The Impacts of Cannabis Cultivation on Fisheries Recovery

A Concurrent Session at the 34th Annual Salmonid Restoration Conference held in Fortuna, CA from April 6-9, 2016.

Session Overview

- Session Coordinator:
  - Dougald Scott, Ph.D., Northern California Federation of Fly Fishers & Salmonid Restoration Federation Board of Directors

Unregulated marijuana cultivation has proliferated in northwestern California since at least the mid-1990s. The environmental impacts of marijuana cultivation include water diversions, excessive sediment, and agricultural runoff. The study Impacts of Surface Water Diversions for Marijuana Cultivation on Aquatic Habitat in Four Northwestern California Watersheds indicates that "water demand for marijuana cultivation has the potential to divert substantial portions of streamflow in the study watersheds, with an estimated flow reduction of up to 23% of the annual seven-day low flow in the least impacted of the study watersheds. Estimates from the other study watersheds indicate that water demand for marijuana cultivation exceeds streamflow during the low-flow period. In the most impacted study watersheds, diminished streamflow is likely to have lethal or sub-lethal effects on state-and federally-listed salmon and steelhead trout and to cause further decline of sensitive amphibian species.

Presentations

(Slide 4) Aquatic Habitat Impacts and Cannabis: Cumulative Effects Leading to Collaborative Regulatory Actions
Stormer Feiler, Environmental Scientist, North Coast Regional Water Quality Control Board

Cannabis and Coho
Hezekiah Allen, Executive Director, California Growers Association
*presentation not included

Long-Term Streamflow Trends in the Eel River Basin
Eli Asarian, Riverbend Sciences
*presentation not included

(Slide 39) Regulating the Watershed Impacts of Pot: Assessing the Utility of New Regulatory Regimes for Commercial Marijuana Production on the North Coast of California
Scott Greacen, Friends of the Eel River

(Slide 53) Water Resource Protection Requirements for Cannabis Cultivators Informed by Decades of Watershed Restoration
Adona White, North Coast Regional Water Quality Control Board staff with the Cannabis Cultivation Waste Discharge Regulatory Program

(Slide 75) Where Has the Water Gone? Is it the Trees or the Weed?
John G. Williams, Ph.D.

Aquatic Habitat Impacts and Cannabis: Cumulative Effects Leading to Collaborative Regulatory Actions

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

CALIFORNIA Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

Regional Water Board Authority and Purview

- Porter Cologne Water Quality Control Act
- Federal Clean Water Act
- Non Point Source and Point Source Pollution
- Prohibitions, Waste Discharge Requirements (WDR), Waivers of WDR's, NPDES Permits, and Total Maximum Daily Loads
- To protect the beneficial uses of water

The Problems

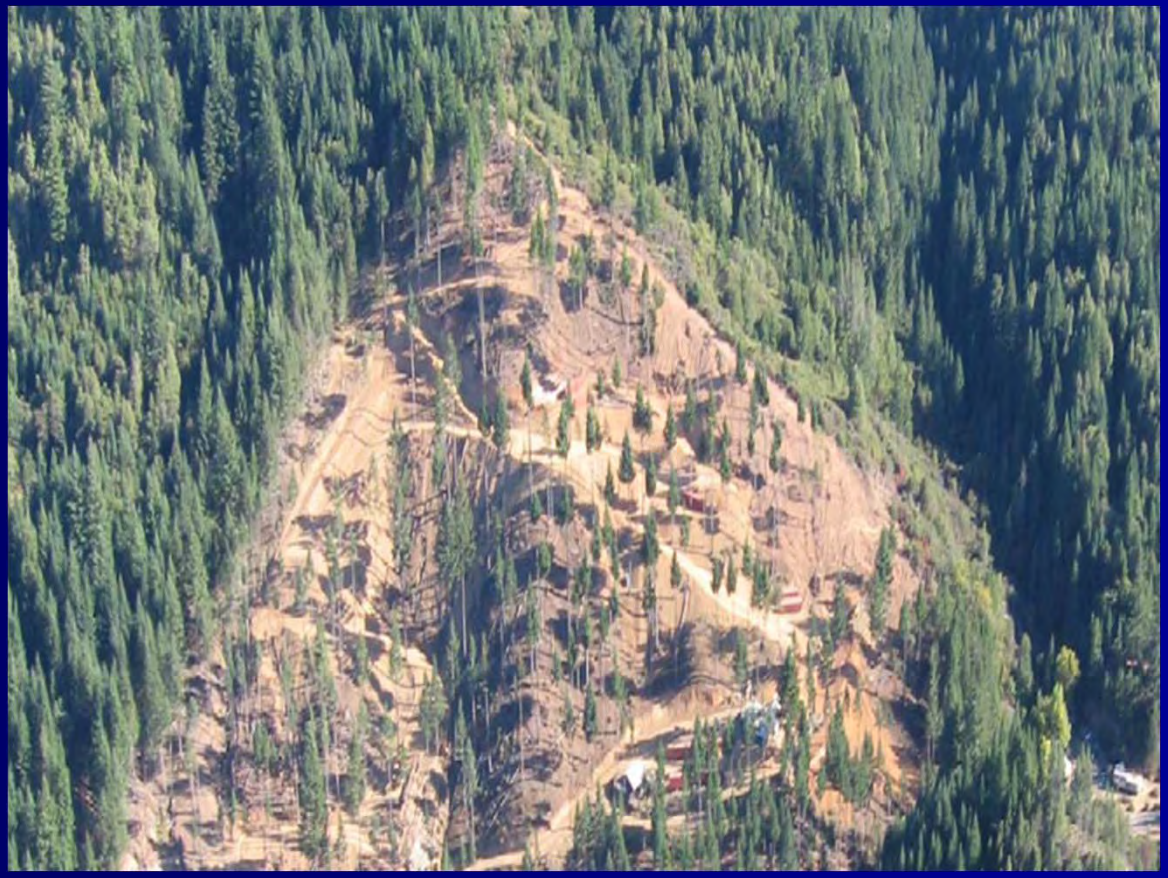
- Mid to late 2000's complaint driven inspections begin identifying significant environmental harm at sites and the watershed scale.
  - Grading and site development
  - Water diversion
  - Road use, maintenance, and construction

  Secondary Effects
    - Pesticides/herbicides
    - Fertilizers and imported soils
    - Human wastes

Post Mountain-2005

POST Mountain-2012

Site Investigations
ECTF 2007



Site Investigations
ECTF (2007)

Large scale grading fills
3 streams

Winter always comes

Site Investigation
ECTF 2007

Failing erosion controls

Background vs. Discharge

Site Investigations
ECTF 2010

Road/dam construction

Road surface runoff
Rainfall-1/10th inch

Site Investigation
1/10th of an inch of rain

Site Investigations 2010 (Ponds)

Potential Negative Impacts on Fisheries

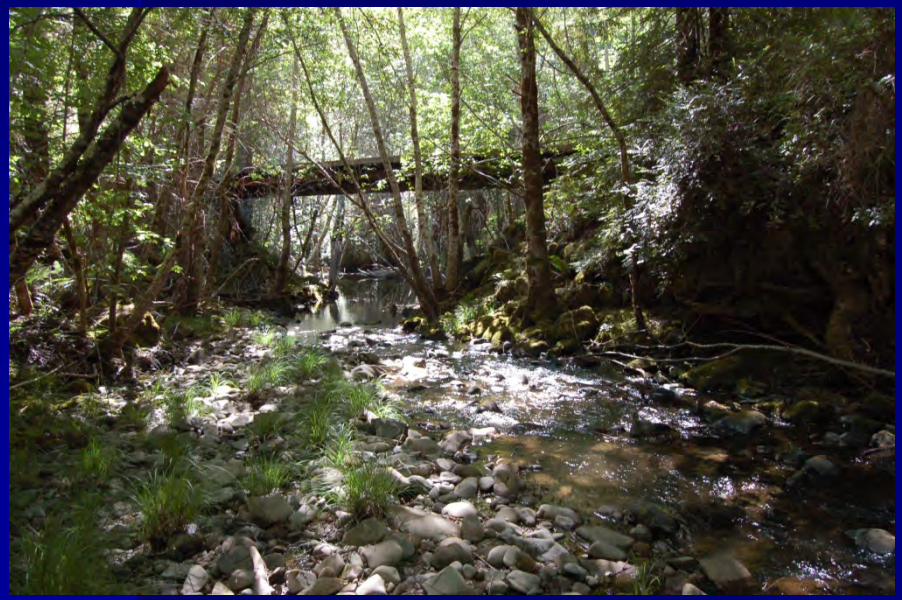
- Reduced habitat complexity in stream linear length and cross sectional area
- Increase in water temperatures, algal blooms, changes in Dissolved Oxygen
- Decreased food supply for fish and wildlife
- Increased physiological stress to aquatic life
- It gets harder to live and there is less living space
- Reduced availability and increased costs for water, for domestic, agriculture, industry, and other beneficial uses.

