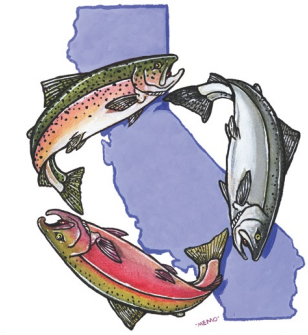
Collaborative Water Management —

A Stakeholder-driven Approach to Enhance Streamflow and Improve Water Supply Reliability in Northern California Coastal Watersheds



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Chapter 1: The Need and Basis for Collaborative Water Management

Throughout the North Coast of California, rural residents and communities are grappling with water shortages and navigating complex regulatory requirements. California's climate coupled with the State Water Board's efforts to bring all water diverters into compliance with state water law highlights the imperative of community-based water conservation planning. Enhancing instream flows for endangered salmonids and water security for landowners requires proactive and collaborative approaches to improve water management practices. This report presents a Collaborative Water Management (CWM) framework to address water resource management in decentralized watersheds. Chapters highlight tools and resources to address current restoration obstacles as well as opportunities that could incentivize water users to coordinate management efforts at a watershed-scale. Additionally, the report outlines a communication strategy and a conceptual CWM pilot demonstration project plan to advance cooperative flow enhancement efforts in the Navarro River. The CWM framework and pilot project are intended to inform and advance similar efforts in other undammed coastal watersheds and tributaries in the region that are struggling to meet the water needs for people and aquatic species.

1.1 Background

California is one of five major agricultural regions in the world that has a Mediterranean climate, where most of the annual rainfall occurs in the winter with scant precipitation during the long dry summer seasons. California's hydrology is highly altered and increasingly vulnerable to climate change effects including longer dry seasons, reduced snowpack and snowmelt, and extreme weather variability. The state arguably has the most complicated water delivery infrastructure anywhere on earth. Most of California's water originates from the mountainous northern part of the state and the Sierra Nevada and is transported to the more populated centers where there are not sufficient water resources to support the growing cities, agricultural production, and development. Sustainably managing freshwater resources has become one of the most pressing issues in the state with debates raging over how to maintain aging infrastructure, dam removal and safety, groundwater management, water scarcity, and instream flows for beneficial uses.

Since California is the most populated state in the country and produces the lion's share of agriculture for the nation and export, it is increasingly challenging to meet the state's water needs and protect native species that rely on instream flows. The recent extended drought underscores how vulnerable California is to the effects of prolonged dry seasons, extended drought, and climate change. Ongoing population growth, development, and agriculture will necessitate improved water management strategies as well as vast improvements to aging water infrastructure and delivery systems. While there has been significant attention to these issues in the densely populated or agriculturally intensive areas of the state, these challenges also deeply affect rural, less intensively managed regions that often lack sufficient infrastructure to address water shortages. In northern coastal watersheds, increasing diversions of water from rivers and streams has degraded important habitat for coho salmon and steelhead. The rural regions of central and northern coastal California watersheds largely lack centralized water management. Landowners and their thousands of points of water diversions are dispersed. As such, collaborative, stakeholder-driven water management efforts are needed to engage landowners across this large portion of the state to improve water reliability for residents and enhance instream flows for salmon and other aquatic species in these areas.

In many coastal watersheds, land use practices and residential domestic water use often require more water supply than is readily available instream during the dry season. For this reason, many conservation groups and landowners are moving towards winter water storage as a means to store enough water to be able to forgo diversion in the summer months when instream flows are critical for endangered species like juvenile coho salmon.

Northern California coastal watersheds such as the Navarro, Mattole, and South Fork Eel rivers also suffer from the cumulative impacts of historic land use practices as well as unpermitted and often unregulated water diversions. These watersheds that provide salmon refugia are mostly in private land ownership. Industrial logging, ranching, agriculture, unregulated cannabis cultivation, viticulture, and rural sub-divisions have increased water scarcity and greatly altered the natural flow regime and stream habitats. Roads, skid trails, culverts and vegetation change have reduced infiltration of rainfall and recharge of groundwater that makes up a significant amount of streamflow in the dry season. The cumulative legacy impacts and water diversions have reduced stream flows needed for both community water supply and endangered salmon and steelhead, and often contributed to increased water temperatures, and dewatering of streams.

The water resource issues and impacts to listed species have prompted efforts by State Water Resources Control Board and California Department of Fish and Wildlife (CDFW) to bring water diverters into compliance with state water law and permitting requirements, though resources allocated to these efforts have been somewhat limited to date. In light of limited resources, the increasing peril to listed species, and increasing regulatory pressure, there is a growing need for coordinated, community-based water resource management to both increase water security for landowners, and improve instream conditions for aquatic species.

Absent a centralized water supply system, rural landowners and businesses are responsible for managing their own water diversions and creating sufficient water security to weather the dry summer months. Since water diversions are regulated by state agencies, many water users who voluntarily want to come into compliance, and/or develop winter water storage, are navigating the complex regulatory requirements of securing permits. Though many landowners already have riparian water rights, appropriative water rights are required to store water, and are becoming increasingly desirable to increase water security. Additional permits such as a CDFW's Lake and Streambed Alteration Agreement (a.k.a. 1600 permits) are usually required to divert water. These permits can be difficult to acquire, and regulatory obstacles and uncertainties as well as the cost of required ecological and water supply studies are often prohibitive for individual landowners.

Furthermore, isolated and uncoordinated water management and flow enhancement projects are unlikely to sufficiently enhance streamflow in priority streams because of the relatively small amount of water savings and improved stream flow generated from small projects. To address these issues, stakeholders throughout the North Coast are exploring community-based water management efforts to enhance streamflow. Collaborative water management offers a proactive way to address these challenges and empower groups of relatively small diverters to coordinate their water use in ways that collectively could produce greater net benefits to streamflow, and increase landowners' water security.

Fundamentally, collaborative water management addresses changes to the way that people manage and use water including changes in the timing of water diversions and storage; infrastructure (tanks, ponds, rainwater catchment, etc.) to achieve management changes, and the required permits and approvals that indoctrinate water management agreements. Collaborative

planning efforts could improve the ease and cost-effectiveness of implementing water management projects and flow enhancement actions.

1.2 Collaborative Water Management in the Navarro River Watershed

The Navarro River watershed embodies many of the conservation and water management challenges and opportunities that pertain to rural and undammed North Coast watersheds. Land-use in the watershed includes forestland (70%), rangeland (25%), and agriculture (5%) with a small percentage devoted to rural residential development.[1] Timber production, livestock grazing, and other agricultural activities have been present in the Navarro River watershed since the mid-1800s, resulting in significant natural habitat alteration and loss. Today, commercial timber harvesting, viticulture, orchards, grazing, and tourism are the principal economic enterprises. Other land use practices include rural-residential sub-divisions, cannabis cultivation, and small market and hobby gardens. There are no major dams, water agencies, or water masters in the basin, and there are hundreds of small water diversions.

Due to the legacy impacts from land management practices and ongoing water diversions, the streams of the Navarro watershed are impaired, and often do not provide sufficient habitat for coho salmon and steelhead trout populations that are listed under the Endangered Species Act. A critical limiting factor for coho salmon and steelhead trout in the Navarro watershed is the availability of summer rearing habitat for juvenile fish. Summer and fall stream flows have declined significantly over the last 50-60 years due to the cumulative impacts of water diversions, timber harvest, road building, and other resource-extractive activities. Proactive and collaborative water management planning can help address community needs as well as legacy land use impacts, agricultural demands, and the lack of a centralized municipal water infrastructure. Addressing the challenges in the Navarro watershed will require working cooperatively at a tributary-scale to provide water reliability for landowners and enhanced instream flows for salmon.

In 2013 The Nature Conservancy, in partnership with the Mendocino County Resource Conservation District (MCRCD) and Trout Unlimited (TU), began a project to increase streamflows in the Navarro River Watershed as part of a larger effort to advance environmental flow projects and strategies to support the recovery of listed coho salmon and steelhead in Northern California. In 2016 the partners were awarded a grant from the Wildlife Conservation Board to implement the Navarro River Watershed Flow Enhancement Project. One of the overarching goals of this project is to develop a Collaborative Water Management (CWM) framework for stakeholder-driven efforts that could improve instream flows in regions with unregulated and decentralized water supply systems. The project's underlying strategy is to incentivize landowner collaboration, within prioritized tributaries, to develop and implement flow enhancement projects. This report represents one of the deliverables under the grant, providing descriptions of many of the elements that are necessary or helpful to developing CWM in similar coastal watersheds.

The project partners were recently awarded a second Wildlife Conservation Board grant to fund the second phase of the effort to implement a CWM pilot demonstration project. As part of the pilot demonstration project, TNC and the MCRCD intend to begin the process of working with willing landowners over the next two years in a priority tributary to the Navarro River to establish a Collaborative Water Management group. The group will work together to develop a tributary water management plan that will include a suite of projects and management actions to improve summer

[1] *https://www.waterboards.ca.gov/northcoast/water_issues/programs/wpc/14navarrosec2.pdf*

baseflows and water supply reliability. A goal of the tributary water management plan will be to meet the requirements of the North Coast Instream Flow Policy[2] (North Coast Policy) Watershed Approach by identifying the technological infrastructure and data necessary to support decision-making processes, developing a charter or agreements to guide on-going management actions, and creating streamflow monitoring methods for measuring project impacts on streamflow.

1.3 Collaborative Water Management

The Collaborative Water Management Project (CWM) provides a model framework to advance voluntary, watershed-based and stakeholder-driven collaborative water management that leverages existing water management policies and tools to increase water security and improve environmental flows for salmonids. A deliverable of the CWM Project was to synthesize existing information resources with input from water resource management practitioners working in the North Coast region. This report provides essential information and practical guidance to empower project planners and landowners to collaborate on projects and identify appropriate management actions to improve streamflow. It is our hope that this compilation of resources, tools and actions will foster the development of collaborative water management plans among landowners who are interested in improving their own water security and stewarding the health of our streams, fish and wildlife.

[2] *Policy for Maintaining Instream Flows in Northern California Coastal Streams,* State Water Board, Division of Water Rights, 2014

Chapter 2: Developing a Collaborative Water Management Framework

At the Navarro Flow Enhancement Project Technical Advisory Group's 2nd meeting in August 2017, part of the agenda was devoted to discussing the initial concepts and elements of a Collaborative Water Management framework. On January 17th, 2018, the project team convened a CWM TAG workshop with an agenda structured around four interactive brainstorming sessions to discover where there were common themes and converging ideas about the various framework elements necessary to advance collaborative water planning. The CWM TAG included members from agencies such as California Department of Fish and Wildlife, National Marine Fisheries Service, State Water Resources Control Board, and the North Coast Regional Water Quality Control Board, as well as others from Sanctuary Forest, Salmonid Restoration Federation, TNC, TU and MCRCD.

The following bullet point summary captures the overarching themes for each brainstorming session and provides insights pertaining to incentives, opportunities, challenges, and key elements that should be considered in developing a CWM framework.

Brainstorm Session #1 - Incentives for Stakeholder Collaboration

The brainstorming session regarding incentives focused on social, informational, regulatory, funding and assistance incentives. Water security and community / stewardship values often motivate landowners but without financial and technical assistance it is unlikely that small landowners will be able to navigate the planning, regulatory and permitting process. Regulatory certainty, permitting pathways, and informational support are essential to advance voluntary collaborative stakeholder efforts to forbear from summer diversions to improve summer base flows for fish, and comply with state and county regulations. Fundamental elements to leverage incentives include stakeholder/community outreach and education about the needs and benefits of collaborative water management, and developing partnerships within communities that affect a cultural shift towards sustainable water use.

Incentives identified by the TAG include:

- Water Security
- Permitting Pathways
- Funding / Assistance
- Community / Stewardship Values
- Flexibility of Management
- Regulatory Compliance / Certainty
- Informational Support

Brainstorm Session #2 - Opportunities to Enhance Flows

The brainstorming session on opportunities to enhance flows identified a wide array of policy, permitting pathways, existing flow enhancement tools and practices, and funding opportunities. The group highlighted that the State Water Board's Cannabis Cultivation Policy[3] could provide opportunities to advance broader benefits to instream flows through the Policy's guidance on mandated water management plans and BMPs. Other policies that are regarded as providing flow enhancement opportunities are the North Coast Policy's Watershed Approach and instream flow dedications (California Water Code Section 1707). The urgency and relatively swift action to

[3] *Cannabis Cultivation Policy*, State Water Board, 2017

implement drought-related polices and mitigation and resilience measures were also noted as opportunities that should be leveraged going forward even though the California drought declaration has ended.

Opportunities identified by the TAG include:

- Cannabis Cultivation Policy, helps set the bar on BMPs
- Policy Tools
    - NCIFP, California Water Code Section 1707, programmatic permitting, Sustainable Groundwater Management Act, California Water Action Plan
- Drought and climate change resilience strategies and policies
- Existing flow enhancement tools and practices
    - Storage and forbearance
    - Rainwater capture
    - Groundwater recharge
    - Beaver dam analogs
    - Large woody debris / Engineered log jams
- Funding prioritization and grant program reform (update scoring protocols, etc.)
- Permitting pathways that could simplify the administrative process:
    - *Ministerial to discretionary*: A ministerial decision is one that calls for little or no judgement by an agency, while a discretionary decision is one that requires the agency to exercise its judgement in deciding what action to take (e.g., whether to grant or deny a permit).
    - *Conjunctive use*: Conjunctive use refers to the coordinated use of surface water and groundwater to meet some kind of objective – for example, by using surface water to meet water during the wetter months of the year and switching to groundwater during drier months of the year, to lessen direct impacts to surface streamflow.
    - *Timing of diversion*: Diverting and storing water in the winter when flows are ample and refraining from summer diversions improves streamflow. Water storage requires that landowners file and report to the Division of Water Rights.

Brainstorm Session #3 - Challenges to Collaborative Approaches to Enhance Streamflows

Most participants identified the lack of scientific data, the expense of required water analyses and site-specific studies, and the cost of permitting as primary challenges. Additionally, practitioners spoke of the funding disconnect where priority projects often don't match scoring protocols. The long timeframe between proposal development and implementation often takes years of development, planning, and permitting before projects are shovel-ready which is particularly challenging when salmonid populations are crashing.

Themes included:

- Lack of scientific data
    - Expense of complex studies required
    - Poorly defined study needs and flow thresholds
    - Difficulty and expense of groundwater studies
    - Lack of comprehensive diversion data
    - Expense and difficulty of setting flow objectives
    - Lack of water use monitoring

- Need for continuing outreach
- Cost of permitting and compliance
- Lack of funds and disconnect with scoring protocols in grant programs

Needs Identified:

- Technical assistance
- Community outreach and education
- Funding for CWM plan development process
- Data to demonstrate measurable results
- Countering misinformation about water rights compliance and regulatory requirements
- Identify which landowners are willing to work together and common interests
- Demonstration projects
- Projects to improve existing diversions

Regulatory Concerns:

- Cost of compliance
- Pace of regulatory approval
- Risk of regulation due to participation / supporting data collection
- Protracted permitting processes due to uncertainty, lack of information, complacency, lack of county support to reduce taxes, etc.
- Lack of urgency in regulatory climate
- Lack of assurances and regulatory uncertainty

Community Challenges:

- Lack of community awareness about issues and opportunities
- Need for focused outreach and education
- Neighbor relationships, how to foster proactive conversation?
- Landowners not being cooperative with each other

Funding Challenges:

- Storage is expensive
- Need for funding to support stakeholder project planning
- Priority for shovel-ready projects
- Risk aversion for new project types
- Lack of stable funding for stream flow gaging
- Cost of water right and flow/habitat studies
- Cost of permitting

Legal Challenges:

- County permitting requirements are often not consistent with state regulatory requirements
- California water law creates disincentives to store water
- Unclear jurisdictional lines
- Unclear/undefined concepts: What is surface water and what is groundwater? What is a stream? What is a substantial diversion?
- Cumulative impacts not well-described or understood

Brainstorm Session #4 - Key Elements of a CWM Framework

The common themes that emerged during the key elements brainstorm were that collaborative flow enhancement efforts need to be community-based and memorialized into binding agreements that establish clear goals. These efforts require strong collaboration and agency flexibility.

Success depends on establishing a common goal that brings stakeholders together, identifying flow objectives, agency management support for participating partners, and a willingness to embrace local solutions. There should also be clear criteria for measuring and replicating successful efforts.

Key elements include:

- Outreach and education
- Collaboration between stakeholders, NGOs, landowners, agencies
- Trust
- Facilitation
- Informational, technical and regulatory/permitting support
- Charters and binding agreements
- Clearly defined over-arching goals
- Flexibility with grant administration and developing practical agreements

The following chapters highlight policy actions, water management tools, informational resources, and outreach strategies that could help incentivize coordinated water management and address challenges identified by the Navarro Technical Advisory Group and participating stakeholders. Additionally, case studies are provided that illustrate the use of these resources, and help provide examples of opportunities and challenges in developing Collaborative Water Management projects.

Chapter 3: Policy and Management Tools to Support Collaborative Water Management

3.1. Introduction

There are various environmental policies governing flow enhancement activities that can be utilized to advance collaborative efforts among watershed stakeholders. The CWM framework seeks to leverage existing policies and management actions in order to promote and expedite flow enhancement activities to benefit fisheries and improve water security for landowners. This chapter describes the utility and benefits of existing policy tools including the North Coast Instream Flow Policy, California Water Code Section 1707 instream flow dedications, Safe Harbor Agreements and a coordinated strategy that includes a batched approach to 1600 permits.

Additionally, this chapter explores voluntary and collaborative approaches including storage and forbearance and coordinated timing of diversions, as well as restoration practices to enhance flows including large wood installations and groundwater infiltration projects.

3.2. Policy Tools to Support Improved Water Management

A. The Policy for Maintaining Instream Flows in Northern California Coastal Streams (North Coast Policy) is a set of rules, developed by the State Water Resources Control Board for maintaining instream flows in the Northern California coastal region. The Policy is designed to maintain instream flows for anadromous salmonids by expediting new winter water rights, if they result in enhanced conditions for fish and wildlife. The North Coast Policy includes the Watershed Approach, intended to promote and support stakeholder group efforts that, if utilized, could advance Collaborative Water Management planning activities to enhance streamflows.

The North Coast Policy promotes principles and guidelines for improving instream flows for the protection of fishery resources, while minimizing water supply impacts on other beneficial uses of water, such as irrigation, municipal use, and domestic use. The geographic scope of the Policy encompasses coastal streams from the Mattole River to San Francisco and coastal streams entering northern San Pablo Bay, and extends to five counties: Marin, Sonoma, and portions of Napa, Mendocino, and Humboldt Counties. However, it does not cover the Eel River basin. The Policy applies to applications to appropriate water, small domestic use, small irrigation use, and livestock stock pond registrations, and water right petitions.

The policy prescribes protective measures regarding the season of diversion, minimum bypass flow, and maximum cumulative diversion. Applicants can implement the policy principles through a specified regionally protective criteria or alternatively through site-specific studies. Furthermore, “The policy provides for a watershed-based approach to evaluate the effects of multiple diversions on instream flows within a watershed as an alternative to evaluating water diversion projects on an individual basis.” (Chapter 4, p.21) This Watershed Approach could provide an incentive for landowners who can share the expense of site-specific studies and permit application efforts to advance their water conservation goals.

“The primary objective of the North Coast Instream Flow Policy is to ensure that the administration of water rights occurs in a manner that maintains instream flows needed for the protection of fishery resources. This policy establishes the following five principles for the administration of water rights:

1. Water diversions shall be seasonally limited to periods in which instream flows are naturally high to prevent adverse effects to fish and fish habitat;

2. Water shall be diverted only when streamflows are higher than the minimum instream flows needed for fish spawning, rearing, and passage;
3. The maximum rate at which water is diverted in a watershed shall not adversely affect the natural flow variability needed to maintain adequate channel structure and habitat for fish;
4. The cumulative effects of water diversions on instream flows needed for the protection of fish and their habitat shall be considered and minimized; and
5. Construction or permitting of new on-stream dams shall be restricted. When allowed, on-stream dams shall be constructed and permitted in a manner that does not adversely affect fish and their habitat."[4]

***B. Registrations*.** The State Water Board's Division of Water Rights administers post-1914 appropriative water rights in California. One class of appropriative rights are registrations; these differ from other appropriative rights in that they are easier to obtain, but must be renewed every five years. There are three types of registrations: Small Domestic Use (SDU) registrations, Livestock Stockpond Use, and Small Irrigation Use (SIU) registrations. Most residential landowners will qualify for a SDU if they divert less than 4,500 gallons per day directly, and divert less than 10 acre-feet (3.2 million gallons) per year to storage. Water storage is usually in the form of tanks or ponds. These registrations provide a means to expedite permitting if the standard permitting requirements are met. Like all water rights issued by the Water Board, registrations include protective measures for fish such as maximum pumping rates, minimum bypass flows, and fish screens.

Landowners who want to store water will need an appropriative water right. For irrigation diversions of up to 4,500 gallons per day and 20 acre-feet of storage, such a right can be obtained via a small irrigation use registration (SIU). The advantage of SDUs and SIUs is that they take less time and expense to acquire than full appropriative water rights. The disadvantage is that they must be renewed every five years. Both SDUs and SIUs are an option for water diverters that are within the North Coast Policy area. Both require CDFW consultation.

C. Safe Harbor Agreements are another policy tool that can be used to improve instream flows. Generally speaking, a Safe Harbor Agreement (SHA) is a voluntary cooperative conservation agreement between private landowners and NOAA Fisheries or the U.S. Fish and Wildlife Service to support the recovery of species protected under the federal Endangered Species Act (ESA). This approach is based on the premise that actions taken under the SHA will provide a net conservation benefit that contributes to the recovery of the species. Examples of conservation benefits include reduced habitat fragmentation, restoration of existing habitat, increased habitat connectivity, buffers for protected areas, and opportunities to test and develop new habitat management techniques. The benefit to participating property owners is that they receive formal "assurances" that they will not be subject to land use restrictions that result in an incidental take of a "listed species" as long as activities improve the overall conditions of the habitat.

This type of agreement is most appealing to property landowners who have the resources to restore their property for listed species and would benefit from regulatory assurances that they will not be held responsible for "take" of a listed species that may occur during management activities result in a net conservation benefit. Landowners who value stewardship and have business enterprises on their land including family farms, ranching, and viticulture would be more likely to participate in a SHA than a small landowner who is not engaged in permitted and economic management activities.

[4] *Policy for Maintaining Instream Flows in Northern California Coastal Streams,* State Water Board, 2014

Most SHA agreements can be developed within six to nine months, although more complex agreements may take longer. Various factors that can influence the timeline include the number and characteristics of the species involved, the size of the area and project, activities to be conducted, and the number of parties to the agreement. See this link for more information: https://www.fws.gov/endangered/landowners/landowners-faq.html

In Northern California, National Oceanic and Atmospheric Administration (NOAA) Fisheries Division and Sonoma County Water Agency have pioneered a Safe Harbor Agreement in the Dry Creek tributary of the Russian River in order to protect salmon and steelhead. Participants in the voluntary program receive assurances for ESA compliance in the form of an "incidental" take permit for activities that are consistent with the agreement and support the recovery of listed salmon and steelhead. Landowners participating in the program are elevating the baseline habitat conditions for salmonids on their property in exchange for regulatory assurances that allows for incidental take of species that may result from routine viticulture operations. This program benefits the participating landowners as well as the multiple stakeholders and partnering agencies committed to habitat enhancement and salmonid recovery in the Dry Creek watershed.

A Landowner's Guide to Dry Creek Habitat Enhancement "Safe Harbor" Agreement outlines the steps for enrolling in this voluntary program and is a recommended sequence for other watersheds to follow.

1) Work with the designated agency to discuss and review conceptual designs for enhancement projects on your property;
2) Participate in the SHA program;
3) Develop or review your farm plan and BMP plan with the designated sponsoring agency and NOAA Fisheries. See winegrower BMP checklist.;
4) Enter into a "Cooperative Agreement" that includes the terms and conditions of the Safe Harbor Agreement;
5) Receive a "certificate of inclusion" issued for an enrolled property, providing the landowner protection from any incidental "take" of protected fish that occurs during the lawful course of viticultural / agricultural operations, as long as the agreed upon baseline habitat conditions are maintained.

The Nature Conservancy is developing another Safe Harbor Agreement to protect salmonids in the Shasta River. This SHA will also include a cooperative agreement, NOAA Fisheries regulatory assurances through an "enhancement of survival permit", and a certificate of inclusion.

D. California Water Code Section 1707 Instream Flow Dedications

Water Code Section 1707 allows for instream flow dedication, allowing a water user to change the beneficial use of all or a portion of a water right for "instream uses" so that the conserved water remaining in the watercourse benefits aquatic habitat, and cannot be taken by downstream users. This policy tool is the only mechanism that can provide a legal basis to prevent others from subsequently diverting the water intentionally left instream for fish and wildlife. Instream flow dedications require that the water user submit a 1707 petition to the State Water Resources Control Board. Once approved the petition will change the applicant's water right, and the ability of downstream users to divert that water, thereby resulting in improved instream flows. Section 1707 petitions are also a way of protecting a water right from abandonment by dedicating it to instream flow benefits. The Nature Conservancy, Trout Unlimited as well as other NGOs and landowners have successfully used instream flow dedications to enhance instream flows and protect their water rights.

