Item 3 LATE ADDITION

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

MEETING OF NOVEMBER 15-16, 2017
SOUTH LAKE TAHOE

ITEM 3
WORKSHOP – ESTABLISHING INSTREAM FLOW REQUIREMENTS TO PROTECT WATER QUALITY AND BENEFICIAL USES

*****Please insert the following enclosure to Item 3 and remove existing pages 3-77 to 3-95

ENCLOSURE	ITEM	Bates Number
7	Dan Worth and Dan Schultz, Division of Water Rights Presentation	3-79
8	Brian McFadin, North Coast Water Board Presentation	3-97

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Enclosure 7

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State Water Resource Control Board Efforts to Protect Instream Flows

Lahontan Regional Water Quality Control Board Workshop – Establishing Instream Flow Requirements to Protect Water Quality and Beneficial Uses

November 15, 2017 – South Lake Tahoe, CA
State Water Resources Control Board
Division of Water Rights
Daniel Schultz
Dan Worth

Division of Water Rights

Our mission is to establish and maintain a stable system of water rights in California to best develop, conserve, and use, in the public interest, the water resources of the State while protecting vested rights, water quality and the environment.

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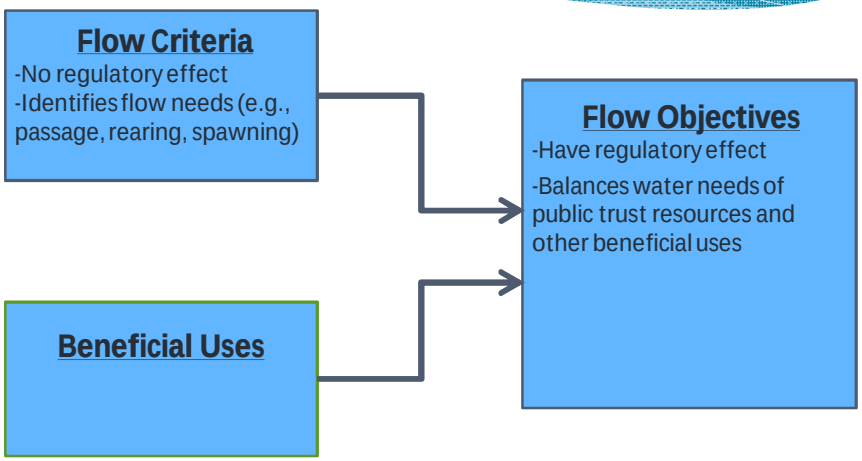
Flow Criteria vs. Flow Objectives



Instream Flow Approach Examples

1. California Water Action Plan
2. Cannabis Policy and Methodology
3. California Environmental Flows Framework

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Part 1

California Water Action Plan

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California Water Action Plan (WAP)

January 22, 2014

- Developed at direction of Governor Brown by:

- WAP focus:
  - Water Supply
  - Ecosystems Restoration
  - Water Infrastructure
- Outlines near- and long-term water priorities

Action 4 – Protect and Restore Important Ecosystems

Sub-action: **Enhance Water Flows in Stream Systems Statewide (Page 12 of WAP)**

"*The State Water Resources Control Board and the Department of Fish and Wildlife will implement a suite of individual and coordinated administrative efforts to enhance flows statewide in at least five stream systems that support critical habitat for anadromous fish. These actions include developing defensible, cost-effective, and time-sensitive approaches to establish instream flows using sound science and a transparent public process. When developing and implementing this action, the State Water Resources Control Board and the Department of Fish and Wildlife will consider their public trust responsibility and existing statutory authorities such as maintaining fish in good condition.*"

Water Action Plan Overview

- What environmental flows are needed?
  - California Department of Fish and Wildlife (CDFW) conducting site specific flow studies
  - State Water Board working with UC Davis on regional approaches
- CDFW, and potentially other groups, to make flow recommendations to State Water Board
- State Water Board to consider recommendations and other available information
- May result in instream flow policies, regulations, or other implementation actions