CDFW Cannabis Regulation: Water Diversion

- Surface Water
- Hydrologically connected springs
- Hydrologically connected ground water wells
- Regulated to provide adequate bypass flows, maintaining fish in good condition below the point of diversion (POD)
- Regulations often lead to water storage which includes the use of ponds and tanks

Importance of Instream Flow

- Stream riffles must have flow to produce the majority of food in streams; dewatered riffles remove instream production, reduce Dissolved Oxygen, and limit the potential for drift feeding.



CDFW's Authority

CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (FGC § 1802)

CDFW Fish and Game Code Sections Relevant to Cannabis Cultivation

- 1602: Alteration of bed, bank, and channel (includes water diversion)
- 5650/5652: Pollution delivery to waters of the state
- 5937: Sufficient water for fish and amphibians below dam or point of diversion (POD)
- 5901: To prevent or impede fish passage

Water Diversion Permitting

- CDFW regulates water diversion by ensuring bypass flows are adequate past the Point of Diversion (ex. 90% bypass)
- Based on the site specific location of the POD's and the water needs/availability, CDFW is likely to propose a forbearance (no diversion) period in our Agreement in lieu of the applicant conducting a bypass flow study.
- To meet forbearance terms, water storage may be necessary and may come in the form of tanks or ponds

Pond Construction

- Off-stream Ponds:
  - Preferred pond placement
- On-stream Ponds
  - May be allowed with engineering, geologic review and proper permitting (CDFW, WQ, County)
  - Permit issuance is much slower and cost is higher
  - Ponds may not be lined on-stream

CDFW Suggestions on Pond Design

- Sizing
- Pond should be sized to meet your water needs
- Pond should be able to be drained should invasive bullfrogs be present to interrupt the life cycle
- Structural Integrity
  - Required to have an engineered spillway or overflow design
  - Must be designed by a licensed engineer

Where is it suitable to build a pond?

This is what we see:
No engineering design of any kind

This is what we see:
No design for the 100 year storm

This is what we see: Pond Failures

There Were and Are Challenges

- Prosecution
  - Not always a circuit prosecutor or willing DA
- Number of Violations
  - Scope of problem is growing
- Administrative Process
  - Enforcement takes time
- Restoration takes time
  - Case resolution often requires restoration

Challenges require strategies (Pilot Program).

Statewide Strategy(2014) & Program Approach

Interagency Coordination

-Counties
-Cities
-Other Agencies

Education and Outreach

-BMP workshops
-Outreach events
-Webpage and informational materials
-Pre-consultations

Regulatory Actions

-North Coast Region:
Order No. R1-2015-0023
-Central Valley:
Order No. R5-2015-0113

Enforcement

-Ongoing interagency inspections in priority watersheds
-Progressive enforcement
-Aerial Enforcement
-Watershed Enforcement Team

Agency Integration
The Watershed Enforcement Team

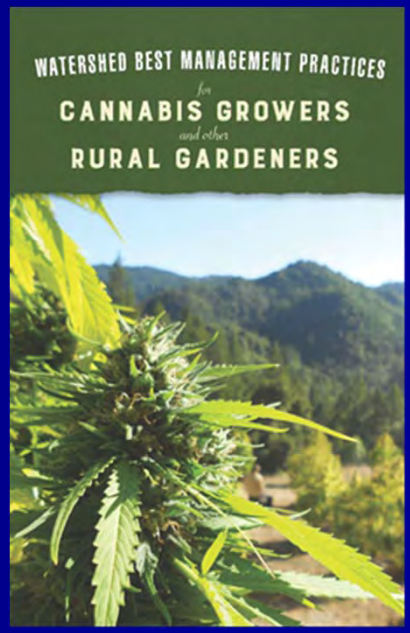
- Department of Fish and Wildlife
- Regional Water Quality Control Boards 1 and 5
- SWRCB Office of Enforcement
- SWRCB Division of Water Rights

We seek to work with local county code enforcement, environmental health, District Attorneys, Circuit Prosecutors, and the Attorney General as may be necessary.

Education and Outreach
North Coast Region

- Presentations and panels (28 events, reaching 1700+ attendees)
- Media (radio and print)
- Watershed-specific outreach: Mad River letters to 175 landowners
- Contracts and grants
  - Eel River Recovery Project
  - Mendocino Resource CD
- Cannabis Growers MP guide

  http://mcrcd.org/publications/



Cannabis Identification and Prioritization System (CIPS)

- Developed by:
  - State Water Board Office of Enforcement
  - State Water Board Division of Information Technology
  - Central Valley Water Board
  - North Coast Water Board
- Private
  - Vestra
  - Formation Environmental

CIPS Compared to Program Enrollment

CIPS

- Numbers and Distribution
- 19,050 individual cultivation sites identified to date
- Sites mapped within 164 HUC 12 watersheds
- Approximately 12% of R1 and 5% of R5 area
- 15,755 in Region 1, 3,295 in Region 5

Region 1 Enrollment

- 372 Enrollments in Region 1

Moving Forward
Enrollment Enforcement

- Water Code section 13260: Requires party discharging waste or proposing to discharge waste to file a report of waste discharge with Regional Board

- Water Code section 13261: A person who fails to furnish a report to pay a fee when requested under 13260 may be liable for Administrative Civil Liability (ACL) of up to $1,000 per day for each day in which the violation occurs.

Enrollment Enforcement Steps

- Step 1: Water Code Section 13260 Directive Letter
  - 30 days to comply or demonstrate Order does not apply
- Step 2: Notice of Violation Letter
  - Notice party is now subject to liability (monetary penalty)
- Step 3: Pre-Administrative Civil Liability Complaint Letter
  - Settlement offer with compliance requirements
- Step 4: Administrative Civil Liability Complaint
  - Complaints issued to those who fail to respond, hearing in 90 days
- Step 5: Administrative Civil Liability Hearing/Order
- Step 6: Lien

What You Can Do
Collaboration with Agencies

- Let your legislative representatives know of your concerns.
- Make sure any legalization effort includes funding for environmental regulatory actions.
- Let us know when you see a potential violation or encounter a trespass grow.

Conclusion

- The environmental damages we see are intense, widespread and likely persistent.
- Marijuana cultivation often occurs in our headwaters affecting water resources at their source.
- Cumulative ecological impacts have long-term consequences for all of us, our children and grandchildren.
- The environmental resource damages associated with cultivation will be costly to repair.
- Legality-If the activities are not in compliance with State, federal and local environmental laws and construction regulations it is an illegal operation.
- An unregulated business has an advantage over any regulated business.
- The violation of environmental laws costs us all, as tax payers, and as people living on the Earth.
- The efforts under way are the beginning of addressing the problems described today.

Contact Information

Stormer Feiler

707-543-7128

Stormer.Feiler@waterboards.ca.gov

David Manthorne

David.Manthorne@wildlife.ca.gov

Cannabis Program Info:

http://www.waterboards.ca.gov/northcoast/water_issues/programs/cannabis/

File a complaint:

http://www.dtsc.ca.gov/database/CalEPA_Complaint/index.cfm

Contributors: Scott Bauer, Stormer Feiler, David Manthorne -The Waterboards, and DFW

Contemplating Diversion

How's This Gonna Work?

Regulating the Watershed Impacts of Pot

Assessing the Utility of New Regulatory Regimes for Commercial Marijuana Production on the North Coast of California

Scott Greacen
Executive Director
Friends of the Eel River
scott@eelriver.org

The Shape of Our Problem

“Everybody’s got numbers!”

Humboldt County Sheriff’s Office	5-6K sites countywide
Department of Fish and Wildlife	5 watersheds
FOER	4K sites across SoHum
Lost Coast Outpost State of the Weed	roughly 3300 parcels, ±200
UC Berkeley	projecting 8K sites in Humboldt County
Regional Board’s CIP	16K in 12% of R1

So we're going to legalize and regulate.

Federal

- Executive
- Legislative
- Judicial

State

- Other states
- California

Local

- Humboldt County
- Other places

Federal Enforcement Priorities

for state and local legalization
per 2013 Cole Memo

Figure 1: DOJ's Marijuana Enforcement Priorities as Outlined in the August 2013 Marijuana Enforcement Guidance

Preventing the distribution of marijuana to minors

Preventing revenue from the sale of marijuana from going to criminal enterprises, gangs, and cartels

Preventing the diversion of marijuana from states where it is legal under state law in some form to other states

Preventing state-authorized marijuana activity from being used as a cover or pretext for the trafficking of other illegal drugs or other illegal activity

Preventing violence and the use of firearms in the cultivation and distribution of marijuana

Preventing drugged driving and the exacerbation of other adverse public health consequences associated with marijuana use

Preventing the growing of marijuana on public lands and the attendant public safety and environmental dangers posed by marijuana production on public lands

Preventing marijuana possession or use on federal property

Source: Department of Justice; Department of the Interior (logo). | GAO-16-419T

Uniting Divided State Water Powers

- DWR – Water Rights
- NCRWQCB – Water Quality
- DFW – Streams, Streamflow, and fisheries

The Regulatory Mechanism

Regulation

- compliance

Best Management Practices

- implementation

Reduced Impacts

- better conditions
- increased productivity

Sustainability (Regenerative Capacity)

Humboldt County's Ordinance

Quick lessons from a fast process

The regulations were put into effect to protect the environment, ensure local control, and convert an underground, black-market economy into a legitimate agricultural and commercial contributor to the local and state economy.