E. Batched Approaches to 1600 Permits *Code 1602 Requirements:*

California Department of Fish and Wildlife (CDFW) has authority under Fish and Game Code section 1602 to regulate any water withdrawal that may have an impact on fish or other aquatic life. According to the Code, anyone who undertakes an activity that might "substantially divert or obstruct the natural flow of any river, stream, or lake" is required to notify CDFW of this activity. Such notifications are particularly important in fish-bearing streams and tributary streams where low flows have been identified as a limiting factor for salmonids. If CDFW determines (on a case-by-case basis) that a water diversion could have a "substantial" impact on the resource, a Lake or Streambed Alteration Agreement (LSAA) may be required. CDFW defines fish to include amphibians and other aquatic and terrestrial life. If a stream or spring has habitat for any aquatic life or is a tributary to such a stream, then an agreement may be necessary. LSAAs are generally required on an individual basis, though programmatic LSAAs are sometimes available for larger properties or programs.

Sanctuary Forest and CDFW have been working on developing a batched approach for the Mattole Storage and Forbearance Program since 2012 utilizing a "long-term group agreement" in lieu of individual agreements for each landowner. The model under development is structured with Sanctuary Forest as the primary permittee and the landowners as sub-permittees. Sanctuary Forest is responsible for annual monitoring of streamflows, landowner compliance and submitting a status report to CDFW every four years. The landowners are individually responsible for operation of their diversions and compliance with all permits. The term of the agreement is 20 years with one renewal allowed for an additional five years. The group agreement includes landowners with different types of water rights for commercial and domestic uses. New landowners can be added under a sub-notification. The process and fees for the sub-notifications are negotiated as part of the agreement.

Batching LSAA permits is most applicable within small watersheds or sub-watersheds where all of the landowners are within relatively close proximity of each other. For large watersheds, several group LSAAs could be developed to cover different tributaries or communities within the watershed.

The advantages of a long-term group approach versus an individual standard agreement approach include:

- Creating a model for long-term management of community water diversions
- Benefits to streamflow resulting from coordinated management of diversions
- Ease of adding new participants as a program expands
- Landowners are often more comfortable with a sub-agreement administered by a trusted local non-profit or RCD that is conducting monitoring compliance- therefore potentially more landowners will join under a batched model coordinated by overseeing NGO
- Conservation non-profits and RCDs can provide experience and expertise in monitoring and reporting that most landowners do not have
- One agreement versus multiple agreements is easier to manage and more cost-effective in the long-term
- Regulatory security — Negotiate the agreement once and the terms and conditions remain the same for all participants through the term of the agreement
- Program and participants would be impacted less by changing rules, agency personnel transitions, etc.

Disadvantages of the batched approach are largely the liability and financial costs and staffing for the managing non-profit or RCD, including:

- Initial time/negotiations - Takes more time to develop this type of agreement initially
- The managing NGO or RCD is responsible for monitoring flows, notifying landowners of forbearance period, compliance monitoring and 4-year status reports to CDFW over the length of the LSAA agreement (or will need to be shifted to landowners if the managing entity can't continue)
- The managing entity has funding responsibility for monitoring and reporting (fees from participants, grants, etc. may be required)
- Higher up-front cost

3.3. Informational Resources and Tools to Support Improved Water Management

There are many informational and online resources available in California to support the development of restoration projects and improved water management plans including online resources about groundwater management, hydrology resources, and water management tools. The following resources provide an overview of water management policies and tools that can be incorporated into watershed-based planning efforts.

A. Groundwater Management

The California Sustainable Groundwater Management Act enacted in 2014 was landmark legislation in that it recognized that California was at high risk of depleting aquifers beyond recovery. The legislation established a framework for sustainable, local groundwater management. "SGMA requires groundwater-dependent regions to halt overdraft and bring basins into balanced levels of pumping and recharge."

SGMA recognizes that the most effective way to manage groundwater is at the local level. Sustainable groundwater management can only be achieved in the context of a balanced regional water budget in which groundwater use and land-use decisions are inextricably linked. This landmark legislation calls for DWR and the State Water Board, in coordination with regional groundwater management entities, local land use authorities, and other stakeholders, to work toward developing guidance and tools to promote effective management of groundwater basins.

SGMA empowers groundwater sustainability agencies (GSAs) to manage groundwater resources for social, economic, and environmental benefits and to address specific requirements to identify impacts to groundwater dependent ecosystems (GDEs).

Although many watersheds in northern coastal California are not currently incorporated into a GSA, SGMA offers science-based guidance on establishing habitat and hydrologic thresholds and working with stakeholders that could be applied to a collaborative water management approach in the Navarro and other coastal watersheds that are not under the jurisdiction of a GSA.

The Nature Conservancy recently published an excellent guidebook entitled Groundwater Dependent Ecosystems Under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans to help agencies and stakeholders efficiently incorporate GDEs into groundwater sustainability plans. "This document is designed to inform local decision-making, consistent with SGMA's emphasis on local control. Rather than prescribing approaches or outcomes, this guidance provides a flexible process meant to enable GSAs and stakeholders to make decisions based on the best available science in a manner that promotes transparency and accountability." Given the nexus of managing groundwater sustainably and improving instream flows, this is a valuable resource due to its emphasis on watershed-based approaches informed by science and local decision-making structures.

Keeping Accounts for Groundwater Sustainability
UC Davis Center for Watershed Sciences produces this California Water Blog that outlines approaches for estimating water budget components. “The water budget serves as a summary of knowledge on a basin and a potent screening tool to evaluate approaches for sustainable management.” Since preparing Groundwater Sustainability Plans inherently involves uncertainties, UC Davis Watershed Sciences team recommends, “A constructive approach for moving forward with the plans may be to 1) accept the inevitability of some uncertainty, 2) implement actions based on current information and 3) plan to adjust actions as new information becomes available.”

California Department of Water Resources Water Management Tool
This is a GIS tool that allows access spatial data including county boundaries, Regional Water Quality Control Board boundaries, tribal lands, adjudicated groundwater basis, critically over-drafted basins, Prop. 1 funding areas, watersheds, water planning areas, Integrated Regional Water Management (IRWM) regions, and many other layers. This resource is particularly useful in California because it contains state drought reports, agricultural and water conservation resources, and information about California’s reservoirs and water supply systems. Since Department of Water Resources (DWR) regulates groundwater in California that comprises 1/3 of the state’s water, this online resource is indispensable for up-to-date information on groundwater legislation, basins, and planning tools.

B. Hydrology Resources and Tools

Hydrologic resources and access to current information is crucial for project planners to be able to develop projects and create management plans that are based on real-time hydrologic conditions. Gaging can be cost-prohibitive so most citizen or non-profit based flow monitoring rely on existing gage data to make correlations and develop flow thresholds. Real time hydrologic data collected by state and federal agencies like the Department of Water Resources or US Geologic Survey provides useful, current and free information that is key to gaining an understanding of hydrologic trends and relationships between precipitation, snow melt, flows and discharge patterns.

Department of Water Resources California Data Exchange Center
The California Data Exchange Center installs, maintains, and operates an extensive hydrologic data collection network including snow reporting gages, and precipitation and river stage sensors. This website offers real-time information pertaining to river conditions, drought and water supply information, and features an interactive daily statewide hydrologic update, and a new tool for California burn areas.

California Institute for Water Resources
The Institute develops research-based solutions to water-related problems. This is an educational website drawing from the expertise of California’s academic institutions to provide management tools for ranchers and farmers, particularly in this time of drought and climate change. The Tools and Resources section includes irrigation schedules, online webinars on drought resources, and a water management educational series.

USGS California Water Data
This comprehensive website includes basic hydrologic data collection, processing, analysis, dissemination, and archiving of the California Water Science Program data, including current California streamflow conditions, groundwater and surface water data, and sediment and water quality.

Managing California’s Freshwater Ecosystems Lessons from the 2012- 2016 Drought
This is a Public Policy Institute of California (PPIC) report that has an excellent summary of findings from eight California case studies on conservation-based water management during the

drought. The report finds that agreements between water users, environmentalists and key stakeholders hold the most promise for effective new approaches to water management. This resource emphasizes the resounding wisdom that watershed management plans should be tailored for specific watersheds and outlines elements of successful water management planning including: deciding on the right-scale, using eco-system and watershed based-approaches, integrating a range of stressors, acknowledging trade-offs and setting priorities, and building the necessary social license and capital.

This position paper recognizes the essential value of stakeholder involvement: "Stakeholder involvement also improves understanding of watershed conditions and is an important source of ideas. Stakeholder groups can play an important role as partners in improving physical habitat in watersheds that have large amounts of private lands."[5]

3.4. Physical Water Management Tools

Physical water management practices that can improve summer base flows include storage and forbearance, rainwater catchment, groundwater infiltration, and water efficiency or conservation practices. In designing any collaborative water management program it is important to have baseline data to understand the available water supply and what the current human water use is.

A. Diversion Forbearance Agreements

Forbearance agreements are legal agreements with landowners to voluntarily refrain from diversion during a specified period of time, typically the dry season. To meet water needs during the forbearance period, sufficient winter water storage is required, such as off-channel ponds, rainwater catchment, or tanks. Stored wet season water to reduce demands on instream flows in the dry season are currently the most common tool for collaborative water management in unregulated watersheds with minimal municipal infrastructure. Dry season forbearance periods should be informed by protective flow thresholds, and adhere to regulatory requirements. Forbearance terms may be fixed to dates (e.g. June 15-October 15), or could be pegged to certain flow thresholds (e.g. 2 cfs). Ideally, there is an identified and funded monitoring and outreach component in order to communicate effectively about the start of the forbearance period to participating landowners, if forbearance is pegged to flow thresholds.

B. Coordinated Diversions

Landowners in a watershed can coordinate the timing and rate of their diversions as a way of reducing the cumulative impacts of withdrawals. Coordination of diversion is often a component of water storage projects and forbearance planning because they are a cost-effective way to minimize summer diversion impacts. For example, a group of landowners may elect to alternate pumping days, so that only one landowner is pumping per day, in order to reduce cumulative diversion impacts and reduce the forbearance season. When planning a water storage program to offset summer impacts, it is important to understand domestic and irrigation water usage in a given stream and run scenarios to understand how coordinated could reduce cumulative impacts. Mechanics and calculations of coordinated diversions are more fully described in the Pilot Plan. The Sanctuary Forest case study presented in Chapter 8 further describes the added benefits of coordinated diversions and collaborative forbearance thresholds. Coordinated diversions is an accessible and affordable strategy for cooperating landowners because it can be accomplished efficiently, with little to no expense, and does not require permits and at the same time coordinated diversions can have an immediate and significant impact on flows.

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[5] *Managing California's Freshwater Ecosystem's Lessons from the 2012-2016 Drought*, Public Policy Institute of California, p.26

C. Storage and Forbearance

Building water storage capacity and forbearing from diverting water in the dry summer months is a likely management action that will be employed in the pilot plan area in the Navarro. Understanding water needs and protective flow thresholds will help determine what level of storage participating landowners require in order to forbear from water diversions for the designated time period.

The two main options for water storage are tanks and ponds. Where drinkability and water quality are important, tanks may be preferred, and where large amounts of water are needed for irrigation ponds may be preferred. Storing water in ponds is significantly less expensive, and can have other benefits. For example, ponds can store substantially more water that can be used for fire safety, gardening and recreation, and have the added benefit of increasing groundwater storage if the pond leaks water underground.

Sanctuary Forest has developed some useful metrics to determine what level of storage a landowner would require for forbearance. To determine the amount of storage needed, Sanctuary Forest recommends using average water use data from the State Water Resources Control Board.[6] Water conservation techniques can reduce actual use by 25-50% below these levels:

- Household water use: 55 gallons per day (gpd) per person
- Garden water use: 18.5 gpd per 100 square feet of garden
- Fire protection water reserve: 2500 gallons

Sample storage calculation for a 3-person household with a 1600 sq. ft. garden:

- Household water need (Aug 1 – Nov 15): **17,325 gallons**
  (105 days × 3 people × 55 gpd)
- Garden water need (Aug 1 – Oct 15): **22,496 gallons**
  (Based on 76 days × 1600 sq. ft. x 18.5 gpd per 100 sq. ft.; this assumes that households will stop irrigating their gardens after October 15, which is recommended)
- Fire protection: 2500 gallons

Total household storage need: 42,321 gallons (for 3½ months)

D. Rainwater Capture and Storage

Stored rainwater is less common and underutilized in California. Rainwater can be stored in tanks or ponds. Rainwater catchment is not subject to the California Water Code's SWRCB diversion permit requirement [California Water Code §§ 1200 *et seq.*], though it may require treatment for potable uses. In any case, relief from the permit requirement incentivizes residents, private businesses, and public agencies to create rainwater supplies to meet landscaping needs, thus decreasing the use of potable water to meet those needs. Rainwater catchment is a practical, cost-effective, and feasible practice to employ in the Navarro watershed.

In California, property owners are currently taxed on rainwater capture systems. Fortunately, a new state ballot measure incentivizing rainwater catchment, Proposition 72, qualified for the 2018 California primary election. If passed, property owners who install rainwater capture systems won't be required to have their property reassessed, saving them from paying higher property taxes.

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[6] *Water Stewardship Guide—Conserving and Storing Water to Benefit Streamflows and Fish in North Coast Creeks and Rivers*, Sanctuary Forest, 2017

E. Groundwater Conjunctive Use and Groundwater Infiltration

Conjunctive use of groundwater is the least common and most complex form of water management but an important long-term management goal to ensure water reliability in California. Conjunctive use means actively managing the aquifer systems as an underground reservoir, or groundwater bank. During wet years, when more surface water is available, surface water is stored underground by recharging the aquifers with surplus surface water. During dry years, the stored water is available in the aquifer system to supplement or replace diminished surface water supplies for human use.

Groundwater infiltration is the process of water entering the soil and underground aquifers. Management practices that help with groundwater infiltration include engineered logjams in streams or floodplains, groundwater recharge ponds, check dams, and beaver dam analogs. Large wood restoration techniques have been successfully implemented in the Navarro, Mendocino Coast, the Lower Klamath, the Eel and the Mattole, and many other coastal watersheds to improve habitat for salmonids. Utilizing large wood has been applied in small creeks and larger systems and post-project monitoring indicates that this practice provides fish habitat and improves streamflow.

Groundwater recharge projects include small restoration projects on the North Coast and the Sierra Nevada, and larger infrastructure projects closer to urban areas and in the Central Valley. Both large wood installation and groundwater recharge at a smaller scale are important and evolving habitat restoration techniques that do not yet have established protocols documented in the CDFW California Salmonid Stream Habitat Restoration Manual though there are other helpful resources available (see Chapter 4 below). Salmonid Restoration Federation in coordination with restoration partners strives to advance the acceptance and implementation of these innovative practices by offering large wood installation technical education workshops, intensive large wood restoration field schools, and a groundwater recharge symposium in 2018 and 2019 respectively.

Upslope land management to slow the rate of runoff and sediment displacement is also an important habitat restoration and groundwater infiltration technique to improve streamflows. Upslope land management, groundwater recharge, large wood projects, and grading for water storage require moving earth so it is important to employ Best Management Practices (BMPs). There are a lot of great resources addressing erosion and sediment control that have been developed by the Mendocino County RCD and Pacific Watershed Associates including the Handbook for Forest, Ranch and Rural Roads (2015)[7]

In California, there are numerous resources and options that can be employed to improve water management. Selecting the appropriate resource and approach to advance a particular project requires a clear understanding of landscape conditions, water usage patterns, community priorities, and the regional and statewide policies and laws that regulate water diversions. Working with a community to ascertain their water needs and share data and pertinent resources facilitates collaborative water management planning.

[7] *Handbook for Forest, Ranch and Rural Roads*, Pacific Watershed Associates, 2015

Chapter 4: Informational Resources and Guidance for Projects and Management Actions to Improve Streamflows and Water Supply Reliability

4.1 Introduction

Several non-profit organizations and Resource Conservation Districts including The Nature Conservancy, Mendocino County Resource Conservation District, Trout Unlimited, Sanctuary Forest, and Salmonid Restoration Federation have developed materials to advance water conservation, best management practices, water transactions, and transferable water conservation models. This chapter synthesizes existing resources and how they can be applied to collaborative water management planning.

The resources identified below include water conservation and storage educational materials, land and water stewardship guides for landowners, existing policies and incentive approaches, and water rights and transaction resources. Additionally, this chapter explores the kinds of technological infrastructure and data necessary to support water management decision-making processes and permitting, as well as monitoring compliance and methods for measuring impacts on streamflow. Understanding and utilizing a range of existing policies and tools can help achieve meaningful, voluntary water management actions to improve streamflow.

4.2 Water Conservation and Collaborative Planning Resources

Resilience in a Time of Drought: A Transferable Model for Collective Action in North Coast Watersheds is a practical 'how-to' guide for community members, restoration practitioners, non-profits, and other stakeholders wishing to establish a voluntary water conservation program in their watershed. This guide was developed based on the methods and findings of a collaborative technology transfer project that was initiated in Humboldt County, California in 2013 by Sanctuary Forest and Salmonid Restoration Federation (SRF) in collaboration with Sara Schremmer, a graduate student in the sociology program at Humboldt State University.

This guide was designed for rural and unregulated watersheds where the population is dependent on local water resources to meet their agricultural or household needs. This useful guide includes chapters on how to conduct a feasibility study; water conservation, efficiency, and storage information; sample materials, and recommended resources regarding issues pertinent to water conservation including funding sources, flow monitoring methods, survey methodology, water rights information, and water efficiency, permaculture and storage information.

This guide is helpful because it outlines replicable steps involved in conducting a feasibility study including:

1) Determining the scope of your study area;
2) Identify and contact stakeholders
3) Collect and analyze preliminary data
4) Work with a hydrologist to assess the flow regime in your watershed
5) Assess the type of actions required to reduce water diversions impacts
6) Community outreach and engagement
7) Implement a voluntary water conservation program

This guide is a comprehensive "technology transfer" resource since it explores several elements to create a successful, transferable model of collective water management including descriptions about how to assess the flow regime in your project area, determine the types of actions to reduce water diversion impacts, and implement a voluntary water conservation program. This resource

includes methodologies for collecting water-use data and sharing that data in a meaningful and accessible way with community members. Sample materials include a water-usage survey, a draft outline of a Quality Assurance Project Plan, and community meeting agendas. One of the report findings is that collective efforts to transfer or scale-out voluntary water conservation strategies will increase chances for success, if: a) local residents have an emotional and physical attachment to the watershed as their place; b) if the project is driven by the stakeholders and residents who stand to benefit from increased streamflows; and c) if stakeholders and residents have sufficient access to ecological data.

Options and Obstacles: Living with Low Water Flows in the Mattole River Headwaters
Prepared by Tasha McKee, Sanctuary Forest, 2004

This report provides historical context and current conditions and explores the causes of low flow problems including climate change, land use history, and population and water use increases. Most valuably, the report outlines potential solutions to the low flow problem and voluntary measures for water conservation and management practices. The methodology of low flow studies was two-fold: 1) to understand human-water usage patterns, and 2) to monitor flows to understand what types of water conservation would be the most effective for the project area.

This report outlines data collection methods, water conservation and irrigation measures, the rationale for how to determine required storage, and a water rights component. The report also explains various types of landowner agreements for streamflow protection including forbearance agreements, conservation easements, and instream flow dedications. Furthermore, this report chronicles the monitoring of landowner agreements, taxation of storage ponds and tanks, and permitting requirements for storage.

Dutch Bill Creek Stream Flow Improvement Plan, The Russian River Coho Water Resources Partnership, March 2017

This Streamflow Improvement Plan (SIP) is a roadmap for prioritizing and implementing streamflow improvement projects with multiple public benefits and a diversity of approaches in the Dutch Bill Creek watershed. The Partnership applies a systematic, watershed-scale approach that brings together landowner interests, streamflow and fish monitoring, technical, planning and financial assistance, and water rights and permitting expertise to modify water use and management to improve instream flow. Chapter 3 regarding human needs, rainfall, discharge, land use, etc. is particularly useful for outlining methodologies that could be useful for a pilot plan in the Navarro River watershed.

From Storage to Retention: Expanding California's Options for Meeting Its Water Needs
California Roundtable on Water and Food Supply, November 2012

This resource is for collaborative water management planning and highlights principles to ensure water retention including: 1) storage that integrates hydrologic components affecting water reliability, 2) the need for comprehensive, timely, and transparent data to inform effective management of stored water, 3) effective storage requires coordination of policies, activities, and accountability, and 4) water storage and retention for improved water reliability an watershed health requires new funding sources and coordination. This report identifies priority recommendations to increase water supply reliability including integrated storage regimes, information and data, institutional coordination, and financing.

4.3 Land and Water Stewardship Guides for Landowners

Slow it. Spread it. Sink it!, A Homeowner's and Landowner's Guide to Beneficial Stormwater Management, Sonoma Valley Groundwater Management Program, 2010
This is an informative manual that describes and illustrates practical and eco-friendly ways to conserve water and protect your property from stormwater runoff, and increase groundwater recharge. It is based on the principle of slowing runoff, spreading it to increase infiltration area, and enabling the water to sink into the ground. This manual explains potential problems associated with runoff and offers Best Management Practices for practical and implementable solutions, and maintenance plans. The manual covers a range of water conservation practices including rainwater catchment, swales, drip irrigation, cisterns, and rain gardens.

Water Stewardship Guide: Conserving and Storing Water to Benefit Streamflows and Fish in North Coast Creeks and Rivers, Kyle Keegan and Sanctuary Forest, 2017
The purpose of this guide is to provide water conservation techniques and instructions on how to pump, store, and use water in a way that meets household needs while also preserving streamflows and protecting fish in neighborhood creeks and rivers. This guidebook is particularly useful for rural landowners because it includes specific information about how to calculate a water budget, optimizing the quality of stored water, when to fill and top off tanks, forbearance periods, preventing water loss, maximum pumping rates, and installing and maintaining fish screens on pumps. It also includes helpful information in layman's terms about water storage permitting and water rights including Small Domestic Use (SDU) registrations, Small Irrigation Use (SIU) Registration, and CDFW 1600 requirements.

Landowner Stewardship Guide, Reducing Runoff and Increasing Infiltration in the Mediterranean Climate of Northern California, Kyle Keegan and Sanctuary Forest, 2017
This guide is designed to educate landowners about permaculture principles and techniques including methods to capture and store water in the soil (restoring the sponge) and increase groundwater recharge, protecting the water cycle, raising the water table, and BMPs for using heavy equipment. This is an excellent guide for rural landowners who are interested in practicing stewardship principles and applications on their land. The booklet includes beautiful and detailed illustrations to depict how to build swales, upgrade roads to improve infiltration and reduce sediment, and repair gullies.

Watershed Best Management Practices for Cannabis Growers and Rural Gardeners,
Mendocino County Resource Conservation District, 2016
This guide outlines Watershed Best Management Practices for rural farming with an emphasis on cannabis cultivation. Although it is designed as a guide for cannabis growers, it has useful information for all types of agricultural practices and it is geared towards landowner accessibility. This guidebook covers land stewardship practices, permits and regulations, and BMPs to protect water quality and quantity. The BMP chapter includes water capture and storage, protecting land and water from erosion, soil health and pest management, and waste disposal.

The appendices are particularly helpful for landowners since they include BMP reference materials, a land self-assessment checklist, a quick reference guide for permitting needs, a synopsis of State Water Board water diversion requirements, and the North Coast Regional Water Quality Control Board cannabis waste discharge permit.

Quick Guide to Watershed Best Management Practices, Salmonid Restoration Federation
This brochure is adapted from the Mendocino RCD Watershed BMP booklet. This brochure includes a land self-assessment checklist, references, and a BMP Checklist for water systems, water storage, pest control, chemical storage, roads and crossings, developed sites, soils, stream

banks, waste management, and habitat enhancement and protection. It also includes a quick reference guide that outlines what agency permits are required for various types of land use activities.

4.4 Water Rights and Water Transactions Resources

There are several useful water rights and transaction guidebooks in California that are designed to assist landowners or water rights holders in understanding the legal requirements and options to preserve instream flows. California has complex water rights law and regulatory requirements so these primers are particularly useful for landowners who are in the process of coming into compliance with state water law or who are attempting to change an existing water right. Some projects and management actions require new water rights so these guidebooks are helpful to introduce various types of water rights to assist landowners in understanding what right is appropriate for their needs, water use, and legal compliance.

A Practitioners Guide to Instream Flow Transactions in California, Small Watershed Instream Flow Transfers (SWIFT) Working Group, March 2016
This is a comprehensive guide to help water rights holders – and those assisting them - understand their options for keeping water instream in California. This guide describes some of the common types of instream flow transactions and outlines how to navigate the process of completing an instream flow dedication under California Water Code Section 1707. The guide includes the necessary steps to complete a dedication including the pre-petition process, how to change a water right's beneficial use to instream use, and monitoring and oversight once you have an approved order. This guide includes well-categorized and thorough additional online resources, a useful glossary of water right and instream flow terminology, and online appendices including a sample forbearance agreement.

Know Your Water Rights Brochure, Salmonid Restoration Federation, 2014
SRF developed this brochure to help explain water rights terminology to landowners and guide landowners through the steps of filing a statement of diversion and use, and determining if they need an appropriative or riparian right.

Small Domestic Use Curriculum, SRF and Trout Unlimited, 2016
This online resource was developed to guide landowners through the SWRCB's water rights processes, specifically filing an initial statement of diversion and use when water is diverted, and Small Domestic Use (SDU) registration processes. This is an online auditory webinar that provides a step-by-step walk-through of the required forms including how to report your water use.

Navigating Water: Regulations for Small-Scale Water Storage Projects in California's Five County Region, Salmonid Restoration Federation, 2016.
This brochure was designed to help landowners and water diverters understand the various permits, plans, and regulatory requirements under the jurisdiction of counties, regions, and the state. The pamphlet describes the water storage and permitting requirements for the Five County region which includes Mendocino, Humboldt, Trinity, Siskiyou, and Del Norte Counties. The brochure also includes contacts and resource web pages for the various counties. Since each county is developing cannabis ordinances, this brochure is designed as an online resource that will be updated annually to reflect changes associated with cannabis legalization and associated requirements.

