

BOARD OF SUPERVISORS MEETING
March 19, 2018

Zoning Ordinance Amendments, Commercial Cannabis Land
Use Ordinance, Case Number OR-17-02

(Each Speaker Limited to 3 Minutes)

Voluntary Sign-In Sheet

- ✓ Sue Long Mayor of Fontana
- ✓ 1. Miranda Taylor
- ✓ 2. Pete Haggard
- 3. ~~BILL ALLMAN~~
- 4.
- 5. ~~SUE LONG~~
- ✓ 6. Laura Cutler ✓
- ✓ 7. PAUL PORTER
- ✓ 8. Frankie Myers
- 9.
- 10. ~~SUE LONG~~
- 11.
- 12.
- 13.
- 14.
- ✓ 15. MARK WHEATON
- 16.



YUROK TRIBE

190 Klamath Boulevard • Post Office Box 1027 • Klamath, CA 95548



Sent via first class mail and email

March 16, 2018

Board of Supervisors
Humboldt County
825 5th Street
Eureka, CA 95501

RE: Humboldt County Commercial Cannabis Cultivation Ordinance

Aiy-ye-kwee' Board of Supervisors:

The Yurok Tribe ("Tribe") is the largest federally recognized tribe in California, with a reservation located on the Lower Klamath River in Humboldt and Del Norte Counties in Northern California. The Yurok Tribal Council has inherent sovereign authority to safeguard and provide for the health, safety, and welfare of Yurok Tribal members and other residents and visitors to the reservation and ancestral lands. The Tribe acknowledges that the Humboldt County Planning Commission ("Commission") and the Humboldt Planning and Building Department ("Department") are working with the Tribe in the necessary and important effort to mitigate the harmful impacts cannabis cultivation has had on the Tribe's ancestral territory and Reservation.

As it stands, the Tribe continues to have strong concerns with the Commercial Cannabis Cultivation ("Ordinance"). In light of cultural landscape impacts that cannot be mitigated and the Tribe's constitutional mandate to protect the health, safety, and welfare of the Reservation and ancestral lands, the Tribe can only remain opposed to the County's legalization of cannabis cultivation as prescribed in the proposed Ordinance. The Tribe respectfully requests that the Humboldt County Board of Supervisors ("Board") amend the Ordinance to exclude cannabis cultivation and sales from the Yurok Reservation and the Yurok ancestral territory, or postpone the formal vote on the ordinance until the ancestral lands management can be properly addressed in the ordinance.

The reasons for the Tribe's position are addressed in more detail below, but include: (1) the detrimental effects of cannabis cultivation on the Tribe and its surrounding environs and the failure of the Ordinance to consider the cumulative impacts of cultivation, and (2) the continued unmitigated nuisance effect of, and destruction of sacred sites and cultural landscapes by, cannabis cultivation.

The Tribe cannot support cannabis cultivation because its legacy on our Reservation is violence and exposure of our already depressed community to criminal activity and environmental pollution. Cannabis cultivation has brought our community international drug cartels, water

contamination and diversion, exotic pests and pathogens, toxic pesticides and other chemicals banned within the United States. Cannabis cultivation has continuously diminished the Tribe's right to use and enjoyment of the Reservation and ancestral lands to the point of being a health, safety, and welfare crisis.

In an effort to address this crisis, the Tribe has reached out to the Department and the Commission with comments on the ordinance, reviewed applications referred to the Tribe by the Department for RRRs and Permits, and is crafting a Memorandum of Understanding ("MOU") with Humboldt County to jointly review, monitor, manage and regulate cultivation on the Reservation and ancestral lands. Despite of the Tribe's comments, meetings and involvement with the Department, there has been no modification of the Ordinance.

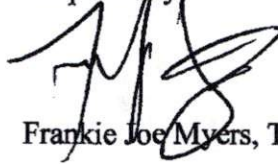
The Ordinance fails to address the public safety and health risk of cultivation and fails to protect the environment. The Ordinance lacks adequate analysis of the cumulative effects of cannabis cultivation, as required by the California Environmental Quality Act, on the natural resources and watersheds within the Tribe's ancestral territory. The Ordinance fails to adopt a procedure by which the cumulative effects of cannabis cultivation will be assessed and mitigated. Without such a requirement in the Ordinance, the negative impacts of cannabis cultivation will go unregulated. The Ordinance lacks adequate enforcement measures to protect the Tribe's water rights and water quality. We cannot over emphasize the importance of enforcement—presently the very life of the Klamath River is in jeopardy and, with it, the life of the Tribe. Both overallocation and poor water quality are major contributing factors to salmon and fisheries declines in the Klamath and Trinity Rivers. Without adequate enforcement and a rigorous analysis of the cumulative effects of cannabis cultivation on the watersheds in ancestral territory, cannabis cultivation will become yet another stress on the County's diminishing fishing and water resources. A process to continually assess the cumulative effects of cultivation should be added to the Ordinance.

Some of the most extensive areas of cannabis cultivation in our ancestral territory are within our sacred sites and cultural landscapes. Federal law, along with common decency, require that these areas be protected. These areas are as sensitive, and in need of protection from cumulative effects, as the watershed areas. The state law requiring 600' setbacks do not address the complex and substantial harms to sacred cultural landscapes caused by cannabis cultivation. The Tribe requests the Board create an exemption to the Ordinance for the ancestral lands, such as that provided to the coastal zone in consideration of the cultural, environmental and water impacts that have already suffered from cannabis cultivation. The Tribe proposes to continue discussions with the Department and Committee to identify these areas.

The Ordinance must be consistent with federal law regarding the definition of tribal lands, the rights of Tribes in the Historic Preservation Act, the Native American Graves Protection Act, various cases regarding Tribal rights, and insure the County properly engages in tribal consultation as required by AB52. A formal review and consultation with the Tribe should be completed *prior to approval* of the Ordinance to ensure protection of Tribal rights. The Yurok Tribal Constitution, Tribal ordinances, laws, policies, and expertise should be relied on to fashion the protections that would best secure the health and welfare of these areas.

The Tribe looks forward to continuing to work collaboratively with the Department to address these issues and establish a long-term plan and process. We respectfully request the Board postpone voting on the Ordinance until these issues can be addressed.

Respectfully,

A handwritten signature in black ink, appearing to read 'FJ Myers', written over the printed name.

Frankie Joe Myers, THPO

cc: Clerk of the Humboldt Board Supervisors, Kathy Hayes: KH Hayes@co.humboldt.ca.us

CALIFORNIA COASTAL COMMISSION

NORTH COAST DISTRICT OFFICE
1385 EIGHTH STREET • SUITE 130
ARCATA, CA 95521
VOICE (707) 826-8950
FACSIMILE (707) 826-8960



March 16, 2018

John Ford, Director
Humboldt County Planning and Building Dept.
3015 H Street
Eureka, CA 95501

RE: Additional comments on the County's proposed coastal CCLUO

Dear Mr. Ford:

Once again, thank you for soliciting input from the California Coastal Commission (Commission) on February 20, 2018 regarding proposed changes to the County's coastal zoning regulations (CZR) to implement the County's Commercial Cannabis Land Use Ordinance (CCLUO version 2.0) in the coastal zone. As you are aware, any changes to the CZR adopted by the County will not be effective until certified by the Commission. The standard of review that the Commission will apply to any proposed changes to the CZR is whether or not the CZR as amended would conform with and be adequate to carry out the provisions of the Land Use Plan (LUP) portion of the County's certified Local Coastal Program (LCP).¹ The County has six different LUPs that the Commission has certified for the lands within the County's coastal zone.² Please note that the following comments are provided by Commission staff; the Commission itself has not reviewed the proposed zoning code changes.

As noted in the below timeline (Attachment 1), County staff and Commission staff have been closely coordinating on draft versions of cannabis-related LCP amendments over the past year. We appreciate the County's outreach, coordination, and consideration of our comments and recommendations on these LCP changes. We also recognize and appreciate the improvements that have been added to the current version of the coastal CCLUO for coastal resources protection, such as additional protections for prime agricultural soils, timberlands, and biological resources. However, the staff report does not fully explain how the proposed ordinance would conform with and adequately carry out the certified LUPs and Coastal Act policies, and we have not had sufficient time to fully review the ordinance as revised and work with your staff to resolve all of the potential LUP conformance issues that are being raised. For example, we believe further consideration of two key issues is needed to ensure that the ordinance conforms with and is adequate to carry out the provisions of the certified LUPs.

First, as indicated in the Final Environmental Impact Report (FEIR) prepared for CCLUO version 2.0,³ implementation of the ordinance will result in significant unavoidable adverse environmental impacts related to increased water demand from public water systems that could exceed supply and related

¹ The County's LCP is comprised of an LUP component along with the CZR and zoning district maps, which implement the LUP. The Commission effectively certified the County's LCP in 1986, after certification of each of the LUPs between 1983 and 1985. The Commission refers to the certified CZR and zoning district maps as the Implementation Plan (IP).

² The six different LUPs are the North Coast Area Plan (NCAP), Trinidad Area Plan (TAP), McKinleyville Area Plan (MAP), Humboldt Bay Area Plan (HBAP), Eel River Area Plan (ERAP), and South Coast Area Plan (SCAP). All were certified by the Commission between 1983 and 1985.

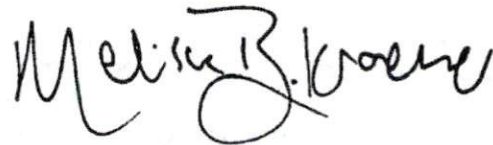
³ The FEIR was published in January 2018.

infrastructure. We are also concerned whether the ordinance would ensure that cannabis operations relying on surface water and groundwater would have adequate water supply to serve the development while protecting wetlands and other coastal resources. These issues are of particular significance in the coastal zone, because (a) each of the LUPs includes policies requiring that adequate services be provided for new commercial, industrial, and agricultural development permitted in areas outside of the urban limit boundaries, and (b) the FEIR concludes that there is insufficient water supply in certain parts of the coastal zone that, with implementation of the coastal CCLUO, will lead to significant adverse environmental impacts in the coastal zone.⁴ The current draft version of the coastal ordinance includes caps on the total number of permits that may be issued for open air cultivation activities in each of the six LCP planning areas, which may be helpful in addressing these concerns. However, the staff report does not explain the basis for establishing the particular caps, and it's unclear whether the proposed caps are appropriate within each planning area in the context of the planning area's water supply issues and protection of water resources within the planning areas.

In addition, the current version of the coastal CCLUO lacks standards for greenhouse construction, which likely will be an integral component of cultivation sites in the coastal zone permitted under the ordinance. The development of greenhouses, such as those that will be used for mixed-light cultivation activities regulated under the CCLUO, raises several issues in the different coastal planning areas related to LUP policies that protect prime agricultural lands, grazing lands, and scenic resources. As noted in the attached timeline, we have been coordinating with the County on a separate LCP amendment related to greenhouses. As we understand it, the County may adopt the CCLUO without simultaneously adopting updated greenhouse standards. While we recognize that the current draft of the coastal CCLUO includes certain protections for prime agricultural soils, grazing lands, and visual resources from mixed-light operations, we encourage the County to consider as part of the CCLUO what standards for mixed-light greenhouse operations are adequate to carry out provisions of the six LUP planning areas and how the standards should be incorporated into the CZR.

We will continue reviewing the ordinance and engage with your staff to resolve the potential LUP and Coastal Act conformance issues that are raised. Our preference would be to resolve with your staff all of the potential LUP and Coastal Act conformance issues that are raised prior to Board adoption of the ordinance, when the County can more easily consider making suggested changes. In any case, we appreciate the County's consideration of our comments and look forward to further collaboration with the County on its coastal CCLUO.

Sincerely,

A handwritten signature in black ink, appearing to read "Melissa B. Kraemer". The signature is fluid and cursive, with the first name "Melissa" being more prominent and the last name "Kraemer" following in a similar style.

MELISSA B. KRAEMER
Supervising Analyst

Attachment 1: Summary of County and Commission staff coordination on cannabis-related LCP amendments

⁴ E.g., see pages 3.13-16-17 of the DEIR.

Summary of County and Commission staff coordination on cannabis-related LCP amendments

- December 30, 2016: County staff transmitted LCP Amendment Application No. LCP-1-HUM-16-0075-2, including CCLUO version 1.0, to the Commission for certification.
- January 17, 2017: Commission staff informed the County that additional information is needed to complete the application in conformance with section 30510 of the Coastal Act⁵ and associated implementing regulations (Title 14 CCR § 13552 et seq.). To date we have not received any of the requested information.
- September 20, 2017: County staff and Commission staff met to discuss the County's projected timeline for updating the CCLUO (version 2.0) and the County's consideration of adoption of an interim urgency ordinance prohibiting commercial cannabis activities within the unincorporated areas of the coastal zone.
- October 5, 2017: County staff and Commission staff met again to further discuss updates to the coastal CCLUO and the County's proposed adoption of an interim urgency ordinance prohibiting commercial cannabis activities within the unincorporated areas of the coastal zone.
- October 26, 2017: County staff emailed a draft version of proposed changes to CZR section 313-69.1.5.2 related to allowance of greenhouses with improved floors on prime agricultural soils to Commission staff for comment.
- November 13, 2017: County staff and Commission staff met to discuss the County's proposed updates to the coastal CCLUO and timeline/process for certifying the updates in the coastal zone.
- December 4, 2017: Commission staff provided comments to the County for consideration at the 12/14/17 Planning Commission hearing on proposed changes to CZR section 313-69.1.5.2 related to allowance of greenhouses with improved floors on prime agricultural soils.
- January 2, 2018: County staff emailed a draft version of the CCLUO version 2.0 to Commission staff for comment.
- February 2, 2018: Commission staff provided preliminary comments to the County on the draft Version 2.0 adopted by the Planning Commission on January 11th.
- February 5, 2018: County staff emailed a revised draft version of proposed changes to CZR section 313-69.1.5.2 related to allowance of greenhouses with improved floors on prime agricultural soils to Commission staff for comment.
- February 16, 2018: Commission staff provided comments to the County on proposed changes to CZR section 313-69.1.5.2 related to allowance of greenhouses with improved floors on prime agricultural soils.
- February 20, 2018: County staff emailed the revised draft of CCLUO version 2.0 to be considered by the Board of Supervisors in March to Commission staff for comment.
- March 15, 2018: County staff emailed the staff report for the March 19th Board hearing on CCLUO version 2.0 to Commission staff for review.

⁵ PRC sec. 30510 states: *Consistent with this chapter, a proposed local coastal program may be submitted to the commission, if both of the following are met: (a) It is submitted pursuant to a resolution adopted by the local government, after public hearing, that certifies the local coastal program is intended to be carried out in a manner fully in conformity with this division. (b) It contains, in accordance with guidelines established by the commission, materials sufficient for a thorough and complete review.*

To our Humboldt County Supervisors:

3-19-2018

After reading the **Written Public Comments Received** as mentioned in **ATTACHMENT 11** it is imperative the Board of Supervisions listen to the citizens as a community. The key word within these comments is **"Setbacks"**.

Our school districts such as Fieldbrook, Pacific Union, Fortuna, and our Humboldt County Superintendent of Schools have all written letters to our County Supervisors asking for the reinstatement of 600' setbacks from school bus stops from cannabis operations.

So I ask you..... If our schools do not want our children exposed to cannabis operations near a bus stop for a mere few minutes...then why would we want to expose these same children living and playing around residences less than 600' away?.... **Please approve your suggested setback distance for marijuana cultivation at least 600' away from residences and our children.**

In addition.....We are also asking that all cannabis operations within any city's Sphere of Influence requiring a physical structure to be mechanically ventilated with a carbon filter or scrubber to minimize the odor of the cannabis. It makes absolutely no sense to try and contain the smell in a structure or greenhouse. A method of odor abatement is needed upon ventilation.

Thank you for your attention in both these matters.

Tim Meade
400 Nob Hill
Fortuna, CA

March 19, '18

To Humboldt County Supervisors
and Planning Commission Members,

Citizens have rights as long as they
don't infringe on the rights of others.

The cannabis business has the right
to grow pot as long as it doesn't stink up
their neighbors' homes and yards, create
constant noise &/or lights, cause contamination
or excessive water use and road damage
that negatively effects the lives of
others.

Humboldt County citizens elected
you to represent them. Be fair to
pot growers without being unfair
to other citizens.

- Gary & Shawn Goodlock
~~Tim Meade~~

Ken & Kim Piretti

~~Joan & Randy Bennett~~

~~Dan~~

Andy & Jennifer

Marilyn & Moore

Ruth ~~Flan~~

Candie Kelley

Jerry W. Meadows

~~Sal Bopp~~

Dann Boechler

512 Nob Hill Rd. Fortuna
~~400 NOB HILL RD FORTUNA~~

500 Nob Hill Rd. Fortuna

475 Nob Hill Rd. Fortuna

529 Nob Hill Rd. Fortuna

529 Nob Hill Rd Fortuna

540 Nob Hill Rd Fortuna

540 Nob Hill Rd Fortuna

856 Beer Ct. Fortuna

854 Beer Ct Fortuna

2026 Flomo Ave Fortuna

535 Garland Ave Fortuna Ca

21, P. 10. M

Jean & Randy Bennett 475 Nob Hill, Fortuna



CALIFORNIA
NATIVE PLANT SOCIETY

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March 19, 2018

Humboldt County Board of Supervisors Rex Bohn, Estelle Fennell, Mike Wilson, Virginia Bass, and Ryan Sundberg

RE: CNPS comments regarding Humboldt County's Cannabis Final Environmental Impact Report and Land Use Ordinance

The North Coast Chapter of the California Native Plant Society ("CNPS") has raised concerns during a previous comment period pertaining to the County's preparations of an Environmental Impact Report for a *Cannabis* land use ordinance. CNPS is a non-profit environmental organization with 10,000 members in 35 Chapters across California and Baja California, Mexico. CNPS' mission is to protect California's native plant heritage and preserve it for future generations through application of science, research, education, and conservation. CNPS works closely with decision-makers, scientists, and local planners to advocate for well-informed policies, regulations, and land management practices.

Comment 1. The Board of Supervisors (BOS) should not certify the Final Environmental Impact Report (FEIR).

The BOS should not certify the FIER or Land Use Ordinance in its current state, but should take more time to address unresolved issues to ensure that permitted *Cannabis* cultivation sites in Humboldt County do not have significant impacts on the environment. Additionally, the public has not had adequate time to review revisions that were released by the county this past Friday.

Comment 2. Inappropriate existing conditions baseline for California Environmental Quality Act (CEQA) analysis of project-related impacts.

CEQA requires an evaluation of project-related impacts compared to existing (baseline) conditions. It is important that the County address prior environmental impacts that have occurred on *Cannabis* cultivation sites when they go through the permitting processes. It is understood that *Cannabis* cultivation sites that are not in the County's permitting process are not within the scope of this CEQA document; nonetheless, impacts at these sites are still a major concern that the County needs to continue addressing through enforcement. For cultivation sites that are in the County's permitting process it is not appropriate to establish a baseline for evaluation of environmental impacts when those "baseline" conditions exist because of violations of local, state, or federal regulations. An appropriate baseline should include site conditions prior to any violations of regulations that may have occurred, including the County's Grading Ordinance, the County's Streamside management Ordinance, the Porter-Cologne Water Quality Control Act, the Clean Water Act, the California Endangered Species Act, Fish and Game Code, or the federal Endangered Species Act. Therefore, the County should establish baseline conditions for impact analyses that include conditions prior to violations of local, state, or federal

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regulations. CNPS supports the County's intent to remove existing cannabis cultivation operations from environmentally sensitive locations and relocate them to more appropriate locations. Additionally, CNPS asserts that the County should address **temporal** and **cumulative** impacts to resources that have occurred prior to removing existing *Cannabis* cultivation operations from environmentally sensitive locations and relocating them to more appropriate locations.

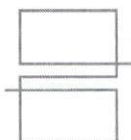
Comment 3. The current project review processes is flawed and results in undisclosed and unmitigated significant impacts associated with violations of local, state, and federal regulations. Certification of the FIER and Land Use Ordinance in its current state will likely result in the same.

There are many examples of *Cannabis* cultivation permits being issued when substantial, unaddressed violations have been brought to the County's attention. For example, a cannabis cultivation site in the vicinity of Spike Buck Mountain has damaged one of Humboldt County's most biologically diverse locations. This site is located on serpentine soils that contain phenomenal species richness, hosting rare species and sensitive natural communities. Despite the County's awareness of unresolved violations and environmental damage at this site (letters sent from County Planning to the land owner on August 17, 2016 and September 20, 2016), the County issued an interim permit on December 27, 2017. The current County project review process is flawed and allows significant impacts to go unresolved. We encourage the BOS to vote no, take a step back, and reassess how the FEIR and ordinance under consideration can be revised to ensure that **all** cultivation site impacts within the scope of the FEIR are disclosed and mitigated to a less than significant level prior to the issuance of **any** County cultivation permits.