Steven Moore, Eureka Times-Standard, Feb 19, 2016

Steps Forward

- Door to compliance now open
- Emerging consensus on key protections
- Environmentalists complaining that Humboldt County is issuing too many permits

toward a Potemkin Village?

An impressive facade or show designed to hide an undesirable fact or condition.

Merriam-Webster

The Money Thing

It’s hard to make predictions, especially about the future.

Assessment opportunities

Deadlines (?) (Humboldt)

- August 31 existing grows on unsuitable sites
- December 31 new operations

Regional Board's CIPS

Humboldt County's Medical Marijuana Land Use Ordinance Round 2 and EIR

Policy Options

- Federal
- State
- Local
- Citizen action

Water Resource Protection Requirements for Cannabis Cultivators Informed by Decades of Watershed Restoration

Adona White, PE, Water Resource Control Engineer

Compliance Assurance Unit

North Coast Regional Water Quality Control Board

Presentation to the 34th Salmonid Restoration Federation Conference

Fortuna, Ca

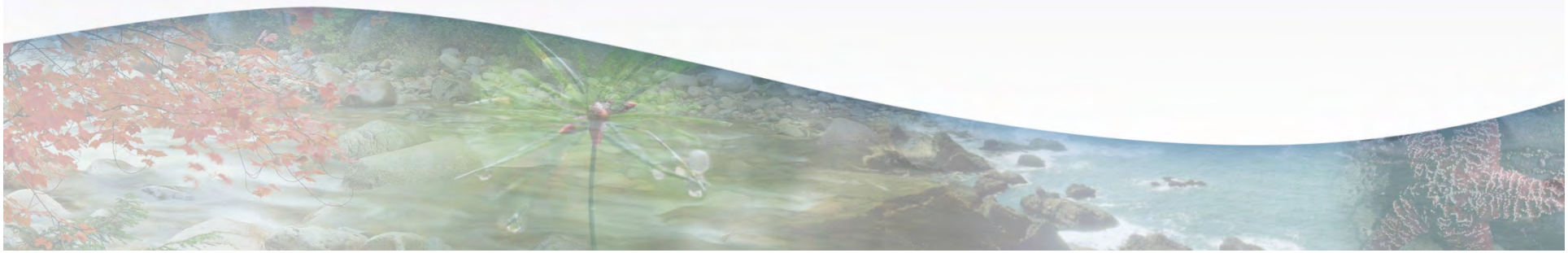
April 9, 2016

North Coast Regional Water Board Vision

Healthy Watershed

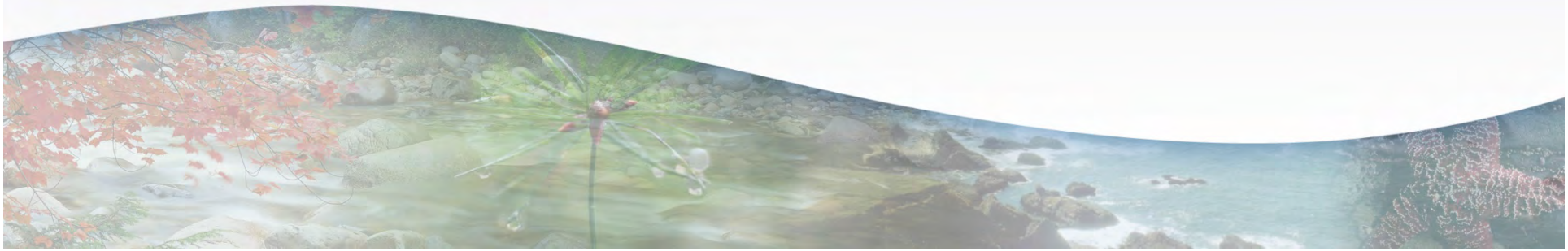
Effective Regulation

Strong Partnerships



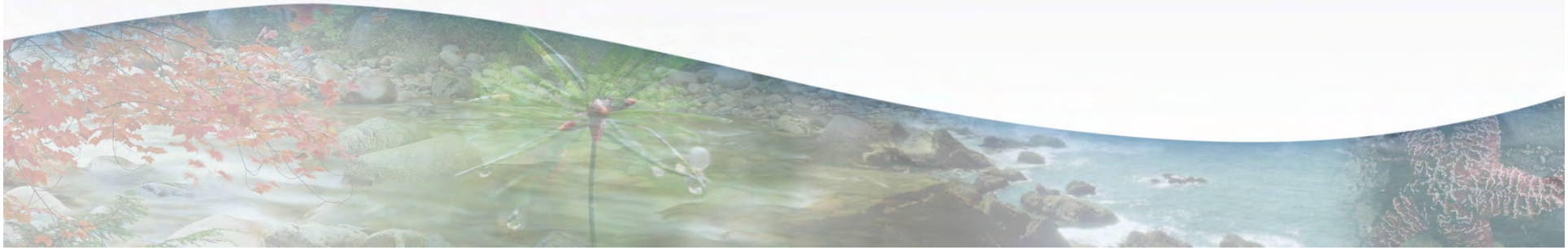
RWB Priorities

- Surface Water Protection and Restoration
- Water Quantity
- Groundwater
- Stewardship
- Enforcement



Surface Water Restoration

- Many of our region's aquatic ecosystems are home to sensitive beneficial uses and at-risk species.
- The cumulative effects of past and ongoing land uses have degraded the health and proper function of these ecosystems.
- Some combination of land use controls, restorative actions, and data-driven adaptive management is warranted to bring our aquatic ecosystems back to health, and to ensure their proper function for current and future uses.

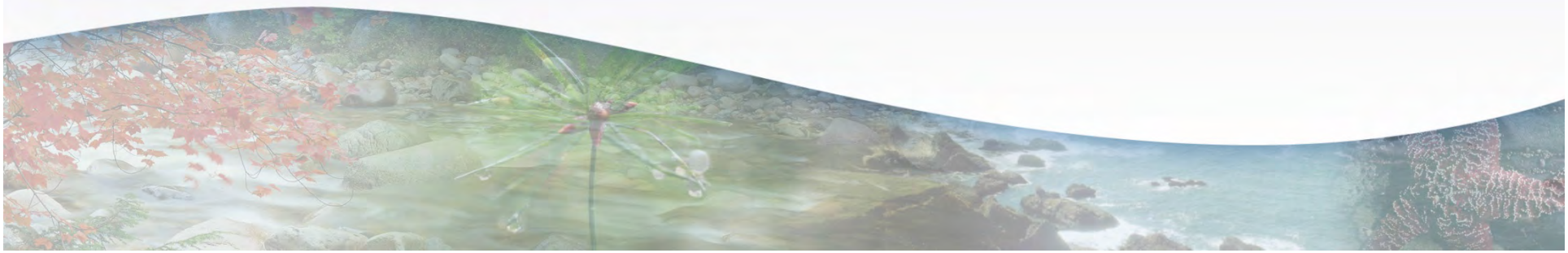


Water Quantity

- Inclusive of all impacts related to timing, amount, and pattern of water:
  - Stream flows and consumptive demands
  - Hydromodification
  - Groundwater-Surface water interaction
  - Groundwater availability
- To the extent that a water quantity issue is associated with an activity that involves a discharge of waste, the RWB can use its permitting authorities to promote use of recycled water, and address hydromodification, water conservation, waste, and unreasonable use.

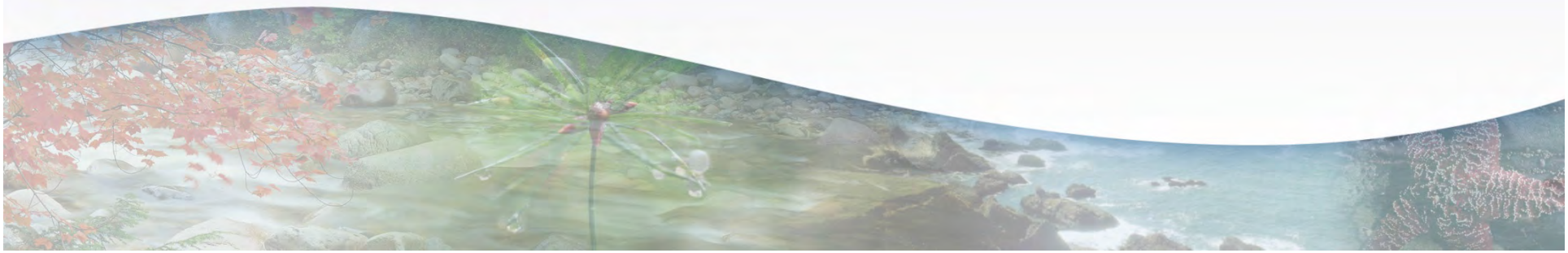
Groundwater

Existing regulations, resources, and information are insufficient to adequately protect groundwater



Enforcement

Consistent and effective enforcement, which includes compliance assistance, is necessary to deter practices that could lead to violations; to promote justice; to reduce the incentive for an unfair economic advantage of noncompliance; to safeguard the public trust; and to protect and restore beneficial uses of water.