4.5 Informational Resources for Federal Policy Tools

In addition, to the California educational resources identified above, there are several federal policies including Safe Harbor Agreements that provide incentives for landowners to enhance streamflow and preserve endangered species habitat. These educational resources describe policy tools and regulatory agreements for restoration activities in layman's terms for landowners or other potential restoration partners.

A Landowner's Guide to Dry Creek Habitat Enhancement "Safe Harbor Agreements"
This landowner guide developed by NOAA Fisheries describes the first Safe Harbor Agreement to conserve salmonid habitat in California. This brochure explains the benefits of SHAs, the key considerations for participating landowners, steps for enrolling in the program, and defines regulatory assurances, enhancement of survival permits, and cooperative agreements in accessible terms for landowners. This is the first example of utilizing a SHA to protect salmon in California and many of the steps in this program would be required in similar endeavors.

Working Together, Tools for Helping Imperiled Wildlife on Private Lands, USFWS 2005
This is a booklet that describes a variety of voluntary tools to allow interested landowners to fashion a conservation strategy that is aligned with their management objectives including conservation banking, Safe Harbor Agreements, Habitat Conservation Plans, Candidate Conservation Agreements, and Assurances. This booklet is particularly useful for landowners who are trying to understand a range of options to protect endangered species on their land.

4.6 Regulatory Policies that Offer Guidance to Incentivize Collaboration in California

In addition to the guidebooks and Best Management Practice tools listed above, it is crucial to plan water management activities consistent with and leveraging existing state and regional water management policies that govern instream flow requirements. These policies offer guidance and tools that can advance programmatic permitting, coordinated diversions, and a watershed approach to collaborative water management.

Policy for Maintaining Instream Flows in Northern California Coastal Streams
Flow enhancement activities, changes in water rights applications, and new water rights within the coastal watersheds north of San Francisco including the Navarro River watershed fall within the scope of the North Coast Policy. The Policy includes the Watershed Approach that is intended to incentivize landowners to work collaboratively throughout the policy area to improve instream flows. "The State Water Board recognizes that a watershed approach for determining water availability and evaluating environmental impacts of multiple water diversions in a watershed may be an alternative to evaluating individual projects using the regionally protective criteria set forth in this policy. Accordingly, flexibility should be provided to groups of diverters who endeavor to work together to allow for cost sharing, real-time operation of water diversions, and implementation of mitigation measures, as long as the proposed approaches are consistent with the principles for maintaining instream flows."[8] The policy encourages two alternative forms of watershed-based approaches: coordinated management of diversions through watershed charters (sections 4.1-4.6) and coordinated permitting of applications (section 4.7).

The Watershed Approach encourages the formation of watershed groups to coordinate the development of technical information for coordinated water right permitting and/or for the coordination of diversion operations. Coordinated water right permitting allows the use of one

[8] *Policy for Maintaining Instream Flows in Northern California Coastal Streams*, State Water Board, 2014

package of technical documents for all pending applications within the watershed group. Coordinated operation of diversions and implementation of mitigation measures may be proposed through diversion management plans. Depending on the water right priority of the projects involved in a watershed group, participants in a watershed approach may receive expedited environmental review of water right applications. Individual water right permits will be issued for any approved applications that are part of a watershed group, provided that individual applicants accept permit conditions.

A watershed charter group consists of participants who enter into a formal project charter to develop technical documents to provide the information needed for coordinated processing of all the pending applications in the watershed group, and to develop a diversion management plan if coordination of diversions and implementation of mitigation measures is desired (Section 4.1).

Chapter 4 in the North Coast Policy describes the purpose of a project charter and the required technical documents for watershed groups including site-specific studies, environmental documents outlining water availability, information needed for draft studies or CEQA, and an evaluation of potential impacts, and diversion management plans.

Since the adoption of the policy in 2014, the Watershed Approach (as defined in the North Coast Policy) has not yet been implemented although other watershed approaches have been successfully employed by Sanctuary Forest in the Mattole headwaters and Trout Unlimited in San Mateo and Marin Counties.

Cannabis Cultivation Policy, State Water Resources Control Board, 2017
The Cannabis Cultivation Policy recently finalized by the State Water Resources Control Board identifies local cooperative solutions to achieve instream flow requirements. CDFW can enter into an agreement with one or more cannabis cultivators if they determine that the said "agreement provides watershed-wide protection for fisheries that is comparable or greater to the instream flow requirements in the Cannabis Cultivation Policy."[9] The waste discharge and instream flow requirements in the cannabis policy are widely regarded as the most stringent, best management practices or "gold standard" of permitting requirements in California.

Voluntary Drought Initiative, NOAA Fisheries, 2012
NOAA Fisheries and California Department of Fish and Wildlife developed the California Voluntary Drought Initiative to develop temporary, voluntary water conservation and instream flow agreements with water users in high priority salmonid streams where the risk of drought-related effects to federal and state listed species is great. Each agreement under the initiative describes targeted flows that are the lowest necessary to ensure survival. The initiative sought to protect mutual interests through voluntary partnerships. This initiative was in response to the extended drought in California that provided an imperative to advance voluntary collaborative efforts.

[9] *Cannabis Cultivation Policy*, State Water Board, 2017

Chapter 5: Community Outreach Strategies and Tools

Community outreach and communication are essential elements in developing a Collaborative Water Management group. This chapter provides recommendations for a watershed communication strategy to accomplish effective outreach in rural communities.
The primary goal of a CWM communication strategy is to identify willing stakeholders and then provide them with technical and potentially financial assistance in order to develop a portfolio of water conservation and storage projects that reduce reliance on dry season diversions and thereby measurably improve instream flows for salmonids and water supplies for residents.

This communication strategy chapter is intended to provide an outline of the steps, objectives and recommended actions to effectively inform and engage communities to improve how they manage water resources. A clear and responsive communication strategy is key to achieving the goals of any conservation program or educational campaign that is founded on stakeholder participation. It is important to identify the target audience and develop educational materials and outreach strategies that are transparent, inclusive, motivational, and informational. A successful outreach plan should be adaptive to current needs, community feedback, and provide shared data and progress reports in a transparent and timely way.

The following tasks and strategies can be utilized in North Coast watersheds where conservation organizations are engaging the local community and building capacity for water management planning and implementation programs.

Step 1: Identify the Goals and Objectives of the Communication Strategy and Outreach Plan
The first step for any conservation-related outreach and education effort is to identify and articulate the initial, mid-term, and long-term goals of the program. Goals should define what you want to accomplish and objectives are the steps to help achieve those goals. For example, the goals and objectives of the Collaborative Water Management Framework are:

Initial goals:

- Educate stakeholders about the urgent challenges facing their river resources in terms of both limited water supply and diminishing fisheries habitat.

- Engage stakeholders in the process of identifying potential solutions and pathways to address water supply shortages and foster watershed stewardship practices.

- Identify a core group of stakeholders willing to work together to develop a mutually beneficial water resource management plan.

Mid-term goals:

- Collect real-time water usage data from willing landowners to inform decision-making and prioritization of projects that have the potential for maximizing efficiencies and yielding improved flow results.

- Work with identified group of stakeholders to discuss how to build capacity and achieve required permitting to implement management actions and projects to enhance streamflow.

- Develop a collaborative water management plan and agreement structures with participating landowners.

Long-term goals:

- Build capacity for watershed stakeholders to support on-going implementation of flow enhancement projects and management actions that employ a suite of water conservation and water storage practices to enhance water security and instream flows for salmonids.

- Implement flow enhancement projects that improve instream flows and water reliability.

Step 2: Communicating with your Target Audience
Most educational materials will be suitable for a range of audiences but how they are disseminated will vary based on the target audience and the venue (public, private, institutional, social, etc.). When creating educational materials that involve complex legal and regulatory requirements, be sure to ask water rights specialists, legal experts, or relevant agency personnel to review descriptions of regulatory processes. Involving experts in the crafting of educational materials ensures that layman descriptions are legally vetted and helps engage stakeholders in a collaborative educational process. Creating educational materials or public meeting agendas with other stakeholders cultivates buy-in and can leverage resources like printing and facilitation costs. Additionally, working collaboratively with agency personnel helps them understand your good-faith effort to provide accessible information to a shared target audience and creates opportunities for constructive discourse.

When identifying and messaging to a target audience it is helpful to have a clear understanding of what are the shared concerns, landscape conditions, and priority issues for the community members in the watershed. It is important to engage individuals and groups who will likely directly involved in the project. Outreach can be conducted individually or in a group setting and should provide an opportunity to generate ideas, gather feedback from stakeholders, and share resources.

Step 3: Develop Outreach Strategies to Engage Stakeholders
Outreach strategies: Strategies should be action-oriented and should consider the following factors: what would be effective and feasible in the target area, and what are the required resources (staffing, funding, capacity, etc.). Effective outreach strategies should be responsive to the inevitable challenges that arise in collaborative activities. Changes to human water use patterns and conversations about water rights often require sensitivity and privacy.

Online media: For some stakeholders, online media can be an effective way of sharing information. If enough target stakeholders are likely to use the internet consider creating a webpage that will be accessible for the public to see project resources, flow data, existing resources, water conservation opportunities, etc. This does not need to be a large financial or staffing investment. It could be a Facebook page or a page on a related project website but it is important that all communications can direct interested parties to valuable information that they can peruse in their own timeframe.

Print and Radio: Print and radio are important forms of outreach for many rural residents who may have limited familiarity or access to the internet. These also might be more trusted sources of information. Initiate a public print, radio, and online media campaign with clear performance measures (i.e. target number of radio interviews, news articles, targeted emails, etc.). Archive press coverage by making news items available on your website.

Integrate with existing outreach efforts: In many rural communities, there are other important forums for community engagement including road associations, volunteer fire departments, and agricultural guilds. Interface with other educational efforts to increase the public profile of the project. Identify other efforts that dovetail with water management and can increase the constituent

base including fire safe councils, Farm Bureau, Regional Water Board public meetings, cannabis compliance workshops, etc.

Educational efforts: Designing and distributing educational materials is helpful to engage new stakeholders. Educational outreach can include water conservation and water rights brochures, educational posters that demonstrate water conservation tools that can be posted garden supply stores and other venues, and hosting public workshops and tours of existing projects that incorporate habitat restoration techniques, water storage, permaculture, or greywater installations.

Step 4: Fostering Community Engagement

Engaging the community and soliciting community input in a proactive way is a cornerstone of the Collaborative Water Management approach. Voluntary water conservation strategies will have more traction if there is community buy-in. The effort will be more sustainable if driven by local stakeholders who stand to benefit from increased streamflows and the desire to preserve the ecological value of their stream.

Sharing ecological data, information about flows, and the impacts of water use on shared water resources helps residents gain an understanding of the benefits of working together to preserve instream flows for fisheries and ensure reliable water supply for landowners. Sharing data should be a two-way street since landowners are often the most knowledgeable about seasonal fluctuations and flow trends in the stream that they live near and depend on. Solicit resident input about changes that they have witnessed, anecdotal data about flows, and observations about the length of the dry season, the beginning of the rainy season, and salmon sightings.

Provide multiple opportunities for public engagement including hosting house parties, public meetings, and free water conservation workshops or field tours to demonstration sites to showcase exemplary projects that may engage or inspire other landowners. It's helpful to have Resource Conservation District or Natural Resource Conservation Service representatives on field tours so landowners can learn about resources and funding opportunities for restoration projects.

Additionally, it is ideal to offer landowners a range of ways to participate including citizen monitoring, organizing their neighbors, "maintaining flow" signage, and hosting house parties or a public forum. Maximize the effectiveness of private or public meetings by developing a clear agenda with desired outcomes, a dynamic agenda structure that allows for interaction, and arrange for an experienced facilitator and a designated note-taker. Be sure to have a sign-in sheet to be able to build a network of stakeholders. After the meeting, distribute the meeting notes with action and follow-up items. It is important to keep community members informed about important milestones in a water management effort including new funding opportunities, scientific findings or changes in laws or regulations that may affect them.

In summary, a communication strategy and outreach plan should be tailored to the specifics of a stakeholder watershed effort. It should be proactive and take into account the constituency and existing community efforts to engage local residents. Discussing project development early on in the planning process can build stakeholder support and social capital that result in better community participation.

Recommended Actions:

Steps for a successful house party:
Often in rural communities, a house party can be an effective and private option for bringing together prospective landowners in a particular watershed or project area who may not initially be inclined to attend a public meeting.

- Identify well-known and respected landowners in priority tributaries who are willing to host a house party and invite their neighbors.
- Select a location that is convenient and comfortable for neighbors to gather.
- Have maps and relevant studies available so landowners can learn about existing studies and efforts in their watershed.
- Suggested meeting format:
    - Introductions: roundtable format with a question that establishes common ground: mutual concerns about water management, regulations, etc.
    - Example: what does your local creek mean to you?
    - Project proponent should clearly explain history of their work in the watershed and why they are interested in your particular tributary.
    - Include resource professionals if appropriate but limit the involvement of agency personnel who may deter landowners from speaking freely.
- Have a sign-in sheet to build a landowner database and gather email addresses, mailing addresses, and try to identify ways landowners would like to participate (potential projects, citizen monitoring, educational opportunities, etc.)

Steps for a successful public meeting:

- Identify the purpose of the meeting and target audience
- Invite a venue that is accessible and plan the meeting at a time to encourage maximum participation from the target audience
- Publicize the meeting publicly using posters, public service announcements, press releases and community calendars
- Make personal invites via email, a phone tree, and potentially a postcard mailing
- Have a designated facilitator and note-taker
- Make the minutes and findings available after the meeting

Steps for a successful public workshop or field tour:

- Create a dynamic agenda that includes an overview of the issues from a conservation, legal, and practical implementation perspective
- Keep it free or donation-based to maximize attendance
- Choose a format that supports achieving the goals and objectives of the meeting. Potential formats include:
    - Tributary breakout groups with sample charter agreements to discuss
    - Resource professional tables for small group or one-on-one consultations
    - Presentations followed by panel discussion
- Make the presentations or photographs of field tours available online
- Field tour planning:
    - Identify a field tour site(s) that showcases exemplary implementation projects
    - Invite people involved in the project: landowner, planner, engineer, etc.
    - Have maps and educational materials available
    - Send out clear instructions about logistics, how to prepare, etc.
- With both workshops and field tours, it is ideal to have a course evaluation to solicit feedback about the quality of presenters, presentations, and how participants will apply what they learned.

Chapter 6: Agreements, Assurances, and Charters

6.1 Introduction:

Collaborative water management requires planning, coordination, and clear agreements among participating parties. Agreements are an essential part of any water management effort particularly one that is grant funded. Water transactions to improve flows benefit from clear agreements that guide participating stakeholders and indoctrinate the legal and voluntary mechanisms required for diversions that protect beneficial uses. Water management and conservation plans require documentation and regulatory assurances when feasible. The water use agreements explored in this section include: 1) Temporary agreements including forbearance agreements; 2) Permanent agreements including water rights, instream flow dedications, and conservation easements; 3) Safe Harbor Agreements that include regulatory assurances; and 4) Watershed and tributary-scale charters. Understanding the appropriate type and scale of agreements is critical to support successful collaborative water management and restoration efforts. The Collaborative Water Management framework is exploring the feasibility of watershed-approach agreements that could leverage resources to advance cooperative water management efforts as envisioned in the North Coast Instream Flow Policy.

6.2 Benefits of Legal Agreements to Improve Streamflows

Some residents of flow-impaired watersheds may wonder why they should enter into a collaborative agreement to modify water withdrawals, rather than just make a private effort to reduce pumping in the dry season. Entering into a coordinated legal agreement with a land trust, non-profit or government entity can provide important benefits for both streamflows and participating landowners. Legal agreements overseen by a third-party can protect water rights, help facilitate diligent monitoring of streamflows and post-project monitoring to ascertain flow enhancement benefits.

Advantages of collaborative agreements include:

1. *Certainty of benefits* – water use practices that are coordinated with other stakeholders and supported by up-to-date data are more likely to benefit instream flows for salmonids and water reliability for landowners;

2. *Permanence* – Legal agreements allow you to have a long-term impact on the low-flow problem because agreements that are formalized and documented are more likely to be implemented over time even if property ownership changes. Additionally, regulatory agencies regard legal agreements as durable commitments.

3. *Permitting* – an agreement can provide ways to reduce the impacts of water use to the environment and other water users, which can make it easier for agencies to issue permits authorizing the proposed activities

4. *Technical assistance* – agreements are often coordinated with non-profits or land trusts, and can benefit from the technical support, services, information, and permitting assistance they can provide.

5. *Instream flow dedicati*ons and *conservation easements* may entitle landowners to a tax benefit, or make them eligible for conservation funding to compensate them for the water they are not using. Agreements formalized in a Section 1707 dedication can safeguard appropriative water rights against loss due to non-use.

6.3 Forbearance Agreements

Forbearance agreements are a legally binding private agreement between a landowner or water user and a local land trust, RCD, or non-profit that outlines the responsibilities of forbearing from diverting water during a specified period during the dry season. With a forbearance agreement, a water user needs to have enough winter water storage in order to forbear from diverting water based on the terms and conditions of the contract.

The main advantage of a forbearance agreement is its simplicity and efficiency; as the terms of the agreement can be structured to fit the needs of the parties. The key term in forbearance agreements is seasonal (not year-round) forbearance from withdrawing water during the dry season. The landowner has the right to withdraw water during the high-flow season and gives up the right to withdraw water during the dry season when instream flows are critically low for juvenile salmonids and other aquatic species.

The length of the forbearance agreement will vary based on the conditions of the stream, target flows, and the agency that is providing oversight. Forbearance periods in Northern California are usually 3-5 months. Forbearance agreements are not permanent (but they are durable and cannot be changed indiscriminately) and they typically extend for a term of years agreed to by the parties.

Forbearance Agreement Models should contain the following information:

A) Recitals (background facts) explaining who the parties are and why they are entering the agreement.

B) A description of the forbearance terms the water user is agreeing to – the exact calendar dates and/ or minimum flows that trigger forbearance, plus the source waters it applies to (including groundwater and tributaries, if applicable) – and any provisions for exceptions in case of emergency.

C) A description of what the water user is being promised in return for the forbearance (e.g., a storage system of other infrastructure).

D) A description of the property to which the forbearance applies.

E) The term of the agreement and associated water management plans (e.g., 15 years).

F) Provision for recording the agreement with the property deed so it is binding on future owners.

Forbearance agreements will require that participating landowners have filed water right applications with the Division of Water Rights. The water rights may include new appropriative water rights to divert winter water to storage. This is currently underway in the Navarro and is an essential management action to reduce summer time diversions.

Other types of water right actions that may be required with forbearance agreements are petitions to change points of diversion (e.g., to move them downstream where they have less impact). Types of water use and the total amount of irrigation needs will need to determine if landowners need a Small Domestic Use, Small Irrigation Use application or an appropriative right.

Please see Appendix A for an example of a sample Forbearance Agreement.

Water Management Plan

A water management plan is an important component of forbearance agreements, cannabis cultivation permits, and water management projects that are grant funded. A Water Management Plan in a forbearance agreement should outline the guidelines for compliance with forbearance periods, recommended participant allocations for water usage during the restricted period, and guidelines for maintenance and repair of the water management system. Additionally, Water Management Plans should address pumping rates, conservation measures to reduce use, and guidelines for compliance monitoring by the trustee and self-monitoring by the participating landowner. The plan should also provide directions about when to fill and top off water management system tanks and emergency provisions in case of a system failure or catastrophic water loss.

A Water Management Plan should also include a calendar that shows the schedule for filling and maintenance as well as a notification table that shows when the trustee should send notifications to participating landowners to remind them about forbearance periods, when to fill and top tanks, and the monitoring schedule to prevent undue losses.

Please see Appendix B and C for examples of Water Management Plans.

6.4 Permanent Agreements: Instream Flow Dedications and Conservation Easements

Permanent agreements include conservation easements or instream flow dedications under Section 1707 of the California Water Code.

Conservation easements are voluntary, permanent, legally binding agreements that restrict the uses of or activities on a property for conservation purposes. Conservation easements are widely used between land trusts (or agencies) and landowners who want to protect specific resource values of their land in perpetuity. Pertaining to streamflows, they can serve as a permanent forbearance agreement. Benefits of conservation easements for landowners is that they can lower an estate tax liability and permanently safeguard the habitat values, water quality, open space, and traditional uses on the parcel with the easement.

Instream flow dedications are instream flow transactions that include a water right change under Section 1707 of the California Water Code for the purpose of preserving or enhancing wetlands, protecting fish and wildlife, or recreation. Although, the California Water Action Plan (2014), drought contingency plans and the Wildlife Conservation Board recognize the value of these instream transactions, in the last decade the State Water Resources Control Board has approved fewer than 80 instream flow dedications in California. The limited use of Section 1707 has stemmed from uncertainties with the petition process, establishing that the water right exists (if not exercised much) and the requirements for baseline information, CEQA exemptions and / or lead agency designations. The SWRCB is trying to address some of these administrative hurdles so this valuable legal tool can be more readily utilized to protect instream flows.

The benefit for landowners to dedicate instream flows on their property is both to preserve ecological values and protect their water rights from being abandoned due to non-use.

Additionally, there are potential tax benefits associated with a Section 1707 dedication. The Internal Revenue Service provides income tax and estate tax deductions for a qualified conservation. To qualify for a federal tax deduction the water right owner must permanently relinquish a fractional or partial interest in an appropriative water right. The qualified conservation contribution of the real property interest is an appropriate water right that must be dedicated to a

government entity, non-profit, or both. This right or easement is for conservation purposes including preserving land, fish habitat, instream flows and other conservation purposes.

Permanent forbearance agreements and seasonal use agreements are other types of agreements that are being explored by California water attorneys and conservation groups. Granting agencies including CDFW and WCB specify that water conservation projects that receive Fisheries Restoration Grant Program or Prop. 1 funds should include 20-year forbearance agreements. Water attorney, Tom Hicks, JD, speculates that, "In the future, permanent forbearance agreements will become an increasingly appropriate fit for voluntary water transactions that achieve localized conservation purposes."

	Forbearance Agreement	**Conservation Easement**	**1707 Streamflow Dedication**
Permanent?	No	Yes	No
Requires SWRCB approval?	No	No	Yes
Provides tax benefit?	No	Yes	No
Protects flows from downstream users?	No	No	Yes
Protects existing appropriative Protecting existing appropriative right?	No	No	Yes

This table excerpted from the SFI Legal Options Guide outlines some of the key differences in streamflow protection agreements.[10]

6.5 Safe Harbor Agreements

A Safe Harbor Agreement (SHA) is a voluntary agreement involving private or other non-Federal property owners to support the recovery of species listed as threatened or endangered under the Endangered Species Act (ESA). The agreement is between cooperating non-Federal property owners and the U.S. Fish and Wildlife Service (USFWS) or the National Oceanic and Atmospheric Administration (NOAA Fisheries).

In exchange for actions that significantly contribute to the recovery of listed species on non-federal lands, participating property owners receive formal assurances from NOAA that if they fulfill the conditions of the SHA, NOAA will not require any additional or different management activities by the participants without their consent, and related incidental take of the species may be covered. In addition, at the end of the agreement period, participants may return the enrolled property to the baseline conditions that existed at the beginning of the SHA. The USFWS provides useful directions for preparing a SHA and an outline of the requirements.[11]

CA Example: A Landowner's Guide to Dry Creek Habitat Enhancement "Safe Harbor" Agreement
This Dry Creek Habitat Enhancement Program in Sonoma County, California is the first time that a Safe Harbor Agreement was utilized for salmon and steelhead listed under the Endangered Species Act anywhere in the nation. The agreement involves Dry Creek winery owners, Sonoma County Water Agency, and NOAA Fisheries.

[10] *Sanctuary Forest's Mattole Flow Program: Legal Options for Streamflow Protection*
[11] *https://www.fws.gov/midwest/endangered/permits/enhancement/sha/shadirections.html*

California Codes and Legislation Pertaining to Safe Harbor Agreements

Fish and Game Code (sections 2089.2-2089.26) allow CDFW to authorize incidental take of a species listed as endangered, threatened, candidate, or a rare plant, through a Safe Harbor Agreement (SHA) if implementation of the agreement is reasonably expected to provide a net conservation benefit to the species, among other provisions. SHAs are intended to encourage landowners to voluntarily manage their lands to benefit California Endangered Species Act (CESA)-listed species without subjecting those landowners to additional regulatory restrictions as a result of their conservation efforts.

California State Safe Harbor Agreement Program Act
The California State Safe Harbor Agreement Program Act establishes a program to encourage landowners to manage their lands voluntarily, by means of state safe harbor agreements approved by the Department of Fish and Wildlife, to benefit endangered, threatened, or candidate species without being subject to additional regulatory restrictions as a result of their conservation efforts. The California State Safe Harbor Agreement Program Act authorizes the department to authorize specified acts that are otherwise prohibited pursuant to the CESA by entering into a safe harbor agreement. Under existing law, the California State Safe Harbor Agreement Program Act remains in effect until January 1, 2020.

6.6 Types of Watershed Agreements
There are a various types of watershed agreements that can be developed between tributary members and water diverters who utilize a shared point of diversion or water source. These can include a watershed charter as envisioned under the North Coast Policy, a voluntary tributary collective charter, and agreements that will be developed with participating landowners as part of the Collaborative Water Management pilot project.