Thank you,

Pete Haggard
Steering Committee Member
North Coast Chapter of the California Native Plant Society
P.O. Box 1067
Arcata, CA 95518

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HUMBOLDT COUNTY

GROWERS ALLIANCE

Monday, March 19, 2018

Humboldt County Board of Supervisors
825 5th Street
Eureka, CA 95501

RE: Commercial Cannabis Land Use Ordinance

These comments are submitted on behalf of the Humboldt County Growers Alliance. We are a membership-based, non-profit, trade association with more than 175 members. Our members are those who have applied for permits and are seeking state licensure in 2018. Our mission is *to preserve, protect and enhance Humboldt County's world-renowned cannabis industry.*

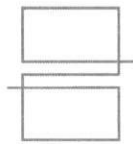
HCGA respectfully requests that the Board of Supervisors adopt the proposed Commercial Cannabis Land Use Ordinance, with a few specific changes:

1. Section 55.4.3.1 "Applications for Commercial Cannabis Activity land use permits filed on or before December 31, 2016 shall be governed by the regulations in effect at the time of their submittal, except as otherwise prescribed herein, or unless an applicant requests to upgrade into Ordinance 2.0."
 - **There may be features within Ordinance 2.0 that would better serve the permittees who previously submitted under Ordinance 1.0; therefore, having the flexibility to choose which path to take would be appreciated.**
2. Section 55.4.6.5.9 Retirement, Remediation, and Relocation of Pre-Existing Cultivation Sites. RRR will be accepted until December 31, 2019 **with the multiplier effect.**
 - The RRR program needs to remain in effect as long section 55.4.6.5 Accommodations for Pre-Existing Cultivation Sites remains in effect, which is December 31, 2019. This because it often takes an applicant several months into the process before it becomes apparent that the site is "inappropriate, marginal, or in an environmentally sensitive area." There needs to be a pathway for applicants to Retire, Remediate, and Relocate to more suitable locations. Additionally, this inclusion would allow our elder cultivators the option to stay on their land, and sell their existing cultivation square footage to a buyer with more suitable lands. In addition we would like to request if an application is denied, the RRR program remains an option even if the program's sunset date has passed. **Please give the Retire, Remediate, and Relocate program as much flexibility as possible.**

3. Section 55.4.6.7 Open Air Cultivation applications submitted under prior ordinance "Provisions and Incentives for Neighborhood Compatibility."
 - We strongly **disagree** with this section. Creating additional criteria, and "shifting the goalpost" after a permit has already been approved is not appropriate, therefore, we suggest deleting the entire section ~~55.4.6.7 Open Air Cultivation applications submitted under prior ordinance—Provisions and Incentives for Neighborhood Compatibility.~~ **The County should not change the course on applicants after approval. This is a very slippery slope from our perspective.**
4. Section 55.4.6.8 Cap on Permits. The total number of permits issued for ~~open-air~~ cultivation activities, (including Indoor, Outdoor and Mixed-Light cultivation and Nurseries) shall be equally distributed among each of the twelve (12) discrete planning watersheds of Humboldt County as directed by the Board of Supervisors by Resolution.
 - The environmental and energy impacts of indoor, or fully enclosed mixed-light cannot be ignored. **If you're going to cap one type of cultivation, cap them all.**
5. Section 55.4.10.10 Interim Permitting of Pre-Existing Cultivation Sites "...where adequate evidence has been submitted demonstrating that a cultivation site existed prior to January 1, 2016, permit applications seeking authorization of commercial cannabis cultivation and ancillary activities at these sites shall be eligible to receive an interim permit, provided the application ~~was filed prior to January 1, 2017 and~~ has been determined to be complete for processing by the Director of the Planning and Building Department."
 - As demonstrated in two previous amendments to the MMLUO, the County supports providing applicants with pre-existing cultivation access to California's State Licensing system, upon submitting a complete application. We propose a change to the CCLUO that grants an Interim Permit to the applicant after the Planning Department deems the application complete. **Strike the date that would not allow 2.0 pre-existing applicants the ability to continuing farming while they are in the permitting process.**

FALLOW TAX:

HCGA wants to **strongly support and applaud the county** for the following new provision under the definition for "Cultivation Area" (CCLUO March 19, 2017, pg. 116) "applicants with approved permits for cannabis cultivation may submit a written declaration on forms provided by the County that they will reduce the size of their approved cultivation area for that year. The County shall assess taxes for cannabis cultivation on the site based on the reduced area of cultivation in the declaration." Until now, there has been no flexibility to make such decisions since cultivators are taxed on permitted area as opposed to cultivated area. This is inefficient from a business



HUMBOLDT COUNTY GROWERS ALLIANCE

standpoint and worsens excess supply. Individual cultivators should have the opportunity to decide if they want to grow their entitled sq. footage based on their business strategy, not the de facto result of the tax structure.

HCGA appreciates the opportunity to provide specific recommendations on the CCLUO to Board of Supervisors. In addition, we greatly appreciate the work done by Director Ford, Planning Department staff and the Planning Commissioners, as HCGA and the public engaged in over a dozen plus workshops, held between September and January. It was through that public process that the vast majority of our recommendations, input and questions were incorporated into the version of the CCLUO that you have before you.

With kind regards,

Terra J. Carver, Executive Director
Natalynne DeLapp, Operations Director

Re: The revision of the County Cannabis Permit Ordinance

March 18, 2018

To: the Humboldt County Board of Supervisors

First of all, I protest the extremely short notice given for the Special Meeting on March 19, 2018 where approval of nearly 2000 pages of documentation is proposed to be approved. The City of Fortuna would like to call a public meeting to discuss the Ordinances and was not notified in time for that to occur.

In your proposed ordinance revision (sec 55.4.5), a Special Permit is required for marijuana operations within Spheres of Influence (SOI) or 1000' from the current boundaries (city limits) of cities in the County. The County could still grant a discretionary permit for a commercial marijuana growing operation after notifying the neighboring land owners if the neighbors don't show or, in the *opinion* of the Hearing Officer, that the "public health, safety or welfare" of the surrounding community is not sufficiently detrimentally effected. This seems to put the Cannabis applicant in the "drivers seat" and the community on the defensive. **Your ordinance should be written to protect the community, not the applicant.**

Since cities can create their own ordinances with regard to these businesses including complete prohibition, it is unreasonable that the County ordinance could impose these controversial operations so near to a City.

Therefore, I urge you to adopt ordinance revisions that would PROHIBIT marijuana growing or processing permits for County parcels within the Sphere of Influence of any city in Humboldt County and in places where the SOI has not been designated beyond the city limits, there should be at least a 1 mile buffer zone where commercial marijuana operations are PROHIBITED.

Cities grow. Land is annexed and new developments are built. The County should respect that and give our cities room for this future growth that is usually residential in nature. Commercial cannabis is not compatible with residential areas, as your current ordinance admits. Commercial cannabis is not common agriculture. Common agriculture does not require security fences, night lighting, cameras and guard dogs and usually does not produce a product that is illegal in the eyes of the federal government and is not for use by children.

General Plans should be respected. There are areas around Fortuna designated as Rural Residential in their general plan (for 2030) AND in the County's own Planning Commission Approved Draft General Plan Update (March 2015) where applications for permits were accepted because the land is technically still zoned AG. These areas already have houses

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in them and receive city services. A generous buffer zone around our cities prohibiting this controversial business that is incompatible with neighborhoods must be legislated to allow development in keeping with the city's ordinances as they grow into these areas.

I urge you to work with the city governments and their citizens to adopt County rules that do not infringe on the rights of cities or on the rights of their citizens, present and future, to decide if Commercial Marijuana operations are compatible with their lifestyle, aspirations and circumstances.

A handwritten signature in cursive script, appearing to read "Paul Farnham".

Respectfully, Paul Farnham
3576 Nelson Lane, Fortuna, CA 95540



B-1

Northcoast Environmental Center
PO Box 4259
Arcata, CA 95518
(707) 822-6918
nec@ournec.org

Humboldt County Board of Supervisors
825 5th Street, Room 111
Eureka, CA 95501

March 17, 2018

John Ford, Director
Humboldt County Planning and Building Department
3015 H Street
Eureka, CA 95501

Subject: Comments on Proposed Ordinance to Regulate Commercial Cannabis Activities in Humboldt County, and Associated Final Environmental Impact Report (FEIR) ("Project"), and on Proposed Alternatives for a Resolution Establishing a Cap on the Number Permits and Acres Which May Be Approved for Open Air Cannabis Cultivation

Dear Supervisors and Mr. Ford:

The Northcoast Environmental Center (NEC) submits the following comments in response to the Notice of Preparation for the Project, and on behalf of NEC's members, staff, board of directors, and member groups.

The Northcoast Environmental Center has engaged in conservation and environmental protection in northwestern California for over 45 years. Our mission includes educating agencies and the public about environmental concerns that may have an effect on our local resources and citizens. In addition, we encourage our members and citizens to take part in civic engagement such as this. We appreciate the opportunity to comment on the Project.

The NEC appreciates that Humboldt County has invested much time and effort into measures, including the proposed Project, which includes a proposed ordinance to regulate cannabis cultivation and its environmental impacts. The NEC is very concerned about the environmental impacts of that cultivation, which are ongoing and have increased greatly over the past decade in concert with increased cannabis cultivation, largely unpermitted and unregulated. While the proposed project represents substantial progress toward regulation and reducing those impacts, we have concerns with the Project as proposed. Many of these concerns have been detailed in a letter to Humboldt County Planning by the California Department of Fish and Wildlife (CDFW), dated March 1, 2018. We share the concerns described in that letter, and incorporate them by reference.

1-8

Particular concerns of NEC, some of which are not contained in CDFW's March 1 letter, include:

1. **Cumulative impacts of the proposed Project combined with those resulting from existing permitted and unpermitted cannabis cultivation.** The Project acknowledges the large number of existing cannabis operations in existence in the County at the time of the "baseline", and their ongoing and substantial impacts including to aquatic, watershed and terrestrial biological resources. These impacts result from water use, grading, discharge of pollutants, use of fertilizers, and the routine use of pesticides including rodenticides and other chemicals. Regardless of whether these combined impacts are treated as "cumulative impacts" in the narrow CEQA sense, these impacts are real and we are concerned of the additional impacts of new and expanded cultivation added to landscapes already substantially degraded by existing cultivation operations, including but not limited to associated grading, roads, dwellings, pesticides and water use. For example, studies by CDFW and others have demonstrated substantial existing degradation of water resources and streams in multiple watersheds due to cannabis cultivation.

We support CDFW's March 1 recommendations regarding "Significant and Cumulative Impacts to Watershed Resources". Further, we recommend that prior to issuing new cannabis permits under the proposed Project, the County conduct analyses, in coordination with CDFW and other appropriate State agencies, which will identify watershed-scale caps on the total number of cannabis cultivation operations, both permitted and unpermitted; these caps would be based on watershed carrying capacities that would avoid substantial environmental impacts. Once these caps are identified, new permits can be issued where the number of permitted and unpermitted cultivation operations are below the cap. This approach would minimize the risk of cumulative impacts. It also would provide incentive for the County to shut down or make compliant existing unpermitted and non-compliant cannabis operations, in order to provide opportunities for permitted operations.

2. **Limits to the Number of Cultivation Permits:** Following from the above point, we urge the County to include, as part of any approved Project, specific limits to the number and total acres of permitted cannabis cultivation operations, both County-wide, and (as described above) at smaller, watershed scales. This will strengthen the FEIR and overall Project, by more clearly identifying the scope of impacts and help shape more substantial mitigations.
3. **Impacts to Northern Spotted Owl (NSO):** The Project as proposed and described in the FEIR would not avoid potential impacts to this State-listed and Federal-listed threatened species. NSO can be impacted in multiple ways by cannabis cultivation, including habitat loss and degradation, and poisoning by rodenticides. It is wholly inadequate to rely on the California Natural Diversity Database (CNDDDB) to identify locations of NSO activities, or to screen for presence of any plant or animal species of concern. The CNDDDB is based on reported surveys, and few private lands available for cannabis

cultivation have surveyed for NSO or other endangered, threatened, or otherwise rare species. We recommend that the County consult with CDFW and the US Fish and Wildlife Service to identify projects requiring surveys for NSO, and to implement mitigation measures based on survey results.

4. **Treatment of abandoned or remediated cultivation sites:** This is addressed in detail in CDFW's March 1, 2018 letter. We support the County's proposed "Retirement, Remediation, and Relocation" (RRR) program, and also concur with CDFW in recommending that the proposed Project should include additional requirements to ensure adequate and effective restoration of abandoned or remediated cultivation sites, and that relocated cultivation areas are not placed in already-significantly-impacted watersheds, such as identified by CDFW or the watershed-based caps described above.
5. **Groundwater:** The use of groundwater from wells has the potential to individually and cumulatively impact water tables and indirectly impact stream flows and biological resources, including but not limited to fish populations and native vegetation dependent upon those flows or groundwater. For example, oak trees are vulnerable to groundwater depletion, particularly during droughts. The proposed Mitigation Measure 3.8-3 would depend upon self-reporting by permittees and would only be implemented in the event of demonstrable drawdown impacts of a well to adjacent well(s). This appears to ignore groundwater impacts where no adjacent wells exist, or where owners of adjacent wells do not complain.
6. **Enforcement Resources:** While recognizing and applauding the County's and Project's proposed enforcement measures, the NEC shares concerns of CDFW and many others of the adequacy of County resources for enforcement, on both permitted and unpermitted cultivation operations, because to date such measures have fallen short of the desired outcome. We also recommend that any approved Ordinance include specific measures, including specific penalties, remediation measures, and cost recovery mechanisms, for unpermitted or otherwise noncompliant cannabis cultivation operations. Proof of existing operations on forested land, particularly TPZ lands, should be substantial, or otherwise proposed cultivation should be prohibited or considered new. Finally, and of great importance, we agree with CDFW that previous trespass cultivation sites should be first remediated, and not issued permits to continue operations. They should be considered for permitting only as a new proposed site, and after the site has been fully remediated.
7. **Resolution Establishing a Cap on the Number Permits and Acres Which May Be Approved for Open Air Cannabis Cultivation:** The County is considering a resolution, separate from the proposed Ordinance, to establish such caps. The NEC supports a more restrictive cap than is provided by Alternative 1 (5,000 acres, 1,250 permits). Of the three cap alternatives presented in the March 19, 2018 report to the Board of Supervisors from the County Planning and Building Department, we recommend

Alternative 3, which better protects Impacted and Stronghold subwatersheds, and caps total permits at 3,000 permits and 750 acres.

Thank you for considering our comments.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Larry Glass', with a stylized, flowing script.

Larry Glass
Executive Director
Northcoast Environmental Center

Re: The revision of the County Cannabis Permit Ordinance

March 18, 2018

To: the Humboldt County Board of Supervisors

First of all, I protest the extremely short notice given for the Special Meeting on March 19, 2018 where approval of nearly 2000 pages of documentation is proposed to be approved. The City of Fortuna would like to call a public meeting to discuss the Ordinances and was not notified in time for that to occur.

In your proposed ordinance revision (sec 55.4.5), a Special Permit is required for marijuana operations within Spheres of Influence (SOI) or 1000' from the current boundaries (city limits) of cities in the County. The County could still grant a discretionary permit for a commercial marijuana growing operation after notifying the neighboring land owners if the neighbors don't show or, in the *opinion* of the Hearing Officer, that the "public health, safety or welfare" of the surrounding community is not sufficiently detrimentally effected. This seems to put the Cannabis applicant in the "drivers seat" and the community on the defensive. **Your ordinance should be written to protect the community, not the applicant.**

Since cities can create their own ordinances with regard to these businesses including complete prohibition, it is unreasonable that the County ordinance could impose these controversial operations so near to a City.

Therefore, I urge you to adopt ordinance revisions that would PROHIBIT marijuana growing or processing permits for County parcels within the Sphere of Influence of any city in Humboldt County and in places where the SOI has not been designated beyond the city limits, there should be at least a 1 mile buffer zone where commercial marijuana operations are PROHIBITED.

Cities grow. Land is annexed and new developments are built. The County should respect that and give our cities room for this future growth that is usually residential in nature. Commercial cannabis is not compatible with residential areas, as your current ordinance admits. Commercial cannabis is not common agriculture. Common agriculture does not require security fences, night lighting, cameras and guard dogs and usually does not produce a product that is illegal in the eyes of the federal government and is not for use by children.

General Plans should be respected. There are areas around Fortuna designated as Rural Residential in their general plan (for 2030) AND in the County's own Planning Commission Approved Draft General Plan Update (March 2015) where applications for permits were accepted because the land is technically still zoned AG. These areas already have houses

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in them and receive city services. A generous buffer zone around our cities prohibiting this controversial business that is incompatible with neighborhoods must be legislated to allow development in keeping with the city's ordinances as they grow into these areas.

I urge you to work with the city governments and their citizens to adopt County rules that do not infringe on the rights of cities or on the rights of their citizens, present and future, to decide if Commercial Marijuana operations are compatible with their lifestyle, aspirations and circumstances.

A handwritten signature in cursive script, appearing to read "Paul Farnham".

Respectfully, Paul Farnham
3576 Nelson Lane, Fortuna, CA 95540



Monday, March 19, 2018

Humboldt County Board of Supervisors

RE: Commercial Cannabis Land Use Ordinance

These comments are submitted on behalf of Honeydew Farms. We are a single- family owned, State- Licensed Farm. We were locally permitted in 2016 and currently have received 30 State licenses for our company. We would like to thank the Board of Supervisors, Planning Commission, Building, and Planning Departments for the work you have done to have made this possible. Our efforts are to help lend an “on the ground” perspective to you to help create policy that will both support a growing and changing industry, and protect the heritage of Humboldt County Cannabis.

Honeydew Farms requests that the Board of Supervisors consider the following changes to the proposed Commercial Cannabis Land Use Ordinance:

1. Section 55.4.5.4 Permit Limits and Permit Counting

- We feel that this section should be removed as it is not consistent with State law. The recommendation of a 4 acre cultivation cap was created when it was believed that the State was going to have a cap of 4 acres per entity. A 4 acre cultivation cap greatly disadvantages established farms the ability to compete on a State level. We are now competing with commercial agricultural areas throughout the state that are not imposing caps in their jurisdictions. We are already facing disadvantages due to being seasonal farmers. Central Valley and Southern California farms are producing 5-6 harvests a year. Instituting a cap does nothing but help these counties surpass Humboldt in production. 4 acres in Humboldt is equivalent to a 1 acre mixed-light grow in Southern California, and most of those counties are not imposing any cultivation size limits. Unless

cultivation licenses are capped on the State level, then the price will continue to fall due to unlimited canopy and farms will have a hard time staying viable. What other industries have caps that propose only being able to grow your business to a limited size? Most industries in the United States are made up of large and small companies, as we live in a free market society. The California State government believed that Proposition 64's intent was for a free market and that is why there is no cap on any license types. If the purpose of a 4 acre cultivation cap is to limit large farms, then that can be achieved through zoning or a limit on farms of a certain size. We respectfully ask that you do not limit a company's ability to grow into a successful state-wide brand.

2. Section 55.4.6.1.2 Minimum Parcel Size and Allowed Cultivation Area

- C) On parcels 320 acres and larger in size, total acreage is seeing a reduction from 12 acres to 8 acres that can be permitted. If 8 acres on a single parcel is the maximum, and if a cultivation limit is to be imposed, please make the two consistent.

3. Section 55.4.6.4.3 Limitation on Use Of Prime Soils

- Limiting Prime Ag use to 20% is no longer necessary due to the expansion of permits to include non-Prime Ag therefore, the pressure on Prime Ag will cease. We feel that the 20% cap should be removed, but if it is desired, please consider a 50% cap.

4. 55.4.6.8 Cap on Permits

- We applaud the county for their position on a cap of cultivation permits in sensitive watersheds. We support these environmental protections however, we feel that the existing farms that are utilizing water from non- diversionary water sources within these zones, or that are on Ag Lands or Ag Preserves should not be capped.
- On the map of the proposed boundary of the Middle Mattole River, the Western line is incorrectly drawn. The proposed line cuts through half of our ranch and does not follow the natural drainage that was intended. We believe this is due to the County's G.I.S. map not being consistent with the actual geography on the ground. There is a creek shown on the proposed map that does not exist or is in the wrong place (see attachment A and B). This is a simple fix, and we ask Board to direct Staff to fix this mapping error.

5. 55.4.8.1.1 Indoor Cultivation

- Currently, the proposed ordinance reads : Within those zones specified under 55.4.6.1.1 (AE, AG, FR, and U), up to 5,000 square feet of Indoor Cultivation may be permitted with a Zoning Clearance Certificate, ~~but may be only conducted within a non-residential structure which was in existence prior to January 1, 2016.~~

We believe that the stricken section above should be removed. We have realized how important Indoor Cultivation is for our business to be able to keep cultivation employees working year-round, keep genetics going, basic nursery operations, and bringing in off-season revenue. Having all facets of our business able to be permitted on the same site would be helpful to the management of our company, rather than being spread out all over the County. If the Board would direct Staff to create a pathway through a C.U.P. on *Commercial Ag* parcels to allow for all-inclusive facilities with all the standard requirements for indoor cultivation, manufacturing, and processing, this would be beneficial to be a more efficient business.

6. 55.4.12.4 Performance Standards For Light Pollution Control

- A) Structures used for Mixed Light Cultivation and Nurseries shall be shielded so that no light **that exceeds light performance standards** escapes between sunset and sunrise.