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WAP Actions Underway

- Developing groundwater surface water models for the South Fork Eel, Shasta, Ventura, and Russian River watersheds
- Stream segment classification study in South Fork Eel watershed
- Outreach and education
- Instream flow gaging in South Fork Eel watershed
- Instream flow studies by CDFW in South Fork Eel (Redwood Creek) and Ventura watersheds

Part 2

Cannabis Policy and Flow Methodology

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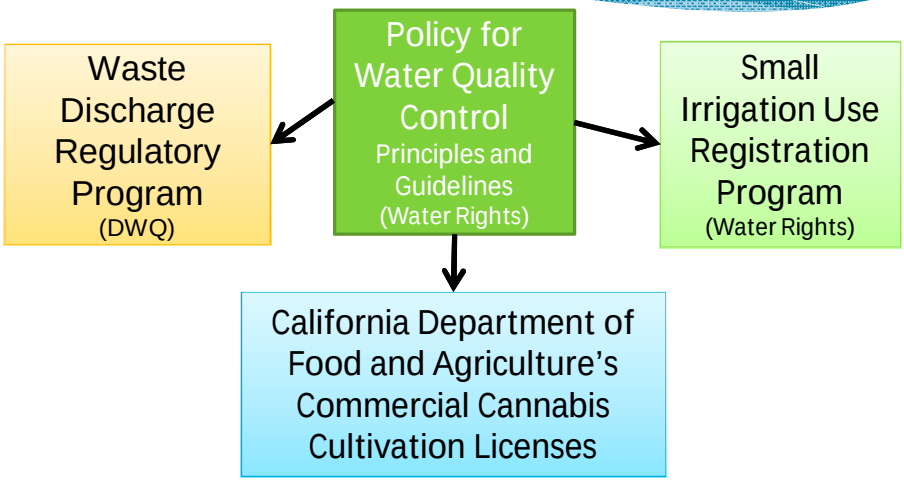
State Water Board Cannabis Regulatory Efforts



Cannabis Cultivation Policy
(Numeric and Narrative Instream Flow Requirements)

Narrative Instream Flow Requirement:

- 50% of streamflow shall be bypassed past point of diversion
- Surface water forbearance period: April 1 – October 31, possibly later depending on precipitation

Numeric Instream Flow

- Diversions can only occur when daily average flow at assigned gage is above minimum instream flow requirement
- Diverters shall measure and record daily water diversion and use

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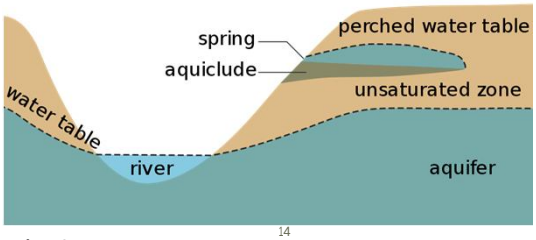
Attachment A, Section 3

Cannabis Cultivation Policy
(Numeric and Narrative Flow Requirements)

Groundwater Requirements:

- Aquatic base flow thresholds established as one mechanism to help monitor whether groundwater diverters are having a cumulative negative impact on instream flows
- If it is determined that groundwater diversions have the potential to significantly affect surface water supply, forbearance periods or other measures may extend to groundwater diverters



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Attachment A, Section 3

Cannabis Cultivation Policy
(Numeric and Narrative Flow Requirements)

Fully Contained Springs:

- Springs that do not run off a property in the absence of diversion and do not have surface or subsurface hydrologic connectivity at any time of year during all water year types may request to be exempt from numeric instream flow and forbearance period (requires substantial evidence)
- Springs deemed exempt are subject to 50% visual bypass and Groundwater Requirements