A watershed charter is an agreement that defines the project goals in a specified watershed area and the agreed upon tasks to accomplish these goals. A watershed charter ensures that project participants have a clear understanding of what is required financially and legally to achieve shared objectives. The North Coast Policy defines a watershed charter group as, “participants who enter into a formal project charter to develop technical documents to provide the information needed for coordinated processing of all the pending applications in the watershed group, and to develop a diversion management plan if coordination of diversions and implementation of mitigation measures is desired.” (NCIFP Section 4.1, p.21)

The North Coast Policy’s Watershed Approach to advance stakeholder flow enhancement goals is based on the premise that a group of water right applicants in the same watershed can reduce individual costs by pooling their resources to pay for required studies and water availability analysis. Theoretically, the determination of water availability for each individual project can be streamlined since the proposed projects are in the same watershed. This could be more efficient for participating landowners and agency staff since it would ideally reduce the SWRCB staff review of pending water right applications that could potentially be bundled.

Although, the Watershed Approach has not yet been successfully utilized, starting in 2008 landowners in Anderson Creek in the Navarro worked with CDFW and the SWRCB to develop a charter. This effort provides an informative case study of some of the opportunities and obstacles involved with this type of approach. While the charter was never completed due to unresolved technical and policy disagreements, several individual water rights were approved and the lessons learned are instructive.

The goal of the Anderson Creek Watershed Charter was to support applications for new appropriative water right on Anderson Creek. To support this goal, the Charter sought to establish the steps required for the Division of Water Rights (DWR) to determine water availability, satisfy the requirements of CEQA, evaluate the potential impacts of water appropriation on public trust resources, and ultimately make decisions on whether and how to approve pending water right applications.

The objectives of the watershed approach outlined in the draft charter provide a template of the steps that the North Coast Policy Watershed Approach would likely require in order to be consistent with the principles of maintaining instream flows, and allow for expedited processing.

Watershed-objectives that should be incorporated into a charter would likely include:

1) Establish the CEQA baseline for each project

2) Ensure project description accuracy

3) Determine if an unappropriated water supply exists for pending applications

4) Determine the significance of potential flow related impacts on fisheries at relevant points of interest

5) Categorize projects by potential impacts

6) Identify mitigation measures for potentially significant impacts

7) DWR makes determination that water is available for appropriation

8) Complete the CEQA process for all projects subject to CEQA

9) Resolve all protests

10) Issuance of permits

The Anderson Draft Charter effort highlights incentives inherent in this approach as well as the potential constraints of the Watershed Approach. Before issuing a permit, Division of Water Rights must determine that unappropriated water is available for appropriation and the environmental impacts of water supply projects for which applicants are seeking a water right. Additionally, it must be determined that the water supply project results in a reasonable and beneficial use of water and employs a reasonable method of diversion.

The effort required to complete water supply and impacts analysis can be daunting due to the time, cost and regulatory oversight required. However, a goal of the Policy's Watershed Approach is to reduce the overall cost, time, and staff burden of processing the water right applications and preparing the appropriate environmental documents by sharing the associated costs among applicants. Determining the flow-related cumulative impacts to anadromous fish can be laborious and expensive. Sharing the costs of required studies can lead to more detailed watershed analysis and a more informed perspective on the appropriate scale of a restoration project or diversion than could normally be provided by one applicant.

In the Anderson Creek effort, the Division of Water Rights conducted a preliminary risk assessment that identified various obstacles that can derail the use of the watershed approach including: DWR staffing limitations and internal changes in priorities; not reaching agreements with parties regarding methodology and appropriate mitigation measures to address potential impacts; and

failure to sustain stakeholder buy-in. Other potential limitations are both regulatory and financial including lack of funds to complete required CEQA or EIR studies.

From this detailed list of pitfalls, one can infer what the elements are that would be required to succeed at implementing the Watershed Approach identified in the North Coast Policy. This would include stakeholder buy-in from the DWR staff and participating landowners. It would also require mechanisms and hopefully an identified funding source to ensure that there are adequate funds for the required site-specific studies and potential mitigation measures.

The Navarro collaborative flow enhancement program already has strengths that lend itself to the Watershed Approach including adequate knowledge and understanding of habitat needs for endangered species and hydrological and biological data in the watershed. The Navarro effort also greatly benefits from the long-term participation of the Mendocino County RCD and the Navarro River Resource Center that has cultivated social equity in the Navarro that could greatly support community buy-in for a watershed approach.

Ultimately, the North Coast Policy's Watershed Approach requires a SWRCB staffing commitment, adequate funds, and a clear, compelling explanation of why this approach would benefit participating landowners. Another type of watershed approach that is strictly voluntary is the adoption of tributary charters that are developed in conjunction with landowners to establish shared stewardship practices, forbearance thresholds, and pumping schedules.

Voluntary Tributary Charters

Similar in nature to the Collaborative Water Management framework concept, several non-profits on the North Coast of California are exploring the feasibility of forming tributary collectives to establish common stewardship goals and water management practices. Additionally, tributary charters provide a means to share best management guidance and formalize agreements about water usage. Sanctuary Forest has been pioneer of community-based water conservation planning and utilizing agreements to facilitate better water stewardship practices amongst residents in the Mattole River headwaters.

Sanctuary Forest defines a tributary collective as a "voluntary group comprised of watershed residents who are striving toward the goals of drought resilience, improved summer streamflows, and a healthy watershed for the benefit of people and native salmon."[12] Essentially, a tributary charter is a stewardship practices agreement to achieve watershed goals.

This charter agreement provides a useful blueprint for community-driven water conservation to improve instream flows for salmon and water security for people. Sanctuary Forest has created a draft tributary charter that outlines stewardship practices that can be employed in any small watershed that suffers from low summer flows including water conservation practices, reduced pumping rates, forbearance thresholds, community emergency water supply and fire procedures, and methods to provide real-time streamflow information to community members. Please see Appendix D to see the draft tributary charter.

Selecting the appropriate form and scope of an agreement will be based on the needs, scale, and objectives of participating landowners as well as the flow conditions, water availability, and water right that the diverter has acquired or is in the process of securing. If a project is grant funded, this may necessitate a more binding type of agreement between landowners, the project proponent and funding entities.

[12] *Draft Charter, Stewardship Tributary Collective*, Sanctuary Forest, Inc.

Chapter 7: Regulatory Impediments and Potential Incentives for Regulatory Reform

7.1 Introduction

Laws and regulations create both opportunities and potential pitfalls for those seeking to engage in habitat restoration and water management activities. One of the potential benefits of managing water in collaboration with other stakeholders is that it can ease the burden of complying with regulatory requirements. This is especially true as water supplies come under increasing pressure due to drought patterns, population growth, and climate change. Many water users will find they can get ahead of the curve of tightening regulations more easily and cheaply by working with neighbors than by pursuing it alone. On the other hand, certain elements of regulatory requirements can sometimes seem to raise unnecessary barriers in the path of landowners seeking to adopt more progressive water management practices. A goal of Collaborative Water Management is to identify potential solutions that can help participating stakeholders reduce the time, money, and effort required to navigate regulatory processes and implement improved practices to benefit streamflows and improve water security.

Fundamentally, the Collaborative Water Management framework involves four things:

- Changes to the way people manage water (changes in the timing, amount, source, and/or location of diversion),
- Infrastructure (tanks, pods, diversions, water delivery systems, etc.) that enables those management changes, and
- Collaboration among watershed stakeholders to develop plans and improve the ease and cost-effectiveness of implementing water management projects and actions.
- Permits, approvals that authorize those changes and ensure they are carried out in ways that produce benefits over time,

The fourth of these elements – permitting – is involved to some degree in most water management changes, and most projects to build the related infrastructure. While a few of these are things landowners can just do on their own, most require permits from federal, state, and/or local agencies. Securing these permits can involve significant time and expense, and sometimes the conditions that come with them are subject to regulatory and financial uncertainty. All of these can be substantial disincentives to water user participation in programs to collaboratively manage water. Following is a discussion of some of the most prominent regulatory issues collaborative water management efforts are likely to face.

7.2 Appropriative Water Right Permitting Process

To the extent that a collaborative water management effort relies on the practice of storing water in the wet season and forbearing diversion in the dry season, the most significant regulatory barrier will be the process of obtaining an appropriative water right from the State Water Resources Control Board (SWRCB) authorizing the storage. Under California law, owners of property adjoining a surface stream generally have a riparian water right to divert and use a reasonable amount of the natural flow of the stream for beneficial uses on the property. In coastal California, many small farmers – and most residential landowners – who divert water throughout the summer and fall months do so under the riparian water rights that come with their property as a matter of common law. Such landowners can be prime candidates to participate in programs to improve dry season baseflows by storing water that is more readily available in the winter months. However, storing water for later use in drier times of the year is one activity that cannot be done using a riparian right. To legally store water, a water user must obtain an appropriative water right from the SWRCB – a process that can be lengthy and expensive even in what might appear to be relatively simple cases.

The main source of difficulty and expense in obtaining an appropriative water right permit is the need to show that enough water is available during the proposed season of diversion so that the new right will not harm existing water uses. Crucially, these uses are for people who already have water rights on the stream (i.e., holders of "senior water rights"), as well as for publicly beneficial uses such as fisheries, wildlife, recreation, and navigation. In California, these are called "public trust uses," and the SWRCB is required to ensure that any new water right permit it issues will not unreasonably affect the streamflow necessary to support them.

7.2.1 Water Availability Analysis

To demonstrate that enough water is available, an applicant must prepare a two-part analysis. The first part, known as a "water availability analysis," lists all the reported water rights upstream and downstream of the proposed diversion and compares their "face value" (maximum allowable diversion in acre-feet) to the average streamflow at that point on the stream, which is estimated using a computer model. This produces an estimate of how much the streamflow is "impaired" at each point along the stream – i.e., the percent of its flow that has already been appropriated and is not available for diversion by a new water right. The second part of the analysis consists of an approved method of showing that the new diversion will not harm public trust uses, which in coastal California is generally synonymous with salmonid fish habitat.

In the North Coast Policy area, this can be done either by (1) agreeing to very conservative permit terms based on standard formulas set forth in the Policy (the "regionally protective criteria"), or (2) conducting site-specific field studies to estimate the minimum flows needed for spawning, rearing, and migration in the area of the proposed water right.

Outside the North Coast Policy area, applicants have more leeway in the method they use for a public trust analysis – a common one is the *Draft Guidelines* prepared in 2002 by NMFS and CDFW, which generally hold that a diversion is not harmful to fisheries if cumulative impairment including the new water right is below 10% at all affected points on the stream.

From the above, it should be apparent that obtaining a new appropriative water right permit is no small task. At a minimum, it requires hiring a qualified hydrologist or engineer to perform a water availability analysis, and an experienced professional to fill out the application forms and compile the supporting information (maps, photos, etc.). For projects in the North Coast Policy area, applicants have two alternatives. The first is to use conservative permit terms under a regional criteria that limit diversions to December 15 – March 31 season of diversion and are coupled with a conservative bypass flow. This is the quickest and easiest way to proceed, but it often results in water right terms that make it difficult to divert enough water to meet water supply needs during the rest of the year – particularly in dry years. The second option is to conduct site-specific studies with the help of a qualified biologist to develop flow criteria and permit terms that are more liberal. However this process will likely take a year or more and cost tens of thousands of dollars.

Both inside and outside the North Coast Policy area, the public trust analysis may lead to a finding that insufficient streamflow is available to supply the proposed new diversion without harming fish – even though the diversion would take place in the winter, when streamflow is relatively abundant, and even though the project will increase streamflow in the summer and fall, when flows are much lower, and fish need water most. The great risk – and great irony – is that policies designed to protect instream flows for fish can serve to prevent the approval of projects that would have substantial net benefits to streamflows needed for fish.

7.2.2 Expedited Permitting

Some permitting reforms have been enacted that can provide ways to avoid the above dilemma. Most residential storage and forbearance projects can be permitted via a small domestic use (SDU) registration, which is essentially a streamlined form of water right that allows relatively small amounts of water (up to 10 acre-feet per year) to be appropriated without a water availability or public trust analysis. This is a small percentage of average annual runoff but is a lot of water for a rural-residential property's needs. A similar registration is available for small irrigation use (SIU) which includes up to 20 acre-feet per year, but these registrations are only available in the North Coast Policy area, and are subject to conditions imposed by CDFW, which usually requires hydrological analysis.

Under the North Coast Policy, "The State Water Board recognizes that a watershed approach for determining water availability and evaluating environmental impacts of multiple water diversions in a watershed may be an alternative to evaluating individual projects using the regionally protective criteria set forth in this policy. Accordingly, flexibility should be provided to groups of diverters who endeavor to work together to allow for cost sharing, real-time operation of water diversions, and implementation of mitigation measures, as long as the proposed approaches are consistent with the principles for maintaining instream flows provided in section 2.1."

Successfully utilizing the North Coast Policy's "watershed approach" could streamline permitting and help landowners share the associated costs of required water availability and site-specific studies. This was an impetus for developing a Collaborative Water Management framework to expedite permitting and coordinate water management efforts to advance habitat restoration and water management projects. Expedited permitting would be advantageous to both landowners and the regulatory agencies overseeing permitting and implementation projects.

Following is a discussion of various state and local permitting requirements that would likely apply to the implementation of a watershed approach to enhancing instream flows. Also included are some general suggestions for how the application of these requirements to watershed approaches might be streamlined to lower the burden of implementing such projects.

7.3 Fish and Game Code Section 1602 (Lake/ Streambed Alteration Agreements)

Another water right permitting law that can complicate collaborative water management efforts is FGC §1602, which provides that no person may "substantially divert . . . the natural flow of . . . any . . . river, stream, or lake" without first entering a Lake/ Stream Alteration Agreement (LSAA) with CDFW. In 2013, a state appellate court confirmed that the word "divert" in the statute gives CDFW the power to place binding conditions – including a season and maximum rate of diversion, and a minimum bypass flow – on any water diversion it finds "substantial." In effect, this means that all new and existing diverters must obtain approval from CDFW in order to divert water legally, in addition to having a valid riparian or appropriative water right.

FGC §1602 can pose a challenge for environmentally beneficial water management projects in several different ways. First, in the case of storage and forbearance projects, it may add an additional permit requirement – the need to enter an LSAA – on top of the appropriative water rights permitting requirements discussed above. Although an applicant will normally have consulted with CDFW during the water right permit process and obtained its support for the diversion terms proposed in the water right application, those terms will often be somewhat restrictive due to CDFW's regulatory responsibility to ensure flows are protective of fish and wildlife. In some cases, there will be a risk that those terms may be restrictive enough to prevent the landowner from diverting enough water to fill storage in dry years. If that happens, the proposed project might not provide sufficient water security improvement to entice the landowner

to participate, with the result that the potential benefits to both instream flow and water security will not be realized. All possible care should be taken to avoid this outcome.

Second, the LSAA process adds to the time and expense of a project, involving a separate application package, staff consultation process, and substantial permit fee. Finally, care must be taken to ensure landowners understand that the requirement to obtain an LSAA is not something that results from their decision to get involved in a collaborative water management project, but rather is an obligation they already have by virtue of CDFW's statutory authority over water diversion. Although this authority has been clear for many years, a lack of resources has prevented the department from enforcing it with equal rigor in all watersheds. As a result, water users in many areas will be unaware of the requirement to obtain an LSAA for their diversion. Often, the way they become aware of the requirement is through outreach efforts related to streamflow projects such as collaborative water management. In this situation, it will be crucial to clearly explain to water users that any requirement to comply with section 1600 exists independently of whether they choose to become involved in a collaborative water management effort, and that such an effort can actually provide a way for them to get into compliance with a minimal amount of time and expense.

7.4 Water Code Section 5101 (Statements of Diversion and Use)

All holders of riparian water rights must comply with Water Code §5101, which requires them to report their water use annually to the Water Board. This statute represents an exception to the general rule that the Water Board does not have jurisdiction over riparian and pre-1914 rights. To be clear, the reporting requirements of §5101 are binding and have been on the books for over 40 years. The reality, however, is that efforts to enforce these requirements in coastal California is a relatively recent phenomenon, beginning with legislative amendments that increased the frequency of reporting to annually instead of every three years, and increased the fine for noncompliance to $500 per day. As a result, many users are not aware of their obligations to report their riparian use under §5101. At the same time, given the visibility of a watershed-scale program, and the need to interact with permitting agencies, it is a certainty that all participants in such a program are going to be called upon to document their compliance with §5101 by the time the program is finalized. As with FGC §1602, discussed above, care should be taken to make clear to program participants that the duty to report their use does not come from participating in the project; rather, it is a legal obligation they already have, and participating in a voluntary streamflow project can ease the burden of complying with it. Beginning in 2016, water diverters are required to annually measure and report their water use.

7.5 Local Building and Planning Regulations

Water management projects that involve building or upgrading infrastructure – including storage tanks, ponds, and rainwater collection systems – typically require permits from county planning and/ or building departments. Tanks are considered structures, and are therefore subject to height and setback requirements, which can be a significant constraint on smaller or oddly shaped parcels. In addition, tanks generally must have structural engineering approval from the building department, although in most counties tanks of 5,000 gallons capacity or less are exempt from this requirement. For this reason it is common to install "farms" of connected 5,000-gallon tanks instead of a single large tank for residential projects.

A very common issue in rural areas is the risk that applying for a building permit to install storage tanks can trigger a building inspection that reveals unrelated building code violations on the property. In rural Humboldt and Mendocino counties, large numbers of homes have been constructed in the past several decades without building or zoning approval, and obtaining such approval retroactively can be expensive if not infeasible. In less extreme cases, it is not unusual for residences to have been added onto or remodeled over the years without all proper

permits. The fear of encountering such issues can be a significant disincentive for landowners to become involved in instream flow projects.

The potential for taxation can be a disincentive for building water storage since adding significant water storage capacity is considered an infrastructure improvement and would be taxed accordingly. Many rural landowners circumvent this by building a series of tanks (a "tank farm") under 5,000 gallons each so they will not be taxed. Another advantage of a tank farm is that they minimize potential loss from leaks.

For water storage projects involving ponds, a county grading permit is presumptively required in almost all cases due to the volume of material that will be moved. However, local resource conservation districts (RCD's) typically have programmatic exemptions to this requirement in place for restoration projects they administer, which can be one of many benefits of working with them as project partners.

7.6 California Environmental Quality Act (CEQA)

Any time a state or local agency takes an action that may significantly affect the environment, it must analyze and disclose those actions in a document that satisfies CEQA – usually a Mitigated Negative Declaration (MND), or a more extensive Environmental Impact Report (EIR). Such state actions include most permits and approvals. In most cases, the permitting agency will serve as the "lead agency" charged with ensuring CEQA compliance. RCDs often fill this role in the case of water management projects to benefit streamflow.

Environmental Impact Reports and Mitigated Negative Declarations can be very expensive and time consuming to prepare. Fortunately, many water management projects will be able to avoid preparing them in practice. Most commonly, this will be because the project qualifies for one of several statutory exemptions provided in CEQA. One of the most common such exemptions is the Class 33 CEQA exemption for small habitat restoration project impacting less than five acres. To properly document the use of this exemption for a project, the lead agency must prepare a short Notice of Exemption explaining why the project is not expected to have significant adverse impacts on sensitive resources including threatened or endangered species, and will not have cumulative impacts in combination with other activities. This notice is filed with the state clearinghouse (an official repository for CEQA-related documents). CEQA Guidelines

7.7 Cannabis regulations

A large and increasing use of water in coastal California is for the cultivation of cannabis. Following the enactment of Proposition 64 in 2016, extensive regulations governing the diversion and use of water for cannabis cultivation were adopted at a state and local level. Any participants in streamflow improvement efforts who grow cannabis on their property will need to ensure they comply with these requirements.

First, all water diversion for legal, state-licensed cannabis operations is subject to the State Water Board's *Cannabis Cultivation Policy, Principles and Guidelines for Cannabis Cultivation* (Cannabis Policy). Despite the name, this Policy does not consist of mere guidelines or suggestions, but rather mandatory, enforceable rules governing all aspects of water diversion and use. In most cases, these rules will require operators to adopt water management practices that are protective of instream flow needs for listed fish species. For example, the rules generally prohibit any direct diversion for cannabis between May 1 and November 1, a period much longer than the voluntary forbearance periods involved in most existing collaborative water management efforts. Moreover, winter diversion is limited to a rate of 10 gallons per minute, and to periods when real-time streamflows are above minimum levels at specified streamflow gauges.

Second, all water diversions for cannabis need to comply with FGC §1600. If the diversion is located on a non-fish bearing stream or spring, compliance can be obtained via a general agreement that includes standard terms for protecting fish and wildlife, and which can be applied for via an online portal. Compliance for other diversions must be obtained via the regular LSAA notification process (discussed above).

Finally, in addition to state-level regulation, some local jurisdictions – including Mendocino Humboldt Counties – have developed cannabis cultivation ordinances that require water availability analyses for surface water diversions. Many growers of cannabis will likely not seek to come into compliance with the new licensing regime, but instead will continue to grow for the illegal market. It will be difficult to incorporate these into formal water management programs. Most programs will rely to some extent on grant funding and working with staff at the Water Board and CDFW, the agencies that regulate water diversion for cannabis. Illegal operators will presumably not want to attract the attention of these agencies, and funders will not want to work with unlawful diverters.

A more uncertain situation exists in the case of farmers who grow a mix of food crops and cannabis – a common situation on the North Coast. The Cannabis Policy requires that water diversion and use for cannabis be measured and accounted for separately from diversion for other use. Depending on the extent of cannabis grown, it may make sense for streamflow project proponents to work with such operators, at least to the extent of their non-cannabis use.

7.8 Exploring Potential Incentives and Streamlined Solutions

While there are certainly challenges and regulatory constraints involved in permitting collaborative water management projects, there are existing and emerging opportunities that should be further explored that could improve the efficiency and accessibility of water storage implementation efforts. Creating pilot projects that utilize streamlined permitting paves the way for other restoration projects to employ similar strategies and steps to achieve water conservation objectives. The following are a suite of policy and permitting solutions that could advance collaborative water management planning.

A. Watershed-Scale Planning and Streamlined Permitting

One of the most effective things the State Water Resource Control Board and CDFW could do to enable the development of water management projects that improve instream flows for fish and water supply reliability for landowners would be to speed the approval of water rights and LSAA agreements for improved water management. One way this might be achieved is by defining the type of projects that are considered “good” for streamflow, and then provide for projects meeting this definition to be approved with minimal and expedited review. This up-front definition could be based on watershed-scale planning defining desired streamflow conditions for the wet season, dry season, and spring recession. These streamflow criteria could be coupled with a policy providing expedited permitting for projects that change existing water management to bring conditions closer to the desired levels.

For example, suppose that goals are developed for a hypothetical watershed calling for minimum flows of 8 cfs in the winter, and 0.5 cfs in the summer. Further, suppose data show that existing flows are typically 15 cfs or more in the winter, but often fall as low as 0.1 cfs in the summer. Examples of projects that would improve these conditions would include:

- A project to switch the timing of an existing diversion from summer to winter by constructing a new storage pond that would be filled in the winter, with a minimum bypass flow of 8 cfs. In exchange, the diverter would agree to reduce or eliminate her existing diversions in the

summer when flows drop below 0.5 cfs. The result of the project would be to bring summer flows closer to desired levels, without causing winter flows to drop below desired levels.

- A project in which a group of six existing summertime diverters agree to rotate their diversions in when flows drop below some calculated threshold – say 0.7 cfs – such that no more than two of them are diverting from the stream at the same time. The result would be to bring summer flows closer to the desired threshold of 0.5 cfs.

Both of the above would be voluntary projects with existing diverters to improve existing streamflow conditions toward desired levels. Therefore, both projects would be eligible for streamlined permitting. Note that in both cases, it will be crucial to ensure that the project parameters – e.g., the volume of storage and the dates/ flows that trigger the obligation to forbear or rotate diversions – are set at levels that allow the diverters to reliably divert sufficient water to meet their reasonable needs. If the terms are too restrictive to provide this basic level of water security, the diverters may choose not to participate and the opportunity to improve streamflow may be lost.

The State Water Board could build on the above streamlining proposal by conducting water availability analyses at the watershed level in key watersheds. Using existing methods, staff would calculate unimpaired flows to determine how much water is available in the winter months. Next, they would quantify and deduct the amount of water taken by existing diverters, as well as the amount of water needed to maintain flows for fish and wildlife during the same period. The result would be a "block" of water that is available in the winter months. This water could then be allocated on a first come/ first serve basis to water users who seek to switch the timing of existing diversions from summer to winter via storage and forbearance projects. Doing the analysis up front would make it much easier to identify and plan such projects, and would make the water right permitting go faster.

CDFW could apply the same analysis to issuing LSAAs for streamflow projects by categorically defining projects that meet the above criteria (i.e., ones that move streamflows closer to desired conditions without increasing existing levels of diversion) as "non-substantial" diversions which would not require an individual LSAA. CDFW could also develop a standard list of conditions that apply to all such projects to ensure minimum requirements (e.g., fish screens) are met.

The North Coast Regional Water Quality Control Board can affect permit streamlining through the development of general Waste Discharge Requirements (WDRs) for pond construction. WDRs are a type of permit that is used to regulate activities that may release pollutants such as sediment into surface waters. These WDRs are already in the Navarro Temperature Action Plan. WDRs are central to cannabis cultivation, logging, viticulture, and agricultural activities or any land use activity that causes discharge. Development of general WDRs and 401 water quality certifications could be completed in a way that includes a CEQA analysis that could be relied on for multiple projects, thereby decreasing the costs associated with projects. This same approach has already been taken to streamline the permitting of sediment source reduction, streambank restoration, and riparian planting projects implemented by the Mendocino County Resource Conservation District, Natural Resources Conservation Service (NRCS) and others.

Part of the idea here is that once the CEQA is done for a class of projects (programmatic), other implementers can rely on that CEQA analysis, as long as their project fits within the scope of the CEQA analysis. This would be beneficial since CEQA review can take a long time and be costly.