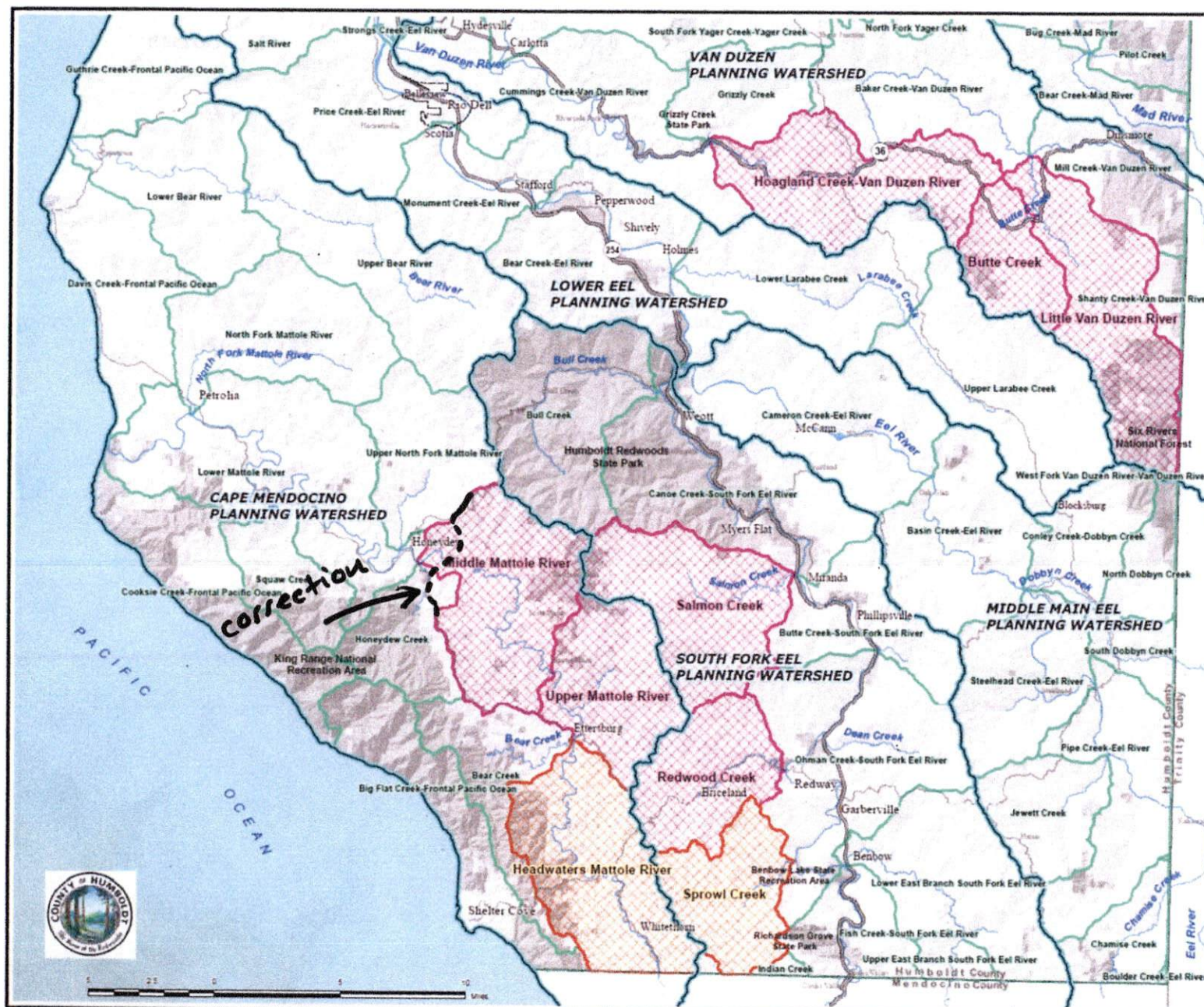
We propose adding in the language noted in red above. Covering greenhouses to stop all light escape is over-burdensome and expensive. Work lighting (not "grow" lights) should be able to be utilized between 5:00 AM-10:00 PM. We have 2 work shifts on our farm as field work sometimes can take all day and greenhouse work can continue into the night and lighting is imperative.

In closing, we would like to thank the Board and Planning Staff for doing an amazing job of listening to industry stakeholders and helping us to achieve success in the State market. Please continue to give us the tools we need to be competitive at the State level.






Thank you for your time and your continued attention to our community.

Respectfully,

Alex Moore, owner Honeydew Farms

2017 Humboldt County
Impacted and Refuge
HUC-12 Subwatersheds

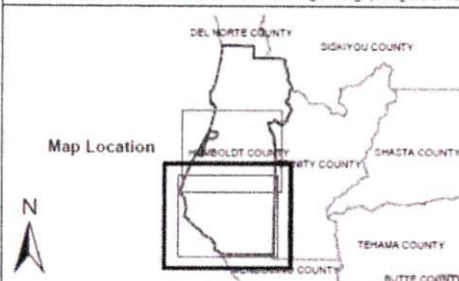
Planning Watersheds

-  Planning Watershed
-  Refuge Subwatersheds
-  Impacted HUC-12 Subwatersheds
-  HUC 12 Subwatersheds
-  Public Lands

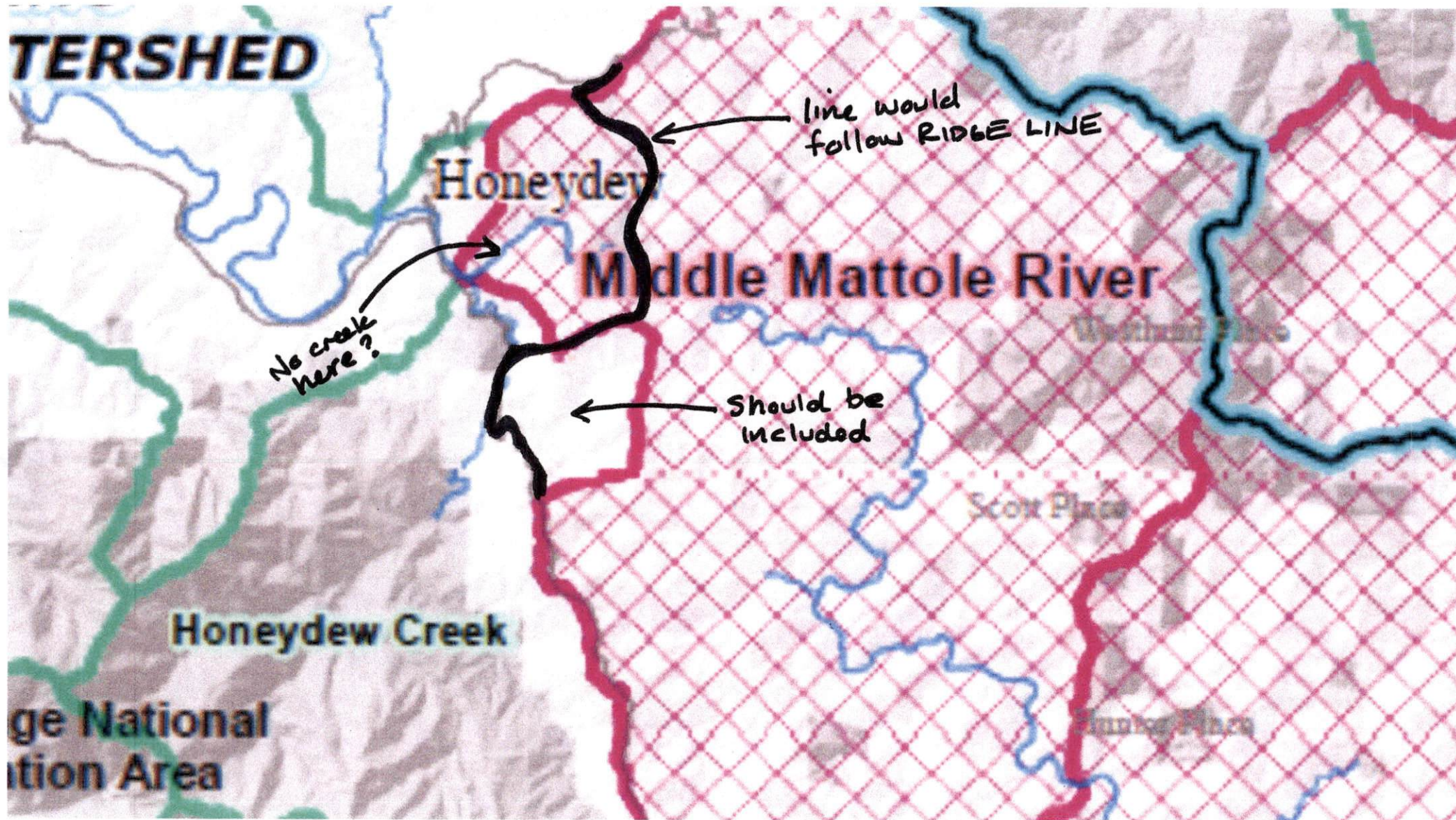
This map is intended for planning purposes only and should not be used for precise measurement or legal boundary definition. Original map size is 17"X11"

Map produced by Humboldt County Planning & Building Department, Mar 2018

ArkMap 10.5 Document: H:\apps\Cannabis\HUC-12\3sheets\2018_Southern_Imagery_HUC12.mxd



③



March 18, 2018

Humboldt County Board of Supervisors,

I live in the Eel River Valley – Fortuna, to be exact. Hiking and roaming the woods and rivers are what I do for fun. Fishin' is good, too. In fact, I, like so many other outdoorsmen, find fishing one of the most rewarding pastimes imaginable. Which is why I'm writing this letter.

On Monday, March 19, 2018 our county will be creating ordinances regulating the cannabis industry. The public is invited to give brief, public testimony before the board enacts any ordinances. Unfortunately I have to work on Monday, so I'm writing this letter to submit in my stead.

I'll get to the point and tell you the gist of my letter is this: fish need water. They need clean, clear, cold water and lots of it. They need waterways free of sediment and chemicals. They need places to hide and deep pools and shallow riffles. The generally toxic, water-sucking cannabis industry is at odds with the fish (and thereby all other parts of the ecosystem who rely on fish).

Thousands of 'grows' threaten the existence of our coveted species of salmon and steelhead. We have too many grows. Blackmarket demand will decrease with legality; the number of blackmarket grows should decrease as well.

Think about it; there are thousands of grows in Humboldt county producing a gazillion pounds of weed in an already saturated market. Enforcement of environmental laws is minimal. Many growers use all kinds of nasty pesticides, herbicides, and fertilizer. They bait and trap and kill anything that threatens their crop. All those chemicals have got to go somewhere, and so they do: down to the Eel. Many chemicals + low flows on the Eel sums up to a river that is not a happy one.

I implore you to create a rigorous permitting method. Use science-based factual research to determine the best course of action. We cannot be content to just let things go on like they have been. Our fisheries, our wildlife, and our people deserve better. Do the right thing. Go slowly, go with intention, be stewards for the environment. It's the only one we have.

G.M. Marshall
Fortuna, CA
gmmarshall@gmail.com



FRIENDS OF THE EEL RIVER

Working for the recovery of our Wild & Scenic River, its fisheries and communities.

Monday, March 19, 2018

Humboldt County Board of Supervisors
via hand delivery

Re: Commercial Cannabis Land Use Ordinance and FEIR

Dear Supervisors;

Friends of the Eel River ("FOER") is gravely concerned that the County's intention to permit thousands of additional commercial cannabis operations will result in significant and continuing unmitigated harms to public trust values, including clean water and critically imperiled coho and steelhead runs as well as wildlife habitat. FOER urges the Board to withdraw the DEIR pending the analysis of cumulative watershed impacts necessary to plan any additional permitting in watersheds already impacted by cannabis-related development and in order to ensure the EIR complies with the California Environmental Quality Act ("CEQA")..

As we have previously noted, FOER's core concerns with the County's proposed commercial cannabis regulations center around cumulative watershed effects, particularly as they bear on the survival and recovery of critically imperiled and legally protected fish populations. The FEIR does not adequately analyze these impacts at the scale necessary to determine whether Humboldt County's watersheds – including many of the Eel River's tributaries, especially in the South Fork Eel and Van Duzen basins – have the capacity to absorb additional cannabis cultivation-related impacts without impairing the survival and reproduction of salmon and steelhead.

The EIR fails to make it clear that we are losing coho and steelhead right now in Eel River tributaries like Redwood Creek on the South Fork Eel west of Redway, due to both excessive sediment inputs and unregulated water diversions, and their cumulative impacts on streamflow and habitat. Those populations of fish are going extinct; if current trends continue, their extirpation is only a matter of time. In the next watershed to the north, the available evidence strongly suggests salmon and steelhead have been extirpated from Salmon Creek by cumulative watershed effects, despite the investments of restorationists' lives and public funds in watershed restoration undertaken in that basin over decades.

HUMBOLDT OFFICE

foer@eelriver.org
PO Box 4945, Arcata, CA 95518 • 707.798.6345

NORTH BAY OFFICE

David Keller, dkeller@eelriver.org
1327 I Street, Petaluma, CA 94952 • 707.763.9336

In general, the County should forbear from issuing any additional permits to commercial cannabis operations in watersheds that provide crucial habitat to salmon and steelhead until an adequate cumulative watershed effects analysis demonstrates capacity in each such critical fishery watershed.

Some watersheds which have not yet suffered serious impacts, like Sprowel Creek on the South Fork Eel, are such important strongholds for remaining fish populations that no further cultivation can be justified in those watersheds. We would urge the County to bar the the issuance of additional permits in such stronghold watersheds.

The Eel River – especially in its South Fork and Van Duzen watersheds – bears a disproportionate share of the impacts associated with large scale cannabis cultivation on the North Coast. Of 107 HUC-12 watersheds in Humboldt County, about a quarter – 28 – make up the Eel and its tributaries. But those 28 watersheds have more than half of the applications for cannabis cultivation permits pending under the 2015 ordinance – roughly 1300 of 2400.

Cannabis Cultivation Watershed Impact Analysis

We have reviewed expert comments and the list of creeks and watersheds critical to the survival of salmon and steelhead identified by the California Department of Fish and Wildlife, titled “CDFW Cannabis Cultivation Watershed Impact Analysis,” and submitted to the Planning Department earlier this month. The creeks listed are all vitally important Humboldt County habitat streams for salmon and steelhead, grouped by watershed / planning basin (e.g. South Fork Eel River). Broadly, they span the spectrum of impacts sketched above from Salmon Creek to Sprowel Creek.

Three classes of stream are designated by the list:

- a) critical fisheries watersheds not yet impacted by cannabis cultivation, designated by *
- b) creeks heavily impaired by cultivation, designated by **
- c) creeks impacted but not yet impaired – all other listed streams.

We generally concur with DFW’s assessment of the importance of the listed streams, and the agency’s classification of their respective level of impairment and importance to fisheries recovery. There may be other streams in Humboldt County which merit being added to this list.

We do wish to note that DFW’s list of stream names does not line up precisely with a list of HUC-12 watersheds provided by the Planning Department, or with a more recent list of HUC-12 watersheds grouped by planning basin. In part, this appears to be because the DFW list includes several different scales of watershed. For example, DFW lists Little Larrabee Creek in the Van Duzen watershed, a tributary of the HUC-12 South Fork Van Duzen; that’s *not* the same drainage as Upper and Lower Larrabee Creeks, both HUC-12s on

the Lower Eel. Similarly, DFW lists “various unnamed tributaries” of the East Branch South Fork Eel River, “all unnamed tributaries on east side of Redwood Creek upstream of Highway 299 bridge,” and “Hettenshaw Valley tributaries.” all are smaller units than HUC-12 watersheds.

However, there are also inconsistencies and errors in the Department’s watershed list (e.g., the “Sprout Creek” on the county’s list is almost certainly a typographic error, where Sproul (or Sprowel) Creek is intended). To resolve these inconsistencies and clarify what areas require more careful consideration of potential land use impacts, DFW should work with the County to designate specifically, by map or similar instrument, what reaches are intended to be described.

DFW recommends “No additional cultivation ... be allowed in ... (the) watersheds” not yet impacted by cannabis cultivation.

FOER strongly concurs with DFW’s recommendation that no additional cultivation be permitted in the designated critical fishery watersheds not yet impacted by cannabis cultivation. Given the existing excess of production capacity in the cannabis industry both locally and statewide, there is no longer any reason to risk any additional impacts to these watersheds and the fisheries they support. These stronghold watersheds should be under a moratorium for any additional commercial cannabis production going forward. This recommended adjustment to the County’s project is essential to partially address the cumulative watershed impacts that will result from the Ordinance and to comply with CEQA.

For the nine creeks heavily impaired by cultivation, DFW suggests “(n)o additional sites nor expansion should be allowed in these watersheds. Could temporarily ban additional cultivation sites until such time all existing are either permitted or removed from the system.” In the Eel River watershed, Salmon Creek and Redwood Creek and its tributaries in the South Fork Eel basin, and Butte Creek and Little Larrabee Creek in the Van Duzen basin, are listed as heavily impaired.

FOER concurs with this DFW mitigation that no additional new permits be considered in watersheds heavily impacted by cultivation pending resolution of all pending applications. We would, however, go further.

We believe the County must take the following steps in order for the Ordinance to comply with CEQA and other relevant laws and protect endangered and threatened species:

1. For any cultivation applications within any of the key fishery watersheds identified on the DFW list, the County must require a Conditional Use Permit ensuring scrutiny of potentially significant environmental impacts by the Board of Supervisors.

2. Condition the issuance of any additional permits, whether of new or existing sites, in the DFW-listed waterbodies unless and until an adequate analysis of cumulative watershed effects is prepared for that watershed. The necessary watershed analysis should be paid for by applicant fees and should be conducted either by the Regional Water Quality Control Board or a qualified consulting firm retained by the County with input from the Regional Board.
3. After such an analysis is prepared, implement measures that will ensure that any additional permits granted in impacted or heavily impaired watersheds will result in a net reduction in sediment impacts. This should be accomplished by requiring each applicant to provide both (a) an adequate analysis of their potential sediment impacts and (b) a mitigation mechanism, certain of application, which would lead to the reduction of an amount of sediment inputs at a multiple sufficient to insure the necessary net reduction. The multiplier should be on-the-ground sediment discharge reductions within the subwatershed equal to ten times the sediment contribution from the permitted grow site (for impaired watersheds) and five times the sediment contribution from the permitted grow site for impacted but not impaired watersheds. To the extent the cumulative impact is the result of water diversions, a similar requirement would be included requiring the applicant to reduce water diversions within the subwatershed by at least twice the quantity of water proposed to be diverted by the applicant.
4. Deny permits and renewal of permits in listed critically important fisheries watersheds for which an adequate cumulative watershed effects analysis cannot be provided or where proposed net sediment reductions cannot be identified or implemented by the applicant(s).

Consistency with Proposition 64

Proposition 64 would also appear to forbid the issuance of additional permits in impaired watersheds. Under the terms of Proposition 64, as codified by SB 94, the California Department of Food and Agriculture is prohibited from issuing plant identifiers to operations in watersheds suffering excessive impacts from diversion or pollution.

§ 26067

(c)(1) The department, in consultation with, but not limited to, the bureau, the State Water Resources Control Board, and the Department of Fish and Wildlife, shall implement a unique identification program for marijuana. In implementing the program, the department shall consider issues including, but not limited to, water use and environmental impacts. In implementing the program, the department shall

ensure that:

*(A) Individual and cumulative effects of water diversion and discharge associated with cultivation do not affect the instream flows needed for fish spawning, migration, and rearing, and the flows needed to maintain natural flow variability. **If a watershed cannot support additional cultivation, no new plant identifiers will be issued for that watershed.***

(B) Cultivation will not negatively impact springs, riparian wetlands and aquatic habitats.

If the language of Prop 64 means anything anywhere, it means that additional operations should not be permitted in watersheds critical to fisheries recovery which are already suffering significant impairment, like Redwood Creek and Salmon Creek.

Therefore, under Proposition 64, creeks designated by DFW as critical watersheds heavily impaired by cultivation should thus be considered ineligible for any additional licensing by the state. Again, an adequate cumulative watershed effects analysis would need to be provided to show that the watershed can support additional cultivation.

Consistency with Nondegradation Policy

California's nondegradation policy defines "existing high quality waters" as the in-stream quality of water existing as of 1968. Hence, any program by the County has to aim at restoring the quality of the County's rivers and streams to the high quality that existed as of 1968. Any program that complies with the state's nondegradation policy has to ensure that any discharges of sediment to already impaired North Coast streams and rivers result in a significant net reduction of sediment to those waterbodies and be consistent with an overall cumulative watershed analysis that would demonstrate a reasonable expectation that such permitted net reduction along with other sediment reductions from other sources in the watershed would restore water quality to 1968 levels. Given the absence of any meaningful cumulative watershed effects analysis presented or referenced in the EIR, the County has completely failed to demonstrate how the Ordinance will comply with the Nondegradation Policy.

The EIR's Cumulative Impacts Analysis is Not Adequate

As FOER has noted in previous comments, the DEIR fails to adequately describe and analyze the cumulative watershed effects associated with commercial cannabis production in various parts of the County.

The EIR fails to adequately describe the baseline conditions necessary to evaluate cumulative watershed effects. It does not analyze the impacts associated with existing concentrations of cannabis-related development which we have repeatedly pointed out.

The EIR fails to analyze the various elements contributing to cumulative watershed impacts at the appropriate and necessary range of scales. This allows the County to suggest, for

example, that water diversions are unlikely to impair the South Fork Eel River. But the Salmonid Restoration Federation's analysis of stream flows in Redwood Creek and its tributaries clearly shows the impacts of stream diversions at scales where they definitely matter for coho and steelhead. These include apparent impacts from pumping. (Klein 2018) Klein noted:

*Although the general trends evident in Figure 18 are consistent with the obvious direct relationship between rainfall and streamflow, the trend over the years plotted suggests a shift in the relationship. Discharges were higher relative to rainfall in the earlier years and diminished relative to rainfall in the later years. In particular, with rainfall highest in 2017, discharges were an order of magnitude lower than in 2014. **Certainly, several factors could explain this large drop in streamflows in relation to rainfall for the five-year period, but increased water extraction would be a prime suspect among them.***

The EIR fails to note that under emergency rules issued for 2018, neither the California State Water Resources Control Board (Water Board) nor Department of Fish and Wildlife, will be requiring or enforcing forbearance from surface water diversions. Given the County's reliance on those state agencies to enforce state rules, the County's assurances that permitted cannabis cultivation operations will not be taking water out of salmon and steelhead streams during the dry months of 2018 rings hollow. Is the County going to require that permittees forbear from water diversions? How will it enforce such a prohibition given the County's level of staffing and related enforcement capacity? Please note that these are hardly theoretical concerns, as 2018 is shaping up to be another very dry year.