Attachment A, Section 3

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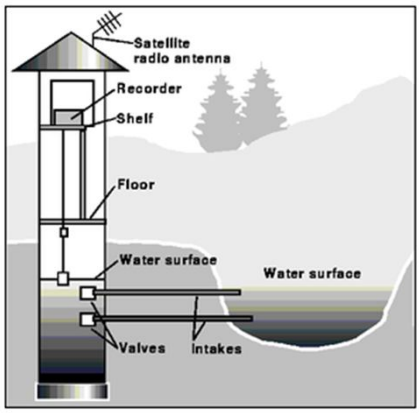
Cannabis Cultivation Policy
(Watershed Compliance Gage Assignments)



- Policy establishes minimum monthly flows at compliance gages
- Watershed areas without existing gages are assigned a compliance gage for a different location in same watershed or a nearby watershed with similar flow characteristics
- During diversion season, cannabis cultivators are required to check their compliance gage assignment at least daily and prior to diverting water to ensure water is available to divert at assigned gage
- Compliance gage assignments may change as more information becomes available

Attachment A, Section 4

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Wet Season Flow Requirement Methodology

- **Wet season flow requirements (surface water diverters)**
  - Flow modeling effort conducted by USGS in cooperation with The Nature Conservancy (TNC) and Trout Unlimited (USGS Model)
    - Predicted natural (unaffected by land use or water management) monthly streamflows from 1950 to 2012
    - Available for majority of USGS National Hydrologic Database stream reaches in California
  - Tessman Method

Situation	Minimum Monthly Flow
40% Mean AF > 40% Mean MF	40% Mean AF
40% Mean MF > 40% Mean AF	40% Mean MF

*MF = Monthly Flow, AF = Annual Flow

  - Flow requirements developed at compliance gages
    - Ungaged watersheds assigned a paired watershed gage for compliance

Dry Season Flow Requirement Methodology

- **Dry season flow requirements (groundwater diverters)**
  - Used predicted natural (unaffected by land use or water management) monthly streamflows from 1950 to 2012 (USGS Model)
  - New England Aquatic Base Flow Standard methodology (USFWS 1999)
    - Aquatic base flow for each compliance gage is calculated based on the mean monthly flow of the lowest flowing month from April through October
    - The aquatic base flow is calculated by taking the median of mean monthly flow (over the predicted historical modeling period) of lowest non-zero flow month that is greater than 1.0 cubic feet per second

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Small Irrigation Use Registration Program

- Statewide *Cannabis* Small Irrigation Use Registration
  - Only for surface water* (including subterranean streams) diverters
  - Accessible through same portal as enrollment under General Order

* Cannabis cultivators whose water is sourced from groundwater, municipal systems, and rainwater capture do not need to file with Division of Water Rights

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Small Irrigation Use Registration Program

- Cannabis Small Irrigation and Use Registrations, like other appropriative water rights:
  1. will not be issued for *fully appropriated streams* in the restricted diversion season;
  2. may not be available on rivers and streams designated as *Wild and Scenic* under *The National Wild and Scenic Rivers System*; and
  3. are not available where water source is in a *CDFW instream flow study area with a final flow recommendation* from CDFW (*Public Resource Code section 10002*)

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Part 3

California Environmental Flows Framework

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Ecological Objectives

- State Water Board staff developed broad ecological objectives to guide development of instream flows, these include:
  - Achieve characteristics of a natural hydrograph
    - Maintain inter-annual variability
    - Maintain intra-annual events
  - Restore natural high flow recession rates
    - Prevent juvenile salmonid stranding
    - Promote riparian seed dispersal
    - Trigger natural species reproduction patterns

Ecological Objectives

- Restore natural geomorphic processes, to maintain channel habitat
  - Floodplain and side channel inundation
    - Rainfall runoff
    - Annual peak spring snowmelt period
  - Channel flushing flows
    - 1st annual significant fall or early winter event
  - Channel maintenance flows
    - 1.5-3 year return interval
  - Channel forming flows
    - 5, 10, and 15 year return interval

