability of runoff and recharge. • IRWM Plans need to consider the effects of SLR on water supply conditions and identify suitable adaptation measures. RWMGs should consider the guidance provided in the OPC's SLR Policy. *Reducing Emissions* • IRWM plans can also help mitigate Climate Change by reducing energy consumption, especially the energy embedded in water use, and ultimately reducing GHG emissions. • In evaluating different ways to meet IRWM plan objectives, where practical, RWMGs should consider the strategies adopted by CARB in its AB 32 Scoping Plan.

	• In addition to offsetting emissions, RWMGs also may consider options for carbon sequestration and using renewable energy where such options are integrally tied to supporting IRWM Plan objectives.
Resource Management Strategies	Identify and implement, using vulnerability assessments and tools such as those provided in the Climate Change Handbook, Adaptation Strategies that address region-specific climate change impacts. • An IRWM region must demonstrate how the effects of Climate Change on its region are factored into its resource management strategies. • IRWM Plans should address adapting to changes in the amount, intensity, timing, quality and variability of runoff and recharge. • IRWM Plans need to consider the effects of SLR on water supply conditions and identify suitable adaptation measures. • IRWM Plans also can help mitigate Climate Change by reducing energy consumption, especially the energy embedded in water use, and ultimately reducing GHG emissions. • IRWM regions should pursue increasing water use efficiency, practice integrated flood management, and seek to enhance and sustain ecosystems.
Project Review Process	The Project Review Process must include the following factors: • *Contribution of the project to adapting to Climate Change*: RWMGs must include potential effects of Climate Change on their region and consider if adaptations to the water management system are necessary. • *Contribution of the project in reducing GHG emissions as compared to project alternatives*: The RWMG needs to consider a project's ability to help the IRWM region reduce GHG emissions as new projects are implemented over the 20-year planning horizon. Considerations include energy efficiency and reduction of GHG emissions when choosing between project alternatives. *CEQA project-level analyses:* In preparing a project-level GHG emissions analysis, RWMGs and the project proponents should estimate GHG emissions from the project; establish significance criteria; identify those project components that may support carbon sequestration; and, if applicable, explain how the project may help in adapting to effects of Climate Change.
Relation to Local Water Planning	IRWM Plans must consider and incorporate water management issues and Climate Change adaptation and mitigation strategies from local plans into the IRWM Plan.
Relation to Local Land Use Planning	IRWM regions must demonstrate information sharing and collaboration with regional land use planning in order to manage multiple water demands throughout the state, as described in CWP Update 2009, adapt water management systems to Climate Change, and potentially offset Climate Change impacts to water supply in California.
Plan Performance and Monitoring	IRWM Plans should contain policies and procedures that promote adaptive management. As more effects of Climate Change manifest, new tools are developed, and new information becomes available, RWMGs must adjust their IRWM plans accordingly.

Coordination	• RWMGs should stay involved in CNRA's California Adaptation Strategy process to help shape the document through their participation. • Agencies that are part of an IRWM effort should consider joining The Climate Registry, http://www.theclimateregistry.org/.

Source: IRWM Proposition 84/1E Guidelines, 2012; pg 69-70.
http://featherriverorg.alias.strangecode.com/wp-content/uploads/2014/10/2012-IRWM-Guidelines.pdf

Much of the required information for climate change has been incorporated into a stand-alone chapter; however, additional climate change information will be added to the RMS and Project Review Process chapters.

Next Steps

The Draft Climate Change chapter is posted on the website and has been distributed to the workgroups and stakeholders for review. Comments are due November 13.

REQUEST

Informational.

Attachments: Draft Climate Change Chapter
Project Climate Change Assessment Memo

Chapter XX Climate Change

XX.1. Introduction

Chapter Overview

The act of planning requires an estimate of future conditions. Traditionally, resource managers have assumed that the past is a good indicator of the future, and have used historical measurements as best estimates for future conditions. Per Proposition 84 and California Department of Water Resources (DWR) requirements, this chapter considers an Upper Feather River (UFR) watershed that, as a result of climate change, may have substantially different climate conditions than historically witnessed in the planning area.

This chapter begins with a description of climate change regulations and requirements related to the integrated regional water management planning process, as well as an overview of the resources used to support chapter analysis and findings. The chapter then provides a brief explanation of how temperature and precipitation could change in the planning area, and how those changes could cause regional impacts. Based on these impacts, the chapter provides the findings of the climate change vulnerability assessment. The chapter concludes with a prioritized list of vulnerabilities in the planning area and a description of how climate change is integrated into the plan's resource management strategies and project selection process.

Regulatory Framework

The primary guidelines for the Upper Feather River Integrated Regional Water Management Plan (IRWMP) are in the DWR's *Integrated Regional Water Management Proposition 84 and 1E Guidelines* (DWR 2012). DWR's guidelines establish the general process, procedures, and criteria to implement the IRWMP Implementation Grant Program, funded by Proposition 84 (The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006) and the related Stormwater Flood Management Grant Program, funded by Proposition 1E (The Disaster Preparedness and Flood Protection Bond Act of 2006). The guidelines present 16 IRWMP Standards. Standard 16 (Climate Change) notes:

The IRWM Plan must address both adaptation to the effects of climate change and mitigation of GHG emissions. The IRWM Plan must include the following items:

- *A discussion of the potential effect of climate change on the IRWM region, including an evaluation of the IRWM region's vulnerabilities to the effects of climate change and potential adaptation responses to those vulnerabilities. The evaluation of vulnerabilities must, at a minimum, be equivalent to the vulnerability assessment contained in the Climate Change Handbook for Regional Water Planning (December, 2011)*
- *A process that considers GHG emissions when choosing between project alternatives.*
- *The IRWM Plan must include a list of prioritized vulnerabilities based on the vulnerability assessment and the IRWM's decision making process.*
- *The IRWM Plan must contain a plan, program, or methodology for further data gathering and analysis of the prioritized vulnerabilities.*

When assessing and evaluating climate change impacts and vulnerabilities, DWR's guidelines encourage IRWMP regions to bear in mind four documents in particular. These documents are briefly described below:

1. **Climate Change Handbook for Regional Water Planning** (DWR, USEPA, and USACE 2011). The Climate Change Handbook for Regional Water Planning (Handbook) assists IRWMP regions in incorporating climate change analysis and methodologies into their planning efforts. As noted above, Proposition 84 guidelines require that the climate change evaluation in this plan be equivalent to the vulnerability assessment contained in the Climate Change Handbook for Regional Water Planning. The climate change work completed for this chapter follows the suggested guidelines laid out in the Handbook.
2. **"Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water"** (DWR 2008). This white paper published by DWR urges a new approach to managing California's water and other natural resources in the face of climate change. The document emphasizes IRWM as the mechanism for fostering a collaborative regional approach to water management. The recommendations from the white paper are incorporated into Volume 1 Chapter 7 of California Water Plan.
3. **Safeguarding California** (CNRA 2014). The CNRA's *Safeguarding California* (2014) updated the California Climate Adaptation Strategy (2009) and discusses statewide and sector-specific vulnerability assessments, looking in particular at which climate factors will be driving impacts in each sector and how impacts interact across sectors. By identifying these inter-relationships, the document highlights opportunities to implement adaptation strategies across sectors. The report also provides comprehensive lists of adaptation by sector.
4. **Climate Change Scoping Plan** (CARB 2008, 2014). CARB's Climate Change Scoping Plan describes different statewide greenhouse gas (GHG) emissions sectors, including water management, and recommends specific strategies that may help reduce GHG emissions. The 2014 update provides strategies for important GHG emissions sectors in the UFR region, including agriculture, water, and natural and working lands.

Chapter Resources

This chapter is supported by numerous resources ranging from scholarly journals to local insights. The published resources used to support the analysis in this chapter are listed in [insert "sources" chapter cross reference]. It is important to note that the UFR watershed is incredibly diverse and has different climate and hydrological conditions throughout. The watershed is also remote and has limited data availability for some of the basins and subbasins. Due to its importance to state water and energy resources, the majority of available reliable data focuses on the North Fork of the Upper Feather River.

In addition to published resources, the planning team obtained local expertise through questionnaires administered via e-mail and in person to the Regional Water Management Group (RWMG); phone interviews with staff from the counties located in the planning area; a climate change workshop in Quincy, CA in August 2015; and a presentation of this chapter to the RWMG in October 2015. The written and human resources used to develop this chapter ensure the proper balance of rigorous research and on-the-ground local knowledge.

XX.2 Region Characterization

[Uma to provide region characterization; Michael Baker and ECORP to condense and reframe in terms of climate change, consistent with the *Upper Sacramento* example]

XX.3 Climate Change Trends

Introduction

Observed warming of the global climate system is unequivocal. Since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased; these observed global changes are expected to continue and accelerate into the foreseeable future (IPCC 2013). Scientists use models to project future climate conditions. Although models are imperfect and include assumptions and uncertainty, they provide the best available estimate of future conditions.

The local effects of global climate warming vary greatly depending on location. The state of California provides the Cal-Adapt data portal, a website that offers the best available local climate projections for a variety of variables under different climate change scenarios. The data used in the Cal-Adapt tools has been gathered from California's scientific community and represents the most current data available. The planning team used Cal-Adapt's Community Climate System Model 3.0 (CCSM3) to gather climate projections in the planning area for temperature and precipitation under a high and low emissions scenario.

The CCSM3 model is a coupled climate model for simulating the earth's climate system and is composed of one central coupler component and four separate models that simultaneously simulate the earth's atmosphere, ocean, land surface, and sea ice. The CCSM3 model is the default model when selecting data from Cal-Adapt.

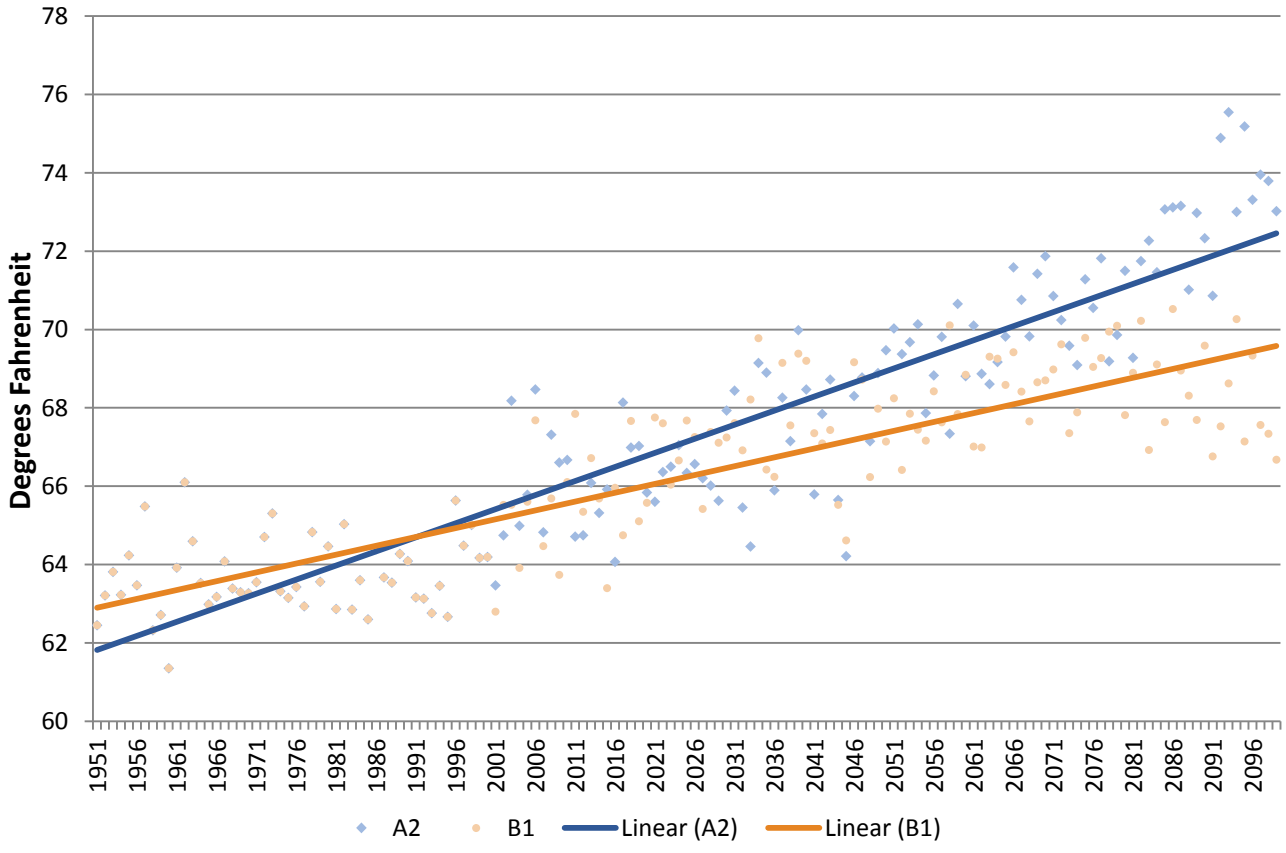
Among the primary drivers of climate projections are GHG emissions scenarios. The Intergovernmental Panel on Climate Change (IPCC) has developed a set of possible future GHG emissions based on different scenarios of global population growth, economic growth, and government regulations of GHGs. Cal-Adapt projections are available for two IPCC emissions scenarios, A2 or B1:

- A2 is the medium-high emissions scenario. The A2 emissions scenario assumes continuous population growth and uneven economic and technological growth. It also assumes that heat-trapping emissions increase through the 21st century and that atmospheric carbon dioxide (CO_2) concentration approximately triples, relative to preindustrial levels, by 2100.
- B1 is the lower emissions scenario. The B1 emissions scenario assumes a world with high economic growth and a global population that peaks by mid-century and then declines. Under this scenario, there is a rapid shift toward less fossil fuel-intensive industries and the introduction of clean and resource-efficient technologies. Heat-trapping emissions peak about mid-century and then decline; CO_2 concentration approximately doubles, relative to preindustrial levels, by 2100.

The planning team reviewed temperature and precipitation projections in the planning area through the 21st century. The figures below show the outputs for mean annual high temperature (Figure XX-1) and average annual precipitation per decade (Figure XX-2). For both emissions scenarios, temperature is expected to increase over the next century. Under the more extreme A2 scenario, the models show that temperatures would be expected to increase on average by approximately 5°F between 2000 and 2100. These averages smooth out temperature anomalies such as extreme heat and heat waves, which are also expected to increase as a result of climate change. Additionally, minimum temperatures are expected to increase through 2100, which could impact snowpack levels.

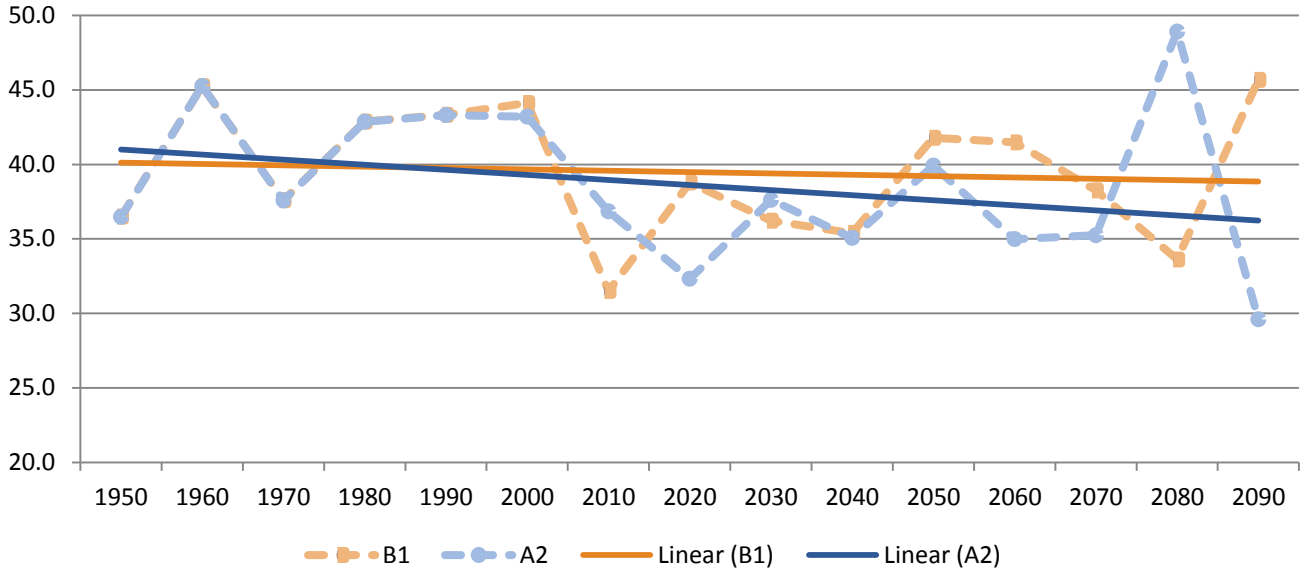
The trend is less clear with the model outputs for precipitation. The A2 scenario shows a slightly larger decrease in annual precipitation across the region; however, the decrease is not substantial under either scenario. What is shown is increasing variability in the amount of precipitation over time. The RWMG should continue to monitor precipitation projections as they become more refined and accurate. In the meantime, the planning area should expect the recent phenomenon of prolonged drought occasionally interspersed by intense downpour events to continue.

Figure XX-1. Mean Annual High Temperature (Fahrenheit)



Source: Cal-Adapt 2015

Figure XX-2. Annual Average Inches of Precipitation per Decade (A2 and B1)



Source: Cal-Adapt 2015

The changes in temperature and variability in precipitation are consistent with changes expected throughout the state. As a result of these changes, the state of California expects numerous climate change impacts to occur and worsen through the next century, including increased wildfires, decreased snowpack and snowmelt runoff, increasingly severe droughts, shifting habitat and threats to biodiversity, damage to forest health, and impacts on energy demand and energy production (CNRA 2014). The following discusses specific impacts that are expected to occur as a result of expected climate change including increased wildfire, decreased water supply, changes to water demand, poorer water quality, increased flooding, and changes to ecosystem habitat.

Wildfire

Rising temperatures and longer dry seasons, both of which are expected in the UFR watershed as a result of climate change, increase the risk of wildfire (DWR 2015). Rising temperatures and earlier snowmelt are shown to increase the frequency, size, and severity of wildfires, trends which align with wildfire activity in the Sierra Nevada since the early 1980s (USDA 2013a). According to the Cal-Adapt Wildfire: Fire Risk Map (2015). the UFR watershed may experience a one- to twofold increase in burned area by 2050 and a two- to threefold increase in burned area by 2085.

In addition to the increased risk of wildfires from higher temperatures and ongoing drought, increasing fuel supply exacerbates the issue. As carbon dioxide supply increases with ongoing emissions and winter snows are replaced by heavy rain, the growth of plants is expected to accelerate (USDA 2013a). Grasslands are positioned to flourish in this scenario, as they require less water and can rebound quickly from wildfires. The region's existing coniferous forests will be increasingly vulnerable due to slower growth, difficulty of migration, and increased dryness.

While severity of wildfire is typically inversely related to frequency, research in the Sierra Nevada region indicates that fuel growth described above (more fuel-rich and drier) will likely increase both the frequency and the severity of fires. This will reduce the ability of large trees, such as conifers, to continue to migrate upslope and rebound from past events, as grassland will be quicker to rebound and provide adequate fuel for the next fire (USDA 2013b).

These projected patterns for wildfires pose a serious threat to water quality in the UFR. Decreased forest and vegetation area as a result of catastrophic wildfire reduces the stability of soils, increasing erosion rates and runoff. If a heavy rain event occurs after a fire, soil, ash, and sediment flow into surface water resources in the UFR watershed, degrading water quality (Sierra Nevada Conservancy 2014). Climate projections estimate that when precipitation does occur, it will be in the form of heavy rains, increasing the volume of water to carry sediment over burned areas into streams and waterbodies (DWR 2015).

Water Supply

The most significant water supply concern in the UFR associated with climate change is the reduction in precipitation, winter snowpack accumulation, and aquifer outflow from springs. Precipitation, occurring as both rain and snow, supply water for the residents of the region as well as runoff to Lake Oroville, a key feature of the State Water Project.

Climate change can directly affect the volume, timing, and type of precipitation (rain or snow) which affects the hydrologic cycle in the UFR basin and impacts the availability of water for beneficial use. The climate within the watershed is Mediterranean, with most of the annual precipitation occurring during the winter (November through March). Because the basin includes large areas that are near the average snowline, rainfall and rain-snow mixtures are common during winter storms. Consequently, the overall timing and rates of runoff from the basin are highly sensitive to winter temperature fluctuations (USGS 2005). This increases the potential for climate change effects associated with a reduced low elevation snowpack and a decrease in the annual watershed runoff.

As described in the vulnerability assessment, below, the interactions between climate, weather, and geology related to water resources in the UFR watershed are complex. A historical declining trend of unimpaired runoff was found for the North, Middle, and South Forks of the Feather River. Potential climate change impacts appear to be pronounced on the North Fork where permeable volcanic bedrock composition tends to contribute larger fractions of groundwater flow to streams than other parts of the Feather River basin.

Runoff from the North Fork is affected by annual reductions in rainfall and snowpack accumulation and melt, and the prolonged dry period which has significantly reduced flow from springs that provide baseline flows. The UFR watershed is experiencing some of the largest impacts in California from the decline of low elevation snowfall and early snowmelt (Freeman 2010). These observed impacts are expected to be exacerbated by future climate change. Models predict that by the end of the century, the Sierra snowpack may experience a 48–65 percent loss from the 1961–1990 average (DWR 2015). Less snow predicted in the UFR watershed due to climate change coinciding with natural dry cycles (as

evidenced from recent volcanic aquifer decline) will cause the resultant runoff impact to be more significant than otherwise anticipated (Freeman 2015).

Increased evapotranspiration in the UFR watershed is likely taking place in the mixed conifer forests due to rising air temperatures. Increased forest growth and higher temperatures are the two key factors contributing to the increased evapotranspiration that has taken place in recent years. Forest management adaptations to precipitation variability, higher temperatures, and more extreme weather events are paramount to how the UFR, surrounding regions, and much of Northern California adapts to climate change with respect to water supply and ecological needs. Because the UFR is the source water area for Lake Oroville, which provides water supply to the State Water Project, understanding how specific management strategies affect the forests' responses to climate change will continue to grow in importance.

Water Demand

As water supply becomes increasingly tenuous, even steady levels of demand can put stress on the watershed. As surface water resources are diminished by decreased snowmelt, water users who previously depended on water from streams may turn to groundwater resources, extracting water at a faster rate than can be recharged. While groundwater makes up only a small amount of the watershed's overall water supply, it is an important source for rural single-family homes as well as public and private water supply systems. In rural areas, many homes are not connected to a municipal water system and are entirely dependent upon private wells for domestic use. As both groundwater and surface water resources diminish during drought period, these wells can be impacted by sedimentation or decreases in aquifer levels. Sierra Valley, the largest groundwater aquifer in the watershed, has suffered from overuse in recent decades (DWR 2013). The population of the Sacramento River Basin, which includes the UFR watershed, is expected to double in the next 50 years, placing more demand from urban uses on the diminishing water supply (Sacramento River Watershed Program 2010).