Similarly, the EIR fails to consider road density, the number and kind of water crossings, and other factors necessary to assess the combination of impacts that degrade water quality and salmonid habitat. In addition, the EIR doesn't adequately consider noise and light pollution impacts to wildlife. Nor are the potentially cumulative impacts of widespread rodenticide use adequately reflected in the County's analysis of wildlife impacts. As Franklin *et al* describe in a recent paper, anticoagulant rodenticides have now been documented in a dead Northern Spotted Owl near a number of marijuana growing operations. (Franklin 2018). The county has neither adequately analyzed the potential effects of rodenticide use on listed and unlisted species, nor proposed any plausible method to control those impacts through its Ordinance.

Cumulative Watershed Effects Analysis is Already Required Under the County's General Plan

The County's own General Plan would seem to require analysis beyond that supplied by the EIR in this case. Among the Goals established by the General Plan are the following:

WR-G1. Water Supply, Quality, and Beneficial Uses. High quality and abundant surface and groundwater water resources that satisfy the water quality objectives and beneficial uses identified in the Water Quality Control Basin Plan for the North Coast Region.

WR-G2. Water Resource Habitat. River and stream habitat supporting the recovery and continued viability of wild, native salmonid and other abundant coldwater fish populations supporting a thriving commercial, sport and tribal fishery.

WR-G9. Restored Water Quality and Watersheds. All water bodies de-listed and watersheds restored, providing high quality habitat and a full range of beneficial uses and ecosystem services.

Note that coldwater fisheries are one of the beneficial uses identified for the Eel River and its tributaries under the Basin Plan. Note as well that the Eel and its tributaries are listed as impaired for sediment and temperature under §303(d) of the Clean Water Act. Thus, all three of the above goals reflect the County's direction to protect water quality and fisheries habitat.

These goals are meant to be achieved through the application of policies related to land use, including the following:

Water Resources and Land Use

WR-P1. Sustainable Management. Ensure that land use decisions conserve, enhance, and manage water resources on a sustainable basis to assure sufficient clean water for beneficial uses and future generations.

WR-P2. Protection for Surface and Groundwater Uses. Impacts on Basin Plan beneficial water uses shall be considered and mitigated during discretionary review of land use permits that are not served by municipal water supplies.

WR-P3. Proactive Protections. Focus regulatory attention and educational efforts in specified watersheds where limited water supply or threats to water quality have **potentially significant cumulative effects** on the availability of water for municipal or residential water uses **or the aquatic environment**.

WR-P4. Critical Municipal Water Supply Areas. The Board of Supervisors shall designate all or portions of watersheds as "Critical Water Supply Areas" if cumulative impacts from land uses within the area have the potential to significantly impact the quality or quantity of municipal water supplies. Water resources within Critical Water Supply Areas shall be protected by the application of specific standards for such areas.

WR-P5. Critical Watershed Areas. The Board of Supervisors shall designate all or portions of watersheds as “Critical Watersheds” if cumulative impacts from existing or planned land and water resource uses within the area have the potential to create significant environmental impacts to threatened or endangered species; including Chinook salmon, coho salmon or steelhead. **Land and water resources within Critical Watersheds shall be protected by the application of specific standards for such areas to avoid the take of threatened or endangered species.** (emphasis added).

WR-P6. Subdivision Water Supply. Any subdivision of land shall be conditioned to require evidence of sufficient water supply during normal and drought conditions to meet the projected demand associated with the proposed subdivision. Sufficient water supply shall include the requirements of the proposed subdivision and existing and planned future uses. Written service letters from a public water system written in conformance with this policy is sufficient evidence. Subdivisions to be served through on-site water supplies or private water systems must provide evidence of sufficient water supply to the County Department of Environmental Health.

WR-P8. Requirements for Water Storage in Flow Impaired Watersheds. New development not served by a public water system that seeks to rely upon surface water shall install water storage capable of providing 100 percent of the necessary water storage volume for the summer low-flow season (e.g. July-August-September). A forbearance agreement prohibiting water withdrawals during low-flow season shall be included as a performance standard for the project.

WR-S3. Development within Critical Watershed Areas. Ministerial land use development proposed within Critical Watershed Areas shall comply with performance standards adopted by ordinance. Discretionary development shall comply with performance standards and supplemental permit conditions. **Standards and permit conditions shall avoid take of endangered or threatened species by reducing cumulative impacts to aquatic habitat to below levels of significance.** (emphasis added).

WR-S4. Water Withdrawal Permitting. Ministerial and discretionary permits for land use development that include development of new in-stream water sources or other streambed alterations subject to California Fish and Game Code Section 1602 shall provide evidence of, or be conditioned to obtain a Streambed Alteration Agreement from the Department of Fish and Game as well as a Water Right Permit or a small scale domestic use registration from the State Water Board.

WR-S5. Subdivisions Demonstration of Sufficient Water Supply. Demonstration of sufficient water supply shall include the requirements of the proposed

subdivision, existing uses, and planned future uses. Subdivisions for residential development subject to state requirements of SB 610 and SB221 shall make the appropriate demonstrations consistent with regulations (as amended) established by these acts. Written service letters from a public water system written in conformance with this policy is sufficient evidence. Subdivisions to be served through on-site water supplies or private water systems must provide evidence of sufficient water supply to the County Department of Environmental Health.

WR-IM11. Water Supply Evaluation and Monitoring. Within five years after the adoption of the General Plan Update the County shall prepare a watershed analysis to determine whether the long term surface and groundwater supply is available, including seasonal, average, dry year, and multiple dry year supplies, and preservation of existing beneficial uses of water. The study shall determine an estimate of the quantity of water available for the level of future development described in the Revised Draft EIR for the GPU. Work with water and wastewater related special districts, regulators, and other appropriate organizations to monitor watershed conditions.

Water Resources Policy 5, Critical Watershed Areas, seems especially salient to the cumulative watershed effects and fisheries concerns we have advanced here. Clearly, “cumulative impacts from existing or planned land and water resource uses within” many watersheds tributary to the Eel River “have the potential to create significant environmental impacts to threatened or endangered species; including Chinook salmon, coho salmon or steelhead.” Yet the Board of Supervisors has so far failed to “designate all or portions of (those) watersheds as ‘Critical Watersheds’.” WR-P5 would seem to clearly require that “(l)and and water resources within Critical Watersheds shall be protected by the application of specific standards for such areas to avoid the take of threatened or endangered species.”

It is clear that cumulative watershed impacts associated with commercial cannabis production, including water diversions and sediment impacts, are causing take of coho and steelhead. The Ordinance conspicuously fails to provide such protective standards to avoid the take of coho and steelhead. Both are listed as Threatened species under the Federal Endangered Species Act. Eel River Coho are also listed as Threatened under the California Endangered Species Act.

The Economics of the post-Green Rush Bust

The premise of the county’s proposed ordinance has always been suspect. The environmental impacts associated with widespread, large scale cannabis cultivation in steep, fragile landscapes spiderwebbed with badly designed and poorly maintained roads

may be subject to solution. But giving permits to most, or even many, of the existing thousands of operators, as well as any new ones that might wish to join the crowd, only makes the problem harder.

To the limited extent the plan to bring Humboldt's illicit weed farmers into a sustainable relationship with their watersheds (by requiring basic environmental compliance as a condition of permitting) ever made much sense, it has now been decisively overtaken by events. Growing weed in the Humboldt hills was extremely profitable when most conventional cultivators didn't dare get involved with marijuana sales.

In California's new legal market, however, only the most effective producers will be able to survive the dramatic reduction in the commodity price of pot which is the natural and inevitable consequence of significant, continuing overproduction.

It is now startlingly clear that the economic assumptions broadly held in Humboldt County over the last couple of decades may no longer hold true. Legalization of marijuana production in California has accelerated a process already underway with the continuing expansion of commercial cannabis production across the Emerald Triangle of northwestern California over that same period.

The supply of cannabis available for sale has outstripped demand for the product. The oversupply has led to significant drops in wholesale prices for weed for those sales that are taking place. The evidence of the distress this shift in the market is causing for Humboldt County growers is abundant and increasing. It is unlikely to diminish in the near future, however.

The available data strongly suggest that California's legal marijuana market will see even greater levels of oversupply than Humboldt growers are presently facing.

The state has already licensed sufficient producers to meet the total anticipated statewide domestic demand of 2.5 million pounds per year – but that domestic demand includes 1.25 million pounds expected to continue to flow through unlicensed channels. Thus, the state has already licensed roughly twice the production capacity needed to meet the demands of the legal marketplace in California.

Several of California's other 57 counties, in addition to Humboldt County, are also pursuing permitting levels of production which by themselves would be sufficient to meet all of the statewide demand.

As we have previously noted, the California Growers Association itself estimated that 1100 acres of cannabis production would meet that projected statewide domestic demand. The 600 acres of production proposed for permitting in the pending and granted applications for Humboldt County permits under the 2015 Humboldt County CMMLUO is more than half that amount. Can Humboldt County really expect to capture half of the statewide market? In this context, the proposal to "cap" permits at 5000 appears to be a plan to permit far

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economically nor ecologically sustainable. Nor is that proposed “cap” linked to any cumulative watershed effects analyses or other substantial evidence demonstrating that it would be sufficient to address cumulative sediment and water use impacts.

These facts suggest that the vast majority of existing growers in Humboldt County with higher fixed costs and higher production costs are unlikely to be viable businesses in cultivation alone. These facts underscore the need for the county to focus on permitting operations most likely to be able to compete in the market California is building, rather than simply providing permits to existing operations which are unlikely ever to be operated cost-effectively. A glut of permitted facilities struggling to survive will not be able to make the necessary investments to ensure their operations’ environmental impacts will be fully mitigated or to play a part in reducing the existing cumulative watershed impacts devastating watersheds up and down the North Coast, in particular the Eel River.

While these facts are extremely difficult to contemplate from the perspective of Humboldt County economic development, they are an essential part of the context which the Board of Supervisors must consider in deciding what scale of commercial cannabis production to permit, in what parts of the County.

Recirculation

Because the Project is being altered and the FEIR contains significant changes from the DEIR, the FEIR should be recirculated. Thank you for your consideration of these comments.

Sincerely yours,



Scott Greacen
Conservation Director

Attachments

Statement of Dr. William Trush re Commercial Cannabis Land Use Ordinance and EIR Roads and Grading in the Redwood Creek watershed, Southern Humboldt County. A summary of a GIS Analysis of Redwood Creek prepared for Friends of the Eel River by GIS Technician Lindsey Holm.

Klein, Randy. 2018. *Low Flow Stream Discharge Monitoring Report for the Redwood Creek Watershed, 2015-17*. A Report Prepared for the Salmonid Restoration Federation.

Reference

Franklin, Alan B., et. al. 02 Feb 2018. *Grass is not always greener: rodenticide exposure of a threatened species near marijuana growing operations*. BMC Res Notes (2018) 11:94 accessible at <https://doi.org/10.1186/s13104-018-3206-z>



March 17, 2018

Humboldt State University River Institute
Department of Environmental Science and Management
1 Harpst Street
Arcata, CA 95521

Re: Commercial Cannabis Land Use Ordinance and EIR

Dear Humboldt County Board of Supervisors,

I'm Dr. William Trush, Co-Director of the HSU River Institute and river ecologist. My scientific career has focused on integrating annual hydrographs, animal/plant habitat and life history needs, and channel hydraulics into ecological processes necessary for restoring/protecting stream ecosystems and their watersheds. I've been quantifying cumulative watershed effects (CWEs) on North Coast California stream ecosystems and anadromous fish populations since the early 1990s.

Primary CWEs to our North Coast watersheds include: (1) highly elevated fine sediment inputs (over background conditions) generated by land uses and roads, (2) excessive late-spring through early-autumn water diversions, (3) encroached/degraded riparian areas and floodplains, and (4) point sources of water quality impairment (e.g., pesticides and fertilizers) are primary culprits. Expanded commercial cultivation has the potential to significantly accelerate all four chronic impacts, as well as override gains in watershed recovery the last two decades.

After reading the Ordinance, FEIR, and then Amendments (March 1, 2018), I remain alarmed that the potential for highly significant chronic watershed impacts has not been integrated adequately into the permitting process or provided meaningful enforcement measures.

Unfortunately the Ordinance's plan focuses on streamlining the permitting of individual parcels and not on accounting for potential cumulative environmental impact from surrounding

parcels permitted in specific tributary watersheds. Also, most watershed impacts from land use practices become environmentally significant as their products (e.g., fine sediment and fertilizer nutrients) accumulate farther downstream. A 'first-step' in CWE analysis and permitting is to reach outside a parcel's immediate property boundary. Five parcels distributed roughly evenly throughout a 5 mi² watershed will have considerably less potential environmental impact than the same five parcels concentrated in one 1.5 mi² tributary watershed. Potential impacts from a single parcel cannot be evaluated when cumulative impacts of adjacent parcels are ignored.

One particularly troublesome off-site, cumulative impact is downstream water quality impairment as a consequence of excessive fine sediment generated upstream. Each parcel generates fine sediment and therefore must be evaluated within the context of fine sediment sources in neighboring parcels. This draft Ordinance makes no provision for this essential 'planning' element. Instead, it relies primarily on unquantifiable standards governing important environmental consequences such as 'habitat protection' and 'conservation.' Recovering water quality in many North Coast watersheds will be essential to salmon population recovery. But in my reading, the Ordinance would not be equipped to protect/perpetuate these hard-earned gains. Instead, this Ordinance plans on ... relies-on ... a game of 'hot-potato' with the North Coast Regional Water Quality Control Board (RWQCB) and California Department of Fish and Wildlife (CDFW). Local state-agency staff are being put into the difficult (often untenable) position of taking the proposed paperwork and making it some-how environmentally relevant. An example of hot-potato administration is in 55.4.10(h) stating:

- h) If any on-site or off-site component of the cultivation facility, including access roads, water supply, grading or terracing impacts the bed or bank of any stream or other watercourse, a copy of the Streambed Alteration Permit obtained from the Department of Fish & Wildlife.

CDFW simply does not, and likely will not, have the resources to come close to implementing the Streambed Alteration Permit intentions (the 'If' in (h)). Recommending Forest Practice Rules (FPRs) guidelines for roads be applied to cultivation activities seems obvious (why invent new guidelines), but there would be sporadic oversight/enforcement over most of the landscape.

Incorporating management guidelines curbing/preventing cumulative watershed impacts isn't easy (e.g., the ongoing struggle with the Forest Practice Rules (FPR)). Best management practices (BMPs) referenced in the Ordinance, often considered the cure to cumulative impacts from landuse, are only as good as they are enforced. And even then, BMPs still 'leak' fine sediment downstream and cannot prevent significant impacts if the density of permitted (and realistically, unpermitted parcels) is too high (i.e., an accumulation of many small BMP leakages). Without providing explicit, quantitative thresholds for landuse in specific watersheds, there is no planning. Simply approving parcels as they come-in is not planning. Yet this course of environmental planning is what the County endorses with this Ordinance.

Another behind-the-back potato toss to CDFW is 555.4.10(n) (p.27 in an earlier Ordinance draft)[reproduced below].

- n) Acknowledge that the County reserves the right to reduce the size of the area allowed for cultivation under any clearance or permit issued in accordance with this Section in the event that environmental conditions, such as a sustained drought or low flows in the watershed in which the cultivation area is located will not support diversions for irrigation.

This 'right', removed from the Final Draft, yet could be a primary tool for minimizing future cumulative impacts. The Ordinance avoids establishing thresholds ... which is the primary tool to minimize CWEs.

A second cumulative environmental impact from cultivation is excessive, localized water diversions during receding summer streamflows. The Ordinance attempts (via potato toss to state agencies) to regulate water diversions in 55.4.10(l) [reproduced below].

- l) Where surface water diversion provides any part of the water supply for irrigation of cannabis cultivation, the applicant shall either: 1) consent to forebear from any such diversion during the period from May 15th to October 31st of each year and establish on-site water storage for retention of wet season flows sufficient to provide adequate irrigation water for the size of the area to be cultivated, or 2) submit a water management plan prepared by a qualified person such as a licensed engineer, hydrologist, or similar qualified professional, that establishes minimum water storage and forbearance period, if required, based upon local site conditions, or 3) obtain approval from the RWQCB through enrollment pursuant to NCRWQB Order No. 2015-0023 and/or preparation of a Water Resources Protection Plan.

Does "surface water diversion" include springs? Why is subsurface pumping excluded? Who will "require" consensual forbearance? As a scientist I want to see the analysis of projected diversion volume/timing as a function of parcel size, permit type, and watershed area. Presumably, the Ordinance's Permit Types were founded on such an analysis, but I'm unaware of cumulative effects analysis so applied. Forbearance from May 15th through October 31 will require extensive storage facilities that will leave a significant footprint on the landscape.

There is no requirement that all parcels in a given tributary watershed be considered collectively before approving individual permits in 55.4.10(l). This necessity is at the heart of preventing cumulative impacts to streamflow locally and downstream. A daily diversion threshold in total gallons/min will be necessary to objectively, quantitatively evaluate cumulative water withdrawal effects. The Ordinance's solution for preventing diversion impacts is another hot-potato toss to the 'qualified person such as' referenced in 55.4.10(l) above. Considerable progress has been made toward prescribing a maximum allowable daily diversion rate during the late-spring through mid-autumn recession hydrograph. But there is no approved methodology for our 'qualified person' to follow. CDFW is doing its best to grapple with this difficult issue. Meanwhile, the Ordinance will be encouraging even greater intrusion onto the landscape.

I own a house on five acres in Fieldbrook. Under the Ordinance's *Table of Humboldt County Commercial Cannabis Cultivation Permit Types*, a type III Use Permit would allow cultivating up to 43,560 ft² (i.e., one acre, or a fifth of my property). Given many years of research on instream flows and cumulative impacts, I likely would be a 'qualified person' under 55.4.10(l), though there are no guidelines as to how that would be affirmed. The drainage area of 'my' tributary watershed to Lindsay Creek is 1.02 mi² close to my downstream property line. My stream, Davenport Creek (not labeled on a USGS topo map), supports annual coho and steelhead spawning/juvenile rearing. Recently (March 10, 2018), one adult steelhead passed upstream. Diverting to conservatively meet cultivation water needs would begin impacting Davenport Creek by early-June. Forbearance likely would be required, as Davenport Creek goes dry by late-July to mid-August depending on the water year. The extent of required storage (and not just the storage tanks' total footprint) would necessitate clearing at least another acre (remembering that a square acre is approximately 209 ft by 209 ft). If three upstream neighbors (each with 5 acre parcels) desired maximum utilization under Type III Use Permits, the potential for cumulative impacts to Davenport Creek would rise very sharply. Yet the only substantive environmental protection 'my' Coho/steelhead would be entitled must come CDFW and the Regional Board, not the Ordinance which would approve individual parcels independently within the greater Anker Creek watershed (Davenport Creek being a northern tributary to Anker Creek).

I'll continue investigating the procedural and environmental ramifications of permitting multiple cultivation parcels in my backyard watershed. Before Ordinance approval, all steps necessary for permitting at least 10 parcels (for different permit types and environmental settings) should be documented and provided to the public. Only in this manner, can we (residents of Humboldt County) realistically evaluate how/if the Ordinance would work. This would reveal what parts of the Ordinance are real and which are not. For example, what is a real permitting timeline?

An effective Ordinance will require quantitative CWE thresholds and a spatial resolution finer than HUC 12 watershed areas. Humboldt County General Plan WR-P5 specifically requires the same: The Board of Supervisors shall designate all or portions of watersheds as "*Critical Watersheds*" if cumulative impacts from existing or planned land and water resource uses within the area have the potential to create significant environmental impacts to threatened or endangered species; including Chinook salmon, coho salmon or steelhead. Land and water resources with Critical Watersheds shall be protected by the application of specific standards [underline mine] for such areas to avoid the take of threatened or endangered species." This quantitative CWE accounting with specific standards can begin by focusing on familiar physical variables measured via remote sensing. Lindsey Holm, GIS Analyst for Friends of the Eel River, measured 6.4 road miles per square mile in the Redwood Creek Watershed near Garberville, and found that U.S. Forest Service Region 5 has a road density of 1.8 miles per square mile. A threshold road density computed from a finer spatial scale than HUC-12 would provide a measureable threshold (i.e., 'specific standard') that looks beyond immediate parcel

boundaries. At a minimum, BMPs could be ramped-up whenever present/future road density exceeds specific road density thresholds of CWE potential provided in the Ordinance.

In conclusion, proponents may consider this Final Draft a good first step forward, politically, but the Ordinance is clearly a step backward, environmentally, for the County's watersheds and uncertain future of its salmon and steelhead populations. Humboldt County residents that value watershed and river health, including wildlife and salmon/steelhead populations, should expect more County guidance than this environmentally irresponsible Ordinance provides.

A handwritten signature in blue ink, appearing to read "William Trush", with a long horizontal flourish extending to the right.

William Trush
Co-Director HSU River Institute
wt1@humboldt.edu

4 WATERCOURSE CROSSINGS

The greater the number of watercourse crossings in a watershed, the greater the potential for cumulative watershed effects. Even a few poorly constructed or unmaintained crossings that are hydrologically connected to the stream can cause watershed impairment.

Watercourse crossings were identified in ArcGIS by intersecting CALFIRE's watercourse layer and the updated road layer described above. While CALFIRE's watercourse layer is the most detailed watercourse mapping available, it is only updated from the USGS watercourse layer as timber harvest planning occurs. Most of the Redwood Creek watershed is in small parcels that have not had recent timber harvesting and as a result, the resolution of the CALFIRE watercourse layer is low. Consequently, this analysis underestimates watercourse crossings.