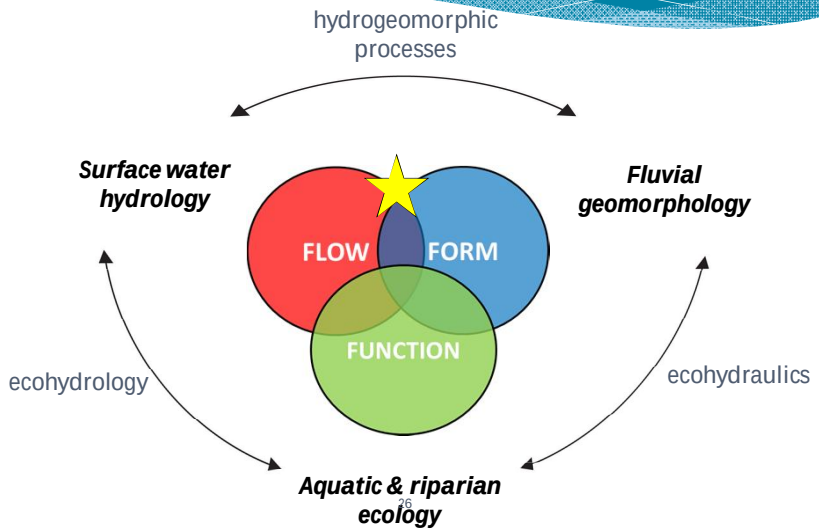
Ecological Objectives

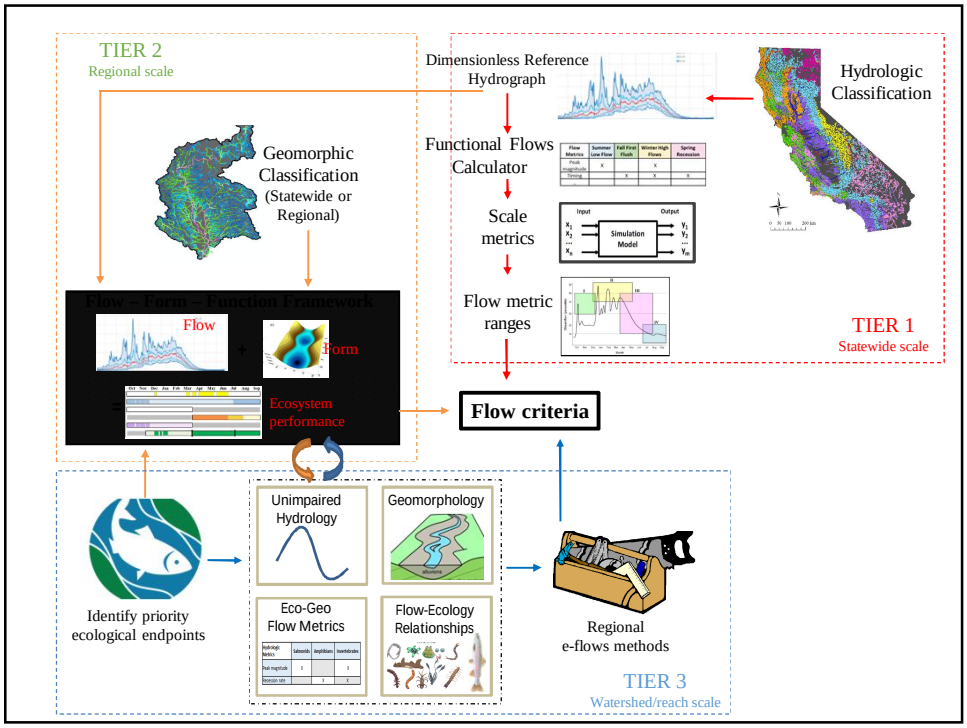
- Restore self-sustaining resilient populations of anadromous salmonids and other native species by:
  - Addressing flow-related salmonid passage impediments
  - Increasing the quantity and quality of salmonid spawning and rearing habitat
  - Reducing water temperature
  - Restoring natural aquatic habitat connectivity

Flow Criteria Methodology Goals and Objectives

- Prepare a Manual with procedures and steps to guide the flow criteria development process
  - Applicable Statewide
  - Incorporates existing information, studies, and data
  - Flexibility in Regional Application
  - Can be implemented by a range of practitioners