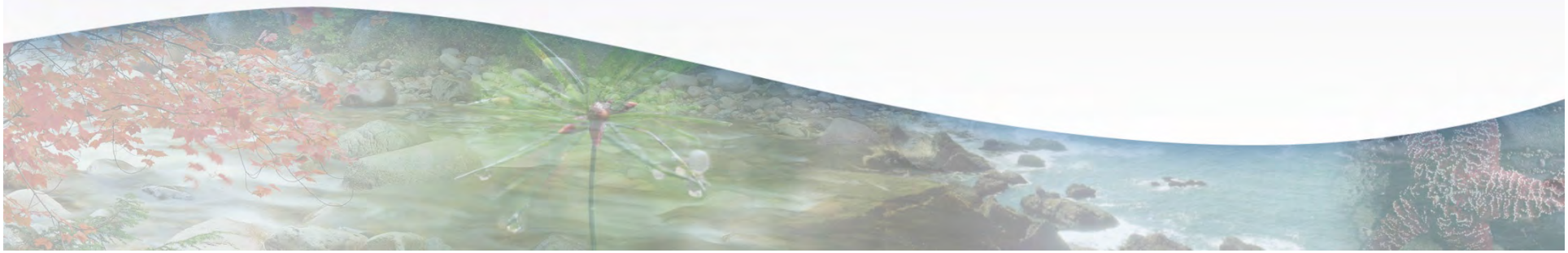
Stewardship

Outreach, education, partnerships

- Insufficient outreach to educate the importance of programs.
- Poor cooperation with counties/cities permitting and Regional Board jurisdiction.
- Need for a sense of stewardship on water quality protection and restoration that's broadly shared in our communities.
- Water conservation education.

Order R1-2015-0023

- Adopted August 2015 by the North Coast RWB
- Regulatory requirements to address the water quality impacts associated with cannabis cultivation, not the cultivation itself

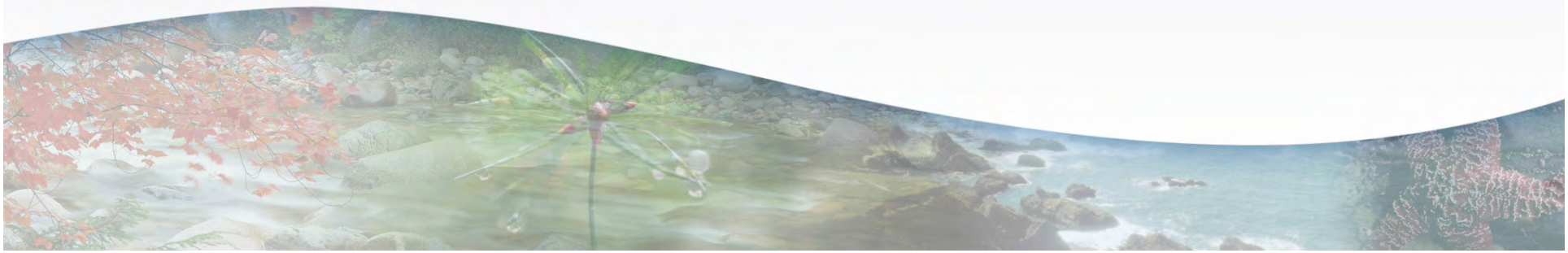


Applicability

- Applies to private properties in the north coast with:
  - >2000 sq ft of cannabis
  - Smaller cannabis operations with water quality impacts
- Persons conducting other similar activities may opt to, or be directed to, enroll under and meet conditions of the Order

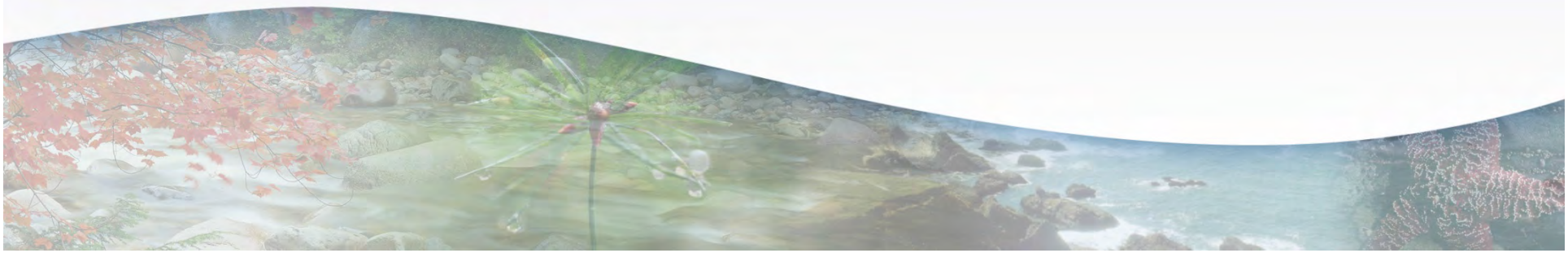
Applicability

- Site maintenance, operations, and cleanup; does not cover new site development
- Does not relieve need for other appropriate permits from Regional Water Board or other agencies (e.g., DFW 1600 agreements, County grading permits, Water Rights)
- Does not supersede any requirements, ordinances or regulations of any other regulatory agency
- The Order does not in any way authorize, endorse, sanction, permit, or approve the cultivation, use, sale or other activities associated with marijuana



Standard Conditions

- Performance standards for site conditions
- If not meeting all standard conditions, identify, schedule, and implement corrective actions via a water resource protection plan



Standard Conditions

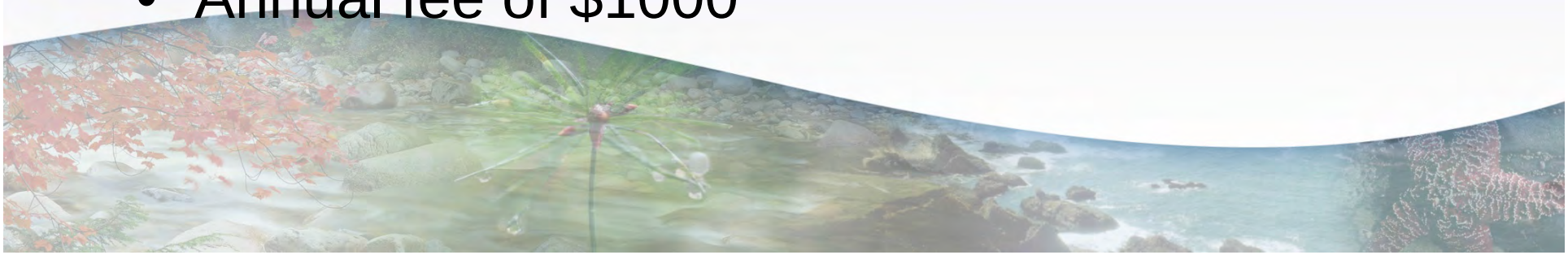
- Roads and developed areas
- Stream crossings
- Stream and wetland buffers
  - (CIII and wetlands = 50 feet, CI/CII = 100 feet)
- Spoils handling
- Water storage and use
- Irrigation
- Fertilizers/pesticides/petroleum products/chemicals
- Refuse/garbage and human waste

Tiered structure based on threat to water quality

- Tier 1 sites: lower threat
- Tier 2 sites: higher threat
- Tier 3 sites: immediate threat
- Characteristics that determine which tier a site belongs under include:
  - site characteristics
  - site development
  - site operational characteristics

Tier 1

- Minimum 200-foot buffer to all surface waters
- No cultivation on greater than 35%
- Total cultivation area no more than 5,000 square feet
- No surface water diversions between May 15 and October 31
- Annual monitoring and reporting
- Annual fee of $1000



Tier 2

- Sites that don't meet either or the standard conditions or the Tier 1 site conditions
- Develop a water resource protection plan within 180 days of enrollment
  - Features not meeting standard conditions:
    - Identify, develop a corrective action plan, prioritize, treat, monitor, and report
  - Plans for water use and storage plan, chemical storage, and monitoring
- Annual monitoring and reporting
- Annual fee of $2500

Tier 2* is for sites that have been verified to meet standard conditions and a total cultivated area less than 10,000 ft^2 , annual fee is $1000