193 watercourse crossings were identified in the Redwood Creek watershed.

Roads and Grading in the Redwood Creek watershed, Southern Humboldt County

1 ANALYSIS AREA

The Redwood Creek watershed (HUC 12 180101060402).

2 ROADS

Road miles were calculated in ArcGIS using the USGS National Transportation Dataset (NTD), CALFIRE's road layer, and aerial imagery. Google earth imagery (1993-2014) and the National Agriculture Imagery Program (NAIP, 2016) were used to add road segments where they were clearly missing, correct inaccurate segments, and delete segments that were clearly in error.

Some areas of the watershed are densely forested and roads are not visible, even though a residence is present. Therefore, road miles calculated in this analysis are an underestimate.

Total road mileage in the Redwood Creek watershed is 6.4 miles per square mile. This value is high compared to other forested watersheds. Forest Service Region 5 (the region closest to Redwood Creek), has 1.79 road miles per square mile [calculated from USDA Land Areas Report (2011) and USDA National Forest System Road Management Strategy Environmental Assessment (2001)]

3 GRADING

We defined grading as the use of heavy equipment to move greater than 50 cubic yards of soil. Grading was quantified by digitizing the area of ground disturbance for marijuana grows visible on google earth. Grading areas that were older than about 5 years, indistinct, or that appeared to be on flat ground were not included. Care was taken to distinguish mowing and forest clearing from grading.

55 grading sites totaled 22 acres. Assuming a 0.5 foot grading depth, which is conservative, grading totaled 17,783 cubic yards.

Cubic yards were calculated as follows using Calculate Geometry and the Field Calculator tools in ArcMap.

$$\text{Square feet} \times 0.5 \text{ feet} = \text{cubic feet}$$

$$\text{Cubic Feet} \div 27 = \text{cubic yards}$$

Low Flow Stream Discharge Monitoring Report for the Redwood Creek Watershed, 2015-17

Randy Klein, Hydrologist

Revised February 1, 2018

Prepared for the Salmonid Restoration Federation

Isolated pool in lower mainstem Redwood Creek, September 24, 2015. R. Klein

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Introduction

Through grants provided by the State of California, the Salmonid Restoration Federation was able to begin watershed-wide monitoring of low flows on Redwood Creek near Redway, California, in 2015, building on previous (2013-14) data collection by Bill Eastwood, long time Redwood Creek resident and watershed restoration practitioner. This report presents data collected during the three-year study period for this project (summers of 2015-17) as well as earlier data (2013-14) collected for a separate project. Both 'spot' discharge data (single measurements made during site visits) from mainstem and tributary sites and continuous discharge records from three of the six mainstem sites along Redwood Creek are presented in graphical form.

The objectives of hydrologic monitoring are to: 1) quantify low flows at a variety of sites selected to represent potential juvenile salmonid rearing habitat; 2) identify locations within Redwood Creek where low flows appear to be most severely impaired by human uses; 3) identify locations where low flows appear to be relatively unimpaired and 4) prioritize stream reaches for actions to augment low flows to optimize benefits to juvenile salmonids; and 5) assist public trust agencies in developing science-based policies aimed at restoring and preserving adequate stream flows for sustaining aquatic ecosystems.

The low flow monitoring and enhancement program underway in Redwood Creek is modeled, in part, on that pioneered in the Upper Mattole River basin by Sanctuary Forest, a local non-profit. Klein and others (in press) inferred that, after installation of over 5 million gallons worth of tank capacity in the Upper Mattole, low flows had been measurably improved. Most of the increase in storage has been from landowners participating in a forbearance program whereby they agree to cease pumping water from stream channels when notified that a threshold has been reached, thereafter relying on stored water until the low flow season ends. The success of this program, particularly in an era of increasing water demands and drought severity, provides a model for replication elsewhere, and the Salmonid Restoration Federation's Redwood Creek project is poised to replicate such a program.

This brief revision to the earlier version dated March 27, 2017, adds data and plots from down-scaled monitoring done in 2017. The text is revised in the areas affected by inclusion of the 2017 data.

Factors Affecting Low Flows

A variety of factors influence low flows, such as, climate (rainfall, temperature, fog, relative humidity, wind speed), vegetation species and age distribution, ground disturbance, streambed sediment depth, and water use for domestic and agricultural purposes. Of these, only vegetation, ground disturbance, human water use, and possibly riparian aquifer storage are subject to human influences and therefore might be modified to improve low flows.

Stubblefield and others (2012) measured water use by trees in the nearby Mattole River, finding that although older and larger trees use more water, dense, younger tree stands use more per unit area. They project that as forests are allowed to mature, the declining numbers of young trees will result in less total water use by forested areas. This, of course, assumes forests will be maturing despite ongoing timber harvest and future stand-replacing wildfires, should they occur.

Sawaske and Freyberg (2014) analyzed stream gaging records from Pacific coastal streams, finding that although spring discharge recession rates have remained relatively constant for the past four to eight decades, summer recession rates have increased. Their results agree with those of Asarian and Walker (2016), who found that although precipitation-adjusted streamflow at pristine sites had not declined, September streamflow declined at 73% of un-dammed sites in Northwest California and Southwest Oregon in the latter part of the available record. They attributed this to water withdrawals and vegetation changes rather than precipitation or other climatic changes.

The burgeoning cannabis industry in North coastal California and its potential effects on streamflow is a topic of daily discussion and debate, a debate largely unsupported by quantitative analysis. Cannabis grows require water, but there is very little data on the volumes or locations of water use by this industry. Bauer and others (2015) conducted aerial inventories of 'grows' (signified by large greenhouses and outdoor gardens) relying primarily on Google Earth's high-resolution images with some level of verification derived from law

enforcement activities on the ground. When their study was done in 2012, Bauer and others (2015) estimated that, for the redwood region, from 23% to 100% of summer flows may be withdrawn for use by this industry, but that deriving more accurate numbers was hampered by grows being typically clandestine operations located on private property. Whatever the true rates of water withdrawals for cannabis growing operations (and they have likely risen since 2012), their proliferation adds to the cumulative effects of the other human-caused decreases in streamflows mentioned above.

Redwood Creek Watershed Study Area

Joining with the South Fork Eel River near Redway, CA, Redwood Creek drains a basin area of about 26 square miles of forested steepplands. Historic land uses were dominated by timber harvest, which continues to the present. Rural residential and small-scale agriculture compose other land and water uses. The town of Brice land is located near the centroid of the watershed and Redway is downstream near the watershed's outlet. Coho, Chinook, and steelhead have historically thrived in Redwood Creek, and reaches of high quality habitat still exist in the watershed.

Much more detailed information can be found in the South Fork Eel River section of the Coastal Watershed Planning and Assessment Program (CWPAP), a California Department of Fish and Wildlife (CDFW) program conducting fishery-based watershed assessments along the length of the California coast. The program's report is located at [http://coastalwatersheds.ca.gov/Watersheds/NorthCoast/EelRiver\(SouthFork\).aspx](http://coastalwatersheds.ca.gov/Watersheds/NorthCoast/EelRiver(SouthFork).aspx).

Study Design

The 2015-17 study design utilized most of the sites monitored in 2013-14 and added several additional sites. Table 1 provides watershed information for areas upstream from the monitoring sites, and the types of monitoring at each site (some data acquired from USGS StreamStats, 2015). The accompanying map (see Appendix B) shows watershed geography and the locations of hydrologic monitoring in 2015-17 (Note that only a subset of sites was monitored in 2017)..

At present, the factors controlling discharge rates within the watershed are not well understood (see above) and generally cannot be controlled, so a controlled experimental design could not be used. Alternatively, the sites were sorted into two groupings that lend themselves to comparisons: a) six mainstem sites (URC-1, RC-1, RC-2, RC-2.5, RC-3 and RC-4) that will support longitudinal trend analyses, and b) seven tributary sites (URC-1, CC-2, DC-1, BC-1, MC-2, MC-1, and SC-1; note that site URC-1 served as both a mainstem and a tributary monitoring site).

Table 1. Watershed and channel attributes and monitoring for Redwood Creek monitoring sites.

Redwood Creek Monitoring Site	Site Code	River Mile Upstream from Mouth*	Drainage Area (mi ²)	Max. Elev. (feet)	Min. Elev. (feet)	Relief (feet)	Mean Basin Elev. (feet)	Mean Basin Slope (%)	Monitoring Parameters **
Mainstem Redwood Creek	RC-4	0.4	25.8	2371	292	2079	1023	32.7	Q, WT, AT
Mainstem Redwood Creek	RC-3	2.0	23.5	2371	350	2021	1037	32.3	MS, CS, Q, WT, AT
Mainstem Redwood Creek	RC-2.5	2.7	17.1	2361	434	1927	1065	31.6	MS, CS, Q, WT, AT
Seely Creek*	SC-1	2.1	5.8	2371	350	2021	977	34.0	MS, CS, Q, WT, AT
Mainstem Redwood Creek	RC-2	4.5	14.0	2361	555	1806	1081	31.2	Q, WT, AT
Upper Miller Creek*	MC-1	5.3	3.4	2361	602	1759	1176	29.7	Q, WT, AT
Lower Miller Creek*	MC-2	5.3	3.6	2361	579	1782	1166	29.6	MS, CS, Q, WT, AT
Buck Creek*	BC-1	5.3	0.8	2361	798	1563	1492	34.2	Q, WT, AT
Mainstem Redwood Creek	RC-1	6.2	6.7	1755	589	1166	1041	31.5	MS, CS, Q, WT, AT
Dinner Creek*	DC-1	6.3	1.0	1727	784	943	1122	32.0	Q, WT, AT
China Creek*	CC-2	6.3	3.9	1742	598	1144	1044	31.6	MS, CS, Q, WT, AT
Mainstem Redwood Creek	URC-1	6.4	2.7	1755	595	1160	1042	31.5	MS, CS, Q, WT, AT

* river mile distances are to tributary confluence with mainstem; drainage areas are at site.

** MS = manual stage; CS = continuous stage; Q = discharge; WT = water temperature; AT = air temperature.

Data Collection and Analysis

Data collection focused on stream discharges and water temperatures collected at both mainstem and tributary sites. Both manually collected data and automated stage data recorded with electronic data loggers were collected.

Stream Stage

Stream stage (the height of the water surface above a datum) was manually measured in relation to a permanent reference marker (a nail in a tree, typically) and recorded continuously at seven of the sites ('CS' sites in Table 1) by means of an electronic stage recorder, which senses water depth and records and stores the data. The stage recorders were deployed into the stream inside a stilling well (a section of perforated pipe). Electronic stage data were downloaded several times during the season.

Discharge

Periodic discharge measurements were made at each monitoring site using methods appropriate to field conditions at the time of each visit. With adequate flow depth, a Parshall Flume was used. When flow dropped too low to use the flume, flow was consolidated into a length of plastic pipe and discharge was measured by timing the filling of a graduated beaker at the pipe's outfall. Manual stage was recorded during each site visit, including when discharge measurements are made. Thus, data pairs of stage and discharge were accumulated for each site and were used to develop stage-discharge relationships. It is this relationship, usually taking the form of an exponential equation, which allows calculation of both manual and electronic stream discharge from stage observations. The accuracy of estimated discharges varies depending on the strength of the stage-discharge relationship at each site. Variability can be caused by channel complexities at the gaging site, errors in reading stages, and errors in measuring discharge.

Data Treatment and Analyses

Manual field data (discharge, stage height, water and air temperature) were entered into spreadsheets soon after data collection. Data logger downloads were processed to adjust for atmospheric pressure and appended into a single data file for each year. Several additional steps were required to prepare the data for analysis, specifically, adjustment of electronic stages to match manual stages, development of a stage-discharge rating equation specific to each site, and finally, computing continuous discharge. For ease of comparison among sites in Redwood Creek that vary widely in contributing drainage area, the discharge data presented herein is expressed as cubic feet per second per square mile of drainage area (cfs/mi²), or 'unit discharge'.

Results

Rainfall Patterns of 2013-17

Figure 1 plots rainfall for 2013-17: 2013 and 2015 stand out as the driest years shown at the end of the winter-spring rainy season (by, say, May 1), with 2014, 2016 and 2017 at two, three and four times wetter, respectively, compared to 2013 and 2015. Near record low rainfall leading up to the 2015 low flow season (14.4 inches by May 1), similar to 2013 (11.5 inches by May 1), combined with delayed onset of rainfall events in the fall, caused many streams to go dry for a substantial portion of the low flow season. In 2015, rainfall essentially stopped in early April and didn't resume in earnest until late November. By contrast, 2016 rainfall was far greater, accumulating to 38.4 inches by May 1, and rainfall ended the 2016 dry season by mid-October with a series of intense storms lasting through the end of the year (Fig. 1). With 2017 providing the largest depth of rainfall as the dry season approached (over 50 inches), one would expect streamflows of the 2017 low flow season to be much more favorable than earlier years for salmonids. Unfortunately, that was not case at all monitoring sites, as will be shown later.

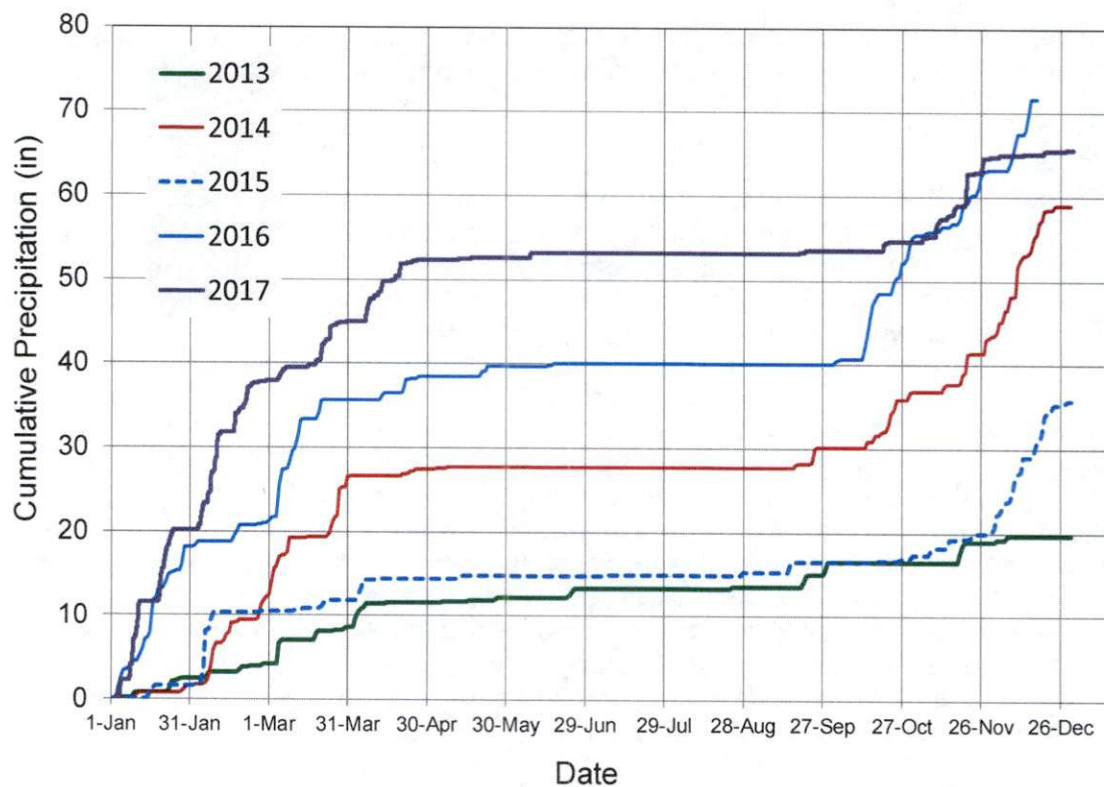


Figure 1. Cumulative calendar year rainfall for 2013-14 for Redwood Creek from the Prism Climate Group's data site (<http://www.prism.oregonstate.edu/>) and the Calfire station 'ERC' at Redway, CA (2015-17).

2015 and 2016 Discharge Measurements by Hydrographic Groupings

As discussed above, rainfall was vastly different between 2015 and 2016, affording an opportunity to compare discharges from two hydrologically distinct sets of conditions. The drought of 2015 extended through late October, punctuated by several small rainfall events (see Fig. 1). In 2016 there were no significant rainfall events between May 24 and October 13, but cumulative rainfall leading up to the dry season was much higher in 2016 than in 2015. In addition, the rain persisted further into the spring recession and began again somewhat earlier than in 2015 (Fig. 1).

Hydrologic monitoring for this project began in June in both 2015 and 2016 and continued through early December, thus including the entire low flow period and the early part of the rainy season. Many of the monitoring sites had periods of zero flow, and some pools that had monitoring went completely dry (see Bill Eastwood's report, attached). Throughout the study area, flows at most sites in 2015 were highly, if temporarily, influenced by small precipitation events. On July 13, 2015 the area received about 0.3 inches of rain, and about 2 inches of rain again on September 16, 2015. Late season rains on October 17 (0.3 inches) and 19 (0.1 inch) brought back flows to RC-3 and RC-2. By mid-October of 2015, rainfall events were sufficient to re-establish flows at all monitoring sites.

Manual discharge measurements were compiled and re-formatted for plotting and used to develop discharge rating curves for converting continuous stage (from the data loggers) to discharge. Plots of measured discharge data using discharge per unit area ('unit discharge' per square mile of contributing watershed area upstream) from 2015 are shown below in Figures 2-3 for the mainstem and tributary sites, respectively [note that URC-1 serves both groups]. Figures 4 and 5 show unit discharges for 2016.

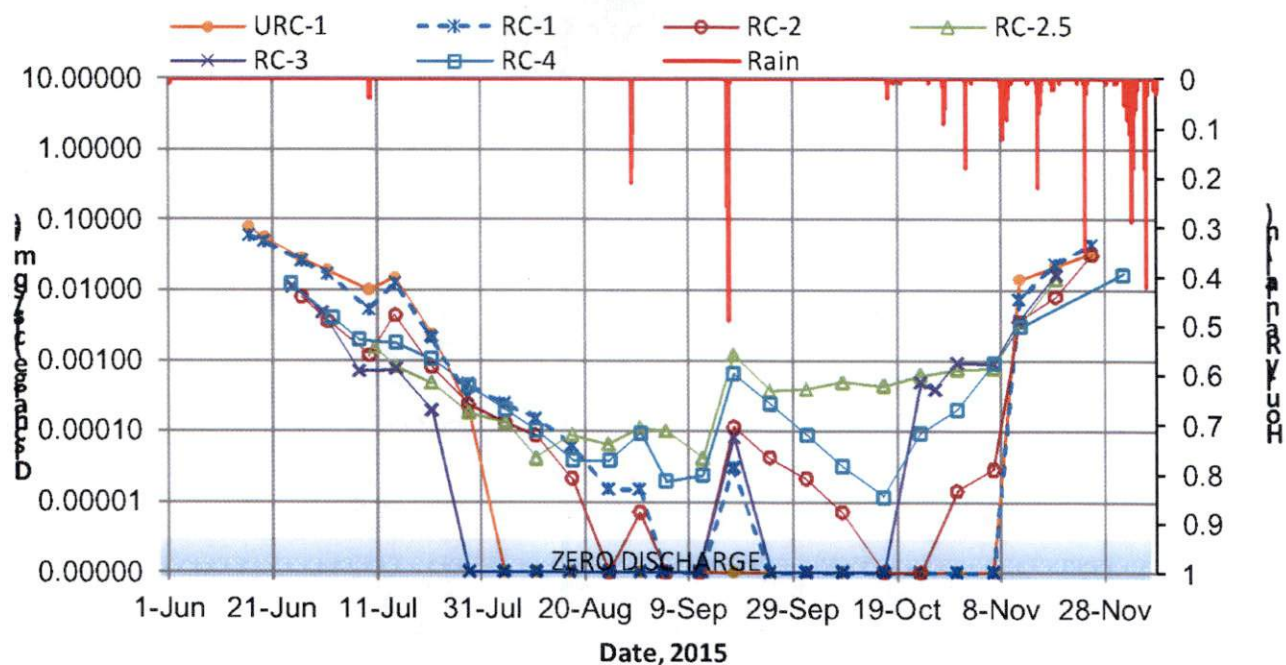


Figure 2. Unit discharge and rainfall at mainstem sites, 2015.

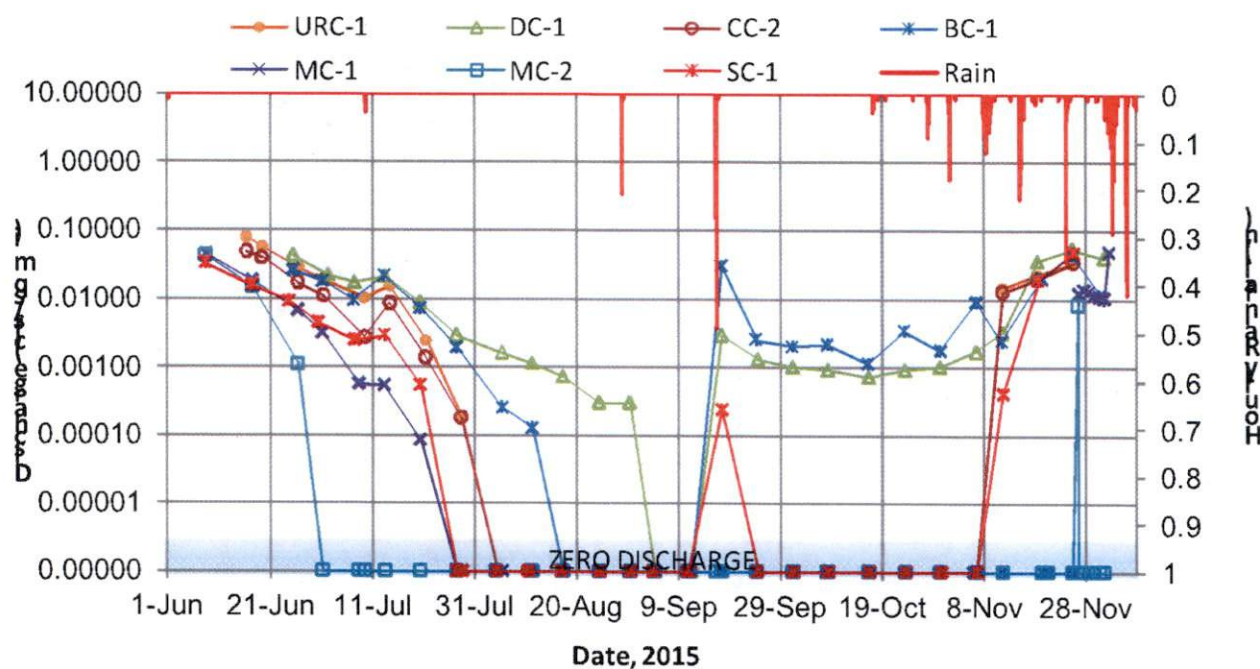


Figure 3. Unit discharge and rainfall at tributary sites, 2015.