B. Legislation Making Small Irrigation Use Registrations (SIUR) Available State-wide

Registrations provide a streamlined process for obtaining appropriative water rights for relatively small amounts of water. In 2009, the legislature created a registration designed for projects at small farms called a "small irrigation use registration" (SIUR), which allows farmers to store up to 20 acre-feet of water for use on existing cultivated lands without going through the full appropriative water right application process. SIURs are ideal for storage and forbearance projects at small farms, but are currently only available in the area covered by the North Coast Instream Flow Policy (San Francisco Bay north to the Mattole River). Making them available statewide would reduce the burden of implementing collaborative projects throughout the California coast.

C. CDFW Regulations Defining Substantial Diversion

As discussed above, existing law (FGC §1602) requires anyone who diverts water from a stream to notify CDFW if their diversion is large enough to be "substantial." Unfortunately, the law does not define the term "substantial." Moreover, the definition of the term surely varies depending on circumstances – while a 10 gallon per minute pump might well be insubstantial if it only draws water from the mainstem Eel River in the wintertime, the same diversion might be very substantial if it draws water from a small tributary in late August. Currently, the only way to gain certainty on whether a diversion is substantial is to consult with CDFW. While CDFW staff are very adept at handling such requests, the lack of standards can make it difficult to predict the outcome in advance. This can make it difficult to plan projects, and can be a barrier to participation by landowners, who dislike uncertainty. A solution to this problem would be for CDFW to enact regulations defining "substantial" diversion. Even if such regulations did not provide certainty in every case, they could go a long way toward providing more clarity than currently exists, which would help get more projects on the ground.

D. Provide A Simple Method for Calculating Protective Water Right Terms

To streamline efficiency and reduce landowner costs, ideally there would be a simple and approved method of calculating protective water right terms without the need for site-specific studies. Much of the time and expense of obtaining new water rights for streamflow projects comes from the need to show that the new diversion will not affect minimum stream flows needed for fish and wildlife. This can be an onerous task, particularly in the North Coast Policy area, where site-specific field studies are often required. A way to avoid this problem would be to develop scientific methods that could quickly estimate minimum fishery flows based on data that are already available. One promising method called the Modified Percent of Flow (MPOF)[13] approach would do this by assuming that fisheries are not significantly impacted so long as total human water diversions take less than 10% of streamflow typically present in a dry year (based on an analysis of historical streamflow data from a gauge near the watershed in question). If the agencies were to endorse such a method, the time and permitting of streamflow projects could be greatly reduced.

E. A User-friendly Interface to Existing Water Rights Data

A user-friendly interface would enable landowners to quickly determine how much water is legally available for diversion at their proposed points of diversion, and during what season, so they can design projects accordingly at minimal expense.

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[13] *Managing Diversions in Unregulated Streams Using a Modified Percent of Flow Approach*, Freshwater Biology, Mierau, July 2017

Every water right application requires a hydrological analysis that estimates the total amount of water available from natural streamflow in a watershed, and compares that to the amount that has been allocated to existing water rights. Although the underlying analysis can be complex, the basic water rights data that need to be inputted are relatively simple. User-friendly software could be developed that would allow a user to click on any point on a map and get a reasonably accurate estimate of the amount of water legally available for appropriation at that point, without impacting fisheries or other water right holders. This would be a great aid in planning collaborative projects at the watershed level.

F. Collaborative Water Management Approaches

The North Coast Policy's Watershed Approach, if further defined, could provide an incentive for a group of water users in a specific tributary who are willing to work together in order to share resources and improve their water security in their tributary. The Policy "provides for a watershed-based approach to evaluate the effects of multiple diversions on instream flows within a watershed as an alternative to evaluating water diversion projects on an individual basis." Furthermore, "The policy encourages two alternative forms of watershed-based approaches: coordinated management of diversions through watershed charters (sections 4.1-4.6) and coordinated permitting of applications." (section 4.7)."[14]

The premise of the Watershed Approach is that a group of water rights applicants in the same watershed can reduce individual costs by cooperatively pooling their resources. Since the adoption of the policy in 2014, the watershed approach has not yet been implemented. The State Water Board and a group of landowners in Anderson Creek in the Navarro watershed attempted to utilize this type of approach and drafted a charter agreement that established the steps required for the Division of Water Rights to determine water availability, CEQA requirements, and evaluate the impacts of water diversions on public trust resources. Although this project was not ultimately able to adopt the watershed approach, the existing charter and lessons learned provide a blueprint for how to move forward towards a collaborative water management agreement that could utilize this approach.

The goal of developing the Collaborative Water Management framework is to build upon the Watershed Approach in order to implement a pilot project in the Navarro watershed that involves a water management plan and agreements amongst participating landowners. Incentives for coordinated diversions could be sharing costs of a water availability analysis, reducing each individual parcel's storage needs and expense by coordinating and thereby reducing the length of an individual's forbearance period, and ideally expedited streamlined permitting.

Other types of voluntary collaborative approaches include the formation of tributary collectives and associated tributary charters that could water stewardship agreements, coordinated diversion schedules, and a commitment to water conservation and best management practices for participating landowners.

[14] *Policy for Maintaining Instream Flows in Northern California Coastal Streams, Division of Water Rights,* State Water Resources Control Board, 2014

Chapter 8: Collaborative Water Management Case Studies

These Northern California coastal watershed case studies provide real-life examples of collaborative water management efforts in northern California. The case studies highlight the water supply and fishery needs that were addressed, the process and approach taken, and key challenges and strategies used to address impediments. These case studies focus on projects that are well underway and are continuing to grow and inform other community-based flow enhancement efforts.

Mattole River Case Study

The Mattole River is located in coastal northwestern California and is part of the temperate rainforest ecosystem of the Pacific Northwest. The Mattole headwaters provide key spawning and rearing habitat for endangered salmonids in the river and have been the focus of salmonid restoration efforts for more than three decades. In the last ten years, low streamflows have severely impacted the limited salmonid habitat.

The Mattole watershed has a Mediterranean climate with most of the rainfall occurring in the winter and little to no rainfall in the summer. Water is abundant in the winter and scarce in the late summer and fall months. Prior to the last decade, the dry season averaged 3.5 months and streamflows in the headwaters mainstem and tributaries would become very low but never stopped flowing. However, in all of the extreme low flow years of the last decade the dry season has been observed to be significantly longer with rain ending sooner in the spring or starting later in the fall. In 2008, flows were the lowest ever recorded at the Petrolia USGS gage and the dry season was 4.7 months long. The mainstem stopped flowing in many locations along with 11 out of 13 fish bearing tributaries including five tributaries with no diversions for human use. Based on this information, it became clear that under current conditions in the Mattole, both the way humans use water and the land's capacity to store water to support summer base flows would need to change for fish and water user’s to have enough water to survive these longer dry seasons.

To address these challenges, Sanctuary Forest (SFI) developed two restoration strategies to improve Mattole flows: one strategy based on changing human use and the second strategy based on restoring ground and surface water hydrologic functions impaired by land use practices. Both strategies are based primarily on storing water from the wet season for the dry season. The storage and forbearance program was developed in response to the severe low flows of 2002 and outcomes from community meetings. This voluntary, incentive based program now in its sixteenth year helps landowners change their water use for the benefit of the river, fisheries and wildlife. Participating landowners forbear from exercising their riparian water rights during the low flow season, and receive a water storage system and water management plan from Sanctuary Forest to ensure an adequate water supply. The first storage systems were installed in 2007 and since then 1.8 million gallons of storage have been installed along with 30 forbearance agreements. Management of the program involves low flow season monitoring along with landowner notices and technical support needed to ensure forbearance.

The program has been very successful and provided increased water security for people and improved streamflow for salmonids. Education and outreach have fostered community appreciation and pride in the program with many households practicing conservation and voluntarily installing some storage on their own.

Process and Approach: Community outreach and meetings to discuss the low flow problem and collect landowner input on potential solutions was conducted as a first step. Community members identified storage and forbearance as a potential solution. The next task was to determine if stopping diversions during the low flow season would make a measurable improvement in flows. A preliminary hydrology assessment was conducted with a consulting hydrologist. The assessment compared the results of flow monitoring with estimates on human water use obtained from surveys. The outcomes of the analysis showed that diversions for human use are significant during low flows. The next step required developing a permitting pathway with water rights for storage and CDFW flow thresholds.

Sanctuary Forest conducted targeted outreach and convened meetings with SWRCB and CDFW to determine the water rights process. The Small Domestic Use registration (SDU) was selected as the most efficient option for rural landowners whose water use fit within the SDU constraints. For institutional water users, change petitions were used to obtain new appropriative rights that included water storage. The CDFW flow threshold process involved working with CDFW biologist and water rights staff. Instream flow studies had not been performed so pool connectivity was the basis for initial forbearance thresholds. Pool connectivity was determined in coordination with CDFW by walking the 9.4 miles of the Mattole headwaters mainstem and determining the locations where flows would become disconnected the earliest. Streamflow measurements were then obtained from the downstream end of this area to determine the flow at which pools begin to disconnect. In consultation with CDFW, streamflow forbearance thresholds were then set at 0.7cfs which is 0.5cfs higher than the flows at which disconnectivity occurs.

Comparison of maximum cumulative human use impacts with streamflows was used to establish restricted pumping thresholds — reduced pumping rates and assigned pumping days. Sanctuary Forest's preliminary analysis based on water use surveys resulted in the restricted pumping threshold of 5 cfs. Analysis later performed by Trout Unlimited, McBain and Trush, and CEMAR resulted in a higher restricted pumping threshold of 10 cfs and the same forbearance threshold of 0.7 cfs. The Trout Unlimited analysis included instream flow studies to determine optimum flows for rearing and spawning as well as a more thorough determination of human water use impacts. The storage and forbearance program would also require legal agreements with participants – both to protect the flows and as a vehicle for grant-funded storage.

Conservation easements and forbearance agreements were both considered and the forbearance agreement option was selected and developed with a consulting water law attorney. The forbearance agreement includes exhibits for the water management system, maps, and the water right. The agreement provides a level of detail sufficient for the landowner to successfully manage their stored water and comply with the program.

The Sanctuary Forest process included implementation, demonstration, and building capacity and trust in order to engage more landowners in the program. The storage and forbearance program was first implemented in a one-mile critical reach of the Mattole headwaters. This reach was selected based on the following factors: known low flow problems, high density of landowners, landowner interest, and importance for salmonid habitat. The storage and forbearance strategy was implemented as a pilot project to assess streamflow and community benefits – and the reach was also selected for monitoring access to the upstream and downstream ends of the reach. Demonstration of streamflow benefits was very important for the community but also needed to gain funder confidence. Following implementation of the first few projects, community outreach continued and participants shared their experience of the program. The program benefited landowners in unexpected ways. For example, winter water security and quality was significantly

improved because the storage allowed for pumping when the water is clear and diversion pumps could be stored safely on shore during torrential flows. The water security aspect of the system with buried pipes was an improvement and resulted in fewer problems with frozen pipes. More landowners became interested in participating after hearing about the benefits.

Operation of the storage and forbearance program included roadside signs and streamflow alerts. Management of the program involves low-flow season monitoring along with landowner notices. Participating landowners receive several phone calls a year to remind them to fill and top their tanks early in the spring, assign pumping days to reduce cumulative impacts, share the estimated and final date of forbearance, and to go over the removal of pumps from the river after sufficient rainfalls. Sanctuary Forest also does follow-up calls to document the end of the forbearance period.

Roadside signs showing the weekly flow are also maintained for all of the community members who are practicing forbearance on their own. Community members have asked for this real-time information and often call to ask about the river conditions. The blue fish program has also engaged community members. This program provides wooden blue salmon signs for each participating family's driveway which inspires neighbors to "earn" a blue fish by conserving and storing water on their own or joining the grant-funded program.

The second strategy SFI employed is focused on restoration of hydrologic functions and increased groundwater storage. Research conducted since 2005 has shown that groundwater enhancement projects have the potential to restore healthy flows, even in drought years. Past land use practices including extensive logging and road systems have greatly decreased groundwater storage capacity resulting in higher winter runoff rates and lower summer flows. Removal of large wood from streams has also decreased groundwater storage through channel incision and loss of floodplain connectivity. In SFI's analysis of Mattole groundwater conditions they found it helpful to describe the groundwater as an underground tank with a limited capacity. Loss of the "infiltration sponge" and soil compaction has caused the "underground tank" to only partially fill up. Road cuts and channel incision cause rapid draining of groundwater and act as leaks in the "underground tank". Extensive research, monitoring, and analysis of the Mattole watershed geology and hydrology show that groundwater recharge projects will need to be designed to either slow groundwater flow or utilize a design whereby groundwater is continuously charged by adjacent surface water as occurs with beaver ponds, instream pools and offstream ponds. SFI is developing pilot projects to restore instream pools and groundwater storage in non-anadromous intermittent streams as well as anadromous incised streams.

While both of the strategies were developed specifically for the Mattole River, they were informed by projects in other parts of the world. Sanctuary Forest has learned from beaver pond stream restoration in Oregon and earthen dams (johads) built to slow monsoon rains and recharge groundwater in India. SFI has had many restoration partners to accomplish this work including other non-profits in the Mattole, agencies, funders, and the community. SFI as an early adopter has freely shared their methodology and information to contribute to the development of restoration strategies for water scarcity and climate change adaptation in other communities and watersheds.

Bodega Valley Rainwater Catchment & Alternative Water Supply Program Case Study

Salmon Creek in the Russian River basin is a small coastal watershed that historically supported salmon runs and is populated by rural-residential and agricultural properties in the Bodega Valley. The Mediterranean climate and past and current land use practices in the valley affected summer flows for fish and residents. The Salmon Creek (tributary to the Russian River) Water Conservation Plan[15] was developed to address low flows for juvenile salmonids in the dry summer months in this important tributary in Western Sonoma County. The goal of the conservation plan was to increase streamflow during the dry season to improve habitat conditions for endangered coho salmon in the watershed. This plan explored a range of options to improve stream flows including developing alternative water storage for agriculture and community needs that would provide water reliability for residents and maintain instream flows for salmonids.

"The community of Bodega and neighboring ranches provided an ideal opportunity to concentrate community planning and project implementation efforts to demonstrate the potential of roof water harvesting systems to meet water supply needs. The Bodega Valley Rainwater Catchment & Alternative Water Supply Program is an example of a multi-pronged, community-based program to provide enhanced water security for residents and help restore streamflows."[16]

The evolution of this project included the steps of conducting a scientific study, identifying the area where water storage would most efficiently address summer diversions, community outreach and education, planning, and implementation. The Salmon Creek Estuary Study[17] recommended an increase in off-stream storage capacity, reduced dependence on summer diversions, and encouraged constructive dialogue in the community. The study also recommended that education and outreach programs were an effective way to inform citizens about managing their water use.

Salmon Creek like many coastal tributaries on the Central and North Coast suffered from low summer flows and had limited groundwater sources. Limited summer water and high municipal water rates created a situation where residents were already cognizant and conservation-minded about the summer water supply. Additionally, there was a growing awareness about the significance of Salmon Creek for endangered coho and steelhead. Economic, regulatory, and environmental pressures catalyzed the community to cooperatively explore solutions to water scarcity.

The Sonoma-based Watershed Council and collaborating organizations began hosting public meetings to share information with residents about watershed conditions, salmon populations, and what could be done to improve water reliability and streamflows. Additionally, Occidental Arts and Ecology Center offered workshops and tours to showcase water conservation strategies, stormwater management, rainwater catchment, and roofwater harvesting methods. These workshops and tours raised awareness of the water scarcity issue and provided tangible examples of water storage options. Additionally, an outreach presentation coincided with the Bodega Volunteer Fire Department fundraiser that provided an opportunity to build support for a rainwater catchment tank for the fire department and attracted local ranchers and other constituents who saw the value of building alternative water storage on their land.

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[15] *Bodega Valley Rainwater Catchment and Alternative Water Supply Program*, Ag Innovations Network, 2013

[16] *Salmon Creek Water Conservation Plan,* Coastal Conservancy, 2010

[17] *Salmon Creek Estuary: Study Results and Enhancement Recommendations, Prunuske Chatham, 2006*

This project included a suite of water storage options including rainwater catchment, roofwater collection, and rainwater captured in off-channel ponds. Rainwater collection in California does not require a water right and is a great way to capture water for non-potable uses including livestock, landscaping, and small-scale gardening. Several private and public projects have been implemented in the Salmon Creek watershed based on this community planning effort including rainwater catchment, underground water storage, and an expanded water distribution system. Projects have benefitted dairy farms, the Bodega Fire Department, Bodega Water Company, and private rural residential properties.

The Salmon Creek flow enhancement effort is instructive because of its success and the range of water storage options that were employed but also because the project overcame the inevitable challenges associated with project implementation and innovative designs. Project challenges included addressing groundwater conditions and drainage in the design. Underwater storage tanks were implemented and the designs required backfilling between pipe rows during installation. This turned out to be difficult to accomplish without affecting the position and shape of the pipes. Additionally, the initial plastic welding did not seal the water tank and resulted in leaks and loss of the collected water. These problems were addressed and now the systems are functioning effectively and have reduced summertime diversions amongst participating landowners.

"The success of the Bodega Valley Rainwater Catchment and Alternative Water Supply program is a testament to the power of innovative solutions, community building, and the value of effective demonstrations. Lessons learned from the program include:

- Innovative solutions require an understanding of the habitat, climate, and history that contributed to the initial problems.
- Progressive thinking initiates action, and can move ideas and issues into mainstream consciousness, but a critical mass is necessary to bring efforts to fruition.
- Early efforts and community building are key to obtaining widespread support. Education, outreach and guided tours were instrumental in gaining the community's engagement.
- In a community as culturally, politically, and generationally diverse as Bodega, the message needs to be framed properly in order to attract and build the trust of multiple stakeholders.
- Even among diverse stakeholders, people will convene and work together to address issues that have widespread effects, and ultimately come to a positive solution.
- Problems are usually multifaceted. Engaging at multiple scales and in different ways is often a successful approach. For example, demonstrating an array of rainwater catchment systems exhibited the scalability of the concept and the diversity of applications, which contributed to the collective buy-in.
- Presenting the approach as customizable, rather than one-size–fits-all, resulted in greater willingness to participate.
- Centralization and decentralization are interconnected. The development of residential (decentralized) projects motivated the creation of a centralized community system.

Ultimately, the success of the Bodega Valley Rainwater Catchment and Alternative Water Supply program, and the importance of demonstrating success early on serves as an example for other communities. Having piloted community rainwater catchment systems effectively, this project can be presented as a model to assist other communities with future efforts. [18]

[18] *Agricultural Water Stewardship Case Study: Bodega Valley Rainwater Catchment & Alternative Water Supply Program, 2013*

Russian River Coho Water Resources Partnership Case Study
The Russian River Coho Water Resources Partnership (Partnership) prepared the Streamflow Improvement Plan as part of the Russian River Coho Keystone Initiative. This collaborative process and streamflow enhancement program provides a successful blueprint that can and has been replicated in other coastal watersheds.

The purpose of the Keystone was to select focal watersheds in the Russian River in order to restore natural flow regimes, increase the viability of juvenile coho and returning adult salmon, and to increase the water reliability for water users. The Partnership "applies a systematic, watershed-scale approach that brings together landowner interests, streamflow and fish monitoring, technical, planning, and financial assistance, and water rights and permitting expertise to modify water use and management to improve instream flow."[19]

The Partnership was formed in 2009 and its overarching goal is to enhance streamflows and provide water reliability followed the tried-and-true steps to build support for a collaborative approach. The Partnerships goals are to:

1) Restore a natural flow regime in priority watersheds

2) Increase the viability of juvenile coho and returning adults

3) Increase water reliability for water users in priority watersheds

4) Increase knowledge and public awareness about watershed processes and impacts on streamflow and fish

The Partnership's approach integrated targeted outreach and community support, project development, implementation, evaluation, and support for strategic water right and policy changes that would improve water management as well as streamflow monitoring to inform decision-making.

Dutch Bill Creek emerged as a focus watershed because "it provides the critical intersection of feasibility of salmon restoration, degree of stream impairment by diminished flows, landowner interest in collaboration, importance to coho salmon, range of land and water uses with the potential to demonstrate a variety of solutions, and federal and state recovery plan prioritization."(Dutch Bill Creek SIP)

A significant consideration in selecting Dutch Bill Creek as a focus for flow improvement efforts was the rich history of community stewardship and habitat restoration activities that had already transpired in the watershed. Dutch Bill Creek is home to several landowners and entities that embraced a conservation ethic and the watershed had the added benefits of years of community engagement, outreach, education, instream habitat assessments, water quality monitoring, fish passage projects, instream structure and large wood placement, sediment reduction projects, upland recharge, coho salmon releases and monitoring — all of which cumulatively improved conditions for coho salmon in the watershed.

The Streamflow Improvement Plan for Dutch Bill Creek utilizes an approach that is useful for application in the Navarro. Both watersheds have a Mediterranean climate where there is ample rainfall and water in the winter but dry summer months with scant precipitation. These watersheds produce an abundance of winter water but the seasonality of its availability is the greatest

[19] *Dutch Bill Creek Streamflow Improvement Plan*, Occidental Arts and Ecology Center, March 2017

challenge associated with ecologically sustainable water management. Similarly, the Navarro and Dutch Bill watersheds include a patchwork of ownership including wineries, agriculture, conference facilities, and rural-residential land ownership. Therefore, the water management actions and strategies that were employed in Dutch Bill are likely to be successfully replicated in the Navarro.

This project was informed by a scientific study to determine the priority reaches to focus flow enhancement efforts. The study findings indicated that increasing daily discharge, pool connectivity, wetted volume, and dissolved oxygen concentrations in salmonid rearing reaches would support increased survival of salmonids through the juvenile life stage. Each of these parameters could be positively affected by enhancing streamflow. The Partnership identified priority reaches by evaluating CDFW habitat surveys, streamflow and fish distribution, the level of flow impairment, and the feasibility of improving streamflows.

Flow improvement actions included:

- Reduce or eliminate direct dry season diversions from mainstem Dutch Bill Creek and its tributaries by institutional and residential users
- Pursue flow releases from ponds, and spring-to-surface-water reconnection
- Assess the impact of stormwater runoff, explore infiltration and groundwater recharge opportunities
- Investigate the possibility that overstocked, even-aged forestlands are having a detrimental effect on streamflow throughout the forested areas of the watershed

Recommended strategies for reducing or eliminating diversions:

- Reduce demand where possible through conservation, water use efficiency improvements, reductions in irrigated acreage, etc.
- Evaluate and develop alternative sources of water such as rainwater catchment, graywater re-use and others.
- Construct water storage to facilitate changes in the timing of diversion from the dry to the wet season.
- Reduce individual and cumulative diversion impacts relative to streamflow through regulatory storage (e.g., diverting at a low rate into storage and pulling from that storage at a higher rate), rotation of diversions with other users, and changes in points of diversion. [20]

For institutional users, reducing diversions can be accomplished by reducing the irrigated area, implementing water conservation measures, and shifting the rate, timing, and place of diversion by building sufficient water storage. The success of this project is largely due to the robust restoration partnerships that work collaboratively in this watershed including Gold Ridge Resource Conservation District, Occidental Arts and Ecology Center, Trout Unlimited, Westminster Woods, and other restoration partners. The ability to create demonstration sites early on helped inspire other neighboring landowners and institutions.

The primary lesson learned in this effort is that project effectiveness monitoring is challenging on a micro-level where flow improvements are small but significant in a small coastal stream. Working collaboratively with partnering landowners and institutions in a losing reach presents the best opportunity to enhance flows for juvenile salmonids and improve water reliability for participating restoration partners.

[20] *Dutch Bill Creek Streamflow Improvement Plan,* March 2017

Chapter 9: Exporting the Collaborative Water Management Model to Other Regions

A goal of developing the Collaborative Water Management framework is to help export and replicate voluntary collaborative approaches in other Northern California watersheds striving to improve stream flows for communities, farmers, and fisheries. The ability to establish community-based water conservation programs in other regions will depend on a range of factors including environmental and regulatory imperatives, receptiveness of the community and, if the time is right, to influence a change in human water-use behavior. Key elements for successfully exporting a collaborative water management approach include leveraging existing conservation efforts, engaging the community, and identifying project proponents who can provide technical support. Additionally, funding is necessary to support collaborative planning, outreach and education, and to design and implement projects. Agency support is also essential to provide informational and regulatory guidance.

Utilizing Collaborative Approaches

To successfully transport a water management model requires an integration of these various elements and working with a local Resource Conservation District, watershed group or non-profit that can provide the institutional knowledge, social credibility, and technical capacity to advance project development. For example, In Redwood Creek (a critical tributary in the South Fork Eel River) landowners were galvanized by historic low flow conditions as well as regulatory enforcement. Sanctuary Forest had pioneered water storage and forbearance practices in the neighboring Mattole River watershed so nearby landowners were acculturated to the idea of storing water in the winter for use in the summer. Because of this, the time was ripe for modifying behavior and engaging in a meaningful dialogue about water use practices. Additionally, regulatory agencies were focused on this watershed because of cannabis cultivation, illegal water diversions, and its' historic significance for salmon. This convergence of factors catalyzed the project but it could not have gained momentum without the leadership of community members who stepped forward and brought other tributary residents to the table. This took the form of community members hosting house parties, initiating constructive conversations about water use, and setting an example by voluntarily forbearing from diverting water during the dry summer months.