Tier 3

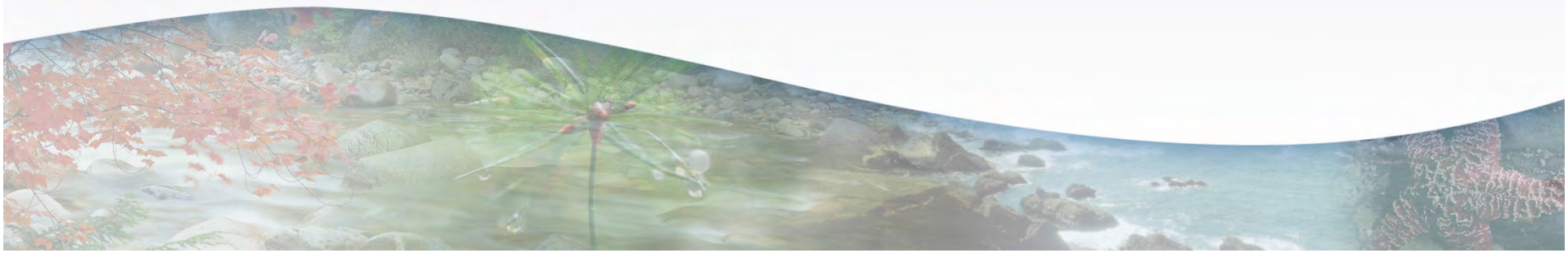
- Immediate threat to water quality and warrants cleanup and restoration, a licensed professional, and Water Board staff oversight
- Within 45 days of enrollment, develop and submit a cleanup and restoration plan for RWB approval.
- Not eligible for enrollment via a third party program.
- Tier 3 Dischargers who are cultivating cannabis concurrent with or following site cleanup activities must also enroll in and conform with Tier 2 requirements.
- The annual fee is $10,000.

Model for other NPS permits

- Property-wide
- All NPS pollutants
- Decent riparian protections
- Addresses flow and water conservation
- Coordinated with other agencies
- Strong support for enforcement
- Watershed approaches
- Significant education and outreach

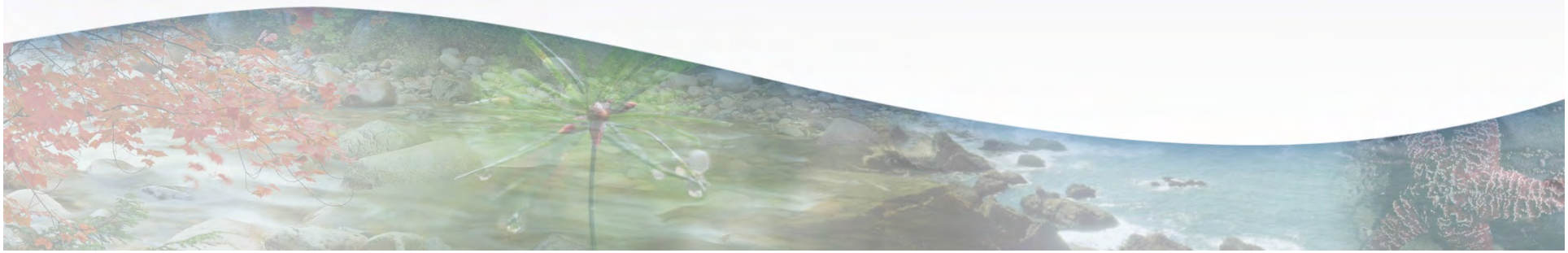
Enforcement

- Enrollment enforcement
  - Directive letters in batches
- Watershed inspections
- Water quality violations
  - Administrative civil liabilities, cleanup and restoration



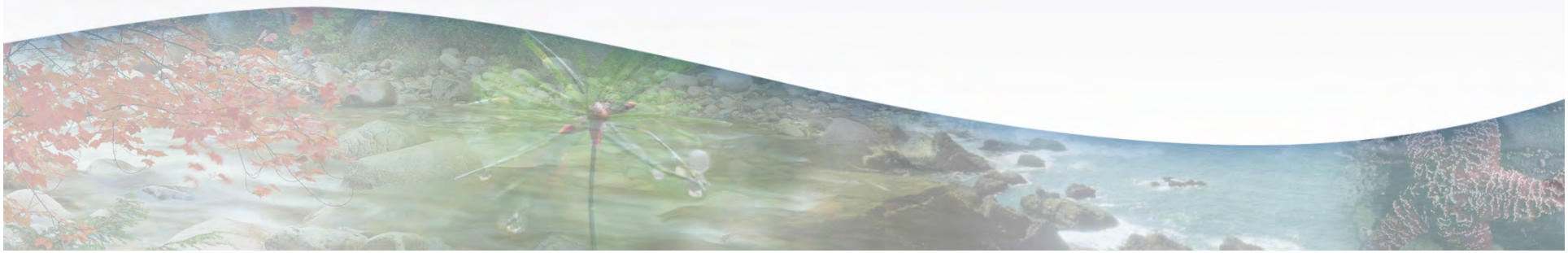
Needed efforts to compliment the waiver

- Shared Resource Issues
  - Inventory and treatment of shared use roads
  - Coordination of diversions
- Trained professionals with expertise in rural lands and watersheds to assist enrollees with corrective actions



Challenges to restoration

- New regulatory requirements on private lands may limit the public funding opportunities
- Can the State effectively do what watershed groups have been doing for decades?



Opportunities

- SEPs
- 401 mitigation projects
- Tributary Associations to coordinate protection of stream flows
- Road Associations to coordinate upgrades and maintenance of shared use roads
- New partnerships

Where did the water go?
Is it the weed, or the trees?

John G. Williams, Ph.D.
Petrolia, CA

Original Title

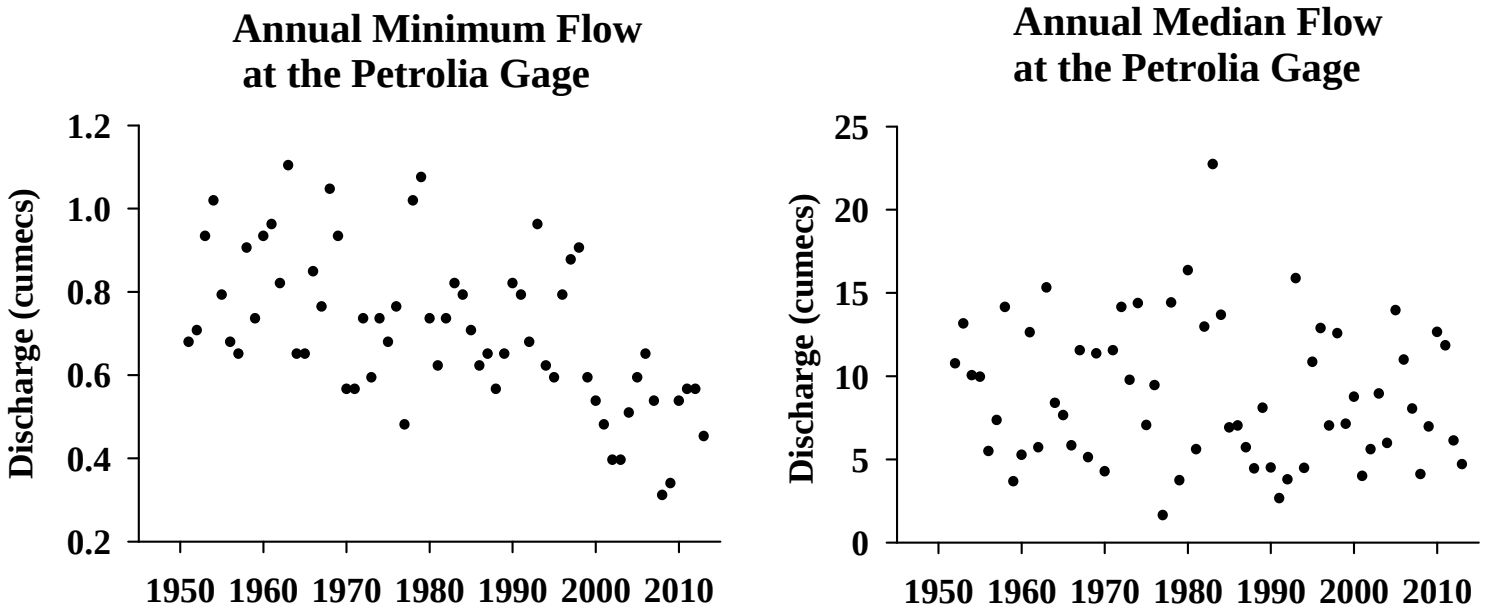
Where did the water go?
It’s the trees, not so much the weed.