Water Quality

Water quality in the UFR is generally considered to be good. The primary threats to water quality in the UFR are from impacts related to common land and water use practices in this watershed, (e.g., ranching, mining, timber harvest, road construction/maintenance, and rural residential development) (Sacramento River Watershed Program 2015). While it is unclear how average precipitation will specifically change with climate change, it is generally agreed that storm severity will probably increase.

More intense, severe storms may lead to increased erosion, thus increasing turbidity in surface waters. Warming temperatures will result in lower dissolved oxygen levels in waterbodies, which are exacerbated by potential algal blooms and in turn enhanced eutrophication. Climate-induced increases in storm intensity may alter pollutant concentrations in waterbodies and produce increased turbidity. This could, in turn, decrease water quality. Stakeholders noted that issues related to eutrophication, such as low dissolved oxygen or algal blooms, are limited to reservoirs and that reservoir water temperature is relatively elevated under existing conditions, increasing potential risk from climate change.

The increased risk of catastrophic wildfire associated with higher temperatures, and prolonged periods of drought, followed by significant storm events, can result in runoff and sedimentation that pose a significant threat to water quality in the UFR.

Flooding

Flooding poses numerous risks to critical facilities and infrastructure including roads or railroads blocked or damaged during flood events, bridges washed out or blocked, backed-up drainage systems, drinking water contamination, sewer systems backed up, and damage to underground utilities (County of Plumas 2013). In the UFR, flooding is of greatest concern during rain-on-snow events that increase the probability of high runoff. Increasing temperatures and reduced and earlier snowmelt are shown to increase the frequency of wildfires. Avalanche chutes, debris chutes, and alluvial fans can be extremely active in flood events that occur after wildfires, which can degrade the quality of the habitat and threaten aquatic species. Unmitigated forest growth without the intervention of a fuels reduction program may increase the risk of catastrophic fire and associated flooding impacts.

Ecosystem Habitat

Impacts of climate change such as rising temperatures and changing precipitation patterns can have a lasting impact on the unique habitats and native species found in the UFR watershed (DWR 2015). In the mountainous parts of the watershed, temperature increases have led to thermal stress for species acclimated to a cooler climate. Forced upslope migrations and upward latitude changes have been observed in recent years, a trend that is expected to continue with increased climate-change related warming (USDA 2013a). These forced migrations can cause thermal or other stress on native species, increasing the vulnerability of the watershed's habitats. Species that are found only in the UFR watershed are especially vulnerable to temperature increases or changes in water availability, as upward migration may not be physically possible in the time needed.

These changes can also have a dramatic effect on the balance of species in the watershed. As some native species struggle to adapt or move as a result of warming temperatures, "habitat generalists" including invasive plants, insects, and pathogens may find it easier to survive and further reduce habitat availability for natives. Heat-tolerant species will be especially positioned to take habitat from native species (Hoshovsky 2013). Warming and snowmelt earlier in the year may not only impact the habitats of species native to the watershed, but could also mismatch timing or distribution among species. For example, disruptions to normal hatching patterns may shift so that insect-eating species may be present before or after the hatching of their insect prey. This unbalanced distribution of species presence and patterns can further endanger species that depend on annual cycles for food, and allow the uncheck growth of another population (Hoshovsky 2013).

The increasing risk of wildfire, as discussed above, also has the potential to disrupt habitats. As frequency and intensity of fires increases, habitats and plant and animal populations will have less time to recover, increasing vulnerability (Hoshovsky 2013). Shifting precipitation patterns toward more winter rain is expected to increase grass biomass in the watershed, which serves an increased fuel for fires. After wildfires are extinguished, grasslands will be far faster to recover than trees, furthering a burn and regrowth cycle that reduces habitat availability for tree species. This can decrease both the number of old-growth forest trees and threaten old-growth dependent flora and fauna (USDA 2013b).

XX.4 Regional Climate Change Vulnerabilities

Assets in the UFR watershed have varying capacity to respond to different climate change impacts. This section examines major climate change vulnerabilities related to water resources in the UFR watershed. This section presents the *Climate Change Handbook for Regional Water Planning* Vulnerability Assessment Checklist, per Proposition 84 guidelines. The checklist is presented by categories and provides key questions to assess vulnerability in each category. The responses to each question include cross-references to resource management strategies that could be employed to enhance regional adaptation to climate change impacts. As noted earlier in this chapter, the answers to each question below were derived using published resources, via questionnaires filled out by members of the RWMG and each of the working groups, and in a three-hour in-person working session with RWMG and working group members. The section concludes with a summary and prioritization of climate change vulnerabilities.

Water Demand

1) Are there major industries that require cooling/process water in your planning region?

☒Yes ☐ No ☐ Perhaps/Uncertain

Agriculture, logging, energy production, and tourism are the main economic activities in the planning region. Some of these activities in the UFR region require cooling water. Collins Pine Company operates a wood products manufacturing and co-generation electricity generating facility in Chester. Sierra Pacific Industries, in Quincy, also uses a cooling tower for a co-generation plant. These facilities are critical for handling biomass during wildfire prevention and response activities. Additionally, some timber mills in the region require cooling water for log decks to avoid wood drying and staining.

2) Does water use vary by more than 50% seasonally in parts of your region?

☒ Yes ☐ No ☐ Perhaps/Uncertain

The largest change in variability as a result of climate change is a longer forest growing season and higher rates of evapotranspiration. Crop irrigation for small fruit and nut operations, which has high seasonal variability, is also a substantial source of water demand in the UFR region, with some suggesting it exceeds 50 percent of total anthropogenic water use. Additionally, the regional population grows significantly in the summer, with an influx of seasonal residents and tourists. These factors create seasonal water use patterns that depend on increased availability in the summer months. Drought, earlier snowmelt, and decreased flows are expected to continue and worsen in the future, making this high demand period increasingly vulnerable to water shortages.

3) Are crops grown in your region climate-sensitive? Would shifts in daily heat patterns, such as how long heat lingers before night-time cooling, be prohibitive for some crops?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Timber production is an important regional commodity. While the UFR watershed's coniferous forests are more resilient to temperature fluctuations than many crops, decreases in precipitation may weaken the productive capacity of this sector. Climate impacts would be prohibitive for a small number of other crops in the region. A majority of the field crops in the region are hay (alfalfa, meadow, and grain) and pasture (irrigated, nonirrigated, and range). In 2011, these crops were valued at $9,591,000 in Plumas County and $3,200,363 in Sierra County. Miscellaneous crops (nursery, apiary, seed, fruit, potatoes, and grains) accounted for $250,000 of agricultural output in Plumas County and $35,000 in Sierra County (County of Plumas 2011). While these crop types represent a very small portion of the region's economy and land use, fruit and nut crops are some of the most sensitive to climate change impacts, specifically changes in precipitation and temperature (CDFA 2013). Warming has been greatest in the Sierra Nevada foothill and mountain region, where the UFR watershed is located, increasing the vulnerability of temperature impacts to agricultural operations (CDFA 2013).

4) Do groundwater supplies in your region lack resiliency after drought events?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Much of the region's drinking water comes from groundwater supplies. Drought conditions prevent aquifers from recharging, a problem that is exacerbated when groundwater withdrawal exceeds infiltration. In the Upper North Fork Feather River, aquifer outflow has decreased 36%, a possible result of an earlier spring snowmelt period (Freeman 2012). In sustained drought conditions, any existing use of surface waters may decrease, shifting even more consumption to groundwater basins. This increases vulnerability to subsidence, groundwater depletion, and decreased water supply for essential activities. The Sierra Valley Aquifer, the largest in the UFR watershed, has demonstrated a downward trend in water levels from 2005. All wells monitored by the Sierra Valley Groundwater Management District (SVGMD) had lower water levels in 2015 then they did in 2005, with some water levels nearly 20 feet deeper (SVGMD 2015). Previously, increases in groundwater pumping for irrigation and extreme drought conditions in the late 1970s led to a steady decline in Sierra Valley Aquifer water levels. Levels were slowly restored, reaching earlier 1970 levels by the late 1990s (DWR 2004). This indicates a slow recharge pattern that may require additional support to build resiliency in the face of continued growth of water demands and drought conditions.

The region is geographically and hydrologically diverse. Because of this, drought events impact the regions of the watershed differently. For example, a 2006 study for the Lake Front at Walker Ranch development, located on the west shore of the Lake Almanor Peninsula on the northeast side of the lake, determined that the Lake Almanor Groundwater Basin and the Mountain Meadows Valley Groundwater Basin were not in risk of overdraft. These basins are identified to have high capacity for

recharge, increasing their resiliency to drought (Kleinfelder 2007). Groundwater monitoring data to sufficiently measure drought resiliency is not available for all basins and subbasins.

5) Are water use curtailment measures effective in your region?

☐ Yes ☐ No ☒ Perhaps/Uncertain

Plumas County proclaimed a local drought emergency on August 19, 2014 (County of Plumas 2014). These exemptions provide necessary relief to water users who depend on dwindling resources, but continued reliance may increase vulnerability. A sustained drought may increase hardships on the over 1,000 riparian and appropriative water rights holders in the region (Ecosystem Sciences 2005). The State Water Resources Control Board (SWRCB) has extended mandatory curtailments on all water rights, including senior water rights holders. These curtailments vary in severity across the watershed but have especially impacted post-1914 water rights holders in the region. As of June 2015, the region had reduced metered residential water use by 22%, achieving SWRCB targets. In this regard, curtailment measures have effectively met state requirements. However, these curtailments have been challenging for communities in the UFR region. Although curtailment measures have met SWRCB requirements, if drought conditions persist or worsen, it is unclear how additional curtailments can be achieved in communities with rapidly diminishing water supplies.

6) Are some instream flow requirements in your region either currently insufficient to support aquatic life, or occasionally unmet?

☒ Yes ☐ No ☐ Perhaps/Uncertain

The UFR has a breadth of users and cannot always support the flows needed by each sector. Hydropower, timber, agriculture, and tourism all make separate demands on the watershed. Aquatic species in the UFR that are already vulnerable to periods of low flow may become increasingly susceptible to harm as snowmelt patterns change. Although environmental water law in California reserves surface water resources for aquatic species, diminished flow magnitude from reduced runoff and sustained withdrawal from agricultural and urban users can significantly reduce biological integrity of aquatic communities (USDA 2013a). Because river flow plays such an integral part in aquatic ecosystems, even moderate changes in magnitude can disrupt fish and macroinvertebrates (Carlisle, Wolock, and Meador 2010). In the last half-century, high-flow periods have occurred earlier as a consequence of warmer spring temperatures and the resulting snowmelt. This spring peak runoff creates a lower flow period in the summer. These shifting flows create extended, extreme wet and dry periods, which are difficult to manage and can disrupt the delivery of necessary flows for economic, recreational, and environmental needs (USDA 2013a). The current drought has significantly reduced flows across the UFR watershed, especially in the North Fork, damaging fish populations as a result.