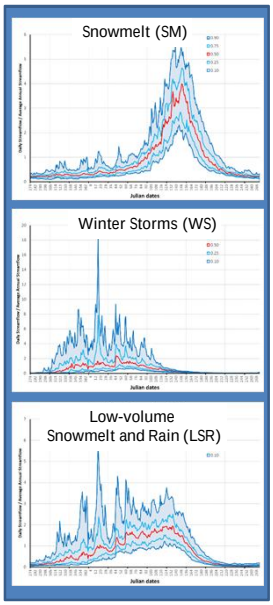
California Environmental Flows Framework Overview



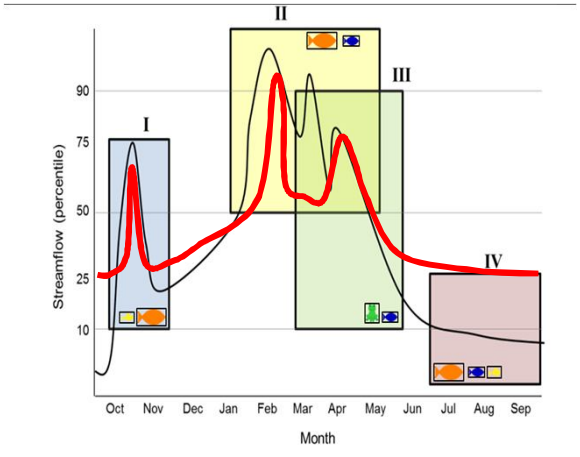


Flow

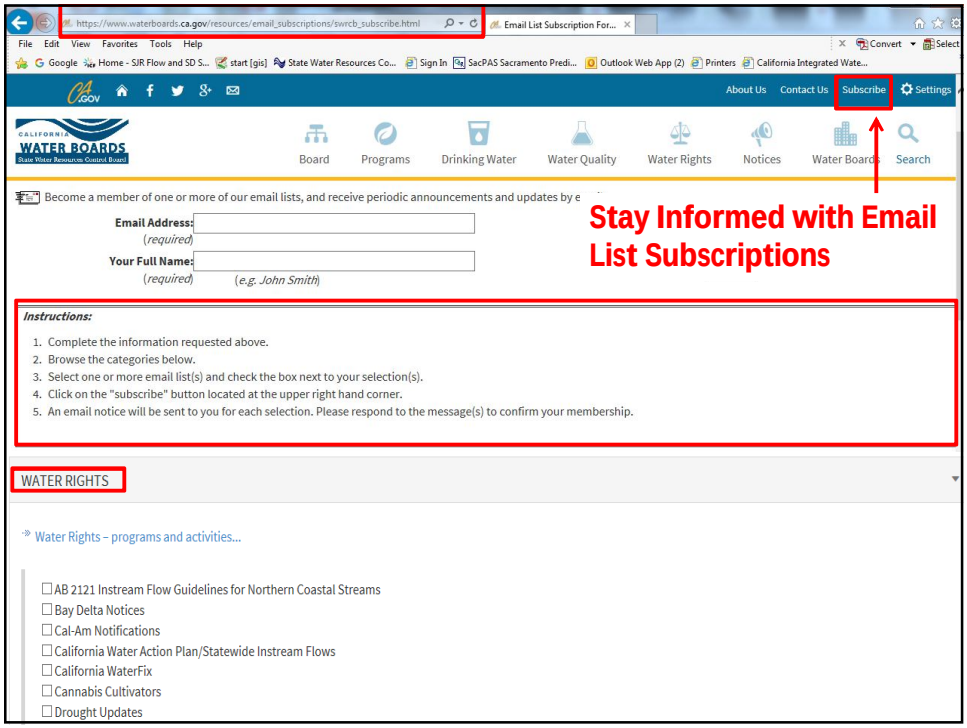
CEFF Tier 1



Statewide environmental flow criteria



I. Fall Flushing Flow II. Winter Floods III. Spring Recession Flows IV. Summer Low Flows



Webpages

- Water Rights: https://www.waterboards.ca.gov/waterrights/
- Cannabis Cultivation Program: https://www.waterboards.ca.gov/cannabis
- California Water Action Plan: https://www.waterboards.ca.gov/waterrights/water_issues/programs/instream_flows/cwap_enhancing/