A quick romp through flow and other historical data

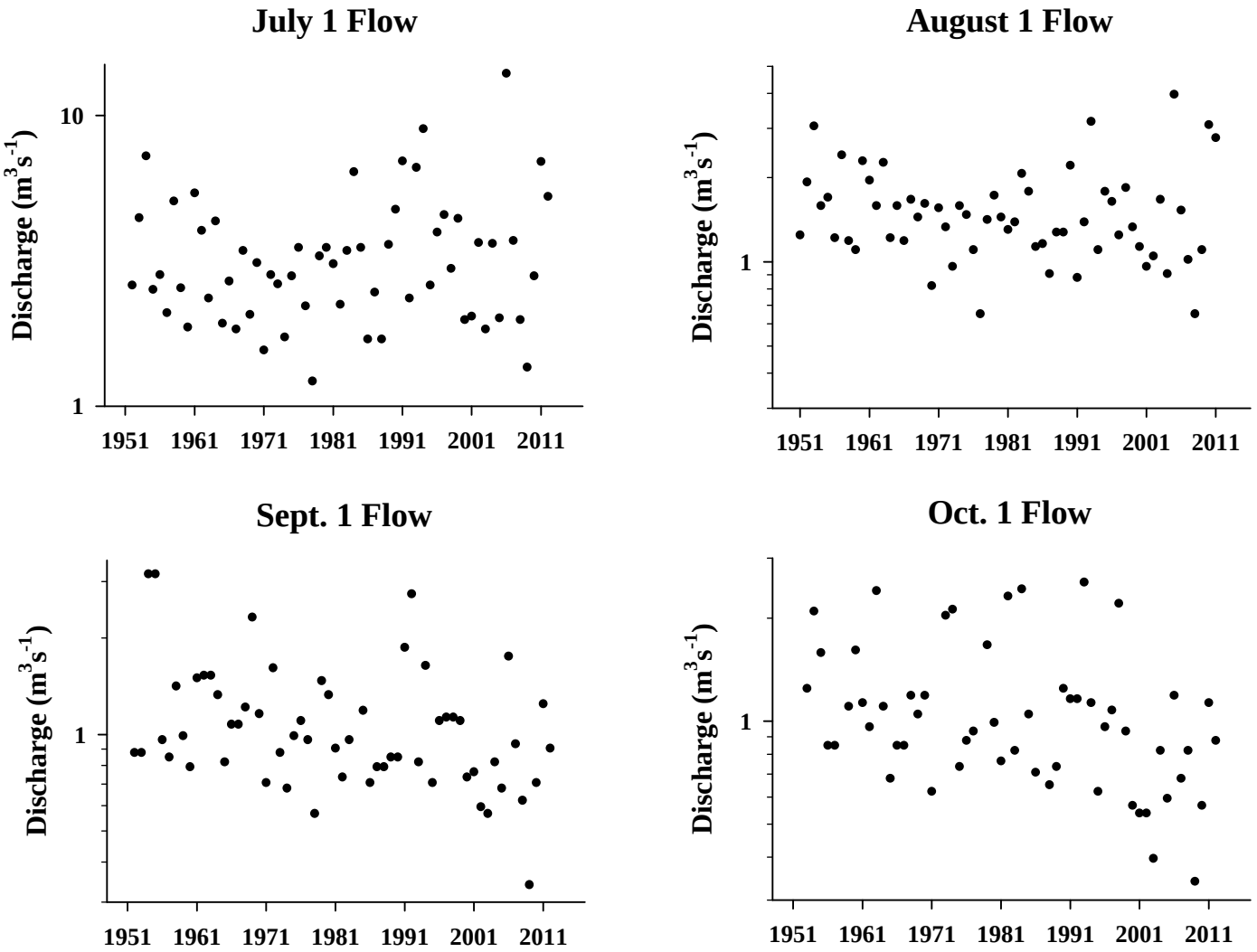
“Marijuana production:
The DRP does mention *cannabis* production, but does not give it enough attention. Marijuana production is a major industry in the northern part of the domain. This has resulted in a sharply increased human population in remote areas of the domain, many miles of dirt road that may be used year-round, construction of many greenhouse pads, increased summer diversions from headwater streams, etc. Full legalization of marijuana production, which would result in production moving to areas with lower costs, would be a large step toward recovery for a significant number of salmonid populations.”

Williams (2011), Review of draft recovery plan for NCC Chinook and steelhead

Mattole River



The data are the daily average flows at the Near Petrolia Gage, Sorted by calendar year and by magnitude. Low flows are getting lower, but median flows show no trend.



The late summer-early fall recession is getting steeper!

Journal of Hydrology 519 (2014) 599–610

Contents lists available at ScienceDirect

Journal of Hydrology

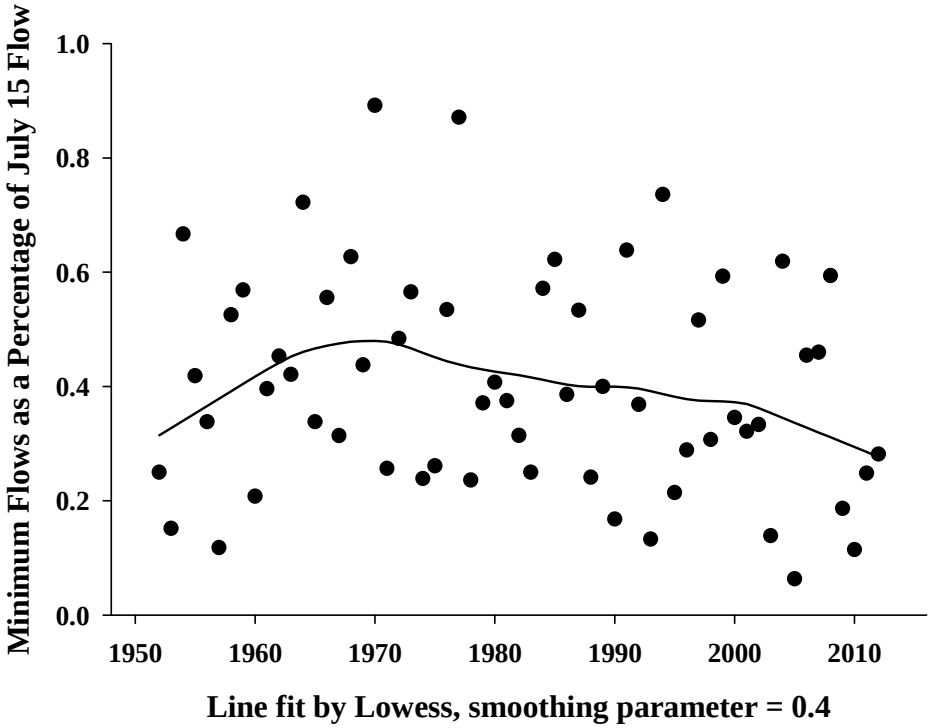
journal homepage: www.elsevier.com/locate/jhydrol

An analysis of trends in baseflow recession and low-flows in rain-dominated coastal streams of the pacific coast

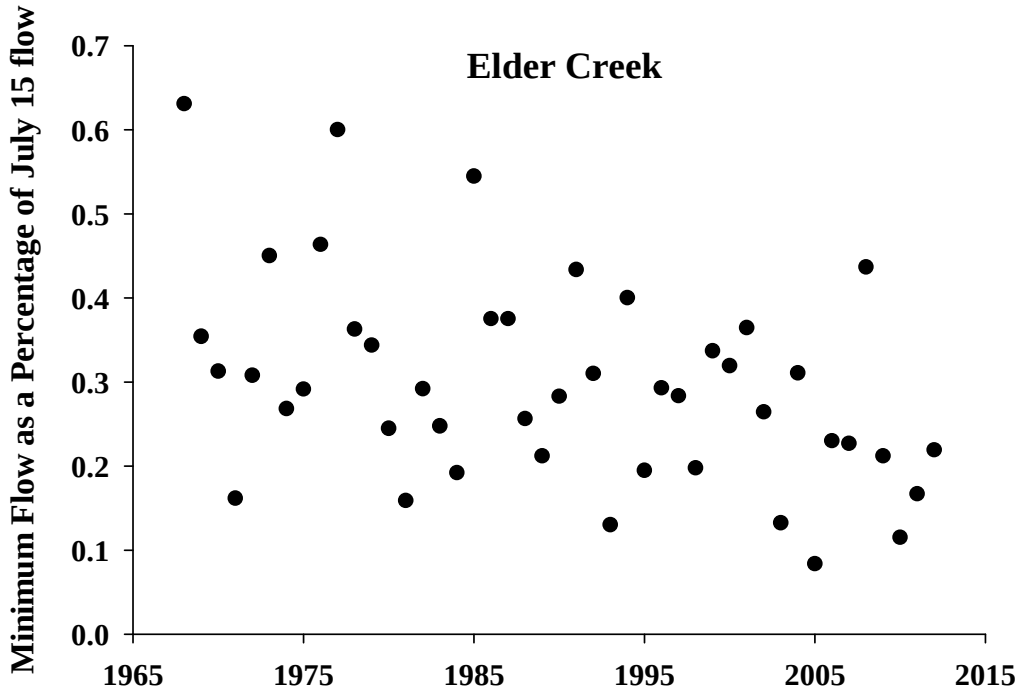
Spencer R. Sawaske*, David L. Freyberg

This paper shows that steeper recession curves in late summer are typical of the area.

Since mid-July flows show no change on average, it makes sense to look at the low flows as a percentage of mid-July flows.



Scaled minimums increase during the period of intensive logging, and decrease thereafter.