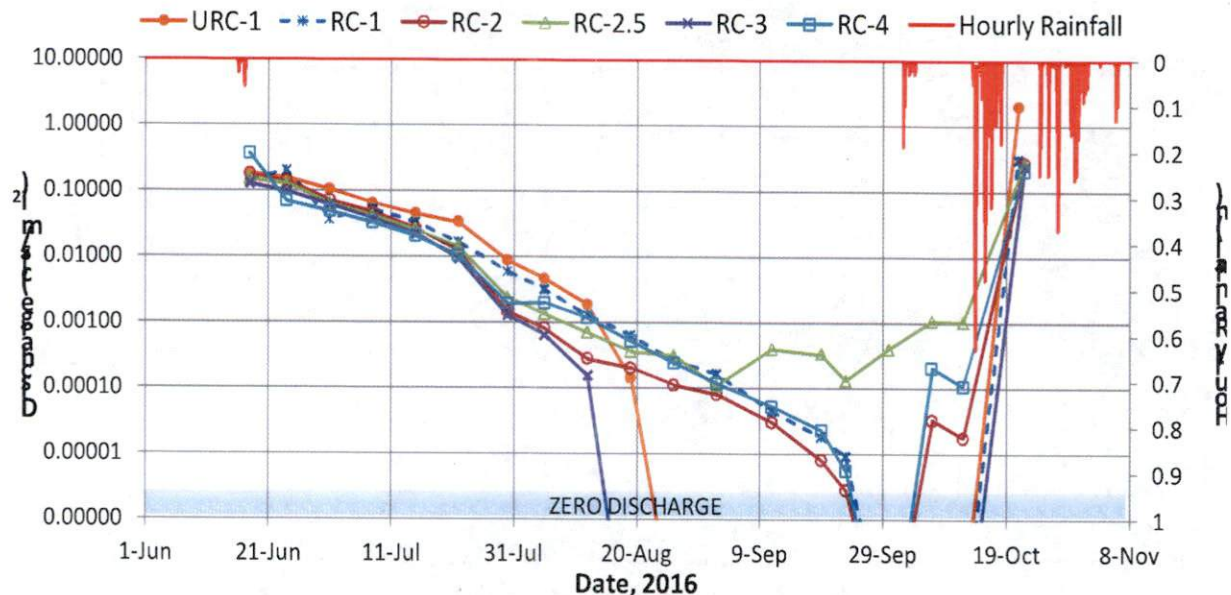


Figure 4. Unit discharge and rainfall at mainstem sites, 2016.

Figures 2-5 illustrate the differences in streamflow between two low flow seasons with differing rainfall. Two rainfall events in mid-summer, 2015, prevented two mainstem sites from going dry (RC-2.5, RC-4, Fig. 2) and caused several tributary sites to rebound after going dry (BC-1, DC-1, and SC-1, Fig. 3). Steady recession of flows in 2016, uninterrupted by rainfall, occurred at all sites from early July through mid-October, when a series of rainfall events ended the dry season (see Figs. 4 and 5). Despite the rainy start to 2016, only two sites had continuous flows throughout the dry season: mainstem site RC-2.5 (Fig. 4) and Buck Creek (BC-1, Fig. 5). Even though the other sites went dry for a part of the low flow season, the periods of zero discharge were much shorter than in 2015.

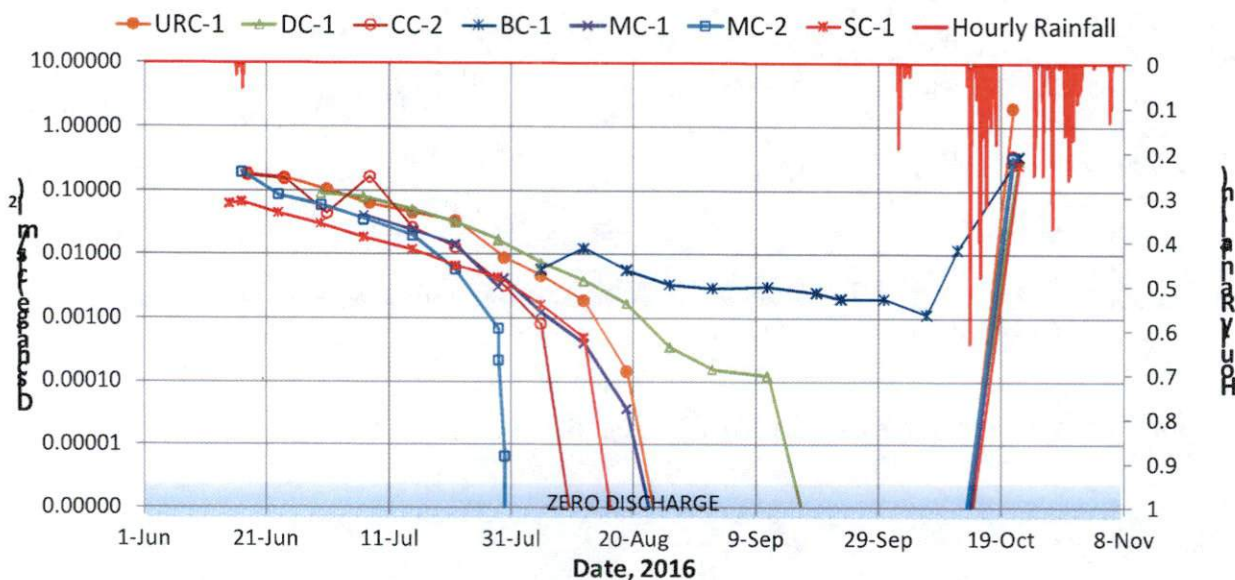


Figure 5. Unit discharge and rainfall at tributary sites, 2016.

Discharge Measurements by Site, 2013-2017

Figures 6 through 17 show unit discharge (cfs/mi²) for the entire periods of record for mainstem and tributary sites. Six sites had measurements going back as far as 2013, providing a somewhat longer view of annual trends beyond our study period for this project. Of note, in Figure 9, the 2013 data suggest there was continuous flow throughout the dry season at RC-3. This not the case, rather it is an artifact of the gap in measuring discharge from mid-August until late September. Field observations indicated that flow had indeed

ceased at RC-3 from August 15 through September 23, 2013 (Bill Eastwood, pers. comm. 2017).

While most mainstem and tributary sites had periods of flow cessation, several stand out as more resilient. Mainstem sites RC-1, RC-2.5, and RC-4 had continuous flow during 2017, and RC-2.5 had continuous flow for all years of monitoring (2015-17) while RC-4 went dry only two of the five monitoring years (2014 and 2016).

Buck (BC-1, Fig. 15) and Dinner (DC-1, Fig. 17) creeks had the most shortest periods of zero flow among Redwood Creek tributaries. BC-1 had flow throughout the 2016 dry season, and the periods of flow cessation at DC-1 were relatively brief. As with RC-3 (see above) in Figure 14, the 2013 data for SC-1 suggest there was continuous flow throughout the dry season, but field observations indicated that SC-1 was not flowing from August 5 through September 23, 2013 (Bill Eastwood, pers. comm. 2017).

Oddly, summer flow recession rates in 2013 and 2016 were nearly identical at several mainstem sites (RC-1, Fig. 6; RC-2, Fig. 7; and RC-3, Fig. 9), despite vastly disparate rainfall by May 1 (11.5 in. in 2013 and 38.4 in. in 2016, Fig. 1). This suggests a shift in the hydrology of the areas draining to the main stem Redwood Creek. An obvious area of inquiry would be to look for increasing in water withdrawals over the intervening three-year period.

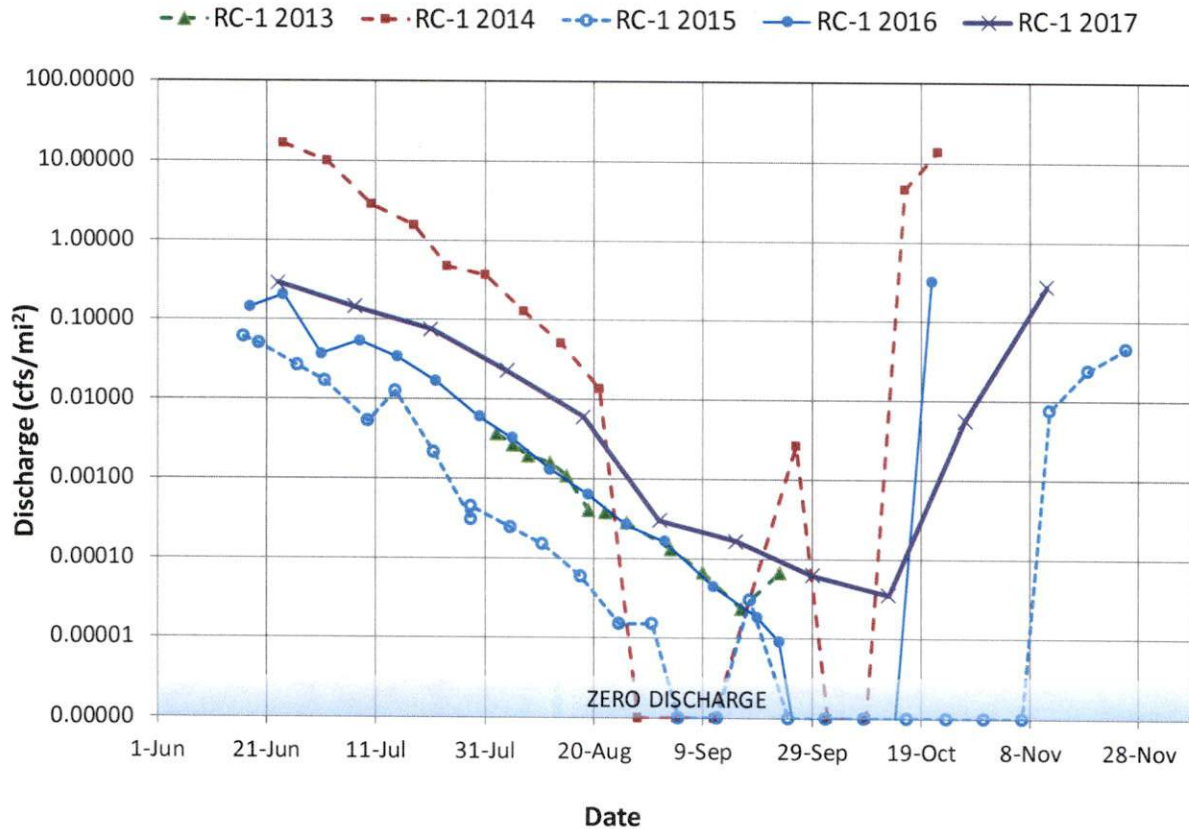


Figure 6. 2013-17 discharge measurements for mainstem site RC-1.

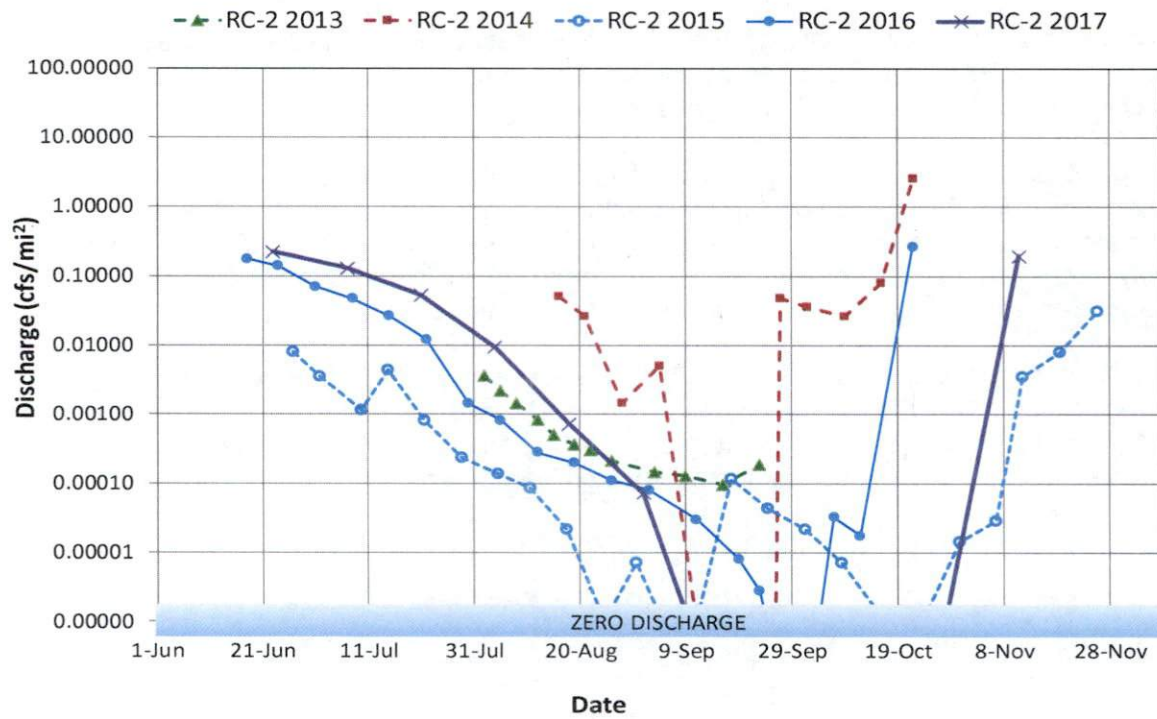


Figure 7. 2013-17 discharge measurements for mainstem site RC-2.

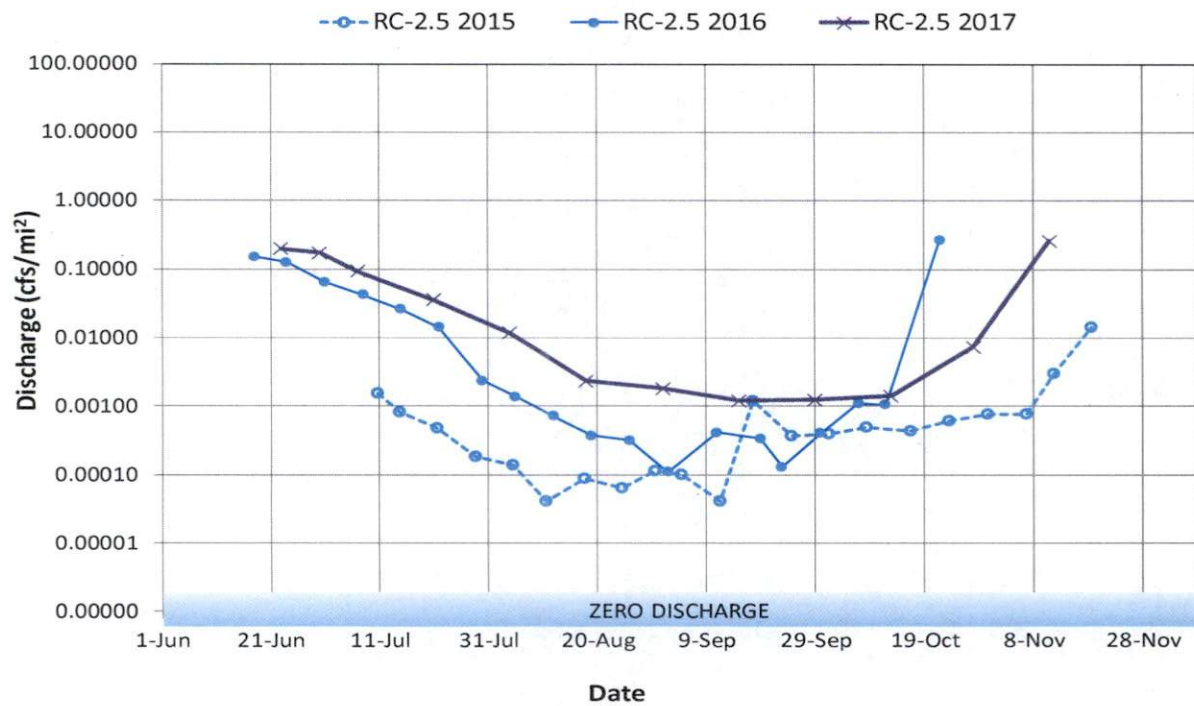


Figure 8. 2015-17 discharge measurements for mainstem site RC-2.5.

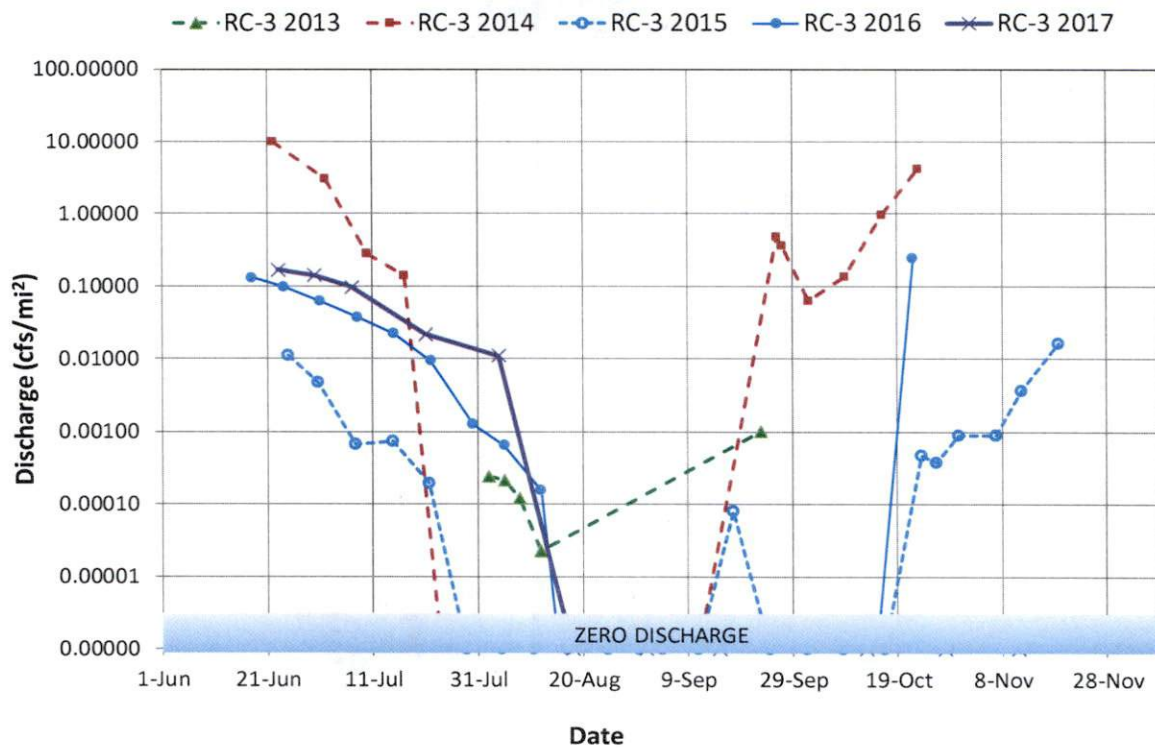


Figure 9. 2013-17 discharge measurements for mainstem site RC-3.