ENCLOSURE 8

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North Coast Water Board Efforts to Address Water Quantity Impacts on Water Quality

Bryan McFadin, SrWRCE
North Coast Water Board
presented to
Lahontan Water Board
November 15, 2017

Presentation Topics

- North Coast flow-related issues and actions: background
- Establishing flow objectives in a basin planning context
- North Coast Water Board efforts to address water quantity-related water quality issues
- Conclusions

Why is Flow a Water Quality Issue?

Key flow-related water quality risk factors:

- Temperature
- Dissolved oxygen
- Biostimulatory conditions
- Fish disease

North Coast Flow-Related Issues

A progression of flow issues in water quality efforts:

- Navarro River Temperature TMDL (2000)
- Mattole River Temperature TMDL (2002)
- Scott River Temperature TMDL (2005)
- Shasta River Temperature TMDL (2006)

North Coast Flow-Related Issues

Shasta River Temperature TMDL (2006)

- Identified effects of flow alteration on temperature and dissolved oxygen (DO)
- Load allocations expressed as temperature reductions and dissolved oxygen concentrations at compliance points, based on 45 cfs of additional dedicated cold water

North Coast Flow-Related Actions

Policy for the Implementation of the Water Quality Objectives for Temperature and Navarro, Mattole, and Eel River Temperature TMDL Action Plans (2014):

- Identifies the importance of addressing flow for temperature concerns
- Directs staff to collaborate with the Division of Water Rights:
  - Water rights permitting process
  - Development of flow objectives, as appropriate

North Coast Flow-Related Actions

2014 Triennial Review of Basin Planning Priorities (2015):

Directs staff to develop:

- Numeric flow criteria for Eel River
- Numeric flow objectives for Navarro River
- Narrative flow objectives

North Coast Flow-Related Actions

Strategic Planning Priority Initiatives (2015):

- Instream Flow
- Aquatic Ecosystem Protection and Restoration
- Groundwater
- Enforcement
- Stewardship

Policy for Maintaining Instream Flow in Northern California Streams (2010; Effective 2014)

- State Water Board action
- Applies to new applications
- Does not address existing rights
- Establishes protectiveness elements:
  - Season of diversion
  - Minimum bypass flow
  - Maximum cumulative diversion
  - Cumulative effects analysis

Establishing Flow Objectives in a Basin Planning Context

Key Concepts:

- Regional Water Boards' planning authority has a greater scope than their implementation authority
- Basin Plan flow objectives inform the necessary conditions for support of beneficial uses (basin planning), for application through the State Water Board's implementation authority (water rights permitting)

Water Code Authority and Legal Basis:

- "Water Quality Control" means the regulation **of any activity or factor** which may affect the quality of the waters of the state…." (Wat. Code, §13050(i).)
- **Lack of water is a form of pollution**, a term defined by the Clean Water Act as the "man-induced alteration of the chemical, physical, biological, and radiological integrity of water." Water quality includes water quantity and no artificial distinction can be made between them. (PUD #1 of Jefferson County v, Wash. Dep't of Ecology (1994) 511 U.S 700.)

Water Code Authority and Legal Basis:

Regional Board shall establish objectives that support beneficial uses and prevent nuisance. Consider water quality conditions that could be reasonably achieved through the **coordinated control of all factors which affect water quality** in the area. (Wat. Code, §13241.)