Successfully exporting a water conservation model requires social, environmental, and economic feasibility. The process of transferring replicable technologies or processes is often referred to as a technology transfer. The definition of "technology transfer" varies by discipline, but can generally be understood as "the movement of know-how, technical knowledge, or technology from one setting to another. In the case of collaborative water management, the transferability can be thought of as the replication, scaling-out, or adoption of water conservation and management strategies or practices that have been employed in one watershed, and can be applied in another place based on the social and environmental context of the watershed."[21]

Although water management planning requires a technical understanding of ecological processes, the social dimension of collaborative planning relies more on well-developed communication strategies. For community-based water planning to truly be effective and take flight, the process should be landowner-driven which is different than stakeholder-driven. Most resident landowners have a strong sense of community and place — a desire to protect and conserve the place they cherish. For many community members in rural areas their water source supplies their home,

[21] *Resilience in a Time of Drought—A Transferable Model for Collective Action in North Coast Watersheds,* Sara Schremmer, Prepared for Sanctuary Forest, 2014, p.5

enriches their land, and supplements their livelihood. Stakeholders include landowners, agency representatives, non-profits, RCDs, institutions, and businesses. Stakeholders will have a vested interest for conservation purposes, regulatory mandates, or institutional needs but they will not necessarily be as effective leaders or communicators as those residents who directly rely on the water resources in their watershed.

According to the Center for Collaborative Conservation Research 2017 Report, *Collaborative Conservation Skills and Tools Identified by Conservation Practitioners*,[22] the most important collaborative skills and tools to achieve conservation success included listening and communication, facilitation of decision-making, and understanding others' interests. These skills were more highly valued for collaborative planning than technical skills and expertise. The needs assessment in this study found that to succeed in collaborative planning it is important to identify commonalities in a thoughtful and trusted collaborative process, that engages all sectors, and results in agreed upon solutions.

Therefore, it is best to be mindful of the approach and process when initiating strategies to facilitate collaborative water management. Landowners and residents are usually knowledgeable about flow conditions, water availability and community dynamics so they can be great sources of information to advance flow enhancement planning.

Ongoing outreach and an amplification strategy is key to engage and inspire local leaders. There are many ways to amplify your strategy, message, and education efforts. It is helpful to use low-tech platforms to share the information and educational materials that you are generating. These platforms can include Facebook for social media, Vimeo for video archives, Soundcloud to share audio media, and Plotly for sharing flow data on your project website. Utilizing these online platforms is an effective way to amplify your efforts. Postings on Facebook could include announcements about educational events, project milestones, and flow advisories. Videotaped presentations can be formatted for Vimeo andbe easily accessible on your project website. Radio interviews can be archived and accessible as a lasting resource. Plotly can be used to create an interactive graph with real-time flow data. All of these education and outreach strategies are designed to create multiple venues to amplify your message.

Export Strategies and Identifying Project Proponents

Strategies to facilitate the export of a collaborative model include conducting an evaluation of watershed conditions (social and environmental), identifying proponents and potential funding sources, education and outreach, technical assistance, and collaborative planning opportunities. When contemplating if a coastal watershed is ripe for a collaborative watershed approach it is best to use evaluation criteria that take into consideration the history of watershed restoration, the value of salmonid habitat, baseline information about flow conditions, and if there are existing social structures and community leaders that could champion the effort. As evidenced in the Collaborative Water Management framework, community buy-in is key to the success of this type of effort.

Identifying additional watersheds that would benefit from collaborative water management planning would include scoping what level of conservation work has already been accomplished in the watershed, identifying established project proponents, and reaching out to see if the CWM framework and goals would complement the work that they are already doing. Most Northern California watersheds have existing watershed groups, RCDs, or programs like the Five Counties

[22] *Building Capacity for Collaborative Conservation in the American West*, Center for Collaborative Conservation, 2017

Salmonid Conservation Program that covers Mendocino, Del Norte, Trinity, Siskiyou, and Humboldt Counties. These organizations have institutional resources and have spent decades cultivating relationships with landowners, agency personnel, and other stakeholders. *Resilience in a Time of Drought: A Transferable Model for Collective Action in North Coast Watersheds* recommends, "Including representatives from a broad range of stakeholder groups early in the analytic and decision-making phase of your project, including citizens and landowners, scientists with expert knowledge of the resource systems under investigation, and appropriate governing agencies." To promote collaborative water management models it would be best to partner with groups who have an intimate working history and knowledge of the watershed.

Technical Assistance and Funding to Support Collaborative Water Management
Community water security and stewardship values often motivate landowners but without technical assistance it is unlikely that small landowners will be able to navigate the planning, regulatory, and permitting process. Regulatory certainty, permitting pathways, and informational support are essential to advance voluntary collaborative stakeholder efforts to forbear from summer diversions. Many landowners want to improve summer base flows for fish and comply with state and county regulations yet they are overwhelmed by the current complex regulatory environment and the costs associated with compliance. Collaborative water management efforts are more likely to succeed if they can facilitate streamlined permitting, cost sharing, and identify funding for on-the-ground projects. Additionally, RCDs and non-profits need funding in order to provide technical assistance, watershed planning, and ongoing education.

Additionally, providing technical assistance and fundraising for collaborative projects is another way to help landowners in your project area and build relationships. Technical assistance can take the form of water rights consultations, assisting with annual reporting requirements, doing a property walkthrough to identify best management practices, or helping facilitate a community meeting to discuss water usage. All of these are valuable types of assistance for landowners and advance collaborative water management planning. This type of outreach and moving from planning to implementation requires securing and leveraging various funding sources.

The passage of Proposition 1 in California authorized nearly three billion dollars for multi-benefit watershed restoration grants and flow enhancement / water storage programs. For small coastal watershed projects to compete, it is imperative to be able to demonstrate stakeholder support and an integrated and achievable vision of coordinated water planning. California has several funding programs to enhance streamflow most notably the Wildlife Conservation Board Streamflow Enhancement Program, CDFW's Fisheries Restoration Grant Program (that has the valued advantage of programmatic permitting for implementation projects), and State Coastal Conservancy funding. Federal programs include the EPA's 319h water quality program (administered by the State Water Resources Control Board in California), National Fish and Wildlife Foundation, and NOAA Fisheries programs. Regional funding and landowner assistance is available through the Natural Resources Conservation Services, USDA programs, as well as community and private foundations.

Support from agencies and restoration partners can also include in-kind contributions, engineering guidance, serving on a Technical Advisory Committee and providing assistance with streamlining permitting or implementing a Watershed Approach as identified in the North Coast Policy. Water management efforts benefit from working with resource professionals and leveraging opportunities to share information. For example, SRF partnered with NOAA Fisheries to produce educational events and provide context for South Fork Eel River tributary prioritization efforts.

Working With Agencies to Promote Collaborative Water Management

Support from state and federal resource agencies will be essential for landowners to succeed in improving instream flows. Agencies can offer incentives like streamlined permitting for landowners working cooperatively to manage water resources. It is helpful for conservation coalitions and non-profit groups to encourage agencies to utilize existing policies to promote watershed approaches to water management. Once there is a demonstrative success like the use of Safe Harbor Agreements to protect steelhead or instream flow dedications to preserve instream flows, it is much easier to replicate those efforts in other watersheds where there are water supply issues, community support, and the potential to enhance flows and salmonid habitat.

Additionally, it is essential to evaluate, and hopefully reform, federal, state and local policies that can offer programmatic permitting to support coordinated water management programs. This requires ongoing collaboration with government agencies, NGOs, and organizations engaged in voluntary conservation efforts as well as input from committed, participating landowners. Collaborative water management export strategies should focus on landowners and communities that are navigating water rights permitting to achieve sufficient water storage.

For export strategies to succeed, project proponents need to consider regulatory changes, concurrent studies, and policies that affect water management planning in the region. One export strategy is to proactively leverage and utilize policy imperatives. For example, the State Water Board (SWB) through the California Water Action Plan is conducting studies to develop instream flow requirements in five watersheds in California. This flow enhancement prioritization provides funding and planning opportunities in critical watershed where there is not sufficient municipal infrastructure to meet existing water demands. Similarly, the NCRWQCB is developing the Navarro River Basin Instream Flow Needs Assessment Plan which when implemented will also result in instream flow requirements. These requirements or thresholds will likely be used in regulatory actions by SWB, such as curtailments of water rights, or authorization of new rights. Those community members working proactively to build improvements to their water storage capacity and come into regulatory compliance will have a significant advantage over those who wait as additional regulations are developed.

Additionally, the Cannabis Cultivation Policy recently adopted by the SWRCB could provide an opportunity for landowners to work cooperatively together and enter into an agreement with CDFW. Such coordinated efforts would result in watershed-wide protection for fisheries and meet comparable instream flow requirements under the new policy. In North Coast watersheds, where cannabis cultivation is a significant land use, this may incentivize landowners and legal cultivators to work together to minimize diversions, build sufficient water storage, and streamline acquisition of cultivation permits.

Another current opportunity that could advance community water management planning is the NOAA Fisheries Salmon Habitat Restoration Priorities (SHaRP) process to identify effective restoration with priority areas of salmon strongholds. This effort has a public engagement component to solicit on-the-ground knowledge from stakeholders that will ultimately inform prioritization efforts.

In summary, leveraging public trust policies and mandates can advance collaborative water management efforts especially in decentralized watersheds. To successfully export a collaborative watershed model requires community buy-in, ecological data, a common vision, prioritization criteria, and a robust and transparent process.

Chapter 10: Navarro Collaborative Water Management Demonstration Pilot Project Plan

Introduction

This chapter provides a conceptual plan for a Collaborative Water Management (CWM) Demonstration Pilot Project for implementation in a sub-basin of the Navarro River watershed. The plan builds upon a body of data and analyses that have been completed by The Nature Conservancy, Mendocino County RCD and Trout Unlimited as part of the Navarro River Watershed Flow Enhancement Project. This plan outlines the steps to establish a group of watershed stakeholders who are willing to work together collaboratively to develop and implement water management projects and actions to improve instream flows for fish and water supply reliability for landowners. Collaborative stakeholder approaches to water management have been successfully utilized in the Mattole, Eel and western Russian River watersheds where tributary water users are also grappling with coordinated water management, protecting fisheries, and ensuring water reliability. A goal in developing this plan is to outline an approach that can be replicated in other northern California coastal watersheds.

The steps of the CWM Pilot Project Plan include:

1. Determine priority tributaries for flow enhancement projects
   Utilize existing information to narrow scope of outreach and data collection efforts based on potential benefits to instream flow, target fish species and water supply reliability for landowners.

2. Tributary Landowner Outreach
   Develop and implement an outreach effort in priority tributaries to raise awareness among landowners about the challenges and opportunities to improve water management and fisheries habitat.

3. Establish Initial CWM Group
   Identify a core group of landowners willing to work together to develop and implement a collaborative water management plan to improve their water supply reliability as well as instream flows for fish.

4. Develop a CWM Plan
   Work with CWM group to identify potential flow enhancement projects and water management actions that could provide cost-savings and mutually benefit participating landowners

5. Adopt an Initial CWM Plan and Charter
   Landowners adopt an initial CWM plan for their stream including a charter or agreements that enable plan implementation, informed decision-making, and support permitting.

Step 1: Determine Priority Tributaries for Flow Enhancement Projects

Goal: Select the sub-basin streams within a larger watershed to focus efforts to identify priority projects that could improve instream flows for fish, water supply reliability for landowners, and serve as a demonstration project.

An initial step in establishing a collaborative water management effort in a large watershed is to determine the scope of the study area and to build support for a community-based water conservation program that is appropriate to the scale, water needs, and habitat conditions of the focus area.

To determine the appropriate scope and scale, it is helpful to establish criteria to inform planning decisions. For example, in the Redwood Creek, South Fork Eel River planning process, selection criteria included: 1) identifying a "losing reach" where coordinated landowner participation could measurably improve flows; 2) identifying a tributary where there was a demonstrated history of stewardship practices, and 3) prioritizing a tributary with high intrinsic habitat value that would be preserved by collaborative water management. The criteria used for the Navarro River Watershed Flow Enhancement Project focused on identifying the tributaries where water management projects could significantly improve baseflows that support juvenile rearing habitat for coho salmon and steelhead by reducing landowner diversions during the low-flow months of the year.

A. Collect and Analyze Data to Inform Restoration Project Planning

To help prioritize where to focus development of flow enhancement projects and collaborative water management efforts, it is very helpful to have streamflow data that characterizes watershed hydrology. Streamflow gaging enables understanding existing instream flow conditions, often in real-time, as well as potentially the areas where diversions significantly impair flow and salmonid habitat. Placement of gages should take into consideration the location of known or expected rearing habitat for salmon and reaches of known or suspected diversion. Gage data is important to identify future flow enhancement projects and to provide the necessary data to cue water management changes such as forbearance. Gages are also helpful to monitor compliance with a forbearance program and to quantify the benefits of flow enhancement projects.

In some watersheds, historical gaging data may already be available, but in most unregulated watersheds of the California coast, very little streamflow data is available. Fortunately, in the Navarro watershed The Nature Conservancy (TNC) began collecting streamflow data at 13 gauging sites starting in 2013. Before doing so, there was only one flow gauge in the watershed for any length of time – the USGS gage near the mouth of the Navarro River. However, most of the diversions are in the upper two-thirds of the watershed. For that reason and that the USGS gage data cannot reflect local conditions in the tributary watershed reaches of the watershed, it was clear that a network of gages was needed to support identification and development of flow enhancement projects in those areas.

The gaging network was specifically designed to characterize instream flow and water temperature conditions in the mainstem Navarro and major tributaries. Gaging locations targeted sub-watersheds with both agriculture and residential development, and documented habitat for coho salmon and steelhead trout. During mid-summer through early fall when instream flows are naturally low, the flow data showed fluctuations outside of the bounds of daily natural variability and even temporarily ceased flows. When the irrigation season ended, flows remained stable and returned to their natural pattern.

The flow data, paired with temperature data, helped identify the tributary watersheds where water management projects might be able to significantly improve instream flows and rearing habitat conditions for juvenile salmonid. Similarly, the data collection effort helped identify the locations in the Navarro Watershed where conditions currently do not support juvenile salmon and therefore would be challenging areas to focus fisheries restoration related water management efforts, at least in the short-term.

Some key questions to ask are:

- What sub-watersheds have water temperatures in the range (or close to it) to support coho salmon and steelhead trout?
- What sub-watersheds have temperatures well above those thresholds?
- Where stream reaches go dry, how long do they go dry for? Are they dry for a relatively short period of a few weeks, or are they dry for most of the summer and fall?

In addition to identifying promising project reaches, gage data is also helpful in supporting implementation of collaborative water management strategies. For example, gaging data indicates when certain management thresholds have been met, such as flow thresholds that might cue forbearance, changes in diversion rates, or coordinated timing of diversions.

B. Assess Water Use in the Watershed

Similar to the need for instream flow data to identify reaches where flow enhancement projects could benefit fisheries, it is helpful to understand water use at a tributary scale within a large watershed in order to identify where improving water management will benefit landowners. Creating a water budget for a project area is essential to understand current conditions and enable development of an effective plan to improve instream flows and water supply reliability at a watershed scale. If sufficient data does not exist, one way to accomplish this is to use the State Water Board's projections of small domestic use per household and calculate a water budget based on the square footage of irrigated lands. However, this approach will only produce a rough estimate that is unlikely to be sufficient to support project development at the individual landowner scale.

In the Navarro watershed, several planning analyses have already been completed that will be helpful in identifying areas where collaborative stakeholder efforts could improve instream flows and water supply reliability for landowners. First, a GIS exercise was undertaken to map human water needs such as residences, wineries, and agricultural fields. Water demand estimates were assigned to each digitized feature, facilitating identification of areas with significant dry-season water demand. As a second step, The Nature Conservancy (TNC) conducted a basic water rights analysis to identify landowners in areas of interest who have registered claims or rights to divert water in the dry season. These two analyses helped identify areas of significant water use demand, as well as potential candidates for collaborative water management projects.

The water use analysis was overlaid with additional information on areas of high salmonid habitat value. This information came from a review of watershed management plans for the Navarro, state and federal fisheries recovery plans, previous monitoring efforts in the watershed, as well as recently collected flow and temperature data that helped characterize existing conditions. Much of this information was developed recently as part of the Navarro River Watershed Flow Enhancement Project jointly undertaken by the Mendocino County Resource Conservation District (MCRCD), Trout Unlimited (TU) and TNC. This effort also included working with agencies to identify priority projects and opportunities for restoration.

C. Understand Water Usage and Gauge Landowner Interest in Collaborative Water Management Solutions

Collaborative water management planning requires understanding not only water usage patterns in the project area but eventually water use down to the level of individual landowners who are

participating in the planning process. A primary goal of the CWM effort is to assess individual landowners' water usage, water needs, and constraints that might limit options for water management projects. Therefore, developing options for a landowner to consider requires information about their water system and use. The most effective way to gather necessary information might be through either one-on-one meetings or a survey. The advantage of a survey is that it provides a framework for residents to think about their water usage, mechanisms to prevent water loss, and opportunities to collaborate with neighbors.

Water Use Survey Recommendations:

- Notify all landowners in the watershed that they will receive a survey and describe the purpose of the survey and how the data will be used and made available.
- Create both a paper version that is sent with stamped remit envelope as well as an online version of the survey that can be emailed to landowners who do not have a mailing address.
- Follow-up with a confidential summary of the results of the water usage survey to share with the community.
- Use the survey to identify new landowners who are interested in participating the CWM planning process and potentially design a water management project for their property.

Step 2: Tributary Landowner Outreach

Goal**:** Develop and implement an outreach effort in priority tributaries to raise awareness among landowners about the challenges and opportunities to improve water management and fisheries habitat.

A. Work with Potential Restoration Partners to Develop a Plan for Landowner Outreach

Once the priority sub-basins have been selected, the next step is to identify the individuals, groups, stakeholders and agency personnel that could be part of helping to refine an outreach planning effort. These may include local Resource Conservation Districts, road or neighborhood associations, farm associations, and others who are familiar with the tributary landowners and the issues that are important to them. Most importantly, they may help identify landowners who may be willing to support outreach efforts and possibly participate in a CWM group. It is helpful to keep in mind that engagement and early support from these entities is important to not only build support but also help inform the goals and objectives of the pilot project.

Early in the outreach phase of project development it is helpful to create a project web page to post educational materials, studies and project resources that can be accessed by community members. Showing real-time flow data is extremely useful to engage and mobilize landowners who may not be realize how quickly summer-time flows diminish. Landowners that are directly diverting during the summer may be willing to modify or coordinate their pumping schedule if they see that their rate of diversion is greater than the available surface water streamflow.

Due to the longstanding work of the MCRCD and the stakeholder engagement associated with the Navarro Flow Enhancement Project, there is already a robust group of agency staff, local leaders and community members who are aware of and support the water management efforts in the watershed. Representatives from a wide array of interests have participated in a Technical Advisory Group for the Navarro River Watershed Flow Enhancement Project that has informed and advised the flow enhancement project outreach and planning efforts. A pilot project in the Navarro would seek their on-going support and involvement.

B. Community Outreach and Engagement

The overarching goals for an initial outreach effort are to engage local landowners by addressing shared concerns related to the health and well-being of their watershed, salmon, and their water supply. In general, rural-residential landowners and agriculturalists may not be as aware of water regulatory requirements as cannabis cultivators who are trying to come into compliance with new regulations. As such, there may be a general need for information throughout the larger watershed including the priority tributaries. Recommendations for community outreach include:

- Develop Outreach Materials
  A brochure can concisely provide basic information about water resource management issues in the watershed and highlight the opportunities and benefits to collaborative tributary efforts to improve instream flows for fish and water users. A brochure can be distributed efficiently to public venues including local post offices, garden supply stores, realty offices, and be shared with project proponents could be a useful outreach tool.
    - Example: SRF developed the *Know Your Water Rights* brochure to help translate the steps to acquire a Small Domestic Use or riparian permit. Providing information in a digestible and compelling format makes it easier for laypeople to comprehend the complex regulatory environment.

- Host an Initial Public Meeting
  An initial step of outreach is setting up a public community meeting where a map of the watershed, printed materials, and resources are available. A presentation with compelling visuals helps illustrate the impacts of water diversions and the potential for restoration. Presentations should highlight species of concern, goals of collaborative water management, existing data, potential incentives, and the regulatory requirements for water storage projects.

  In the case of the Navarro, meetings in the priority sub-basin watersheds, with key landowners may be beneficial. Hosting public meetings provides an opportunity to see who already has interest in participating in a coordinated program. Landowners who are likely to attend public forums will often self-identify as interested restoration partners. Providing a useful service at meetings like a water rights clinic or consultations will attract landowners who are genuinely interested in coming into regulatory compliance and managing water resources. Motivated landowners are willing to reach out to their neighbors since they are already concerned with the overall health of the tributary that they live in. The initial process of outreach will help identify sets of landowners and tributary reaches that have the largest amount of stakeholder support.

- Host Field Tours and Workshops
  Tours and workshops are a great way to meet potential landowner partners and provide an engaging experience for attendees to learn about water management efforts from other local landowners. Offering field tours of existing restoration efforts provides an opportunity to showcase water storage projects, and best management practices in an informal setting. It also provides a venue to introduce the concept and benefits of collaborative approaches to water management. Similarly, hosting technical workshops about low-cost but effective ways to store water or improve water management through use of greywater, rainwater catchment projects, and water use efficiency techniques is a free service that is likely to attract potential project partners.

- Participate in Community Events
  An efficient and effective way to advance outreach efforts is to attend community events to meet and talk with residents. Often community events provide opportunities to participate in constructive discourse, share presentations or set up an information table. In the Navarro Watershed there are numerous wine and music festivals as well as smaller events like garden sales, or resource agency workshops that should be included in outreach efforts. Participating in fire safety council and road association meetings will provide additional opportunities to engage local landowners who already care about community resources.

- Sponsor a House Party
  House parties that are hosted by a landowner in a priority tributary can be one of the best ways to engage other local landowners and provide information about efforts to form a collaborative water management group.
    - For example, during the roll out of the Redwood Creek, South Fork Eel Water Conservation Project, project proponent Salmonid Restoration Federation, organized two house parties and a free workshop and field tour. The house parties were hosted by well-known and respected local residents and provided opportunities to share water concerns, ecological data, and discuss the scope and potential of a community-based water conservation program. Additionally, the free workshop and field tour brought together residents and resource professionals to share skills about water storage options, the importance of storing winter water for use during the dry season, water loss prevention mechanisms, and water conservation practices.
    - When doing public outreach, it is effective to include direct phone calls to personally invite landowners to be involved in the planning process, let them know that they are valued partners, and emphasize that their input will be greatly appreciated.

- Utilize local media for public outreach
  Rural landowners often get news from local radio stations and newspapers, and online forums and blogs. Spreading the word about restoration opportunities and public meetings to address low streamflows and collaborative water management efforts can best be accomplished through local media. Cultivate relationships with local radio hosts, news directors, and local reporters. In rural areas of Northern California, water issues and cannabis legalization are leading stories.

Fortunately, in the Navarro watershed there is a long history of community outreach and engagement regarding the resource management issues in the watershed. However, efforts to identify landowners interested in implementing water management projects as part of the Navarro Flow Enhancement Project revealed that many residents in the watershed are still not aware of the needs, challenges and opportunities to address instream flow water management issues. CWM demonstration pilot project outreach efforts should build on the network of stakeholders in the watershed who are already well informed in order to connect with an even greater number of residents. The outreach tools and strategies discussed in this section can also be employed to raise awareness and stimulate landowner interest in improving water management practices and possibly participating in a CWM group.

Step 3: Establish Initial CWM Group

Goal: Identify a core group of stakeholders to collaboratively develop a water resource management and implementation plan that could enhance instream flows and engage other community members to participate in water stewardship practices.

A key milestone in the pilot project will be the selection of the sub-basin watershed for development of a CWM group. Hopefully outreach efforts will inspire many landowners in each of the priority watersheds to participate in the pilot project but it might be unrealistic to expect most or even many landowners to come forward right away. After all, a need for the CWM demonstration project is to provide a positive example that could build broader participation by landowners who may be hesitant to get involved initially.

Priority watersheds will be selected based on the potential for instream flow enhancement and the relative interest and capacity among landowners to work together. Another factor that will inform prioritization is the extent to which there are social structures including road associations, voluntary fire departments, small water municipalities, etc. that can facilitate cooperation and communication. Another important factor is the relative potential for improving instream flows. Project planners may prioritize selecting a tributary watershed where there are large landowners or institutions that use a proportionally greater amount of instream flows. These stakeholders may have financial means and interests to support a long-term commitment that yields greater water management benefits. However, given that the primary goal is to demonstrate a collaborative approach, the overarching priority should be to select a watershed with the greatest potential to successfully demonstrate the ability of local landowners to identify and implement a wide-range of water management solutions that would improve their water supply reliability and instream flow conditions for salmon.

Step 4: Initial CWM Plan Development

Goal: Work with identified landowners to develop restoration projects and management actions that address their individual water needs and can provide mutual benefits including cost-savings of partnering with other neighbors.

Once a priority watershed has been selected based on initial landowner support, further outreach and information gathering will likely be needed to support development of a Collaborative Water Management Plan.

A. Kick-off Meeting to Discuss Process for Developing the CWM Plan

Stakeholder outreach at the initial phase of the collaborative water management planning effort is needed for several reasons. It is important to engage community members in identifying shared water management concerns and potential solutions early in the planning process. First, additional landowners may come forward once they know that their neighbors are participating in this planning effort. Secondly, participating landowners need to be part of the plan development process from the start in order to develop shared goals and provide input into what is socially and economically feasible and practical for them. Participating in the CWM group will ideally build trust with project planners and neighbors as well as help to identify the most effective means to share information whether it be through road signage, targeted emails, phone trees, etc. Establishing communication methods will help participants know how to stay informed, reference real-time data, and keep track of project development milestones. Taking the time upfront to develop these communication systems and priorities will lay the foundation for ongoing cooperation, cultivate a shared purpose, and foster a collective sense of tributary stewardship among landowners. It may require several meetings to establish understandings and the process may benefit from employing

a professional facilitator to help reach agreements and navigate the challenges that may arise at the start of collaborative group planning efforts.