Resource Management Strategies (RMS) for adapting to water demand vulnerabilities:

- Agricultural water use efficiency
- Urban water use efficiency
- Conveyance – regional/local
- System reoperation
- Water transfers
- Conjunctive management
- Precipitation enhancement
- Drinking water treatment and distribution
- Matching water quality to water use
- Agricultural land stewardship
- Land use planning and management
- Economic incentives
- Outreach and engagement
- Water and culture

Water Supply

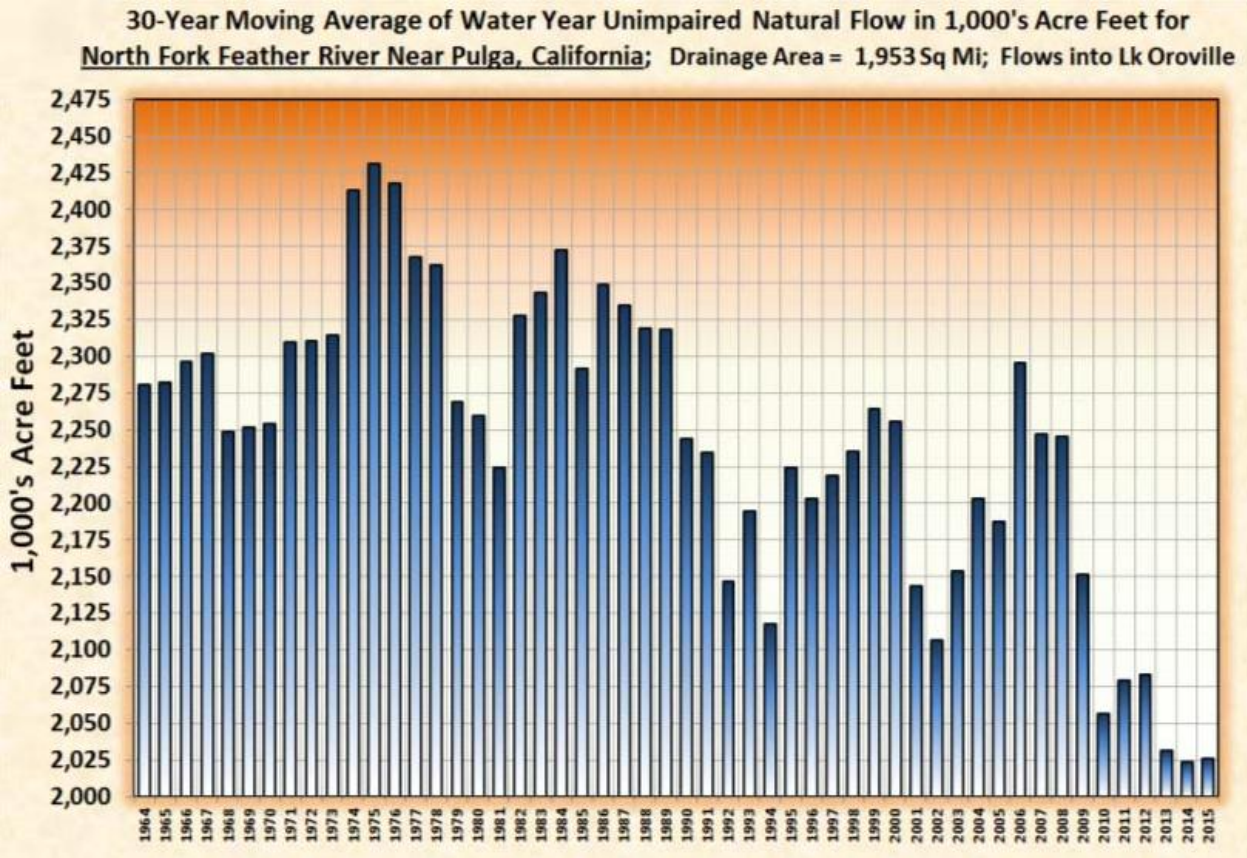
1) Does a portion of the water supply in your region come from snowmelt?

☒ Yes ☐ No ☐ Perhaps/Uncertain

According to the California Water Plan Regional Report for the Mountain Counties Area, the majority of water originates as surface water flows from the Sierra Nevada (DWR 2013). The Upper Feather River watershed receives water runoff from low elevation snowmelt, with the amount of snowfall largely dependent on the location and topography within the UFR watershed (Freeman 2012). In Plumas County, snowpack at high elevations serves as a natural water reservoir that drains into the water system throughout the year (County of Plumas 2012b). Plumas County includes approximately 72% of the UFR watershed. A study by Gary Freeman (2010) showed that subbasins within the UFR watershed that are either in a rain shadow or behind topographic barriers are more likely to be impacted by climate change due to reduced snowpack and spring runoff, resulting in reduced runoff for the water year. Highly impacted subbasins within the UFR watershed include the Lake Almanor subbasin and the East Branch North Fork Feather River subbasin. An analysis of the unimpaired natural flow of the Middle Fork and the South Fork of the Feather River (similar to the analysis shown in Figure XX-3) indicates that flows in the Middle Fork and South Fork have been impacted to a lesser degree than the North Fork. Additionally, the UFR watershed is experiencing some of the largest impacts in California from the decline of low elevation snowfall and early snowmelt (Freeman 2010). Less snow predicted in the UFR watershed due to climate change coinciding with natural dry cycles (as evidenced from recent volcanic aquifer decline) will cause the resultant runoff impact to be more significant than otherwise anticipated (Freeman 2015).

Figure XX- 3 illustrates the 30-year moving average (ex. data point 1964 is the average of 1935 through 1964) of the Water Year (October 1 through September 30) unimpaired natural flow for the North Fork Feather River near Pulga for the period 1964 through 2015. The declining trend indicates that over this period, 1935 through 2015, the North Fork Feather River has experienced a reduction in annual runoff restricting the ability to meet water demands.

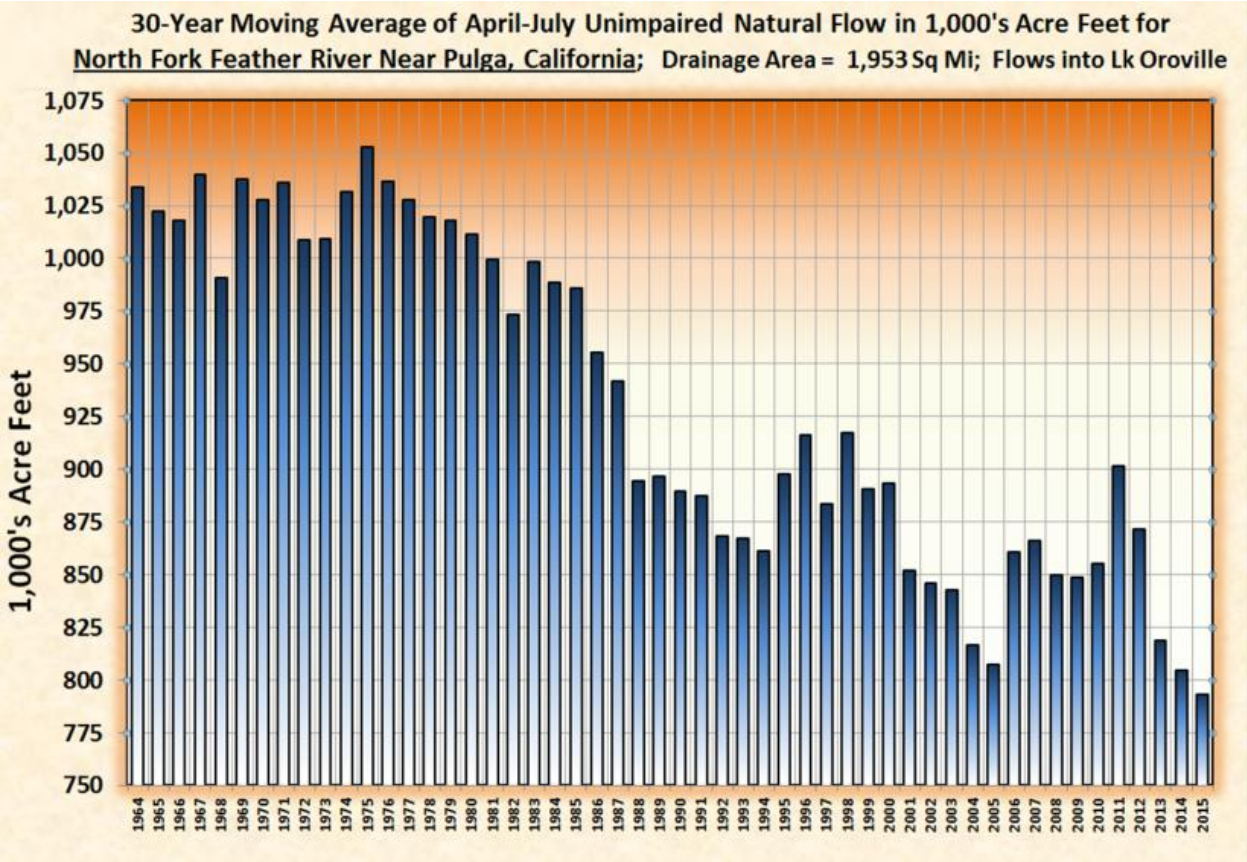
Figure XX-3. North Fork Feather River Water Year (October 1–September 30) Runoff



Source: Freeman 2015.

Figure XX-4 illustrates the 30-year moving average of April through July unimpaired natural flow for the North Fork Feather River near Pulga. Although similar to the Water Year chart above, we see an even starker declining trend indicating not only a reduction in overall flow, but also a reduction of that flow occurring as snowmelt which typically makes up the bulk of the flow occurring during the April through July period.

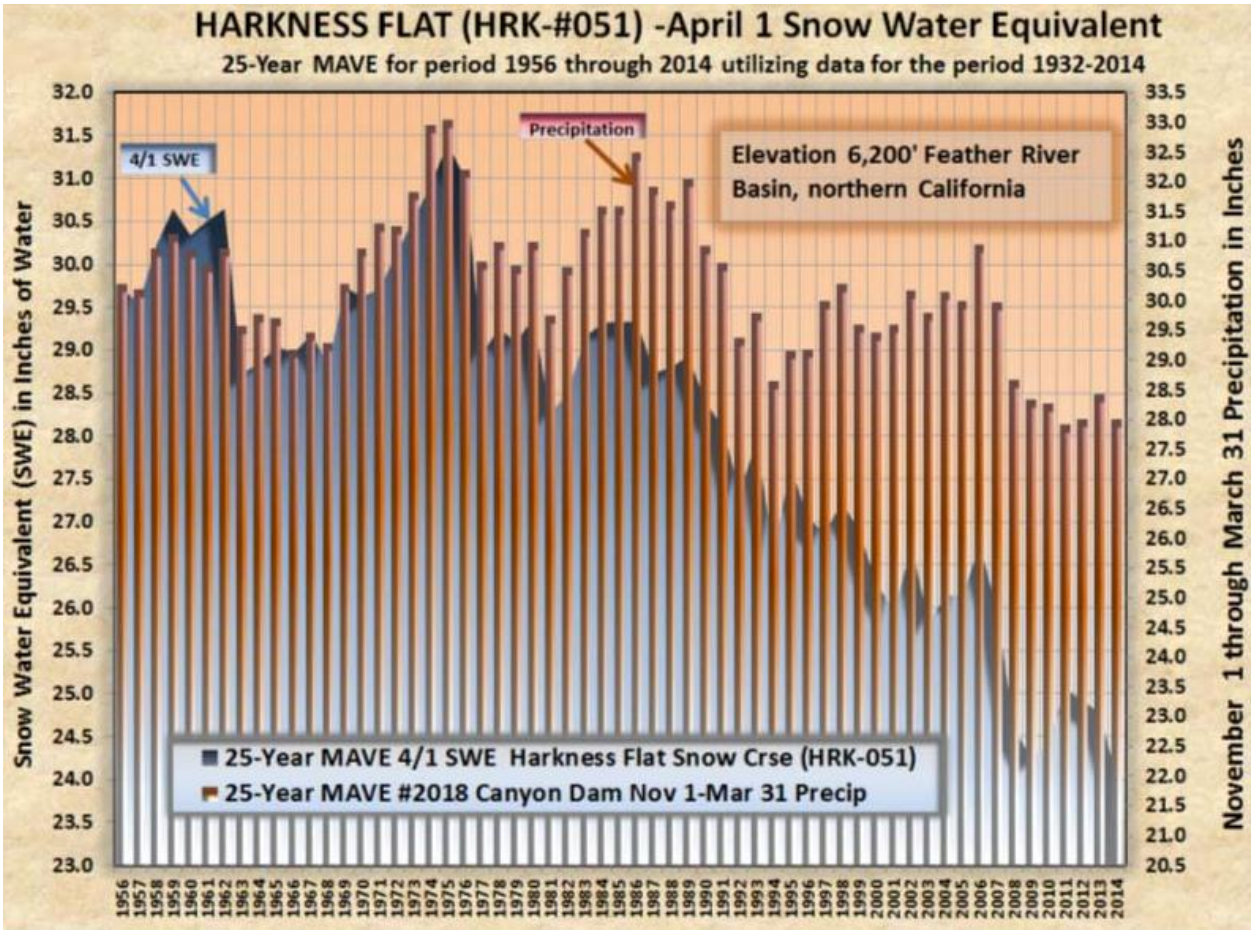
Figure XX-4. North Fork Feather River April–July Runoff



Source: Freeman 2015.