Regional Water Boards' Planning Role

- Establishing flow objectives is an exercise in developing science to define the instream flow needs of beneficial uses.
- The identified instream flow needs inform the State Water Board of the flow conditions required to satisfy public trust responsibilities
- The flow conditions satisfying public trust can then be incorporated into the water rights regulatory process

Considerations for Developing Flow Objectives

- Developing site-specific science, basin planning takes significant time
- Involvement of partner agencies is critical

North Coast Water Board Efforts to Address Water Quantity-Related Water Quality Issues

- Navarro River watershed instream flow needs study
- Russian River tributary flow & dissolved oxygen investigation
- Scott Valley groundwater study
- Middle Trinity River watershed flow monitoring and prioritization
- California Water Action Plan participation
- Grant projects

North Coast Water Board Efforts to Address Water Quantity-Related Water Quality Issues

- Navarro River watershed instream flow needs study
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- Middle Trinity River watershed flow monitoring and prioritization
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- Grant projects

Navarro River Watershed Instream Flow Needs Study

Four phases:

- Phase 1: Study Plan Development (2 years)
- Phase 2: Study Plan Implementation (2 years)
- Phase 3: Basin Plan Amendment Process (2-3 years)
- Phase 4: Implementation

Navarro River Watershed Instream Flow Needs Study: Scientific Approach

Establishing 3 flow thresholds:

- No measurable effect on the migration, spawning, and abundance and growth of juvenile salmonids
- Flow conditions associated with chronic impacts (i.e., reduced growth, higher risk of disease, etc.)
- Flow conditions associated with acute impacts (i.e., mortality)

Russian River Tributary Flow & DO Investigation

Dissolved oxygen during low flows have been identified as a critical factor limiting survival of Coho salmon in Russian River tributaries

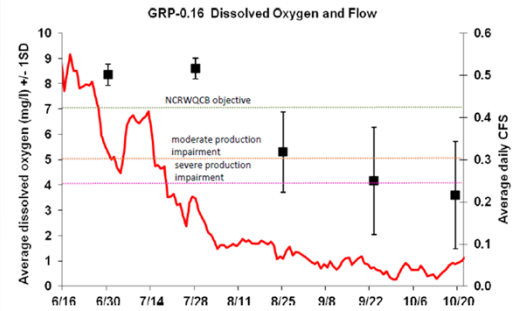


Figure 36. Stream flow and dissolved oxygen in the Grape Creek treatment reach, 2010.

Russian River Tributary Flow & DO Investigation

Dissolved oxygen conditions rapidly decline when surface flow became disconnected and pools isolated

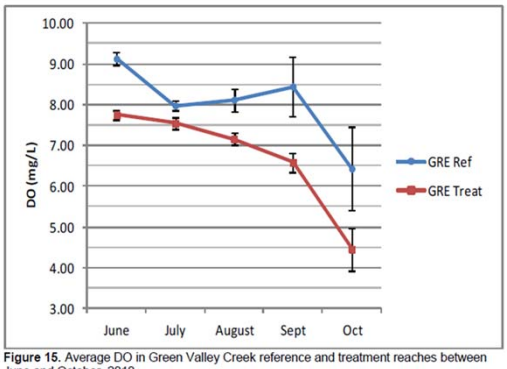


Figure 15. Average DO in Green Valley Creek reference and treatment reaches between June and October, 2010.

Russian River Tributary Flow & DO Investigation

Project goals:

- Identify when diversions are resulting in mortality
- Inform targets for flow augmentation
- Provide a benchmark to gauge success of restoration efforts
- Inform bypass flows
- Inform implementation of water rights priority system during curtailments
- Provide data for a future TMDL

Russian River Tributary Flow & DO Investigation

Project approach: identify hydraulic thresholds related to dissolved oxygen concentrations:

Hydraulic thresholds:

- Flow
- Depth at riffle crest
- Cross-sectional area at riffle crest

Russian River Tributary Flow & DO Investigation

Project approach: identify the relationship of hydraulic thresholds to dissolved oxygen concentrations:

Hydraulic thresholds:

- Flow
- Depth at riffle crest
- Cross-sectional area at riffle crest

⇒ Monitoring: flow, depth, velocity, width, pool volume, and dissolved oxygen

Scott Valley Groundwater Study: Background

Scott River Watershed TMDL (2006):