B. Collect Additional Flow Data as Necessary

The collection of streamflow data will be needed to support development of projects as well as on-going project implementation. Streamflow data collection may also be needed for required monitoring and reporting associated with new water rights or related permitting. It is helpful if there are existing gages in the watershed, especially with multiple years of data. However, such gages are expensive to install and maintain and may not be the most cost-effective method to meet the needs of the CWM group and local landowners.

An important overarching consideration should be that local landowners participate in the collection of data and understand what the information means in terms of their water use. Landowner participation will increase awareness about conditions in the watershed and foster a sense of stewardship for their local stream.

Some options for engaging residents in data collection include:

- Identify citizen monitoring sites that can be managed by landowners or the MCRCD or see if some TNC monitoring site data can be shared with the larger community.
- Develop agreements regarding the sharing of aggregated flow information.
- Design a symbol like the salmon fish sign that is awarded to landowners who are engaged in forbearance or other CWM practices and that can be prominently displayed on their property.

C. Understanding Flow Thresholds

The process of establishing flow thresholds requires analysis of streamflow data, optimum flows for all stages of the salmon life cycle, and human water use. The level to which a non-profit can determine flow thresholds will vary based on your monitoring budget and gage information. The Sanctuary Forest experience provides a clear example of a cost-effective way to determine flow thresholds and how this process can evolve overtime since it is informed by real-time observations. For example, in 2005, when the Sanctuary Forest storage and forbearance program was initiated, no instream flow studies had been performed and pool connectivity was the basis for forbearance. As the program evolved, pool connectivity was determined in coordination with CDFW by walking the losing reach in the Mattole headwaters and determining the locations where flows would become disconnected the earliest. Streamflow measurements were then obtained from the downstream end of this area to determine the flow at which pools begin to disconnect. In consultation with CDFW, streamflow forbearance thresholds were then set at 0.5cfs higher than the flows at which dis-connectivity occurs. Comparison of maximum cumulative human use impacts with streamflows was used to establish restricted pumping thresholds — reduced pumping rates and assigned pumping days. Analysis later performed by Trout Unlimited included instream flow studies to determine optimum flows for rearing and spawning as well as a more thorough determination of human water use impacts.

This preliminary understanding of flow thresholds is necessary in order to develop conceptual designs. Flow thresholds are later refined in the final design process and during post-project implementation.

D. Develop Project Proposals with Willing Landowners

Using the water use and hydrology data, work with willing landowners to develop water management project proposals that match their interests, needs and constraints. A more detailed discussion of water management projects and actions can be found in Chapter 2. For some landowners, a pond or tank system might be the most desirable and appropriate solution. Such

projects are a common approach to reduce dependence on summer diversions. However, such systems are costly, require permits and possibly even additional biological studies. A simpler option for individual landowners might be to focus on rainwater harvesting which can generate significant amounts of water, particularly for landscape irrigation, at relatively low cost and with fewer permitting requirements. Other options might include landowners working together to change management practices regarding how the use their existing systems. The cumulative benefits of landowners working together to coordinating the timing of diversions and or reduce pumping rates could significantly minimize impacts to dry season base flows and fish habitat.

E. Demonstrating the Value and Mechanisms of Coordinated Diversions

Coordinating Diversions amongst landowners in a tributary reach is a promising water management strategy that could improve summer base flows in the Navarro River watershed. This would require identifying cooperating landowners in a specific reach, achieving a common set of water conservation goals, and understanding the flow thresholds to identify site-specific forbearance periods and diversion schedules. A voluntary approach would be driven by a stewardship ethic and a desire for water security and regulatory assistance or assurances.

Sanctuary Forest has pioneered this type of community coordination and developed some metrics about the benefits of coordinated water diversions. For tributary forbearance thresholds, Sanctuary Forest has worked directly with CDFW water rights specialist, Jane Arnold, using the guideline limiting diversions to 10% of the flow. This has been applied for both the individual diversion as well as the cumulative impacts of all diversions on the tributary. With this method, if there is more than one diverter, the cumulative impacts determine the forbearance threshold. To calculate cumulative impacts, survey information from each stream is used to determine the # of diversions and the diversion rates. When the maximum cumulative impacts = 10% (everyone diverting at the same time) pumping days are assigned. When cumulative impacts with assigned pumping days =10%, then no diversions are allowed.

Another interesting and applicable observation that has emerged from the Sanctuary Forest model is the cost-benefit analysis of adding more storage to increase the forbearance period for participating landowners versus more proactive coordination. For example, human demand does not greatly affect the amount of time that flows are optimal for rearing juvenile salmonids but water diversions can greatly impact lower flows. There is a financial trade-off for bringing another participant into a forbearance program and using the same funding to increase the storage for a person already in the forbearance program to extend their forbearance period from 3 to 6 months.

SFI and Trout Unlimited concluded that adding a new participant would reduce the current rate of diversion during the low flow period whereas extending a participant's forbearance period would not. "Given this trade-off, the most cost-effective way to improve streamflow at the habitat thresholds identified is to use new storage to bring new participants into the program, and to rely on an aggressive rotation schedule to prolong the period of time with flow in Good or Fair conditions and reduce the amount of time with streamflow in the Summer Low Flow period." *(Mattole River Headwaters Streamflow Improvement Plan*, Trout Unlimited and CEMAR, April 2013).

F. Information Exchange Regarding Diversion Schedules

Information about the diversions schedule can be communicated via the project website, signage, targeted emails, and in the voluntary agreements that are developed with participating landowners. To be thorough, it is optimal to utilize all of these mechanisms for communication. Road signage is a cost-effective and immediate way to convey flows and communicate about the end of the

pumping season. Targeted emails can be an efficient reminder to participating landowners about the diversion schedule and flow information. The diversion schedule should also be in writing and indoctrinated in the agreements that are developed with landowners. Compliance monitoring with the assistance of the project proponent (likely a non-profit, RCD or watershed group) can help remind landowners about the diversion schedule and mechanisms to prevent water loss as well as support Best Management Practices.

Sanctuary Forest has developed a diversion schedule for the landowners participating in the storage and forbearance program. This tool can be utilized in other tributary reaches in a voluntary capacity, or as part of a coordinated forbearance program. The diversion schedule should incorporate flow thresholds and current monitoring data, or it can be approached in a much more informal way. For example, in Redwood Creek a community land trust agreed that each participant needed to forbear for at least 90 days and they created a pumping schedule where each landowner could only divert one day a week at a designated pumping rate. The community land trust self-enforced compliance and integrated a citizen-monitoring component because they cared deeply about the value of their land for juvenile salmonids.

Step 5: Create an Initial CWM Plan and Charter Agreements

Goal: Stakeholders develop an initial CWM plan for their stream including a charter or agreement structures that support implementation of the CWM plan.

A. Create an Initial CWM Plan

Once the individual project proposals are created the group will benefit by synthesizing the actions into an overall plan to improve instream flows for fish and water management for landowners. By combining the projects into a comprehensive plan, the landowners establish a collective vision that can immediately provide guidance for voluntary actions that do not require infrastructure (e.g. coordinated timing of diversions). Furthermore, a plan for the watershed will support efforts to seek funding by being able to explain the cumulative value of each project toward restoring the health of an important stream for salmon and steelhead. The CWM Plan will also facilitate further design development and permitting for complex projects. For projects that require new water rights to divert and store flows during the winter using the North Coast Policy, the CWM Plan will ideally support group permitting in keeping with the Policy's Watershed Approach. For projects that require new 1600 permits from CDFW, more beneficial terms and conditions may be possible when applicants seek permits collectively and are able to show the cumulative benefits of combined actions. This was the case in the Mattole when coordinating the timing of diversions and reducing diversion rates enabled landowners to get permits for longer seasons of diversion.

B. Formation of Collaborative Water Management Agreements

Water management agreements are an important tool to memorialize collaborative water management practices. The scope and scale of the agreement and whether it is informal or legally binding will depend on the purpose of the agreement and if it is required (e.g. to advance streamlined permitting or as part of a grant funded project) or voluntary. When developing a collaborative water management agreement with landowners it is important to consider the scope of the project, water needs, regulatory requirements, diversion schedules, and forbearance thresholds. The terms of the agreement will vary based on the scale of the water management projects, and terms of compliance and forbearance monitoring.

Agreements will be developed with willing landowners and will reflect solutions and approaches that are feasible and applicable to the parcel and water usage needs. Landowner input and participation will be necessary and valuable in order to develop a concept proposal that can be used to support project implementation. For grant funded implementation concept proposals include:

1. A description of the proposed project and or management actions including the any proposed forbearance of dry season diversions.
2. A description of landowners involved including their water use and need.
3. An estimate of the instream flow benefits of the proposed project in terms of timing and amount of water not diverted in the dry seasons.
4. Identify potential permitting requirements
5. A cost estimate of the proposed project.

Any collaborative water management effort will greatly benefit from an integrated water storage plan, scientifically-based ecological data that is shared with the community, institutional coordination and cooperation amongst stakeholder partners, and sufficient funding so planning efforts can evolve to on-the-ground implementation.

Appendix A: Sample Draft Forbearance Agreement

AGREEMENT FOR THE FORBEARANCE OF DIVERSION OF WATER, AND FOR THE CONSTRUCTION, INSTALLATION AND USE OF A WATER STORAGE SYSTEM

This Agreement is made and effective _____ (the "Effective Date"), by and between The Nature Conservancy ("TNC"), Trout Unlimited ("TU"), and _____ ("Landowner").

BACKGROUND FACTS

A. TNC and TU are tax-exempt non-profit organization qualified under Section 501(c)(3) of the Internal Revenue Code of 1986 that seek to protect instream flow within the Navarro watershed for the benefit of native steelhead trout and coho salmon.

B. Landowner is the owner of certain property in Mendocino County which is described in Exhibit A ("the Property"), and currently diverts water from the Navarro River stream system for domestic and/ or agricultural use.

C. TU and TNC have collectively established a program to work cooperatively with property owners to improve streamflows for the benefit of native steelhead trout and coho salmon in the Navarro River watershed.

D. A primary focus of the program is to work with landowners to develop, fund, and implement voluntary projects to reduce the diversion of water from the river and tributaries during the dry season months, while simultaneously increasing the security of landowners' dry season water supply.

E. This Agreement arises out of a cooperative relationship among TNC, TU, and the Landowner, who share the common purpose of implementing a Project to construct a Water Storage System on Landowner's property that will enable Landowner to divert and store water during the wetter months of the year, and will provide a secure water supply enabling Landowner to forbear diversion of water during the drier times of the year.

F. Landowner, TNC, and TU desire to enter this Agreement for the purpose of setting forth terms and conditions for the implementation of this Project.

AGREEMENT

For the mutual consideration stated in this Agreement, the parties agree as follows:

1. **Term.** The term of this Agreement is twenty years from the date it is signed by all parties (the "Effective Date").

2. **Agreement to be Recorded.** This Agreement will be recorded within a reasonable time following the Effective Date, in the official records of Mendocino County, California, and may be re-recorded at any time as may be required to preserve any party's rights herein. For its term, the obligations of this Agreement are agreed to be covenants running with the land within the meaning of California Civil Code §1468.

3. **Construction of Water Storage System.** Project proponent shall construct a Water Storage System on the Property in substantial conformance with the description attached as **Exhibit B**.

(a) TU shall exercise reasonable precautions to avoid damage to persons and property during the installation of the Water Storage System.

(b) TU, and TNC will assist Landowner in obtaining all permits and approvals necessary to construct and operate the Water Storage System. Landowner shall be responsible for maintaining compliance with all terms and conditions of all such approvals.

(c) Landowner shall maintain, repair, and operate the Water Storage System as described in **Exhibit C**. Landowner is responsible for all costs and liabilities related to the ownership, operation, upkeep, taxes and maintenance of the Property.

(d) Landowner shall use the Water Storage System to meet Landowner's water requirements during the Restricted Period, consistent with the requirements of the Water Management Plan and any permits necessary to operate the Water Storage System.

(e) Upon the Start Date, the Water Storage System shall by operation of this Agreement become the property of Landowner.

4. **Landowner's Forbearance.** Landowner shall refrain from all diversion of surface water and groundwater, as described in this Section ("Landowner's Forbearance").

(a) Each year between the dates of June 15 and October 15, inclusive (the "Forbearance Period"), Landowner shall cease all diversion of water from the _____ and its tributaries (including surface streams, subterranean streams, springs, tributary groundwater, and other sources of flow contribution to the _____).

(b) Notwithstanding the requirements of subsection 4(a) above, Landowner may declare Emergency Conditions during the Forbearance Period and may, after obtaining the consent of TU, divert limited amounts of water during the Forbearance Period. Emergency Conditions include significant loss of stored water from the Water

Storage System due to mechanical failure, vandalism, or any other unforeseen event that threatens human health or safety.

(c) If Landowner believes Emergency Conditions exist, Landowner shall promptly notify TU. Upon obtaining the consent of TU, Landowner may divert limited amounts of water during the Forbearance Period. Any such diversions shall be for the minimum time and amount necessary to meet Landowner's domestic requirements on the Property.

(d) If landowner is unable to contact TU within 12 hours despite making all reasonable efforts to do so, Landowner may begin emergency diversions as provided in Paragraph 4(c). Landowner shall continue to make all reasonable efforts to contact and notify MCRCD, and obtain its consent for continued diversion.

(e) Landowner shall promptly remedy any situation causing Emergency Conditions under his or her control.

5. **Water Management Plan.** Attached as **Exhibit C** to this Agreement is a Water Management Plan that is intended to provide Landowner with guidelines for managing stored water during the Forbearance Period and maintaining the Water Storage System.

6. **Monitoring and Enforcement.** TU shall be responsible for ensuring compliance with this Agreement, and shall engage in a regular program of compliance monitoring as provided in the Water Management Plan. TU may employ the assistance of agents, including TNC and TU, to assist with compliance monitoring. Monitoring will normally consist of visits to the Property just prior to the beginning of the forbearance period in the summer, and just after it ends in the fall.

7. **Access to Property.** Landowner shall provide TU and TNC reasonable access to the Property, at reasonable intervals, for the purpose of constructing the Water Storage System and ensuring compliance with and effectiveness of this Agreement. When seeking access TNC, and/or TU shall provide Landowner notice of not less than 24 hours prior entering onto the Property, and Landowner shall have the opportunity to participate in any inspection.

8. **No Waiver of Water Rights.** This Agreement does not waive, diminish, or modify any riparian, appropriative, or other water rights held by Landowner.

9. **Termination of Agreement.** This Agreement may be terminated if any of the following conditions occurs:

(a) The mutual written consent of all parties.

(b) TU determines that compliance with the Agreement will result in the violation of a federal, state or local statute or regulation.

(c) Grant funding provided to TU for the Project is terminated, delayed or reduced.

10. Enforcement and Dispute Resolution.

(a) Notwithstanding its rights pursuant to Section 11(b), it is the intention of the parties to strive to amicably resolve any dispute which might arise concerning this Agreement. The parties agree that prior to taking any other action, they will communicate any concerns relating to another party's performance under this Agreement to that party and shall provide a reasonable opportunity, including through mediation, for all parties to fully present and address their views and concerns with regard to the dispute.

(b) Any party may terminate this Agreement if another party is in material breach or default of this Agreement, and fails to cure the breach or default within 21 days of being served with written notice. In such an event, the party alleging breach or default shall have any other rights available in law or equity to remedy or recover for any injury or damages it suffers as a result of such breach or default. In the event of breach or default by Landowner, damages shall include return of all costs incurred by TNC, and TU for (including those costs paid by grant monies), including all costs of construction and permitting of the Water Storage System.

11. Hold Harmless and Release.

(a) Landowner shall indemnify and hold harmless TNC and TU, and their officers, agents, and employees, from any and all liabilities, claims, demands, damages or costs resulting from, growing out of, or in any way connected with or incident to the Property and the Water Storage System, except for active negligence of TNC or TU, or their officers, agents or employees. The duty to indemnify and save harmless includes the duty to defend as set forth in Civil Code Section 2778. The Landowner waives any and all rights to any type of express or implied indemnity or right of contribution from TNC and TU, and their officers, agents or employees, for any liability resulting from, growing out of, or in any way connected with or incident to the Property and the Water Storage System.

(b) Landowner shall indemnify and hold harmless TNC, and TU and their, officers, employees, agents, against any and all liabilities, claims, demands, damages or costs arising from or in any way connected with the potability or quality of water from and in the Navarro River, its tributaries, adjacent groundwater, and the Water Storage System.

(c) MCRCD, TNC, and TU hereby release, hold harmless, and indemnify Landowner from and against any and all liabilities and damages arising from TNC, TU, or their agents and designees accessing the Property pursuant to this Agreement, unless due solely to the active negligence or willful misconduct of Landowner.

12. Successors and Assigns. This Agreement shall apply to and bind the successors and assigns of the parties hereto, as well as any tenants, lessees, or other third parties that use or are authorized to use the Water Storage System.

13. Amendment. This Agreement may be amended or modified only by the recorded, written consent of all parties. This Agreement may be renewed by the parties by a

written agreement signed by them or their successors in interest. Any such renewal agreement shall be in writing, shall be recorded, and shall be appended to this Agreement.

14. **Notifications.** Except as otherwise provided in paragraphs 8 and 11, all notification under this Agreement shall be made in writing and mailed by first class mail, return receipt requested, to the addresses shown below. In addition to this requirement, the parties are encouraged to send additional informal notice via email or fax.

Trout Unlimited 4221 Hollis Street Emeryville, CA 9460 (510) 280-5392	The Nature Conservancy 201 Mission Street, #4 San Francisco, CA 94105 (415) 777-0487	Landowner [Address] (XXX) XXX-XXXX

15. **Entire Agreement.** This document and any exhibits attached constitute the entire agreement of the parties, and any and all prior agreements, understandings, and representations are hereby canceled in their entirety and are of no further force and effect

IN WITNESS THEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

TU:

By: _____

Brian J. Johnson, California Director

Landowner:

By: _____

The Nature Conservancy:

By: _____

XXXXXXXXXXXXX

Appendix B: Template Water Management Plan

Water Management Plan

Introduction

This Water Management Plan is provided in accordance with Section 5 of this Agreement and intended to help the Landowner to comply with the terms of forbearance as described in Section 4 of this Agreement.

I) Guidelines for Compliance with forbearance

Restricted Period: Landowner is prohibited from pumping, withdrawing or otherwise diverting water from anywhere on the Property, including from springs and other sources as described in Section 4(a) of this Agreement, between the dates of ___ and ___, inclusive, except in the event of emergency as authorized by Sections 4(b) through 4(e) of this Agreement.

II) Recommended Allocations for Landowner Water Usage during the Restricted Period

Landowner Responsibility: Landowner has a maximum capacity to store 40,000 gallons, as described in Exhibit A, Water Management System. Landowner is responsible for allocating use of this water during the entire Restricted Period in order to comply with the terms of forbearance. Landowner is responsible for managing the diversion, use, and treatment of water with regard to the system.

Model Water Budget: The following model water budget provides recommended water usage allocations for domestic purposes (including related irrigation) during the Restricted Period. These allocations are estimates based on figures provided by the State Water Resources Control Board. Landowner's actual water usage may vary considerably and Landowner needs to be aware that changes in the stated assumptions of the model could have significant impacts on recommended allocations. It is strongly advised that Landowner use the figures provided here to create their own water budget and to utilize the actual water use figures gathered for Compliance self-monitoring by Landowner (see Section V below) to monitor and adjust their water usage diligently during the Restricted Period.

Assumptions:

Restricted Period: The restricted period is 123 days long, beginning on June 15 and ending on October 15.

Estimated Household Size: Household size is estimated at four adult individuals with full plumbing.

Storage: 40,000 gallons.

Allocations:

Domestic Uses: **300 GPD**; 6 people x 50 GPD per person x 123 days = **36,900 gallons** total.

Fire Protection: It is recommended that Landowner maintain **2,500 gallons** in reserve to help suppress fire in the case of emergency.

Total Water Usage: **300 GPD** X 123 days = 36,900 gallons domestic + 2,500 gallons fire protection reserve = **39,400 gallons.**

With total storage of 40,000 gallons, this creates a reserve supply of 600 gallons.

Budget Discussion

Under these allocations the average daily water usage for domestic uses is **300 gallons per day** for the time period June 15 through October 15 (123 days). This allows for a water budget of **2,100 gallons per week**.

If the Landowner requires a greater storage capacity, they may increase their capacity of storage at their own cost, provided that they notify and review the proposed storage project with the MCRCD for the following: 1) ensure that the proposed project does not jeopardize the function or security of the existing Water Management System; 2) revise the Water Management Plan and water budget for monitoring purposes.

III) Guidelines for Maintenance and Repair of the Water Management System

Responsibilities: Landowner is responsible for regular maintenance and repair of the Water Management System as described in Section ___ of this Agreement. Regular maintenance and repair is required for the successful operation of the Water Management System for the purposes of compliance with forbearance, particularly as regards to preventing and repairing leaks. The maintenance guidelines for the poly tank and plumbing systems are outlined below.

Poly Tank Maintenance:

- Shading of tanks: If possible, plan to shade tanks to protect them from direct sunlight. The life expectancy of poly tanks may be increased significantly if the tanks are shaded. Direct sunlight can cause the plastic to break down, shortening tank life.

- Cleaning of tanks: Plan to empty the tanks (to 8 inches or less) once per year. If needed, clean with a soft bristle broom and remove MCRCDrbid water (If water used to fill tank is pre-filtered and pumped when the creek is clear, it should not be necessary to empty and clean the tanks). The emptying should be done no later than February 15 of each year, so that the tank can be refilled with fresh clean water prior to the end of the season of diversion to storage and when streamflows are still high and water quality is good.

Plumbing and Pump Systems Maintenance and Repair:

- The entire plumbing system should be inspected and repaired, as needed each spring in preparation for the dry season. This includes all exterior above ground plumbing as well as household fires and garden irrigation systems.

- If the system uses a surface water diversion, clarity filter cartridges will need to be replaced as needed based on the turbidity of incoming water and at a minimum of twice per year.

IV) Guidelines for Compliance Monitoring by Trustee

Monitoring Frequency: MCRCD will perform a minimum of two monitoring visits each year. MCRCD will provide notice two weeks prior to monitoring to facilitate scheduling with the Landowner. Spring monitoring is aimed to ensure that the Water Management System is in operating order and in good repair and ready for the low flow months. Fall monitoring is done to review water meters and records and determine landowner compliance with forbearance and if overall objectives of this Agreement are being met.

Landowner Role in Trustee Monitoring: The Landowner or a designated representative knowledgeable about the Water Management System and its use and operation should be present for the monitoring visit. Landowner should provide a tour of the Water Management System for inspection by MCRCD.

V) Guidelines for Compliance Self-Monitoring by Landowner

Water Use Meters: The Water Storage System is equipped with meters to assist the Landowner with management of the stored water in compliance with forbearance. It is the responsibility of the Landowner to ensure that the stored water lasts for the entire Restricted Period and to adjust water use as needed to this end.

Written Water Use Records: Landowner should keep written records of his water consumption during the Restricted Period. The tanks will be equipped with a water meter and the Sample Water Use Log is provided below to assist the Landowner with tracking of water use. The water meters should be read once per week and the amount of water used recorded on the Water Use Log. If the weekly water use exceeds the amount allocated, the Landowner should reduce water use. MCRCD will provide technical advice for water efficiency improvements and reduction of use. Landowner should provide MCRCD with copies of Landowner self-monitoring records during a monitoring visit or at any other time as requested by MCRCD.

Sample Water Use Log for Restricted Season:

Weeks of restricted season	*Date*	*Water Meter Reading*	*Actual Water Used*	*Weekly Water Allocation (Gallons)*	*Difference*
Week 1	6/15/15			2,100	
Week 2	6/22/15			2,100	
Week 3	6/29/15			2,100	
Week 4	7/6/15			2,100	
Week 5	7/13/15			2,100	
Week 6	7/20/15			2,100	
Week 7	7/27/15			2,100	
Week 8	8/3/15			2,100	
Week 9	8/10/15			2,100	
Week 10	8/17/15			2,100	
Week 11	8/24/15			2,100	
Week 12	8/31/15			2,100	
Week 13	9/7/15			2,100	
Week 14	9/14/15			2,100	
Week 15	9/21/15			2,100	
Week 16	9/28/15			2,100	
Week 17	10/5/15			2,100	
Week 18	10/12/15			1,200	
Total usage				**36,900**	
Fire reserve				**2,500**	
Total budget				**39,400**	

VI) Guidelines for Filling and Topping the Water Management System Tanks

Fill Tanks Early: In order to comply with bypass flows, and minimize impacts of pumping on streamflows and fish habitat, the Landowner should fill to the maximum all available water storage during spring, winter, and late fall months as provided in this Agreement. Pumping should be scheduled when water source has good clarity. For optimum water quality, tanks should be drained annually and cleaned as needed prior to refilling.

Top Tank Regularly Prior to the Restricted Period: Tanks need to be topped to their full capacity just prior to the Restricted Period to ensure sufficient storage.

Pumping After the End of the Restricted Period: On October 16, landowner may resume pumping.

VII) Guidelines in the Event of Emergency due to Catastrophic Water loss or other loss

In the event of emergency water loss during the Restricted Period, the Landowner will notify MCRCD immediately. After contacting MCRCD and obtaining its consent, Landowner may declare Emergency Conditions according to Section ___ and conduct limited pumping to meet his domestic water use requirements.