Figure XX-5 illustrates the 25-year moving average of the April 1 Harkness Flat Snow Course located on the Upper North Fork Feather River utilizing the period 1932 through 2014. This snow course is a permanent site that represents snowpack conditions in snow water equivalent. Snow water equivalent is the depth, in inches, of the water that would form if the snow were to melt. There is a declining trend suggesting a reduced snowpack over time. This matches the conclusion discussed above of a reduced snowpack over time. The figure also charts the 25-year moving average of the November 1 through March 31 precipitation at Canyon Dam (Lake Almanor). This, too, indicates a trend of reduced precipitation over time.

Figure XX-5. Harkness Flat Snow Course April 1 Snow Water Equivalent and November 1 through March 31 Precipitation at Canyon Dam



Source: Freeman 2015.

2) Does part of your region rely on water diverted from the Delta, imported from the Colorado River, or imported from other climate-sensitive systems outside your region?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Water is diverted by canal from Little Truckee River, a primary tributary to the Truckee River, into Webber Creek for supplemental irrigation use in the Sierra Valley. These waters eventually flow into the Feather River Basin. The maximum diversion rate is 60 cubic feet per second during the growing season (March 15 through September 30). This interbasin water diversion varies from about 1,500 acre-feet per year to 10,000 acre-feet per year with an average of about 5,700 acre-feet per year (Nevada Division of Environmental Protection 1997).

3) Does part of your region rely on coastal aquifers? Has salt intrusion been a problem in the past?

☐ Yes ☒ No ☐ Perhaps/Uncertain

The region is not located near the coast. Salt intrusion is not an issue for the region.

4) Would your region have difficulty in storing carryover supply surpluses from year to year?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Reservoirs in the UFR historically spill frequently during the spring when inflow exceeds both the available usable capacity of the seasonal reservoirs and the capacity of releasing inflow through outlets (Freeman 2012). Rain-shadowed subbasins in the watershed are experiencing earlier snowmelt, an increased proportion of precipitation occurring as rain with less snowfall overall, and reduced aquifer outflow from springs. The filling of mountain reservoirs from snowmelt earlier in the year and an increasing dependence on rainfall for filling is anticipated to eventually lead to an increased likelihood for spill from reservoirs in the UFR watershed (Freeman 2012). Under these conditions, reservoirs are expected to be operated to hold storage higher than historical practice to help meet late summer and fall water demands, which will increase the risk of reservoir spills. As snowpack reduces, there is likely to be increased motivation to hold water in storage. According to stakeholders, meadows in the basin have been impacted reducing their capacity to store water and relax the natural flow hydrograph. Stakeholders also noted that there is unused groundwater storage, primarily in the North Fork Feather River basin, and that stormwater capture could be a source of water.

5) Has your region faced a drought in the past during which it failed to meet local water demands?

☒ Yes ☐ No ☐ Perhaps/Uncertain

According to the Plumas County General Plan, adequate water supply is currently available for water purveyors in Plumas County and all have reported sufficient supply to meet projected water demands until 2030 (County of Plumas 2012a). The majority of potable water supply in Plumas County is provided by a variety of individual Community Service Areas (CSA), Community Services Districts (CSDs), and Public Utility Districts (PUDs) that serve the various communities located throughout the region. During water years 2014 and 2015, due to statewide drought conditions, the State Water Resources Control Board (SWRCB) curtailed post-1914 water rights tributary to the Sacramento-San Joaquin Delta, including the UFR watershed. This curtailment reduced the ability to divert water, impacting water supply availability. In response, water purveyor demand management plans have been effective in balancing available water supply with demand. Climate change impacts could lead to more severe, frequent, and prolonged drought conditions, reducing the reliability of the local water supply. According to stakeholders, during times of drought, some agricultural water supplies are not considered adequate and residential wells have gone dry, requiring drilling deep wells and the trucking of water to homes.

6) Does your region have invasive species management issues at your facilities, along conveyance structures, or in habitat areas?

☒ Yes ☐ No ☐ Perhaps/Uncertain

According to the Environmental Impact Report (EIR) prepared for the Upper North Fork Feather River Hydroelectric Project (UNFFR Project), several invasive and noxious weeds have been introduced to the UFR watershed. Surveys conducted by Garcia and Associates in 2000 found nine species of invasive and noxious weeds occurring in disturbed areas around the reservoirs and along roads and the river within the UNFFR Project area (SWRCB 2014). The EIR also identified a risk of spreading invasive plants or noxious weeds with increased ground disturbance in the areas surrounding the reservoirs, roads, and along the river, which could have an adverse effect on special-status plants that may occur within the UFR watershed (SWRCB 2014).

Certain invasive species are expected to be favored as a result of warming and drying conditions. Additional invasive species act as stressors on native species that, when combined with lower flows or erratic flow regimes more likely with greater climate variability, can cause decreased viability for desired species. Stakeholders noted the existence of yellow star thistle (*Centaurea solstitialis*) in the UFR basin and the concern for introduction of quagga and zebra mussels, which exist in the region, both invasive species that could be advantaged through climate change.

RMS for adapting to water supply vulnerabilities:

- Urban water use efficiency
- Conveyance – regional/local
- System reoperation
- Water transfers
- Conjunctive management
- Precipitation enhancement
- Municipal recycled water
- Surface storage – regional/local
- Drinking water treatment and distribution
- Groundwater remediation/aquifer remediation
- Forest management
- Recharge area protection
- Economic incentives
- Outreach and engagement
- Water-dependent recreation

Water Quality

1) Are increased wildfires a threat in your region? If so, does your region include reservoirs with fire-susceptible vegetation nearby which could pose a water quality concern from increased erosion?

☒ Yes ☐ No ☐ Perhaps/Uncertain

According to a report prepared by the Sierra Nevada Conservancy (2014), *The State of the Sierra Nevada's Forests*, the Sierra Nevada (including the UFR watershed) are at a high risk for uncharacteristically large and damaging wildfires. After fires, burn areas can experience increased erosion rates due to the increases in runoff and lack of vegetation to stabilize the soil. According to the Cal-Adapt Wildfire: Fire Risk Map (2015), the UFR watershed may experience a one- to twofold increase in burned area by 2050 and a two- to threefold increase in burned area by 2085. The fire season has extended in recent years, according to stakeholders. Increased fire frequency, intensity, and season may impact vegetative species composition, especially the size and extent of old-growth forest habitat and related fauna; threaten critical facilities located in fire-prone areas; and increase chances for human and economic loss due to development in fire-prone areas. Reservoir water quality has been adversely affected by increased post-fire erosion. According to stakeholders, mercury is a concern as well as potential effects caused by catastrophic fire induced through fire suppression activities over time.

2) Does part of your region rely on surface waterbodies with current or recurrent water quality issues related to eutrophication, such as low dissolved oxygen or algal blooms? Are there other water quality constituents potentially exacerbated by climate change?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Water quality in the UFR watershed in Plumas County is generally considered to be good; however, there are general concerns including temperature, dissolved oxygen, sediment, and bacteria. Additionally, several waterbodies are listed on the Clean Water Act's 303(d) list of impaired waters for mercury, copper, temperature, and toxicity. These waters include Feather River, North Fork (below Lake Almanor); and Feather River, South Fork (Little Grass Valley Reservoir to Lake Oroville) (County of Plumas 2012b).

Water quality in the UFR watershed is heavily influenced by Lake Almanor, as the majority of its water flows through several reservoirs and into Lake Oroville. According to the UNFFR Project EIR, Lake Almanor generally meets water quality objectives set by the SWRCB in the Sacramento Basin Plan. Water temperature in Butt Valley Reservoir is heavily influenced by Lake Almanor and the operation of hydropower facilities. In general, Butt Valley Reservoir, just downstream of Almanor, shows similar dissolved oxygen (DO) concentrations as Lake Almanor, which currently meets water quality objectives. Other reservoirs in the UFR watershed include Belden Forebay, Seneca Reach, and Belden Reach, all of which are directly or indirectly influenced by Lake Almanor and reservoir operations. Thus, water quality is relatively similar to Lake Almanor and Butt Valley Reservoir; however, water temperature fluctuates depending on hydropower operations, and DO can be slightly elevated depending on the time of year (SWRCB 2014).

Warming temperatures will result in lower dissolved oxygen levels in waterbodies, which are exacerbated by potential algal blooms and in turn enhanced eutrophication. Climate-induced increases in storm intensity may alter pollutant concentrations in waterbodies and produce increased turbidity. This could, in turn, decrease water quality.

Stakeholders noted that issues related to eutrophication, such as low dissolved oxygen or algal blooms, are limited to reservoirs and that reservoir water temperature is relatively elevated under existing conditions, increasing potential risk from climate change.

3) Are seasonal low flows decreasing for some waterbodies in your region? If so, are the reduced low flows limiting the waterbodies' assimilative capacity?

☒ Yes ☐ No ☐ Perhaps/Uncertain

UFR watershed flows are largely regulated by a series of hydroelectric projects located on the North Fork Feather River above Oroville Dam. Lake Almanor is the start of the system and was constructed to store water in the winter and spring and release flows throughout the summer and fall for hydropower generation (SWRCB 2014).

As stated above under the Water Supply subsection, the rain-shadowed subbasins in the UFR watershed (the Lake Almanor subbasin and the East Branch North Fork Feather River subbasin) are experiencing earlier snowmelt, an increased proportion of precipitation occurring as rainfall with less snowfall overall, and reduced aquifer outflow from springs. This change in precipitation timing and type has resulted in the filling of mountain reservoirs from snowmelt earlier in the year. An increasing dependence on rainfall for filling is anticipated to eventually lead to an increased likelihood for spill from reservoirs (Freeman 2012). It is likely that streamflow will increase in some areas of the UFR watershed during the spring. The Freeman 2012 study considered the possible side effects of climate change on runoff by comparing two consecutive 35-year periods (1942–1976 and 1977–2011). Trend analyses over a moving 30-year average show reductions in flow on tributaries to the Feather River watershed at about 4.5%. This would suggest that overall seasonal low flows are decreasing in the UFR watershed. Additionally, these low-flow conditions are expected to be more extreme and last longer. Decreased flows in some waterbodies will likely result in higher concentrations of pollutants and reduced assimilative capacity.