- Identified interaction of groundwater and surface water as an important factor controlling Scott River temperature
- Requested Siskiyou County develop a groundwater study plan for Scott Valley by 2008

Scott Valley Groundwater Study: Background

Since 2008:

- Development of the Scott Valley Integrated Hydrologic Model by UC Davis (SVIHM)
  - Investigation of water management strategies to increase in-stream flows
  - Development of specific management scenarios
- Pilot project to investigate feasibility of groundwater recharge projects
  - First groundwater recharge project permitted for instream flow enhancement

Scott Valley Groundwater Study

The study has identified strategies for increasing instream flows through conjunctive use of surface and groundwater resources:

- Managed aquifer recharge
- In-lieu recharge

Managed Aquifer Recharge

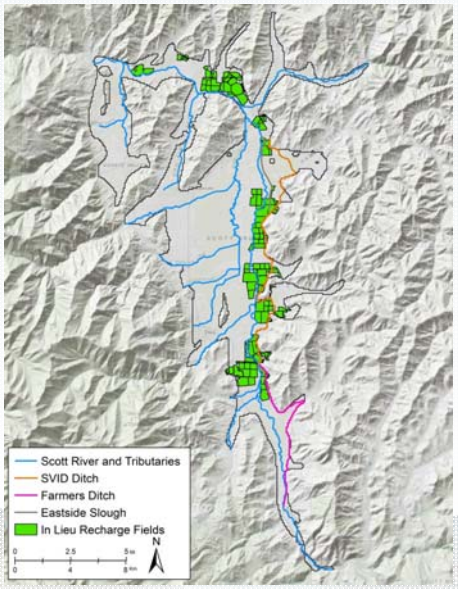
Use agricultural fields as temporary spreading basins during **winter months**

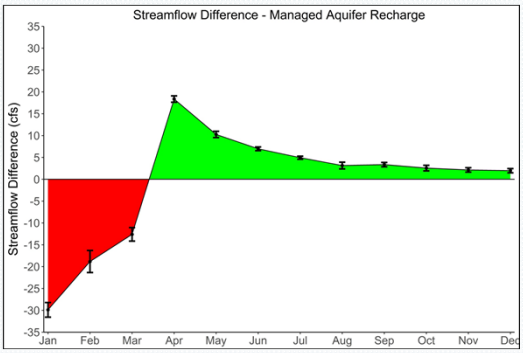
- Flood fields during crop dormancy
- Flows are high and demand is low

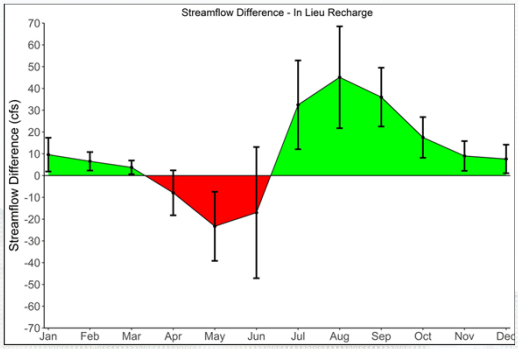
CA&ES Outlook F2015

In-Lieu Recharge

- Use surface water instead of groundwater when available on selected fields
  - ~5,900 acres
- Delays portion of groundwater pumping until later in the summer







Scott River Groundwater Study

Key Points:

- The model allows evaluation of potential management solutions
- Water is plentiful in the basin, but timing is out of sync with use
- Shift in timing creates a win-win: enough water for farmers and fish
- Non-regulatory approach is leading to faster progress

North Coast Water Board Efforts to Address Water Quantity-Related Water Quality Issues

Conclusions:

- Regional Water Boards have authority to address flow-related concerns
- Establishing flow objectives does not happen quickly
- All possible actions should be considered
- Collaboration with other agencies is critical

North Coast Water Board Efforts to Address Water Quantity-Related Water Quality Issues

Questions?