Appendix C: Sample Water Management with Pumping Schedule and Maintenance Guidance
Prepared by Sanctuary Forest for CDFW and Participating Landowner Use

Water Management Plan

Table of Contents

Introduction

This Water Management Plan is provided in accordance with Section 6 of this Agreement and intended to help the Participant to comply with the terms of Forbearance as described in Section 4 of this Agreement.

I) Guidelines for Compliance with Forbearance

Restricted Period: Participant is prohibited from pumping, withdrawing or otherwise diverting water from anywhere on the Property, including from springs and other sources as described in Section 4(a) of this Agreement, when streamflows drop below 0.5 cfs in the Mattole River mainstem at the Measure Point which is located 30-50 yards

upstream of the confluence with Bridge Creek, except as authorized by Trustee in the event of emergency. To facilitate Participant compliance with their Water Right Registration (see Exhibit D) and Section 5(b) of this Agreement, Participant is required to refrain from diversion of water under the terms of their Water Right Registration during the months of September and October.

Bypass Flows: So as not to harm endangered fisheries and to facilitate Participant's compliance with their Water Right Registration and section 5(b) of this Agreement, pumping rates by the Participant are limited. Participant pumping shall not exceed 5 % of the streamflow as calculated at the Measure Point. Maximum allowable pumping rates are 22GPM (0.05 cfs) and are further restricted to a maximum rate of 11GPM (0.025cfs) when streamflows drop below 5 cfs at the Measure Point.

Pumping Days: To prevent cumulative impacts from multiple pumps operating simultaneously, Trustee will assign pumping days to Participant and all other participants in this water forbearance and management program when streamflows at the Measure Point drop below 5.0 cfs.

Pump Intake Screens: Pump intake screens will be installed as part of the Water Storage System that comply with National Marine Fisheries Service criteria for California streams that provide habitat for juvenile coho, Chinook and steelhead. Landowner will be responsible for annual inspection and maintenance of screens.

Notices: Trustee will provide Participant notice of the timing of all seasonal restrictions under this Agreement (see section X of the Water Management Plan) at end of this document.

II) Recommended Allocations for Participant Water Usage during the Restricted Period

Participant Responsibility: Participant has a maximum capacity to store 50,000 gallons of water as described in Exhibit A, Water Management System. Participant is responsible for allocating use of this water during the entire Restricted Period in order to comply with the terms of Forbearance.

Model Water Budget: The following model water budget provides recommended water usage allocations for domestic and agricultural purposes during the Restricted Period. These allocations are estimates based on figures provided by the State Water Resources Control Board. Participant's actual water usage may vary considerably and Participant needs to be aware that changes in the stated assumptions of the model could have significant impacts on recommended allocations. It is strongly advised that Participant use the figures provided here to create their own water budget and to utilize the actual water use figures gathered for Compliance Self Monitoring by Participant (see Section V below) to monitor and adjust their water usage diligently during the Restricted Period. :

Assumptions

Estimated Restricted Period: The restricted period is estimated to be 105 days long, beginning on August 1 and ending on November 15. This estimated is based on the 2004 dry season, which represents the third driest year in the 50-year record. The actual Restricted Period is based on streamflows and includes at least the months of September and October.

Estimated Household Size: Household size is estimated at three adult individuals for homes with full plumbing.

Estimated Garden Size: Garden size is estimated to be 30ft x 50ft for 1500 square feet.

Allocations

Domestic Uses: **165 Gallons per Day (GPD)**; 3 people x 55 GPD per person x 105 days = 17,325 gallons total.

Agricultural Uses: **278 GPD**; 1500 sq.ft. garden x 18.5 GPD per 100 sq. ft of garden x 105 days = 29,190 gallons total.

Fire Protection: It is recommended that Participant maintain 2,500 gallons in reserve to help suppress fire in the case of emergency.

Total Water Usage: **49,015 gallons**; 17,325 gallons domestic + 29,190 gallons agricultural + 2,500 fire protection reserve

Budget Discussion

Under these allocations the average daily water usage for combined domestic (165 GPD) and agricultural (278 GPD) uses is 443 GPD. The actual stored water available to the participant is 50,000 gallons. Subtract 2500 gallons for fire protection reserve, leaving 52,500 gallons available for the Restricted Period. Divide this by 443 GPD usage gives an estimated maximum restricted period that Participant could survive on stored water without using fire protection reserves of 118 days. Participant should note when constructing their own water budget and allocating their use during the Restricted Period that irrigation for agricultural uses is the most significant consumer of water.

III) Guidelines for Maintenance and Repair of the Water Management System

Responsibilities: Participant is responsible for regular maintenance and repair of the Water Management System as described in Section 5(f) of this Agreement. Regular maintenance and repair is required for the successful operation of the Water Management System for the purposes of compliance with Forbearance, particularly as regards to preventing and repairing leaks. The maintenance guidelines for the Pioneer tank and plumbing system are outlined below.

Pioneer Tank Maintenance and Repair*:* A Pioneer tank owner maintenance manuals will be distributed to Participant with the tank when installed. General maintenance requirements include the following:

- Roof maintenance: For reasons of safety and longevity, do not walk on tank roof unless absolutely necessary. If necessary, then walk on truss only, with a maximum of 2 people on the roof at one time. Keep the roof free of debris and leaves by sweeping with a long handled broom.

- Leakage: Report any signs of tank leakage immediately to Trustee and Whitethorn Construction, the authorized Pioneer Tank installer. All repairs should be performed directly by or with guidance from the Whitethorn Construction authorized installation crew.

- Corrosion: Inspect tank regularly for corrosion. If there are signs of corrosion, this should immediately be treated and painted with zinc rich paint.

- Erosion: Check sand base for erosion before and during winter and place additional gravel over sand base as needed to prevent erosion.

- Anodes: Inspect anodes every 3 years and plan to replace every 10 years.

- Cleaning of tank: Plan to empty the tank (to 8 inches or less) once per year. If needed, clean with a soft bristle broom and remove turbid water. The emptying should be done no later than April 15 of each year, so that the tank can be refilled with fresh clean water in April or May when streamflows are still high and water quality is good.

- Vermin protection and vegetation intrusion: Treat tank perimeter with suitable and safe vermin, pest and vegetation deterrent.

Plumbing and Pump Systems Maintenance and Repair:

- The entire plumbing system shall be inspected and repaired, as needed each spring in preparation for the dry season. This includes all exterior above ground plumbing as well as household fixtures and garden irrigation systems.

- Clarity filter cartridges will need to be replaced as needed based on the turbidity of incoming water and at a minimum of twice per year.

- Pump intake screens need to be inspected annually prior to beginning of the pumping season such as early November and replaced if showing signs of wear.

IV) Guidelines for Compliance Monitoring by Trustee

Monitoring Frequency: Trustee will perform a minimum of two monitoring visits each year. Trustee will provide notice two weeks prior to monitoring to facilitate scheduling with the Participant. Spring monitoring is aimed to ensure that the Water Management System is in operating order and in good repair and ready for the low flow months. Fall monitoring is done to review water meter records and determine landowner compliance with Forbearance and if overall objectives of this Agreement are being met. Trustee may request more frequent monitoring as necessary to ensure Participant compliance with Forbearance.

Participant Role in Trustee Monitoring: The Participant or a designated representative knowledgeable about the Water Management System and its use and operation shall be present for the monitoring visit. Participant shall provide a tour of the Water Management System for inspection by the Trustee.

V) Guidelines for Compliance Self Monitoring by Participant

Water Use Meters: The Water Storage System is equipped with meters to assist the Participant with management of the stored water in compliance with Forbearance. It is the responsibility of the Participant to ensure that the stored water lasts for the entire Restricted Period and to adjust water use as needed to this end.

Written Water Use Records: Participant shall keep written records of their water consumption during the Restricted Period. The tank will be equipped with a water meter and the Sample Water Use Log is provided below to assist the Participant with tracking of water use. The water meter will be read once per week and the amount of water used will be recorded on the Water Use Log. If the weekly water use exceeds the amount allocated, the Participant will reduce water use. Trustee will provide technical advice for water efficiency improvements and reduction of use. Participant shall provide Trustee with copies of Participant Self Monitoring records during a monitoring visit or at any other time as requested by the Participant.

Sample Water Use Log for Restricted Season:
(Storage = 50,000 gallons allocated at 443 gallons per day)

Date (Weekly Entries for approx 15 weeks)	*Water Allocation per week*	*Actual Water Used per week*	*Difference (Water Allotment- Actual Use)*
Week 1 (of restricted season)	3101gallons	3000	101 (101 gallons under)
Week 2	3101gallons	3200	-99 (99gallons over)
Week 3	3150 gallons		

VI) Guidelines for Filling and Topping the Water Management System Tanks

Fill Tanks Early: In order to comply with bypass flows, and minimize impacts of pumping on streamflows and fish habitat, Participant shall fill to the maximum all available water storage no later than June 15th or before streamflows at the Measure Point drop below 5 cfs. When refilling for seasonal storage, pumping should be scheduled when water source has good clarity. For optimum water quality, tanks should be drained annually and cleaned as needed prior to refilling.

Top Tank Regularly Prior to the Restricted Period: Tanks need to be topped to their full capacity just prior to the Restricted Period to ensure sufficient storage. Participant shall top tanks regularly during the period from June 15 to August 1st, or anytime when streamflows at the Measure Point are between 5 cfs and 0.5cfs. Tanks must be topped weekly to ensure that topping will not have significant impacts on streamflows. When streamflow drops to 0.5 cfs no water will be pumped until the end of the Restricted Period.

Pumping After the End of the Restricted Period: At the end of the no pumping season (when streamflows at the measure point exceed 0.5 cfs), the Participant may begin pumping again at the 11 GPM rate during assigned pumping days. When streamflows at the measure point exceed 5.0 cfs, the Participant may begin pumping again at the maximum rate of 22 GPM. For optimum water quality, Participant should wait to resume pumping until the fall rains have flushed the river of organic material and the water has become clear again.

Notices: Trustee will provide notice to Participant of the beginning and ending of all seasonal restrictions with a minimum of one-week notice prior to the start date and a maximum of one-week notice following the end date. A summary of anticipated notices is provided in Section 9 of this document.

VII) Guidelines in the Event of Emergency due to Catastrophic Water loss or other loss

Notice of Emergency Water Loss: In the event of emergency water loss during the Restricted Period, the Participant will notify Trustee immediately and will not take any action to refill the tank without Trustee permission. The Trustee may declare Emergency Conditions according to Section 4(b) and authorize limited pumping for Participant's domestic water use requirements.

Emergency Condition Pumping: Trustee will determine an allowable pumping regime under Emergency Conditions based on current streamflows and in consultation with DFG. Trustee may allow up to 5% of the streamflow to be pumped to obtain water sufficient for the landowners basic water needs. If pumping can occur while maintaining adequate bypass flows, Trustee will oversee refilling with reduced pump rates and volumes per day to ensure no significant impacts to streamflow. If streamflows at the Measure Point fall below 0.05 cfs no emergency pumping will be allowed, and water will be trucked in from a commercial provider with up to 7500 gallons paid for by Trustee, subject to funding availability. The landowner will be responsible for the costs of water replacement if the water has been lost through landowner negligence.

VIII) Water Management Calendar

Month	*Seasonal Restrictions*	*Tank Filling & Topping*	*Maintenance*	*Monitoring*
January				
February				
March		Fill tank		
April		Fill tank	Exterior plumbing, irrigation & household	
May		Fill tank		Trustee & Participant
June		Top tank		
July	Reduce pump rate and pumping days	Top tank		
August	No Pumping			Participant self monitor
September	No Pumping			Participant self monitor
October	No Pumping			Participant Self monitor
November	Reduce pump rate and pumping days		Pump intake screens	Trustee & Participant
December				

IX) Anticipated Notices

All notices for the purpose of seasonal pumping restrictions and arranging monitoring days and will be given by telephone, email, or in-person and documented with notice by mail. Notices each year will include the following:

Summary of Notices

Month	*Purpose of Notice*	*Timing of Notice*
May	Spring Trustee monitoring	2 weeks prior
July	Seasonal restriction - pumping rate reduction and pumping days assigned	1 week prior
August	Seasonal restriction- no pumping period	1 week prior
November	Seasonal restriction- resume pumping at reduced rate and pumping days assigned	1 week after
November or December	End of seasonal restriction	1 week after
November or December	Fall monitoring	2 weeks prior

Appendix D: Draft Tributary Charter Agreement Prepared by Sanctuary Forest

DRAFT CHARTER
[NAME OF TRIBUTARY] Tributary Association
[Month], [Year]

ARTICLE I: Name of Group

SECTION 1: The name of this group shall be _____.

SECTION 2: The [Name of Tributary Association] is a voluntary group comprised of watershed residents who are striving toward the goals of drought resilience and of improving summer streamflows for the benefit of people and native salmon.

ARTICLE II: Purpose

SECTION 1: The purpose of the [Name of Tributary Association] is to…

- Examples
    - Work together to improve habitat conditions for native salmon and other wildlife
    - Improve water quality and quantity in our watershed
    - Reduce sediment in [name of Tributary]
    - Educate our friends, family, and neighbors about the importance of water conservation
    - Coordinate the timing, duration, and rate of our water diversions in the summertime
    - Understand how we can change our behaviors in order to have a reduced impact on our watershed

SECTION 2: The boundaries of the [Name of Tributary Association] are defined by…

SECTION 3: Programs, meetings, and events operated or sponsored by this Association are available to all members of the general public.

SECTION 4: This Association is organized and operated solely on a voluntary basis.

ARTICLE III: Contact

SECTION 1: The Association can be contacted by mail at [Example: PO Box XXX, Redway, CA 95560] and by e-mail at [Example: seely.creek@calsalmon.org].

ARTICLE IV: Membership

SECTION 1: GENERAL. Membership is open to all adult persons, families, or businesses who reside, work, or operate a business within the aforementioned boundaries and who subscribe to the purposes of the Association.

SECTION 2: APPLICATION FOR MEMBERSHIP. Application for admission as a member shall be completed and submitted to the Association… [Examples: in writing or electronically, at an Association meeting, etc.]. The applicant for admission as a member shall become such when the application is received and upon payment of the applicant member's annual dues [if annual dues are applicable].

SECTION 3: SUSPENSION OR EXPULSION. Any member of the Association may be suspended or expelled by the Association for conduct which the majority of members may deem to be prejudicial to the interests of the Association; provided, however, that there shall be a fair hearing to discuss the alleged offense before the suspension or expulsion takes place.

SECTION 4: DUES. Dues shall be payable by members at such times and in such amounts as the Association shall determine from time to time. Dues are nonrefundable.

SECTION 5: RESIGNATION. Any member may resign at any time via written or verbal notice to the Association.

ARTICLE V: Meetings of Members

SECTION 1. ANNUAL MEETING. An Annual meeting of the members shall be held on _____ of each year, with the exact date, time and place of meeting to be established by the members. The annual meeting shall be held in Humboldt County, California, in a location to be determined.

SECTION 2. ADDITIONAL MEMBERSHIP MEETINGS. Additional membership meetings of the Association shall be held on _____ of each year with the exact date, time and place of meeting to be established by the members. The annual meeting shall be held in Humboldt County, California, in a location to be determined.

SECTION 3. NOTICE OF MEETINGS. Written or printed notice stating the place, day and hour of any meeting of members shall be delivered not less than 10 (ten) days before the date of the meeting, either personally, by mail, e-mail, telephonically, posting on the Association's website or other social media page to each member. In cases of a special meeting, the purpose for which the meeting is called shall be stated in the notice.

SECTION 4. QUORUM. A minimum of ___ members shall constitute a quorum at the annual meeting in each year, with the exact date, time and place of meeting to be established by the members. The annual meeting shall be held in Humboldt County, California, in a location to be determined.

SECTION 5. CHAIR OF MEETINGS. The President, or in the President's absence, the duly appointed person, shall call all membership meetings to order, and shall act as Chair of such meetings, and the Secretary, or duly appointed person of the Association shall act as Secretary of all meetings of the members. The order of business may be amended or suspended at any meeting by a majority vote of the members present.

SECTION 6. RECORDS. The records of this Association shall be the sole and conclusive evidence of the current members and as to who shall have the right to vote at any meeting of the members.

ARTICLE VI: Officers and Agents

SECTION 1. OFFICERS. The officers of the Association shall be President, Vice President, Secretary and Treasurer, and such other officers as may be elected in accordance with the provisions of this ARTICLE.

SECTION 2. ELECTION AND TERM OF OFFICE. The Association members shall elect officers at the first Annual Meeting. Each officer shall hold office until the officer's successor shall have been duly elected and qualified. Any member of the Association may serve as an officer. Officers are selected by a majority vote.

SECTION 3. REMOVAL. The Association may remove any officer whenever the best interest of the Association would be served thereby. The removal of any such officer shall require a majority vote of the members of the Association

SECTION 4. PRESIDENT. The President shall preside at all meetings. The President may sign, with the Vice President, Secretary or Treasurer or any other proper officer of the Association, all official documents of the Association. The President shall present a report of the Association's activities to the general membership during the annual meeting.

SECTION 5. VICE PRESIDENT. In absence of the President, or in the event of the President's inability or refusal to act, the Vice President shall perform the duties of the President and when so acting, shall have all the powers and be subject to all the restrictions upon the President. The Vice President shall perform such other duties as may be assigned by the President.

SECTION 7. SECRETARY. The Secretary shall keep the minutes of the meetings of the members and shall maintain a current list of the members of the Association.

SECTION 8. TREASURER. The Treasurer shall oversee and keep an itemized report of all monies received and spent, shall verify and pay all obligations, and provide financial updates at member meetings.

ARTICLE VII: Checks, Deposits, and Gifts

SECTION 1. CHECKS, DRAFTS, ETC. All checks, drafts or other orders for the payment of money, notes or other evidence of indebtedness issued in the name of the Association, shall be signed by such officer or officers, agent or agents of the Association in such manner as shall from time to time be determined by resolution of the membership.

SECTION 2. DEPOSITS. All funds of the Association shall be deposited from time to time to the credit of the Association in such banks, trust companies or other depositories as the members may select.

SECTION 3. GIFTS. The Association may accept any contribution, gift, bequest or devise for the general purposes or for any special purposes of the Association.

Article VIII: Books and Records

The Association shall keep accurate and complete records of accounts and shall also keep minutes of the proceedings of its members. A record shall also be kept giving the names and addresses of the members entitled to vote.

Appendix E: Informational Resources Referenced in the CWM Report

Water Conservation and Storage Resources

Options and Obstacles: Living with Low Water Flows in the Mattole River Headwaters, Tasha McKee, Sanctuary Forest, 2014
www.sanctuaryforest.org/wp-content/uploads/2014/12/Options-and-Obstacles-Living-with-Low-Flows-Copy.pdf

From Storage to Retention: Expanding California's Options for Meeting Its Water Needs California Roundtable on Water and Food Supply, November 2012
http://www.aginnovations.org/result/2015-05-10/from-storage-to-retention-expanding-california-s-options-for-meeting-its-water-needs

Water Stewardship Guide: Conserving and Storing Water to Benefit Streamflows and Fish in North Coast Creeks and Rivers, Kyle Keegan and Sanctuary Forest, 2017
http://www.sanctuaryforest.org/wp-content/uploads/2017/10/Water-Stewardship-Guide-Booklet-Form.pdf

Resilience in a Time of Drought—A Transferable Model for Collective Action in North Coast Watersheds, Sara Schremmer, Prepared for Sanctuary Foresthttp://www.calsalmon.org/sites/default/files/files/GuideForCollectiveAction_2014.pdf

Best Management Practices Resources

Slow it. Spread it. Sink it! A Homeowner's and Landowner's Guide to Beneficial Stormwater Management, Sonoma Valley Groundwater Management Program, 2010
http://sscrcd.org/pdf/Slowit.Spreadit.Sinkit.vfinal.pdf

Handbook for Forest, Ranch and Rural Roads, Pacific Watershed Associates, 2015
http://www.pacificwatershed.com/sites/default/files/roadsenglishbookapril2015b_0.pdf

Landowner Stewardship Guide, Reducing Runoff and Increasing Infiltration in the Mediterranean Climate of Northern California, Kyle Keegan and Sanctuary Forest, 2017
www.sanctuaryforest.org/wp-content/uploads/2017/10/Land-Stewardship-Guide-Booklet-Form.pdf

Watershed Best Management Practices for Cannabis Growers and Rural Gardeners, Mendocino County Resource Conservation District, 2016
http://mcrcd.org/

Quick Guide to Watershed Best Management Practices, Salmonid Restoration Federation, 2016
http://www.calsalmon.org/sites/default/files/files/2016_Quick_Guide_to_Watershed_BMP_Brochure.pdf

Winegrower and Winery Best Management Practices for Reducing Water Use
https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=101473&inline

Instream Flow and Water Transaction Resources

A Practitioners Guide to Instream Flow Transactions in California, Small Watershed Instream Flow Transfers (SWIFT) Working Group, March 2016
http://www.calsalmon.org/sites/default/files/files/SWIFT_Guide_Instream_Flow_Transactions.pdf

Sanctuary Forest's Mattole Flow Program: Legal Options for Streamflow Protection
http://www.sanctuaryforest.org/wp-content/uploads/2014/12/Legal-Options-for-Streamflow-Protection.pdf

Know Your Water Rights Brochure, Salmonid Restoration Federation
www.calsalmon.org/sites/default/files/files/RedwoodCreek_WaterRights.pdf

Small Domestic Use Curriculum, SRF and Trout Unlimited, 2016
http://www.calsalmon.org/programs/water-rights-education/resources

Navigating Water: Regulations for Small-Scale Water Storage Projects in California's Five County Region, Salmonid Restoration Federation, 2016
http://www.calsalmon.org/sites/default/files/files/5Counties_Navigating_Water_Compliance.pdf

Managing Diversions in Unregulated Streams Using a Modified Percent of Flow Approach, Freshwater Biology, Mierau, July 2017
https://onlinelibrary.wiley.com/doi/epdf/10.1111/fwb.12985

Water Conservation and Streamflow Improvement Plans

Water Stewardship Guide—Conserving and Storing Water to Benefit Streamflows and Fish in North Coast Creeks and Rivers, Sanctuary Forest, 2017
http://sanctuaryforest.org/wp-content/uploads/2017/10/Water-Stewardship-Guide-Booklet-Form.pdf

Bodega Valley Rainwater Catchment and Alternative Water Supply Program, Ag Innovations Network, 2013
https://oaec.org/wp-content/uploads/2014/12/BodegaValleyRainwaterCatchment.pdf

Salmon Creek Water Conservation Plan, Coastal Conservancy, 2010
http://goldridgercd.org/documents/SalmCkWatCons.pdf

Salmon Creek Estuary: Study Results and Enhancement Recommendations, Prunuske Chatham, 2006
http://www.salmoncreekwater.org/project/SalmonCreekEstuaryStudy.pdf

Dutch Bill Creek Streamflow Improvement Plan, Occidental Arts and Ecology Center, March 2017
http://cohopartnership.org/2017-03-04 Dutch Bill Creek Streamflow Improvement Plan (final- rfs).pdf

California Policies, Initiatives, and Reports

Policy for Maintaining Instream Flows in Northern California Coastal Streams, State Water Board, Division of Water Rights, 2014
www.waterboards.ca.gov/waterrights/water_issues/programs/instream_flows/docs/adopted_policy.pdf

Cannabis Cultivation Policy, State Water Board, 2017
www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2017/final_cannabis_policy_with_att_a.pdf

California Water Action Plan: Actions for Reliability, Restoration, and Resilience, CA Natural Resources Agency, Update 2016
http://resources.ca.gov/docs/california_water_action_plan/Final_California_Water_Action_Plan.pdf

Managing California's Freshwater Ecosystem's Lessons from the 2012-2016 Drought, Public Policy Institute of California
http://www.ppic.org/wp-content/uploads/r_1117jmr.pdf

California Voluntary Drought Initiative, NOAA Fisheries and California Department of Fish and Wildlife, 2014
http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/voluntary_drought_initiative.html

Safe Harbor Agreements

Safe Harbor Agreements, Frequently Asked Questions, US Fish and Wildlife Service, 2017
https://www.fws.gov/endangered/landowners/landowners-faq.html

A Landowner's Guide to Dry Creek Habitat Enhancement "Safe Harbor" Agreement, NOAA Fisheries
http://www.westcoast.fisheries.noaa.gov/publications/habitat/fact_sheets/dry_creek_safe_harbor_agreement_landowners_guide.pdf

Working Together, Tools for Helping Imperiled Wildlife on Private Lands, USFWS, 2005
https://www.fws.gov/endangered/esa-library/pdf/ImperiledWildlifeFinalDec2005.pdf

Requirements and Directions for Preparing a Safe Harbor Agreement, USFWS, online resource
https://www.fws.gov/midwest/endangered/permits/enhancement/sha/shadirections.html

Groundwater Management Resources

SGMA Groundwater Management Portal, Department of Water Resources
https://www.water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management

Groundwater Dependent Ecosystems Under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans, The Nature Conservancy, 2018
https://www.scienceforconservation.org/assets/downloads/GDEsUnderSGMA.pdf

Keeping Accounts for Groundwater Sustainability, UC Davis Center for Watershed Sciences, 2015
https://californiawaterblog.com/2015/05/10/getting-to-the-big-picture-in-groundwater-management/

Streamflow Data Tools

Department of Water Resources Water Management Planning Tool
https://gis.water.ca.gov/app/boundaries/

Department of Water Resources California Data Exchange Center
https://cdec.water.ca.gov/

California Institute for Water Resources, University of California
http://ciwr.ucanr.edu/

Drought and Water Management Information, California Institute for Water Resources, University of California
http://ciwr.ucanr.edu/California_Drought_Expertise/Drought_information/

USGS Current Water Data for California
https://waterdata.usgs.gov/ca/nwis/rt

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