An analysis of the unimpaired natural flow of the Middle Fork and the South Fork of the Feather River (similar to the analysis shown in Figure XX-3) indicates that flows in the Middle Fork and South Fork have been impacted to a lesser degree than the North Fork. The risks to seasonal low flows are also expected to be lesser in the Middle Fork and South Fork.

4) Are there beneficial uses designated for some waterbodies in your region that cannot always be met due to water quality issues?

☒ Yes ☐ No ☐Perhaps/Uncertain

According to the Basin Plan, the North Fork Upper Feather River provides several beneficial uses including municipal and domestic water supply, hydropower generation, water contact recreation, water non-contact recreation, cold freshwater habitat, spawning habitat, and wildlife habitat (Central Valley RWQCB 2011). The Basin Plan indicates the Middle Fork Feather River provides the following beneficial uses: agricultural, recreation, warm and cold water freshwater habitat, spawning habitat, and wild habitat. Beneficial uses for the South Fork Feather River are not listed in the Basin Plan. In addition to hydropower generation, the UNFFR Project provides approximately 30,920 acres of reservoirs and tributaries that provide water contact and water non-contact recreational opportunities (SWRCB 2014). The SWRCB has not reported any water quality issues in connection with beneficial uses.

Overall climate drying and warming could exacerbate elevated water temperatures, a reduced capacity for dilution, potential for eutrophication and total organic carbons related to increased algae presence, sediment and non-point source pollution from more intense storm events and higher peak flows, and the potential for wastewater runoff into receiving waters.

5) Does part of your region currently observe water quality shifts during rain events that impact treatment facility operation?

☒ Yes ☐ No ☐Perhaps/Uncertain

While it is unclear how average precipitation will change with climate change, it is generally agreed that storm severity will probably increase. More intense, severe storms may lead to increased erosion, which will increase turbidity in surface waters. The region's water treatment needs are met in several ways, including through on-site septic systems, community septic systems, and community wastewater treatment plants (County of Plumas 2012b; Sierra County 2012). At least one system in the watershed has experienced overflows due to excessive inflow, which is exacerbated by rainfall (SWRCB 2009). According to stakeholders, there is a potential risk to water treatment and wastewater treatment facility operation during severe rain events, which could be exacerbated with climate change.

RMS for adapting to water supply vulnerabilities:

- Flood management
- Conveyance – regional/local
- System reoperation
- Precipitation enhancement
- Drinking water treatment and distribution
- Groundwater remediation/aquifer remediation
- Matching water quality to water use
- Pollution prevention

- Salt and salinity management
- Urban stormwater runoff management
- Ecosystem restoration
- Forest management
- Recharge area protection
- Sediment management
- Watershed management

Flooding

1) Does critical infrastructure in your region lie within the 200-year floodplain?

☒ Yes ☐ No ☐ Perhaps/Uncertain

The Federal Emergency Management Agency (FEMA) has developed best available floodplain maps with delineated 100- and 500-year flood zones for Plumas County. The California Department of Water Resources (DWR) has not delineated the 200-year flood zones in Plumas County. The majority of the 100-year flood zones are associated with local watercourses (County of Plumas 2012a). Development in the region is discouraged within the 100-year flood zones.

Because the 200-year floodplain is not delineated, it is not known if critical infrastructure lies within the 200-year floodplain. The Plumas County Hazard Mitigation Plan indicates that there are 69 critical facilities (out of 720) at risk from flooding. Critical facilities data were overlaid with flood hazard data to determine the type and number of facilities within the 100- and 500-year floodplain. Flooding poses numerous risks to critical facilities and infrastructure including roads or railroads blocked or damaged, bridges washed out or blocked, backed-up drainage systems, drinking water contamination, sewer systems backed up, and damage to underground utilities (County of Plumas 2013).

Localized drainage problems with flooding do occasionally occur. In Plumas County, flooding may result from rainfall and runoff exceeding the capacity of local watercourses, rainfall and runoff to depressions causing localized areas of shallow flooding, or flooding from failure of a dam. Some communities are at risk to flooding from dam failure and inundation (County of Plumas 2012a). Additionally, and according to stakeholders, the wastewater plant and fire departments are susceptible to flooding that could be increased from climate change.

2) Does part of your region lie within the Sacramento-San Joaquin Drainage District?

☐ Yes ☒ No ☐ Perhaps/Uncertain

The UFR watershed is north of the Sacramento-San Joaquin Drainage District.

3) Does aging critical flood protection infrastructure exist in your region?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Stakeholders indicated that the Taylorsville Mill Race Farmers Dam is in need of repair.

4) Have flood control facilities (such as impoundment structures) been insufficient in the past?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Flood control facilities, including the Big Ditch flood control channel in Chester, have historically provided adequate levels of flood protection. According to stakeholders, local flooding risk is present at road crossing and culverts and the Taylorsville Mill Race Farmers Dam has been insufficient in the past.

5) Are wildfires a concern in parts of your region?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Rising temperatures and earlier snowmelt are shown to increase the frequency of wildfires, especially in Northern California. Fire size and intensity have already increased significantly in the Sierra Nevada since the early 1980s (USDA 2013a). Increasing fuel supply has also led to the regional increase in wildfires, a product of increased winter rains in place of snowfall (USDA 2013a). The Plumas County Hazard Mitigation Plan indicates that the highest fuel hazard is along the Feather River Canyon (County of Plumas 2013). According to the Cal-Adapt Wildfire: Fire Risk Map (2015), the UFR watershed may experience a one- to twofold increase in burned area by 2050 and a two- to threefold increase in burned area by 2085. This increased risk of severe wildfires poses a significant risk to water quality in the Upper Feather River by increasing sedimentation and runoff that disrupt the river's normal and healthy function. Avalanche chutes, debris chutes, and alluvial fans can be extremely active in flood events that occur after wildfires, which can degrade the quality of the habitat and threaten aquatic species. Unmitigated forest growth without the intervention of a fuels reduction program may increase this risk.

RMS for adapting to flooding vulnerabilities:

- Flood management
- Conveyance – regional/local
- System reoperation
- Precipitation enhancement
- Urban stormwater runoff management
- Land use planning and management
- Watershed management

Ecosystem and Habitat Vulnerability

1) Does your region include inland or coastal aquatic habitats vulnerable to erosion and sedimentation issues?

☒ Yes ☐ No ☐ Perhaps/Uncertain

The region features complex topography and multiple waterways, as well as highly erodible granitic and sedimentary soils. Grazing and timber production in the region's riparian zones have decreased vegetation and increased the amount of sedimentation and runoff in adjacent waterbodies (PCFCWCD 2004). In the past, these activities were the leading causes of erosion in the UFR watershed. While these sectors still cause issues of erosion in some portions of the watershed, stakeholders noted that current management practices have significantly decreased their impacts on aquatic habitats. As noted earlier, the growing threat of wildfires will consequently increase the amount of erosion and sedimentation in the watershed, increasing the region's vulnerability to negative habitat impacts as a result. Additionally, roads in the watershed are understood to exacerbate erosion and sedimentation issues.

A variety of aquatic habitats, including lakes, rivers, streams, and reservoirs, exist in the watershed. Aquatic species in the region, including rainbow and brown trout, landlocked Chinook salmon, large- and small-mouth bass, green sunfish, Sacramento perch, channel catfish, and brown bullhead catfish, can be negatively impacted by increased turbidity from sedimentation and erosion (Sierra Institute for Community and Environment 2009).

2) Does your region include estuarine habitats which rely on seasonal freshwater flow patterns?

☐ Yes ☒ No ☐ Perhaps/Uncertain

The region does not encompass any estuarine habitats.

3) Do climate-sensitive fauna or flora populations live in your region?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Although all flora and fauna can be impacted by climate-caused habitat changes, plant and animal species that can live in a broad range of conditions are more resilient to these changes than those that can only survive in a very narrow habitat. Because of an inability to migrate to another habitat, the species that are found only in the Upper Feather River region are especially sensitive to climate-related changes. The most recent State Wildlife Action Plan identified no fish or invertebrate species as focal species of conservation strategies in the Sierra Nevada Foothills and Sierra Nevada regions, but does identify many amphibian, reptile, and bird species (CDFW 2015). The UFR watershed is diverse and complex, and changes in habitat factors such as temperature or precipitation can impact a wide range of species. In the Sierra Nevada region, 60% of coniferous forest bird species are expected to experience significant range reduction, narrowing the amount of acceptable habitat and increasing vulnerability (USDA 2013a). Decreased stream flow and rising water temperatures in the Sierra Nevada are likely to

increase thermal stress on salmonids and decrease ranges for sensitive species such as rainbow trout (USDA 2013a). Even decreasing winter snowfall can increase grazing by deer and elk throughout the winter, which in turn reduces the growth of certain tree species, damaging essential habitat for songbirds in the region (USDA 2013a). The interconnectedness of the region's climate with all of the species that live there means that shifts in normal temperature and precipitation closely impact many of the native species.

4) Do endangered or threatened species exist in your region? Are changes in species distribution already being observed in parts of your region?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Chapter XX (Region Description) provides an overview of existing endangered and threatened species conditions in the UFR region. A majority of the existing research on changes in species distribution in the region shows that upslope movement into higher elevations of the Sierra Nevada has been and will continue to be the trend in regional habitat movement (USDA 2013a). A pattern of climate-driven changes in fire activity, which has the potential to further disrupt species distribution, has also already been observed (USDA 2013a).

5) Does the region rely on aquatic or water-dependent habitats for recreation or other economic activities?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Fishing, boating, kayaking, swimming, hunting, bird-watching, and agriculture are all integral parts of the economic prosperity of the UFR region. The Plumas County Visitors Bureau promotes outdoor recreation as a popular tourist attraction for the region in every season. Cross-country skiing, longboard racing, snowmobiling, and snowshoeing are winter attractions that may also be negatively impacted by a reduced snowpack (Plumas County Visitors Bureau 2015). Additionally, other agricultural industries, including timber, rely on the watershed for irrigation and milling.

6) Are there rivers in your region with quantified environmental flow requirements or known water quality/quantity stressors to aquatic life?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Pacific Gas and Electric Company (PG&E) manages a number of dams along the North Fork Feather River and releases water to meet minimum flow requirements for aquatic species along the Seneca and Belden reaches (SWRCB 2014). Diminished flow is an integral predictor of fish and macroinvertebrate community health (USDA 2013a). Stakeholders noted that water has been released from Lake Almanor to reduce issues associated with diminished flows, but high water temperatures and low dissolved oxygen in these releases can be uninhabitable for aquatic species. If sustained drought or increased water temperature continues to exacerbate existing conditions, reduced flow could diminish both the

quality and the quantity of habitat for aquatic species (USDA 2013a). As mentioned above, flows in the Middle Fork and South Fork have been impacted to a lesser degree than the North Fork.

7) Do estuaries, coastal dunes, wetlands, marshes, or exposed beaches exist in your region? If so, are coastal storms possible/frequent in your region?

☐ Yes ☒ No ☐ Perhaps/Uncertain

There are no estuaries, coastal dunes, wetlands, marshes, or exposed beaches in the region. Coastal storms are not a concern.

8) Does your region include one or more of the habitats described in the Endangered Species Coalition's Top 10 habitats vulnerable to climate change?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Most of the UFR region in California's Sierra Nevada range, which is identified by the Endangered Species Coalition as one of the top 10 most vulnerable habitats to climate change. The region has a diverse ecosystem, which is dependent on snowmelt from the Sierra Nevada and Cascade ranges to regulate the water cycle and vibrancy of the habitat. Nearly 200 species in the habitat are on California's Special Animals List, which tracks threatened and endangered species in the state. As rains replace winter snows, the annual spring snowmelt will continue to move earlier, disrupting ecosystem function (Endangered Species Coalition 2010).