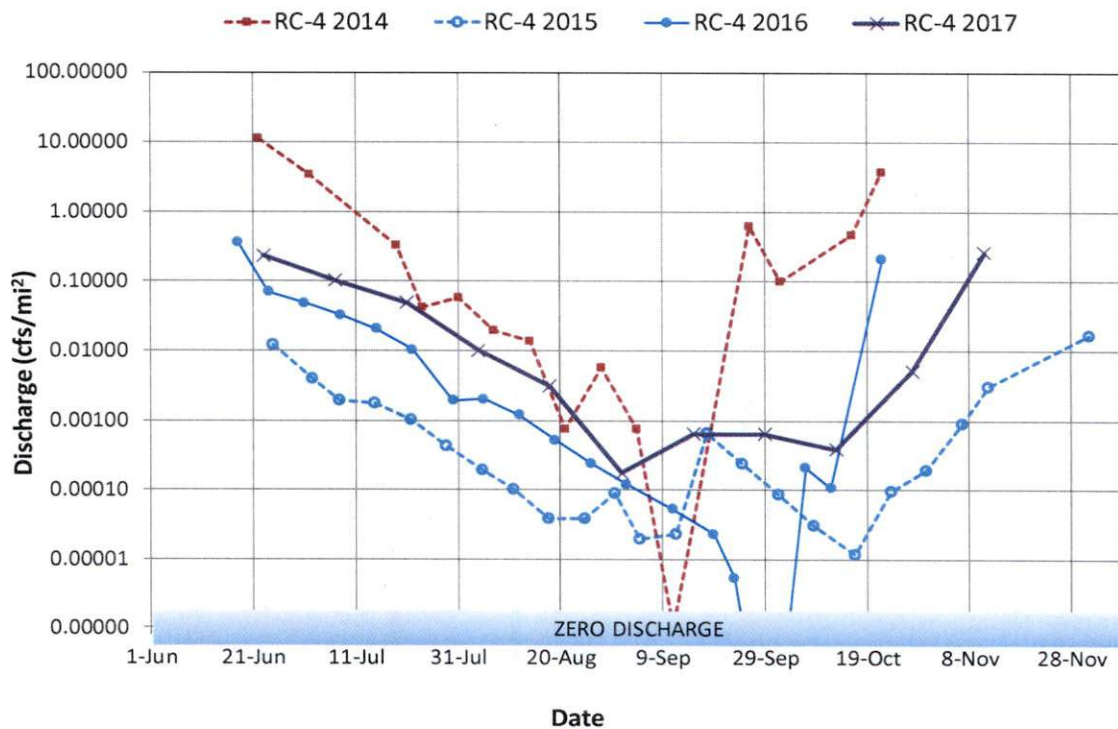


Figure 10. 2014-17 discharge measurements for mainstem site RC-4.

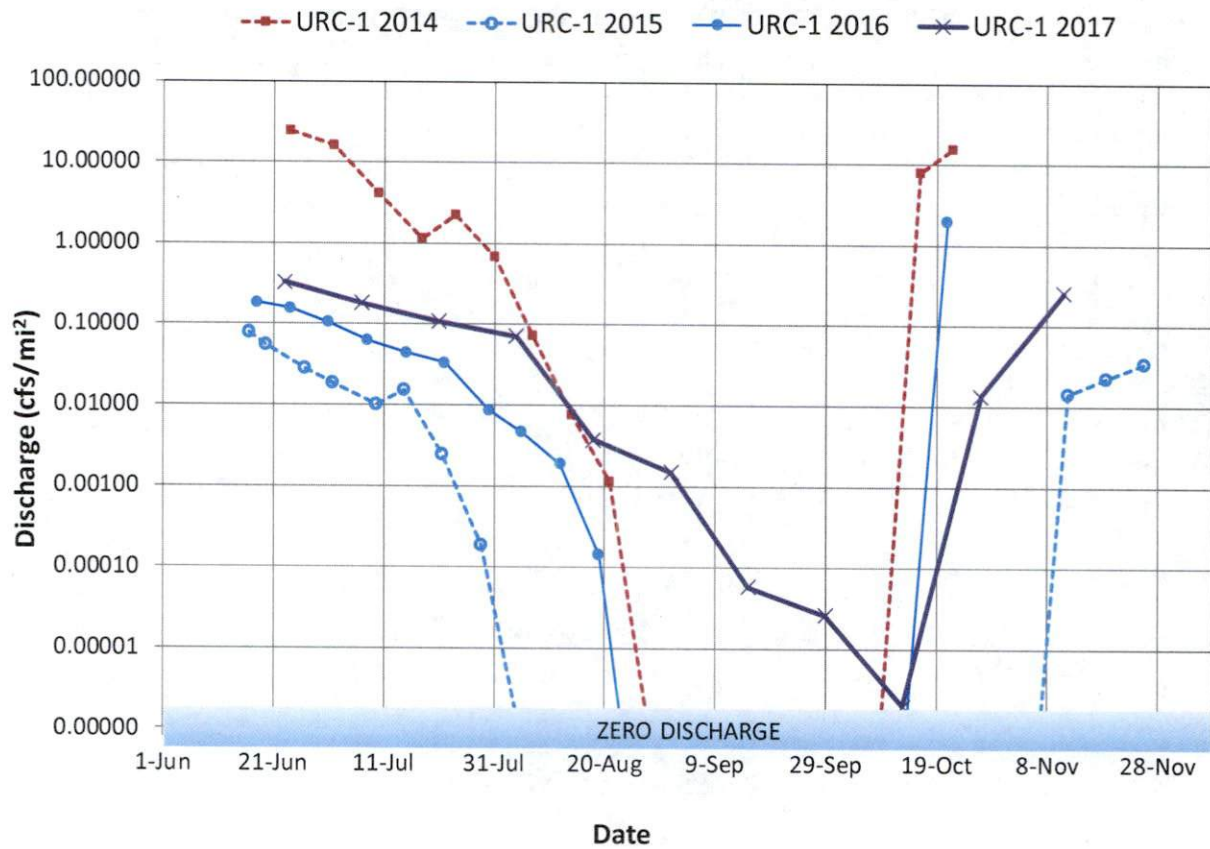


Figure 11. 2014-17 discharge measurements for mainstem/tributary site URC-1.

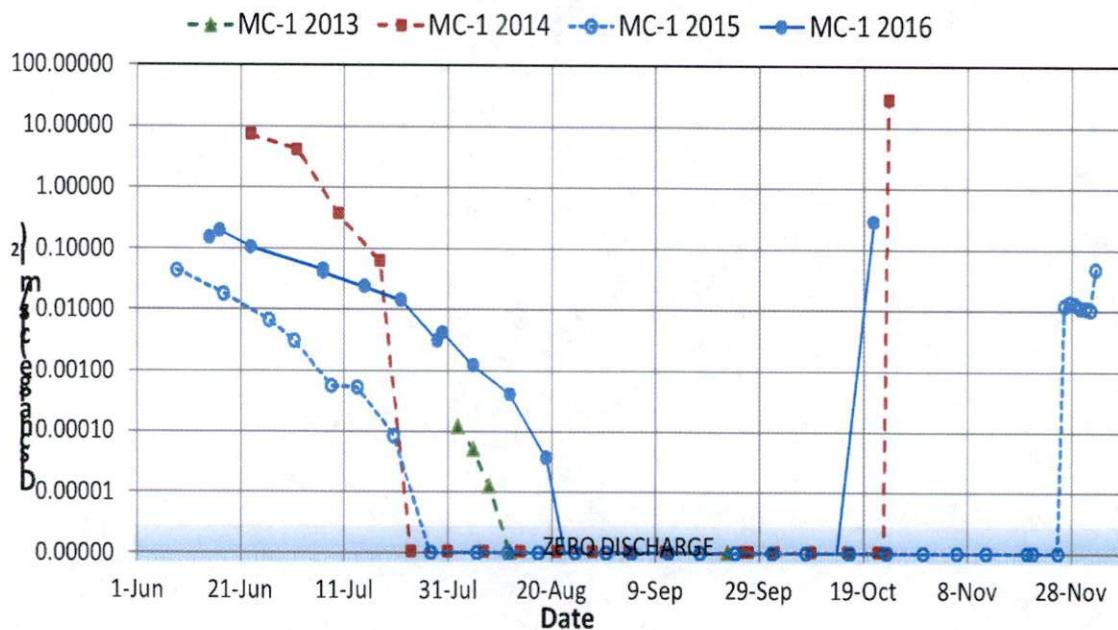


Figure 12. 2013-16 discharge measurements for tributary site MC-1.

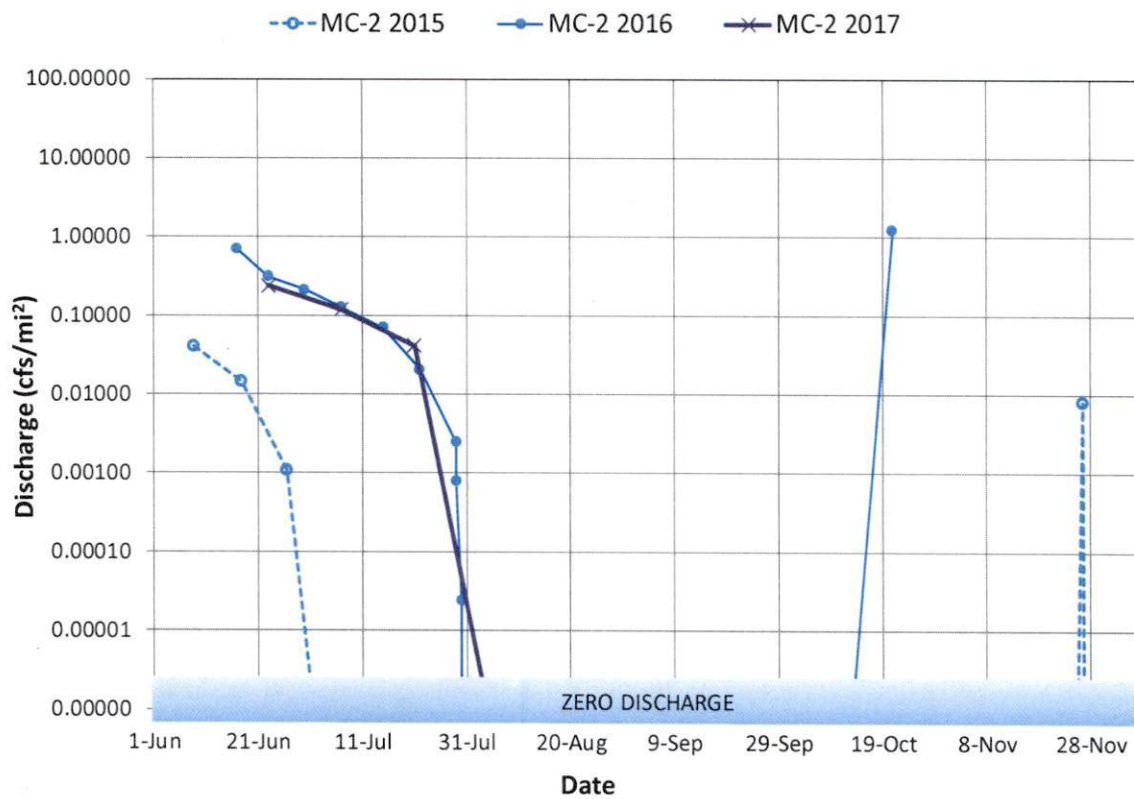


Figure 13. 2015-17 discharge measurements for tributary site MC-2.

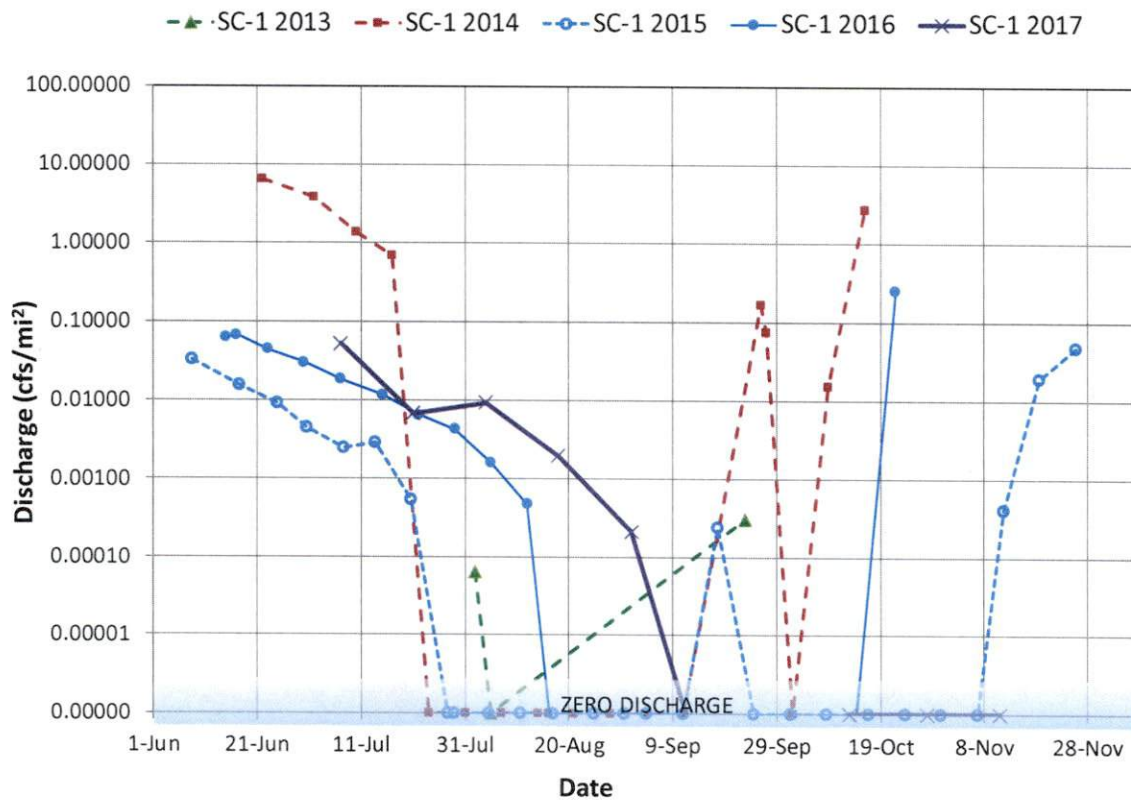


Figure 14. 2013-17 discharge measurements for tributary site SC-1.

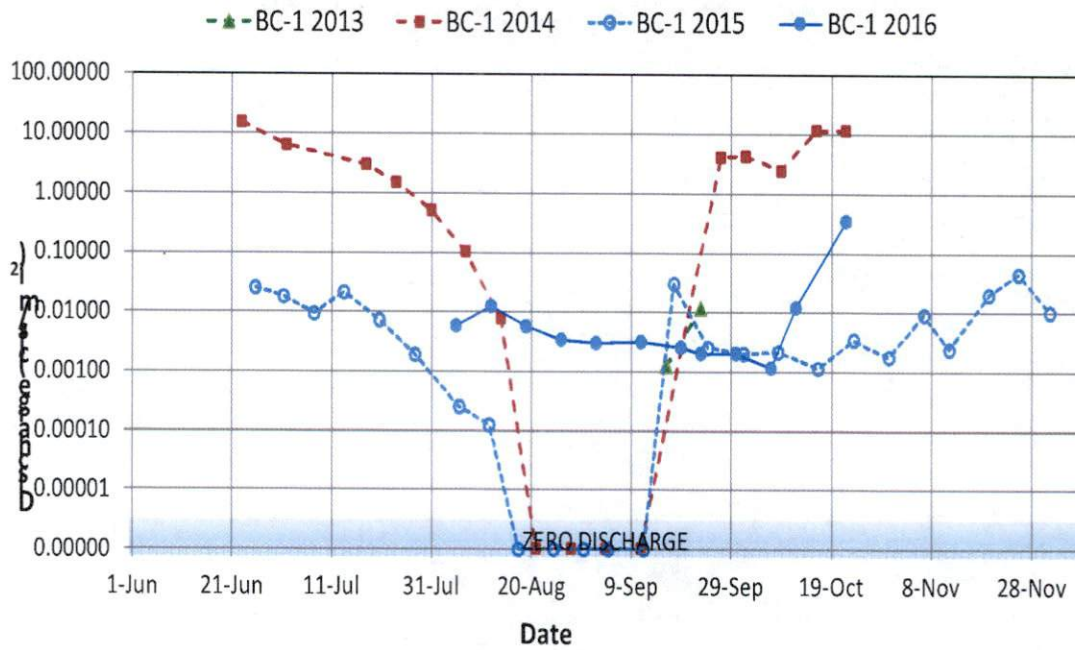


Figure 15. 2013-16 discharge measurements for tributary site BC-1.

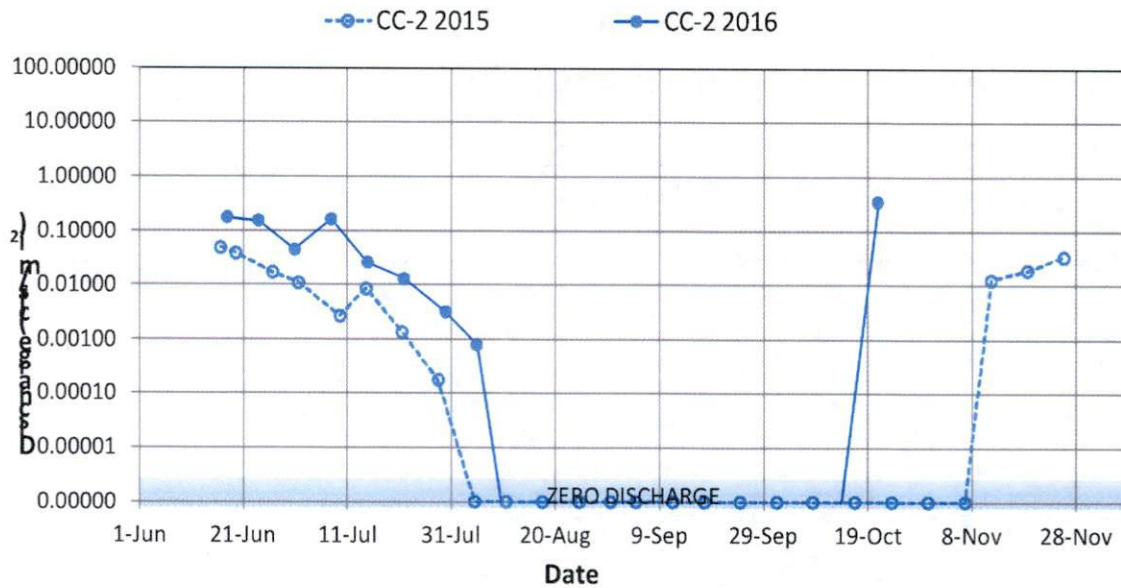


Figure 16. 2015-16 discharge measurements for tributary site CC-2.

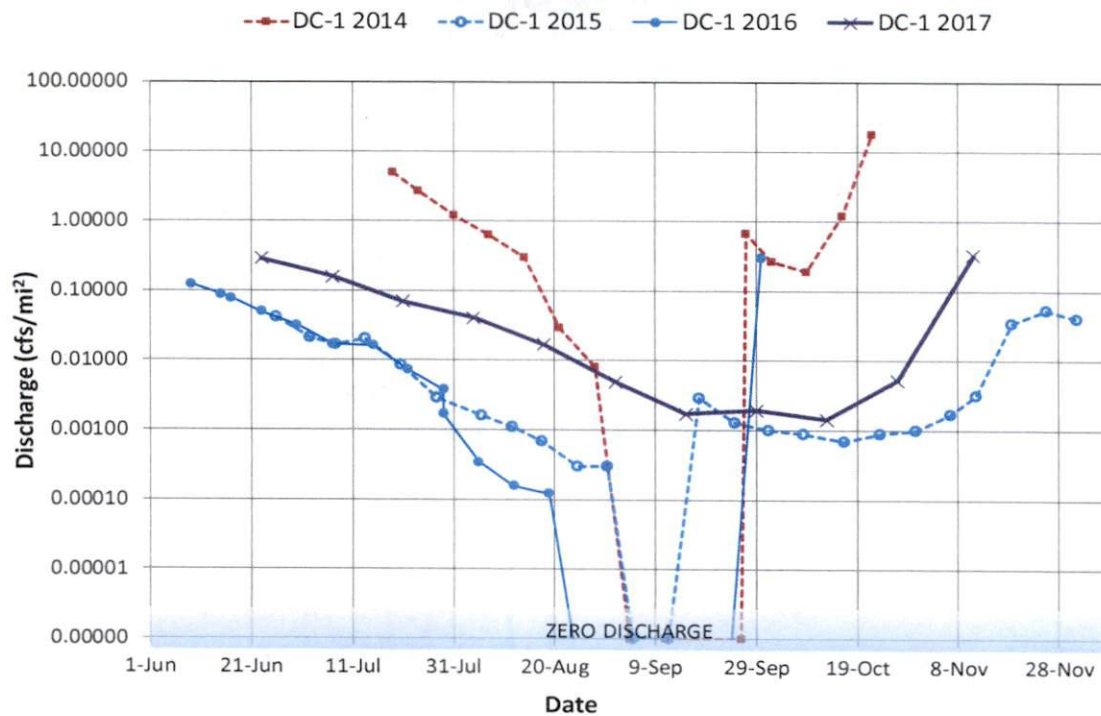


Figure 17. 2014-17 discharge measurements for tributary site DC-1.

The year-to-year variability of drought severity is primarily a result of several factors described earlier, with the most important driver being rainfall leading up to the dry season. The data collected since 2013 generally validate this, but certainly water extraction can also have a large effect. However, the rate and timing of water extraction is a proverbial 'moving target' and unquantifiable for all practical purposes. Figure 18 provides a potential means of evaluating time trends in water extraction. The averages of discharge measurements made in August and September of each year (the driest months) are plotted along with the May 1 cumulative rainfall as a percentage of the 30-year average.