There is a consistent declining trend in scaled low flows in Elder Creek, where there was no logging of consequence.

Historical evidence that forest have expanded since the Anglo invasion.

"With an average rainfall of forty to fifty inches, with a rich soils and with an increasing control of annual fires, the forests and woods of [northwest California] are showing a decidedly aggressive character and are encroaching steadily on the barren lands. There is today more wooded area in Humboldt County than when the white man came over half a century ago."

Willis Jepson (1910:11) *The Silva of California*.

Cumulative Watershed Effects of Fuel Management in the Western United States

Chapter 7.

Fuel Management and Water Yield

Charles A. Troendle, *METI Corporation, Fort Collins, CO*

Lee H. MacDonald, *Watershed Science Program, Colorado State University, Fort Collins, CO*

Charles H. Luce, *Rocky Mountain Research Station, USDA Forest Service, Boise, ID*

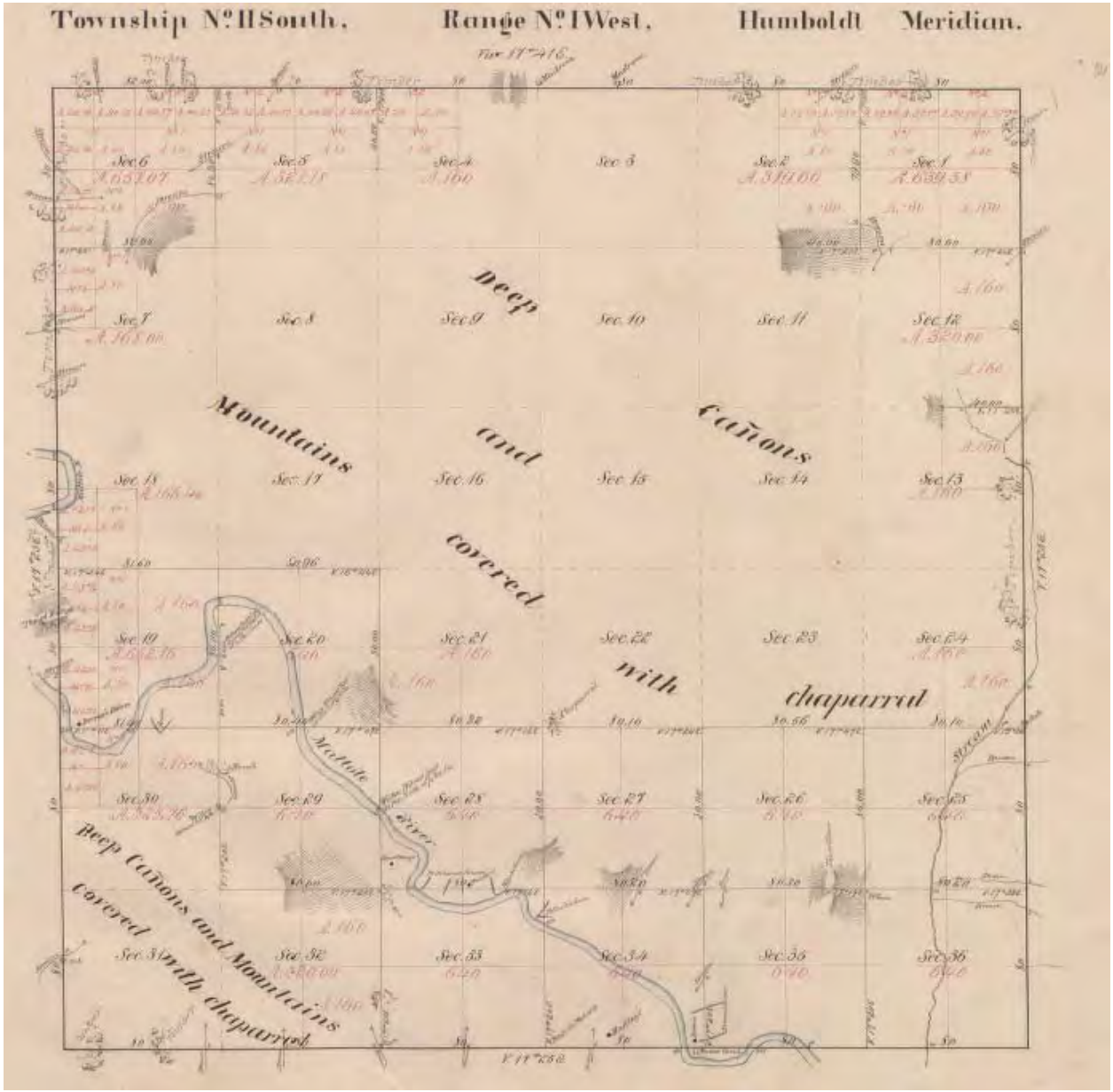
I.J. Larsen, *Department of Earth and Space Sciences, University of Washington, Seattle, WA*

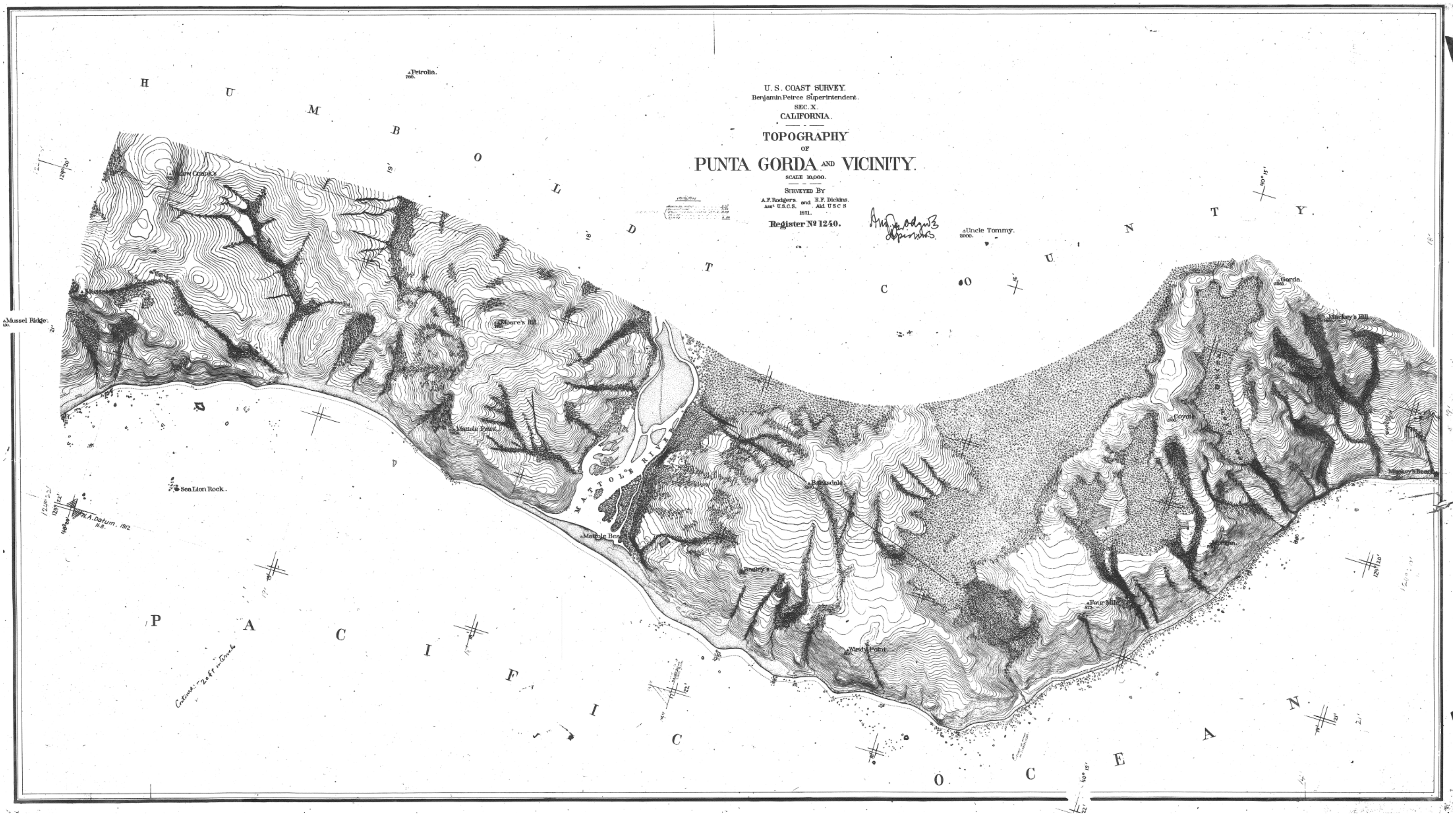
The inverse relationship between forest area and seasonal low flows is well established, e. g., in this review.