The importance of the watershed is underscored by its listing as an Audubon Important Bird Area. The region supports over 1% of the global and 10% of the state population of one or more sensitive species, supports more than nine sensitive bird species, hosts 10,000 or more observable shorebirds in one day, and hosts 5,000 or more observable waterfowl in one day. The Important Bird Area surrounding Lake Almanor is notable for supporting one of the largest populations of willow flycatchers in the state, which breed in meadows with willow thickets in and around Westwood (California Audubon Society 2015).

9) Are there areas of fragmented estuarine, aquatic, or wetland wildlife habitat within your region? Are there movement corridors for species to naturally migrate? Are there infrastructure projects planned that might preclude species movement?

☒ Yes ☐ No ☐ Perhaps/Uncertain

The chain of dams in the Upper Feather River region fragments aquatic habitat and prevents movement of fish and other aquatic wildlife to varying degrees. Additionally, extensive road systems, fencing, and historic mining have damaged the watershed and disrupted natural movement corridors (USDA 2013b). Catastrophic wildfire can also destroy habitat and disrupt natural migration corridors across the UFR watershed.

Integrated planning efforts in the Plumas National Forest have led to significant improvements in forest-wide restoration of habitat connectivity for fish and other aquatic organisms. These aquatic organism passage (AOP) programs, when paired with overall watershed restoration, help to decrease the number of fragmented movement corridors (USDA 2013b). At the time of this writing, no known infrastructure projects are planned that might preclude species movement.

RMS for adapting to ecosystem and habitat vulnerabilities:

- Agricultural water use efficiency
- Conveyance – regional/local
- System reoperation
- Conjunctive management
- Pollution prevention
- Salt and salinity management
- Urban stormwater runoff management
- Agricultural land stewardship
- Ecosystem restoration
- Forest management
- Land use planning and management
- Sediment management
- Watershed management
- Water-dependent recreation

Hydropower

1) Is hydropower a source of electricity in your region?

☒ Yes ☐ No ☐ Perhaps/Uncertain

The region's electricity is provided by the Plumas-Sierra Rural Electric Co-op (PSREC) and PG&E. As of 2014, PSREC generated 0.5% of its grid-wide energy from small hydroelectric and 33.2% from large hydroelectric (PSREC 2014). In 2012, PG&E procured 2% of its total electricity from small hydroelectric and 11% from large hydroelectric (CEC 2012). This hydropower production may become vulnerable to decreased production capacity if flow volume decreases. All together, the dams on the Upper Feather River produce 9%–30% of California's power (USDA 2013b).

In the lower North Fork Feather River, PG&E owns a series of reservoirs known as the "stairway of power" for hydropower production (Sacramento River Watershed Program 2015). Seven dams regulated by the Federal Energy Regulatory Commission (FERC), listed below, are located in the region, five of which are owned and operated by PG&E.

- Bucks Creek (PG&E – Bucks Lake)
- Rock Creek/Cresta (PG&E – North Fork Feather River)
- South Feather (South Feather Water & Power – Little Grass Valley)
- Lake Oroville (California Department of Water Resources)
- Upper North Fork Feather River (PG&E – Almanor/Butt Valley)

- Poe (PG&E – North Fork Feather River)
- Hamilton Branch powerhouse (PG&E – Lake Almanor)

Climate change has the potential to alter the ability of all of the operational hydroelectric facilities in the region to produce power due to shifting temperatures, altered stream flow, and higher rates of evaporation and transpiration in the feeder watersheds (Bryan et al. 2013). While trends in precipitation and temperature can vary significantly across the region, decreases in snowfall and the consequent impacts will be more evenly distributed. Significant declines in snowfall over the past century have been observed in the watershed (USDA 2013a).The watershed depends on Sierra snowmelt for much of its flow. Because of this, the dams along the UFR and its many tributaries are vulnerable to decreased generation as a result of the decreased availability of water resources.

2) Are energy needs in your region expected to increase in the future? If so, are there future plans for hydropower generation facilities or conditions for hydropower generation in your region?

☒ Yes ☐ No ☐ Perhaps/Uncertain

Limited population growth and rising temperatures have the potential to increase demand for energy in the UFR region. Currently, large-scale hydropower (presented above as the stairway of power) is built-out in the watershed. The region's electricity is primarily provided by the Plumas-Sierra Rural Electric Cooperative, as well as PG&E and the Lassen Municipal Utility District. As of July 2015, FERC has not issued any permits for a new dam. Although some potential exists for smaller hydropower generation facilities, decreases in overall hydropower productivity and increased challenges to building hydropower (such as few undammed rivers, little unallocated water, and growing environmental, economic, and political constraints) may strongly limit facility development (Pacific Institute 2015).

RMS for adapting to hydropower production vulnerabilities:

- Conveyance – regional/local
- Land use planning and management
- Water and culture

Vulnerability Assessment Summary

Table XX-1 summarizes the climate change vulnerabilities and relevant resources management associated with each category of water use and resources, as described in the text above.

Table XX-1. Climate Change Vulnerability Summary

Category	Vulnerabilities	Resource Management Strategies
Water Demand	Seasonal variability, climate-sensitive crops, drought-sensitive groundwater supplies, in-stream flow requirements	• Agricultural water use efficiency • Urban water use efficiency • Conveyance – regional/local • System reoperation • Water transfers • Conjunctive management • Precipitation enhancement • Drinking water treatment and distribution • Matching water quality to water use • Agricultural land stewardship • Land use planning and management • Economic incentives • Outreach and engagement • Water and culture
Water Supply	Decreased snowfall, worsening of natural dry cycles, decreased water supply	• Urban water use efficiency • Conveyance – regional/local • System reoperation • Water transfers • Conjunctive management • Precipitation enhancement • Municipal recycled water • Surface storage – regional/local • Drinking water treatment and distribution • Groundwater remediation/aquifer remediation • Forest management • Recharge area protection • Economic incentives • Outreach and engagement • Water-dependent recreation

Category	Vulnerabilities	Resource Management Strategies
Water Quality	Lower dissolved oxygen levels in waterbodies, potential algal blooms and eutrophication, altered pollutant concentrations in waterbodies, increased turbidity, decreased water quality	• Flood management • Conveyance – regional/local • System reoperation • Precipitation enhancement • Drinking water treatment and distribution • Groundwater remediation/aquifer remediation • Matching water quality to water use • Pollution prevention • Salt and salinity management • Urban stormwater runoff management • Ecosystem restoration • Forest management • Recharge area protection • Sediment management • Watershed management
Flooding	Runoff exceeding the capacity of local watercourses, rainfall, and runoff to depressions causing localized areas of shallow flooding, sedimentation resulting from wildfire	• Flood management • Conveyance – regional/local • System reoperation • Precipitation enhancement • Urban stormwater runoff management • Land use planning and management • Watershed management
Ecosystem and Habitat Vulnerability	Aquatic habitat erosion and sedimentation, climate-sensitive fauna or flora, endangered or threatened species, aquatic habitats used for economic activities, quantified environmental flow requirements, climate-sensitive habitats, fragmented habitat and movement corridors	• Agricultural water use efficiency • Conveyance – regional/local • System reoperation • Conjunctive management • Pollution prevention • Salt and salinity management • Urban stormwater runoff management • Agricultural land stewardship • Ecosystem restoration • Forest management • Land use planning and management • Sediment management • Watershed management • Water-dependent recreation
Hydropower	Hydropower facilities, regional energy needs	• Conveyance – regional/local • Land use planning and management • Water and culture • Other strategies

XX.5 Prioritizing Vulnerabilities

All of the vulnerabilities listed above represent important issues and considerations for the planning region as a whole. Some vulnerabilities will be of high priority to a certain suite of stakeholders because of their area of expertise, interests, or employment; another stakeholder group's priorities will likely differ for the same reasons. Identifying vulnerabilities for such a diverse group of stakeholders and issues is an exercise in assessing how soon that vulnerability may occur, if it's not already (urgency), and the degree of probability that the vulnerability will become a hazard, if it's not already (risk).

In August 2015, approximately 28 local stakeholders attended a climate change-focused meeting in Quincy, California, and participated in a vulnerability prioritization activity. Table XX-2 displays the results of that activity in terms of urgency and risk, and sorts by priority based on those findings. It is important to make the distinction that these priorities are relative to responding to climate change and not IRWM project prioritization.

Table XX-2. UFR Climate Change Priorities

Priority	Category	Topic	Urgency	Risk
1	Water Demand	Seasonal water use variability	High	High
1	Water Supply	Snowmelt	High	High
1	Water Supply	Unmet local water demands (drought)	High	High
1	Water Supply	Invasive species	High	High
1	Water Quality	Water quality (wildfires)	High	High
1	Water Quality	Eutrophication water quality issues	High	High
1	Water Quality	Seasonal low flows and assimilative capacity	High	High
1	Water Quality	Treatment facility operations	High	High
1	Flooding	Aging critical flood protection	High	High
1	Flooding	Wildfires	High	High
1	Ecosystem and Habitat Vulnerability	Climate-sensitive fauna or flora	High	High
1	Ecosystem and Habitat Vulnerability	Recreation and economic activity	High	High
1	Ecosystem and Habitat Vulnerability	Quantified environmental flow requirements	High	High
1	Ecosystem and Habitat Vulnerability	Top habitat vulnerable to climate change	High	High
2	Water Demand	Unmet in-stream flow requirements	Medium	High
3	Water Demand	Climate-sensitive crops	Medium	Medium
3	Water Demand	Groundwater drought resiliency	Medium	Medium
3	Water Demand	Water curtailment effectiveness	Medium	Medium
3	Water Quality	Unmet beneficial uses	Medium	Medium
3	Flooding	Critical infrastructure in a floodplain	Medium	Medium
3	Flooding	Insufficient flood control facilities	Medium	Medium
3	Ecosystem and Habitat Vulnerability	Erosion and sedimentation	Medium	Medium
3	Ecosystem and Habitat Vulnerability	Endangered or threatened species	Medium	Medium
3	Ecosystem and Habitat Vulnerability	Fragmented habitat	Medium	Medium
3	Hydropower	Electricity source	Medium	Medium
4	Water Supply	Supply surplus carryover	Low	Medium
5	Water Demand	Cooling/process water for industry	Low	Low
5	Water Supply	Climate-sensitive water supply	Low	Low
5	Hydropower	Growing energy needs	Low	Low

XX.6 Further Data Gathering and Analysis of the Prioritized Vulnerabilities

Proposition 84 guidelines requires that this IRWMP "contain a plan, program, or methodology for further data gathering and analysis of the prioritized vulnerabilities." The program to fulfill this requirement is located in Chapter XX (Chapter Title).

XX.7 Greenhouse Gas Emissions and UFR Project Development and Selection

In addition to addressing climate change vulnerability, Proposition 84 guidelines require this IRWMP to describe how GHG emissions are mitigated and how adaptation actions are addressed. As part of the project evaluation process (see Chapter XX (Project Review Process)), each project was required to identify if it addressed climate change issues. In order to say that a project had addressed climate change issues, project sponsors were required to respond to a checklist that provided high-level GHG emissions estimates for construction- and project operation-related GHG emissions, as well as state how the project contributed to regional resiliency.

Climate change adaptation strategies are also included in this IRWMP as part of the RMS chapter. As noted above, each climate change vulnerability topic was assessed for relevant RMS. Where an RMS was identified as being relevant to climate change, the project team provided climate change considerations and further analysis. See Chapter XX (Resource Management Strategies) for more information.

XX.8 Sources

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MEMO

To: Uma Hinman, Uma Hinman Consulting

From: Chris Read, Michael Baker International

Cc: Tammy Seale, Michael Baker International; Chris Stabenfeldt and Michael Preszler, ECORP

Date: October 5, 2015

Re: Upper Feather River Integrated Regional Water Management Plan – Climate Change Project Assessment Tool

INTRODUCTION

The Upper Feather River (UFR) Regional Water Management Group (RWMG) is updating the Upper Feather River Integrated Regional Water Management Plan (IRWMP). The IRWMP planning process is guided by 16 plan standards as identified Proposition 84 Guidelines. Plan Standard 16 (Climate Change) reads as follows (underline ours):

The IRWM Plan must address both adaptation to the effects of climate change and mitigation of GHG emissions. The IRWM Plan must include the following items:

- *A discussion of the potential effect of climate change on the IRWM region, including an evaluation of the IRWM region's vulnerabilities to the effects of climate change and potential adaptation responses to those vulnerabilities. The evaluation of vulnerabilities must, at a minimum, be equivalent to the vulnerability assessment contained in the Climate Change Handbook for Regional Water Planning (December, 2011)*

- *A process that considers GHG emissions when choosing between project alternatives.*

- *The IRWM Plan must include a list of prioritized vulnerabilities based on the vulnerability assessment and the IRWM's decision making process.*

- *The IRWM Plan must contain a plan, program, or methodology for further data gathering and analysis of the prioritized vulnerabilities.*

The UFR IRWMP meets the majority of the requirements above through the climate change chapter, and through climate change information integrated in other IRWMP chapters. The underlined requirements above are met entirely (in the case of considering project greenhouse gas (GHG) emissions) or partially (in the case of adaptation responses and further data gathering) through the attached climate change project assessment tool. Although the tool will be a stand-alone supporting tool, we recommend that it be included in the IRWMP as an appendix to illustrate Proposition 84 consistency.

CLIMATE CHANGE PROJECT ASSESSMENT TOOL DESCRIPTION

The tool allows project applicants and the planning team to assess project consistency with Proposition 84 plan standards. The tool is a written checklist that asks GHG emissions and adaptation/resiliency questions (**Attachment A**). The tool is intended to be filled out by project applicants as part of the project assessment process; completing the checklist allows project applicants to meet RWMG identified plan assessment standards. The tool contains two sections: GHG emissions and adaptation/resiliency.

GHG EMISSIONS

The tool helps project applicants estimate GHG emissions associated with their proposed project in both construction and operation phases of the project. Project applicants are asked a series of questions about the kinds of activities that are likely to occur during the construction or operation of their project. Where an activity on the checklist is confirmed as being applicable to a project, applicants are directed to an attached Microsoft Excel worksheet (**Attachment B**). Project applicants provide activity data (number of pieces of construction equipment, acres of forest managed to prevent wildfire, etc.) and are provided with overall project GHG emissions estimates for project construction and operation.

The tool uses best practices and vetted sources for construction, construction-related transportation, and operations emissions. **Table 1** provides emissions factors and sources used for each question in the tool. Emissions factors are the number of metric tons of carbon dioxide equivalent (the standard reporting unit, often written as $MTCO_2e$) that are emitted per unit of activity data.

Table 1. GHG Tool Factors and Sources

Topic	Emissions Factor	Source
Construction Equipment (non-road or off-road engines, equipment, or vehicles)	0.010 $MTCO_2e$ per gallon of diesel Fuel consumption per hour (varies by equipment type).	CARB (California Air Resources Board). 2015. *Information for Entities That Take Delivery of Fuel for Fuels Phased into the Cap-and-Trade Program Beginning on January 1, 2015*. http://www.arb.ca.gov/cc/capandtrade/guidance/faq_fuel_purchasers.pdf CARB. 2007. *OFFROAD Software* (updated with 2013 factors). http://www.arb.ca.gov/msei/categories.htm
Transportation of Construction Materials	0.010 $MTCO_2e$ per gallon of diesel	CARB. 2015. *Information for Entities That Take Delivery of Fuel for Fuels Phased into the Cap-and-Trade Program Beginning on January 1, 2015*. http://www.arb.ca.gov/cc/capandtrade/guidance/faq_fuel_purchasers.pdf
Construction Worker Commute	0.008 $MTCO_2e$ per gallon of gasoline	CARB. 2015. *Information for Entities That Take Delivery of Fuel for Fuels Phased into the Cap-and-Trade Program Beginning on January 1, 2015*. http://www.arb.ca.gov/cc/capandtrade/guidance/faq_fuel_purchasers.pdf

Topic	Emissions Factor	Source
Electricity	0.000196 $MTCO_2e$ per kilowatt hour	PG&E (Pacific Gas and Electric Company). 2013. *Greenhouse Gas Emission Factors: Guidance for PG&E Customers*. http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf
Natural Gas	0.00531 $MTCO_2e$ per therm	PG&E. 2013. *Greenhouse Gas Emission Factors: Guidance for PG&E Customers*. http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf
Tree Planting	186 $MTCO_2e$ sequestered per acre of forest	American Forests. 2015. *Carbon Calculator Assumptions and Sources*. http://www.americanforests.org/assumptions-and-sources/
Wildfire Risk Reduction	6.3 $MTCO_2e$ per acre of managed forest	CEC (California Energy Commission). 2011. *An Analysis of Wildfire Fuel Treatments as a Carbon Offset Project Type*. http://www.energy.ca.gov/2014publications/CEC-500-2014-047/CEC-500-2014-047.pdf
Wetland Impacts	4.33 $MTCO_2e$ per acre	Hansen, LeRoy. 2009. *The Viability of Creating Wetlands for the Sale of Carbon Offsets*. http://ageconsearch.umn.edu/bitstream/54551/2/JARE,Aug09,%2308R,pp350-365.pdf

ADAPTATION/RESILIENCY

In addition to the quantitative GHG assessment, the tool includes qualitative questions about how the proposed project contributes to or impedes climate change adaptation/resilience in the planning area. Questions are tied directly to the vulnerability assessment; respondents are asked to explain how the project makes the planning area more or less resilient to vulnerabilities with a ranking of 3 or higher in the vulnerability assessment prioritization table.

ATTACHMENTS

Attachment A: Climate Change Project Assessment Tool
Attachment B: GHG Assessment Worksheet
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Climate Change – Project Assessment Checklist

This climate change project assessment tool allows project applicants and the planning team to assess project consistency with Proposition 84 plan standards and RWMG plan assessment standards. The tool is a written checklist that asks GHG emissions and adaptation/resiliency questions.

Name of project: _____

Project applicant: _____

GHG Emissions Assessment

Project Construction Emissions

(If you check any of the boxes, please see the attached worksheet)

- ☐ The project requires nonroad or off-road engines, equipment, or vehicles to complete.
- ☐ The project requires materials to be transported from outside of the UFR watershed.
- ☐ The project requires workers from outside of the UFR watershed.
- ☐ The project is expected to generate GHG emissions for other reasons.
- ☐ The project does not have a construction phase and/or is not expected to generate GHG emissions during the construction phase.

Operating Emissions

(If you check any of the boxes, please see the attached worksheet)

- ☐ The project requires energy to operate.
- ☐ The project will generate electricity.
- ☐ The project will proactively manage forests to reduce wildfire risk.
- ☐ The project will affect wetland acreage.
- ☐ The project will include new trees.

Adaptation & Resiliency Assessment

Water Supply

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water supply vulnerability issues:

- ☐ Not applicable
- ☐ Reduced snowmelt
- ☐ Unmet local water needs (drought)
- ☐ Increased invasive species

Water Demand

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water demand vulnerability issues:

- ☐ Not applicable
- ☐ Increasing seasonal water use variability
- ☐ Unmet in-stream flow requirements
- ☐ Climate-sensitive crops
- ☐ Groundwater drought resiliency
- ☐ Water curtailment effectiveness

Water Quality

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority water quality vulnerability issues:

- ☐ Not applicable
- ☐ Increasing catastrophic wildfires
- ☐ Eutrophication (excessive nutrient pollution in a waterbody, often followed by algae blooms and other related water quality issues)
- ☐ Seasonal low flows and limited abilities for waterbodies to assimilate pollution
- ☐ Water treatment facility operations
- ☐ Unmet beneficial uses (municipal and domestic water supply, water contact recreation, cold freshwater habitat, spawning habitat, wildlife habitat, etc.)

Flooding

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority flooding vulnerability issues:

- ☐ Not applicable
- ☐ Aging critical flood protection
- ☐ Wildfires
- ☐ Critical infrastructure in a floodplain
- ☐ Insufficient flood control facilities

Ecosystem and Habitat

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority ecosystem and habitat vulnerability issues:

- ☐ Not applicable
- ☐ Climate-sensitive fauna or flora
- ☐ Recreation and economic activity
- ☐ Quantified environmental flow requirements
- ☐ Erosion and sedimentation
- ☐ Endangered or threatened species
- ☐ Fragmented habitat

Hydropower

Describe how the project makes the watershed (more/less) resilient to one or more of the following high priority hydropower vulnerability issues:

- ☐ Not applicable
- ☐ Reduced hydropower output

GHG Emissions Analysis

Project Construction Emissions

☐ The project requires non-road or off-road engines, equipment, or vehicles to complete. If yes:

Type of Equipment	Maximum Number Per Day	Total 8-Hour Days in Operation	Total $MTCO_2e$
			0
			0
			0
			0
			0
			0
			0
			0
			0
		Total Emissions	**0**

☐ The project requires materials to be transported from outside of the UFR watershed. If yes:

Total Number of Round Trips	Average Trip Distance (Miles)	Total $MTCO_2e$
		0

☐ The project requires workers from outside of the UFR watershed. If yes:

Average Number of Workers	Total Number of Workdays	Average Round Trip Distance Traveled (Miles)	Total $MTCO_2e$
			0

☐ The project is expected to generate GHG emissions for other reasons. If yes, explain:

☐ The project does not have a construction phase and/or is not expected to generate GHG emissions d
construction phase.

Project Operating Emissions

☐ The project requires energy to operate. If yes:

Annual Energy Needed	Unit	Total $MTCO_2e$
	kWh (Electricity)	**0**
	Therm (Natural Gas)	**0**

☐ The project will generate electricity. If yes:

Annual kWh Generated	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☐ The project will proactively manage forests to reduce wildfire risk. If yes:

Acres Protected from Wildfire	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☐ The project will affect wetland acreage. If yes:

Acres of Protected Wetlands	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

☐ The project will include new trees. If yes:

Acres of Trees Planted	Total $MTCO_2e$
	0

*A negative value indicates GHG reductions

GHG Emissions Summary

Construction and development will generate approximately:	0 $MTCO_2e$
In a given year, operation of the project will result in:	0 $MTCO_2e$

ITEM NO. 6

Upper Feather River
Integrated Regional Water Management

RWMG Meeting No. 7
October 23, 2015

To: Upper Feather River Regional Water Management Group

From: Uma Hinman, Uma Hinman Consulting

Subject: Next Meeting Date and Topics

Date: October 18, 2015

INTRODUCTION

Regular Meeting

Suggested dates for the eighth regular RWMG meeting are November 20, December 4 or 11.

Topics recommended for the next RWMG meeting:

1. Workgroup updates
2. Tribal Outreach update
3. Presentation of Agricultural Land Stewardship Workgroup RMS recommendations
4. Presentation of Uplands/Forest Workgroup and Tribal Advisory Committee RMS recommendations
5. Plan Performance and Monitoring
6. Draft Implementation Project lists

Future topics:

- Draft DAC Assessment
- Presentation on Community Vulnerability Study
- Presentation on Forest-Water Balance Study
- Draft chapter reviews

REQUEST

Discuss and approve the next meeting date, time and tentative content.