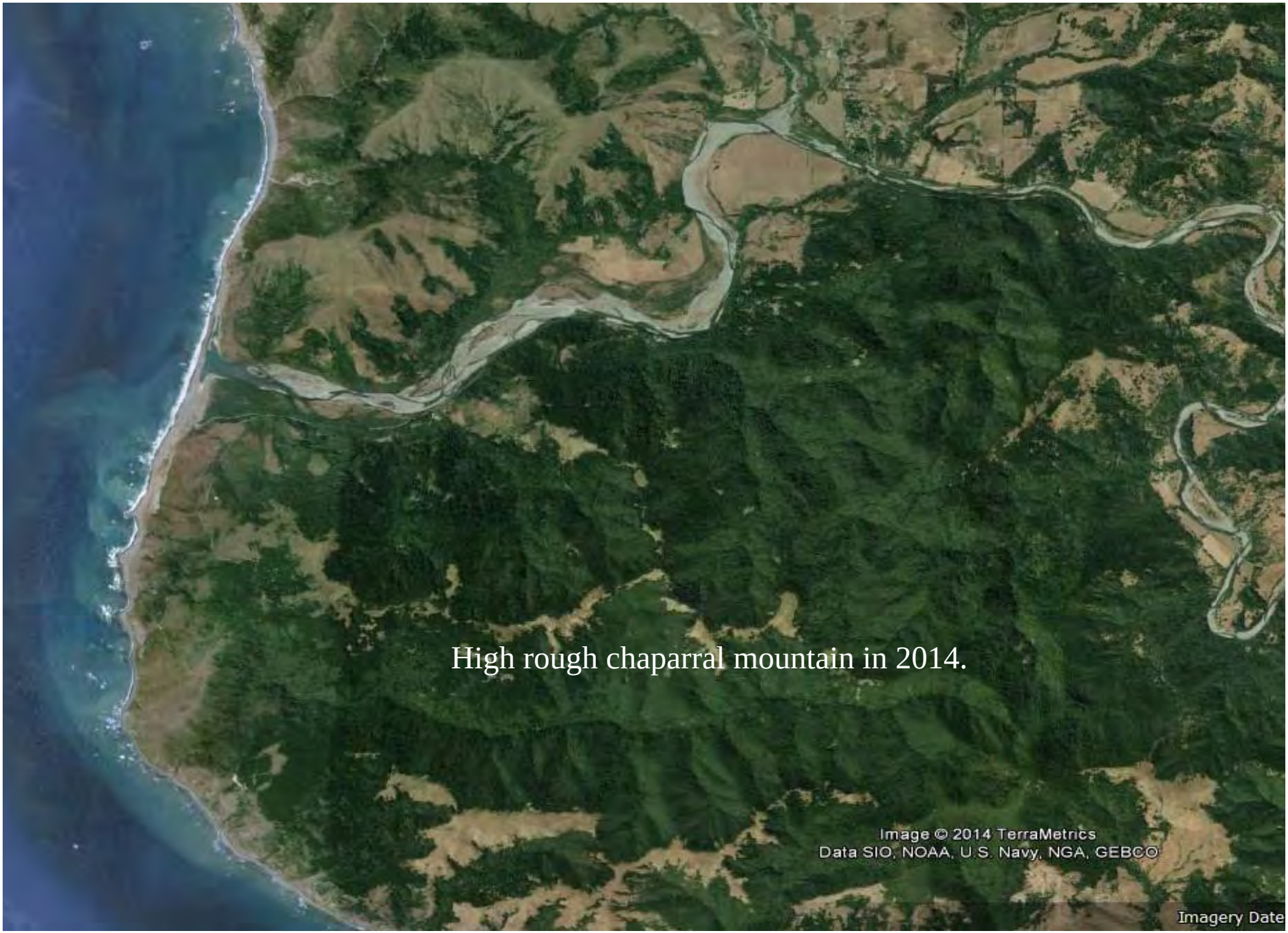

Petrolia
Mattole River
Image © 2014 TerraMetrics
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Imagery Date

1861 Survey platt

Another plat from the time.




U. S. COAST SURVEY.
Benjamin Peirce Superintendent.
SEC. X.
CALIFORNIA.
TOPOGRAPHY
OF
PUNTA GORDA AND VICINITY.
SCALE 10,000.
SURVEYED BY
A.F. Rodgers. Assᵗ U.S.C.S. and E.F. Dickins. Aid U S C S
1871.
Register Nº 1240.
HUMBOLDT COUNTY.
PACIFIC OCEAN
Petrolia.
Uncle Tommy.
2000.
Mussel Ridge.
Moore's Hill.
Mattole Point.
Sea Lion Rock.
Mattole Beach
MATTOLE RIVER
Windy Point.
Four Mile.
Gorda.
Mackey's Hill.
N.A. Datum, 1912



High rough chaparral mountain in 2014.

Prehistoric fire area and emissions from California's forests, woodlands, shrublands, and grasslands

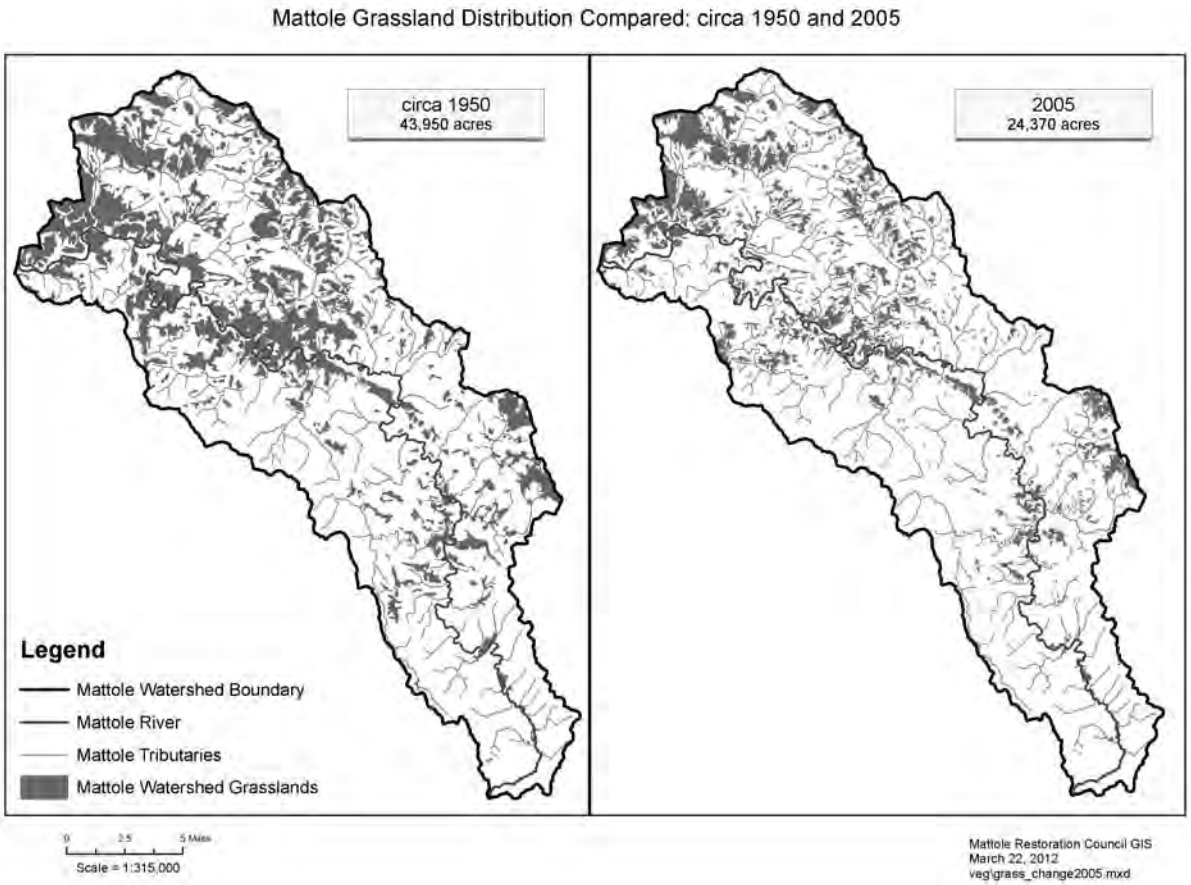
Scott L. Stephens *, Robert E. Martin, Nicholas E. Clinton

Forest Ecology and Management 251:205-216 (2007)

"This work estimates that approximately 1,800,000 ha of California wildlands burned annually in the prehistoric period. Our estimate of prehistoric annual area burned in California is 88% of the total annual wildfire area in the entire US during a decade (1994–2004) characterized as "extreme" regarding wildfires (Stephens and Ruth, 2005). The idea that US wildfire area of approximately 2 million ha annually is extreme is certainly a 20th or 21st century perspective."

That is about 4% of California each year.

Loss of Grasslands



The forest has not just grown back; it is expanding!
So, what to do?

So, if too many fir trees are a problem, what should we do about it?

Clearing trees out of prairies with chain saws helps, but it is hard to keep up with the regrowth of the trees

We need to get fire back on the landscape

Grows and associated houses in the outback make it that much harder to implement sane fire policies.