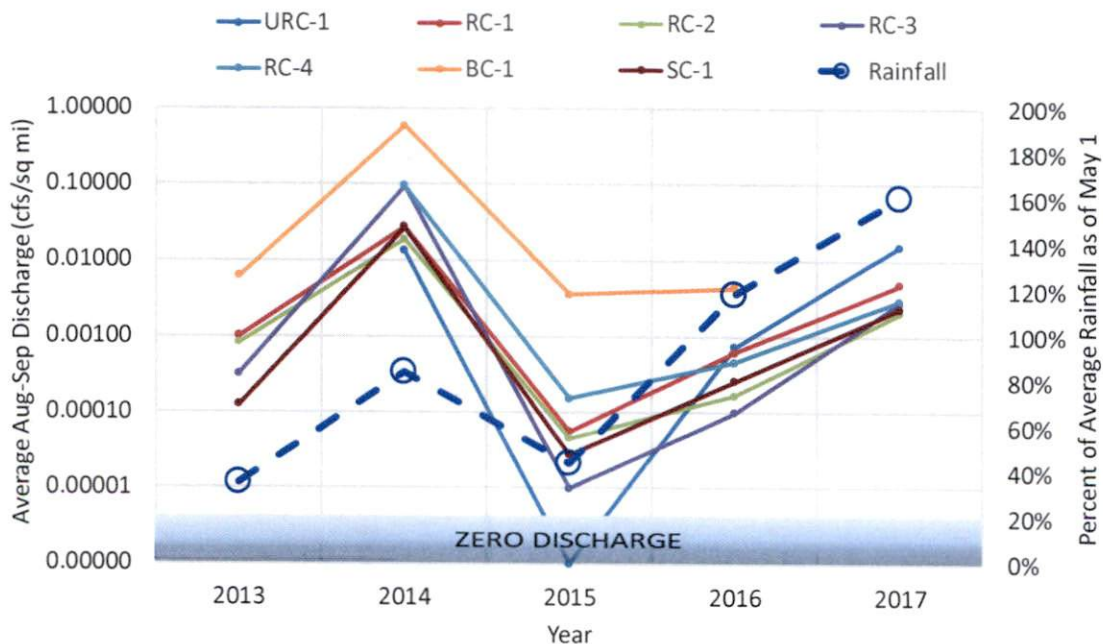


Figure 18. Average discharge for the driest months (August and September) for 2013-17 at several Redwood Creek monitoring sites and percent of average rainfall as of May 1 each year.

Although the general trends evident in Figure 18 are consistent with the obvious direct relationship between

rainfall and streamflow, the trend over the years plotted suggests a shift in the relationship. Discharges were higher relative to rainfall in the earlier years and diminished relative to rainfall in the later years. In particular, with rainfall highest in 2017, discharges were an order of magnitude lower than in 2014. Certainly, several factors could explain this large drop in streamflows in relation to rainfall for the five-year period, but increased water extraction would be a prime suspect among them.

Continuous Discharge from Water Level Recorders, 2015-16

Figure 19 shows 2015 continuous discharge data for the four mainstem sites equipped with data loggers (URC-1, RC-1, RC-2.5, and RC-3). Figure 20 shows the 2015 continuous discharge data for the tributaries. Because discharge at the MC-2 site remained at zero for nearly all of the 2015 data collection period, it is not plotted. Hourly rainfall from the nearby Calfire rain gage at Redway is also plotted. The continuous discharge data, although less accurate than the discharge measurement data because of the need for applying an imperfect rating curve to the recorded stage data, allow more precise determinations of the timing of discharge rises and falls. Note that although data loggers were deployed in 2017, time and budget limitations prevented data preparation and analysis.

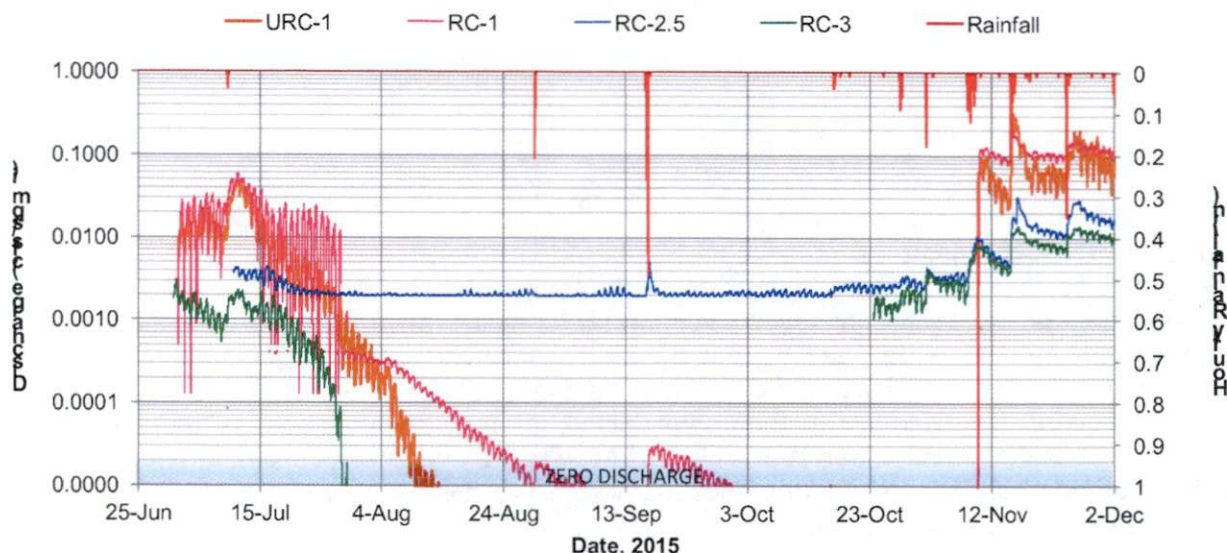


Figure 19. Continuous unit discharge and rainfall at mainstem data logger sites, 2015.

The conspicuous drops in discharge at the beginning of the period at RC-1 from late June through July, 2015, may either be an unexplained artifact of the data logger's recording process or a true depiction of semi-regular periods of discharge fluctuations. Anecdotal knowledge may help explain this phenomenon. If it is the result of periods of instream water extraction, the pumping location would have been very near the data logger site.

All sites except RC-2.5 dropped precipitously beginning in late July, 2015, particularly at RC-3, the downstream-most site. Small rises occurred at RC-1 and RC-2.5 due to a small rainfall event on September 16, 2015. By early November, enough rainfall had accumulated to restore flows at all sites.

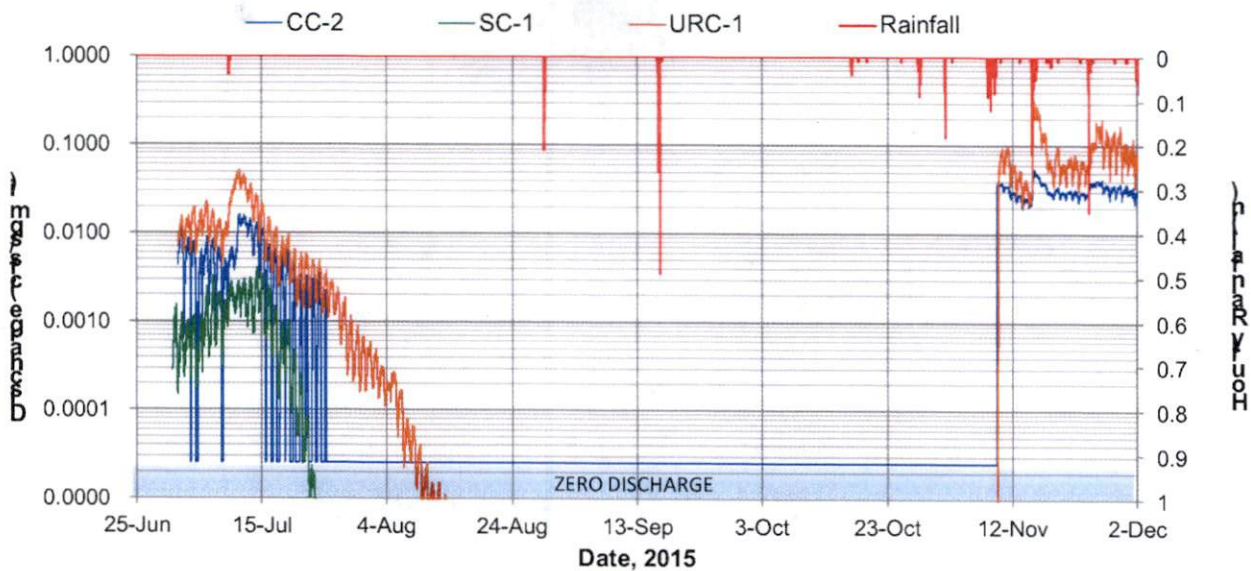


Figure 20. Continuous unit discharge and rainfall at tributary data logger sites, 2015.

Tributary sites behaved similarly to the mainstem sites in 2015, dropping precipitously in the summer, but earlier than the mainstem sites. Site CC-2, like the mainstem site RC-1 above, exhibited semi-regular drops through late July, before dropping to zero discharge. As with RC-1, anecdotal information might reveal whether or not these drops are real and possible causes.

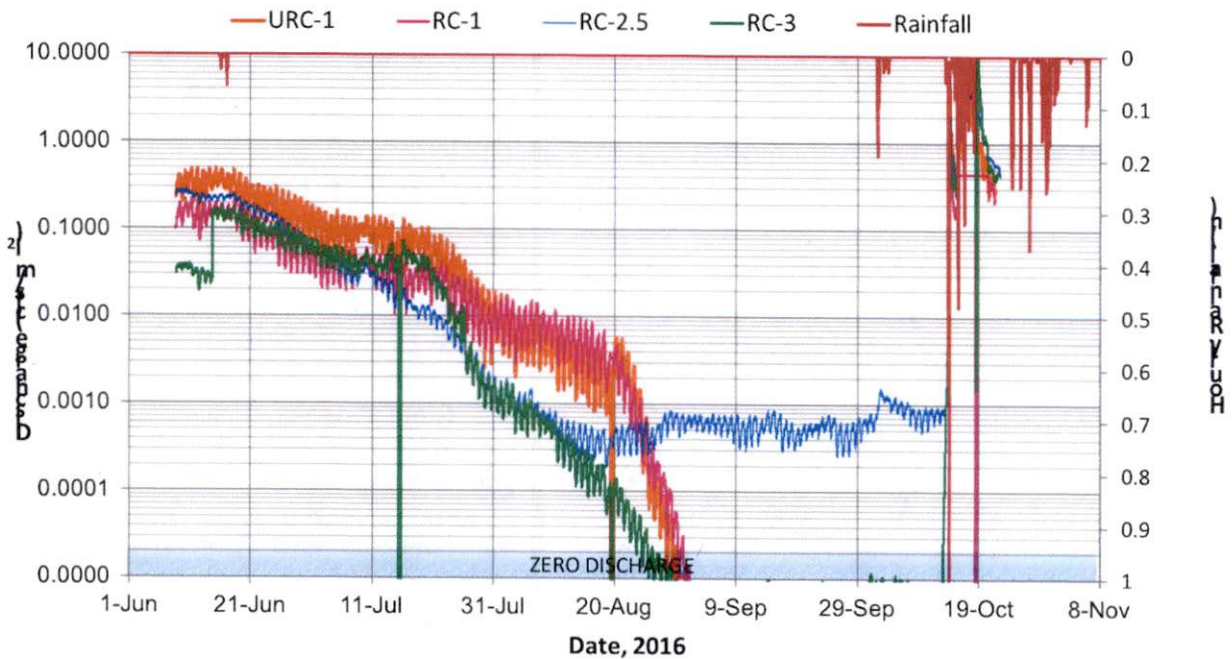


Figure 21. Continuous unit discharge and rainfall at mainstem data logger sites, 2016.

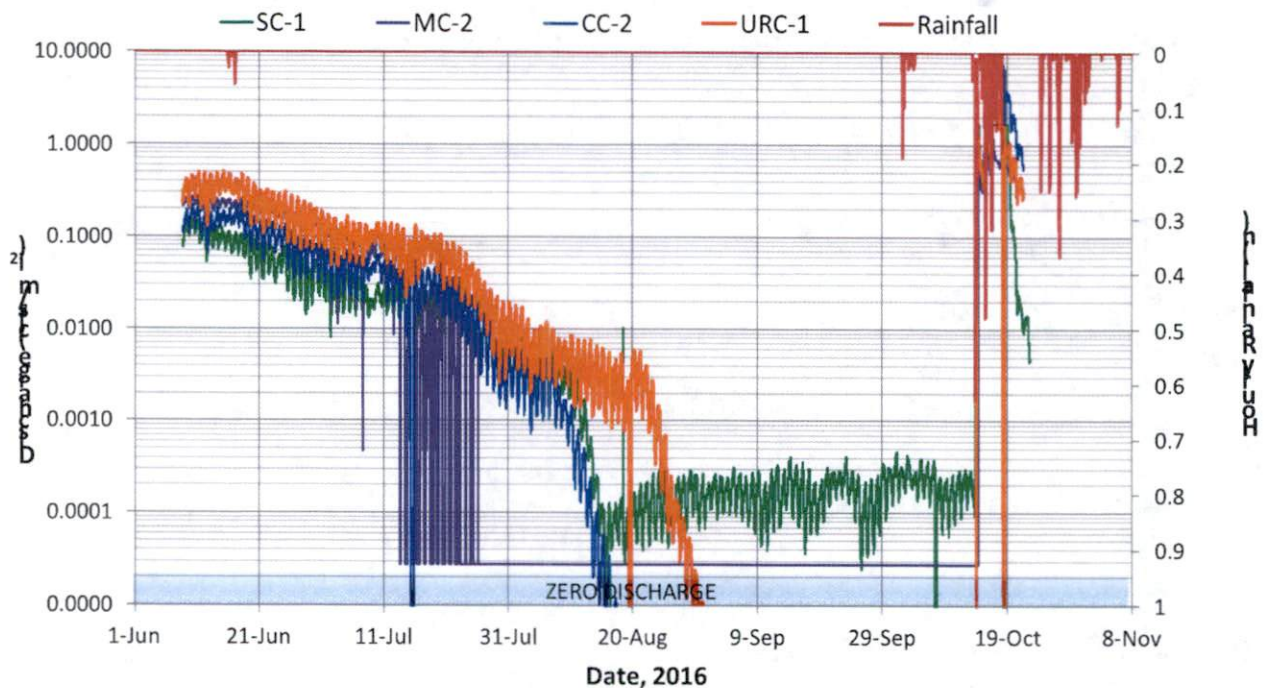


Figure 22. Continuous unit discharge and rainfall at tributary data logger sites, 2016.

Figures 21 and 22 show data logger discharge from 2016 for the mainstem and tributary sites, respectively. As with the spot measurements, flows dropped precipitously at RC-2.5 and RC-3 beginning in July, 2016 (Fig. 22), and resumed with the mid-October rainfall events. Unlike in 2015, the steep decline in flows was delayed at both URC-1 and RC-1 relative to the other two sites, with a rapid decline beginning on August 20. As in 2015, RC-2.5 flows leveled off in early August of 2016 (Fig. 22), after a steep decline, and flowed continuously throughout the season. Tributary sites behave similar to mainstem sites although recessions steepened somewhat earlier. Only SC-1 flowed continuously, or nearly so, in 2016. A small rainfall event October 2, 2016, had little effect on flows, but the larger storm of October 13 brought the dry season to a close.

Longitudinal Discharge Trends

Temporal variations of discharge along the mainstem of Redwood Creek are plotted in Figures 23-25 for 2015-17. As a rule, stream discharge generally increases with increasing watershed area, and the downstream accretion of streamflow is a basic conceptual model in watershed hydrology. However, low flows in Redwood Creek in the years plotted often did not conform well to this model. Site RC-2.5 consistently had higher discharges than both the upstream and downstream sites (RC-2 and RC-3, respectively) throughout the driest part of the summer and fall of 2015 and 2016 (Figs. 23-24), dropping steeply downstream to RC-3 in 2015-16 before recovering somewhat farther downstream at RC-4. This odd phenomenon began by late July in 2015, and early August, 2016, and diminished in 2017 with all mainstem sites except RC-2 flowing continuously throughout the dry season.

Beginning in mid-June, 2016, flows were dropping in a relatively consistent manner along the mainstem. However, beginning in late August this pattern was disrupted by a drop in discharge at the RC-3 site, as occurred in 2015. Farther downstream at site RC-4, flow resumed to a level consistent with the upstream sites through the rest of the low flow season. This odd, and as yet unexplained, phenomenon persisted until early November in 2015, and until mid-October, 2016, when flows increased at all mainstem sites in response to fall rainfall events (see Appendix A for a possible explanation). Interestingly, in 2017, the flow at RC-3 never dropped to zero, unlike the previous two years, suggesting that whatever had been causing the loss of flow over this segment on the mainstem was negated in 2017. It would be highly beneficial to investigate the reason(s) for the apparent improvement in mainstem flow continuity. If it was a result of a change in someone's water withdrawal regime, this would serve as a good example for other landowners.

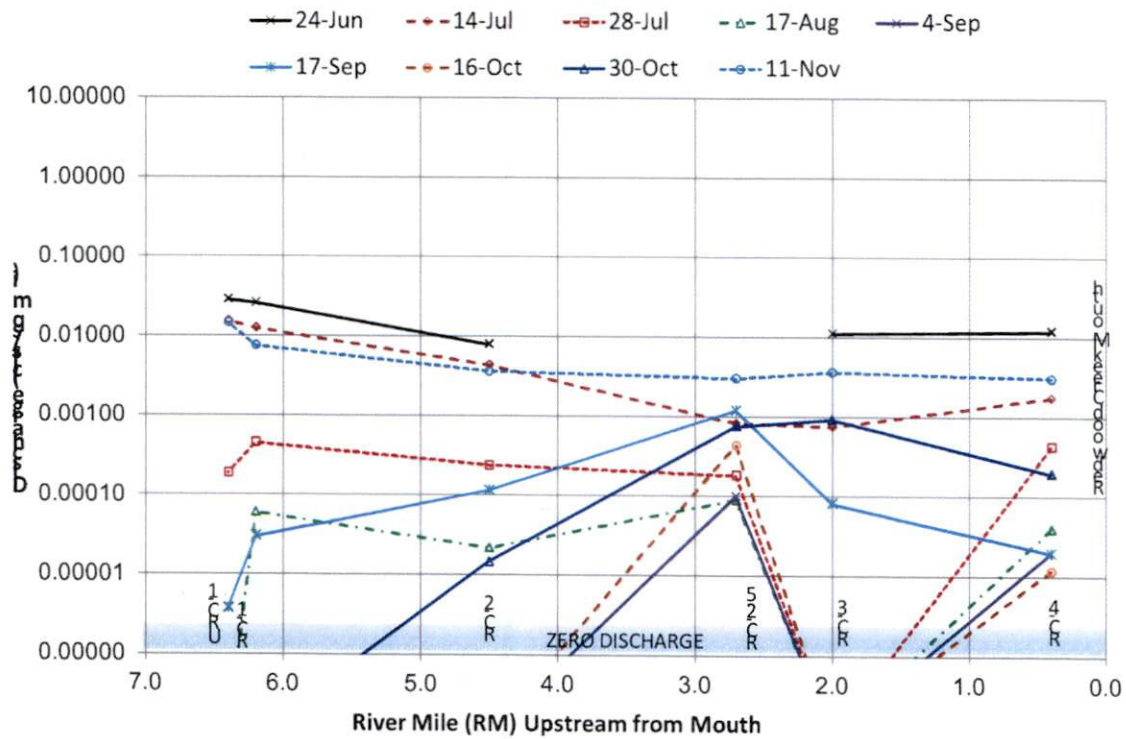


Figure 23. Discharge variations along Redwood Creek at mainstem sites, 2015.

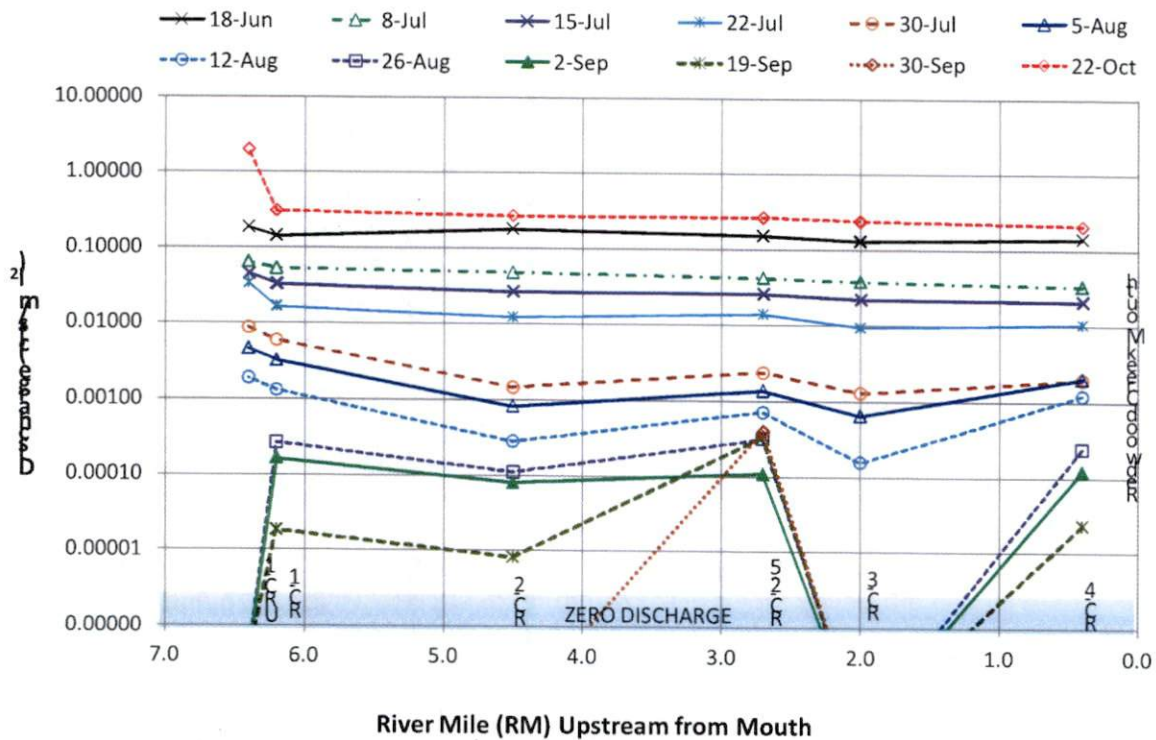


Figure 24. Discharge variations along Redwood Creek at mainstem sites, 2016.

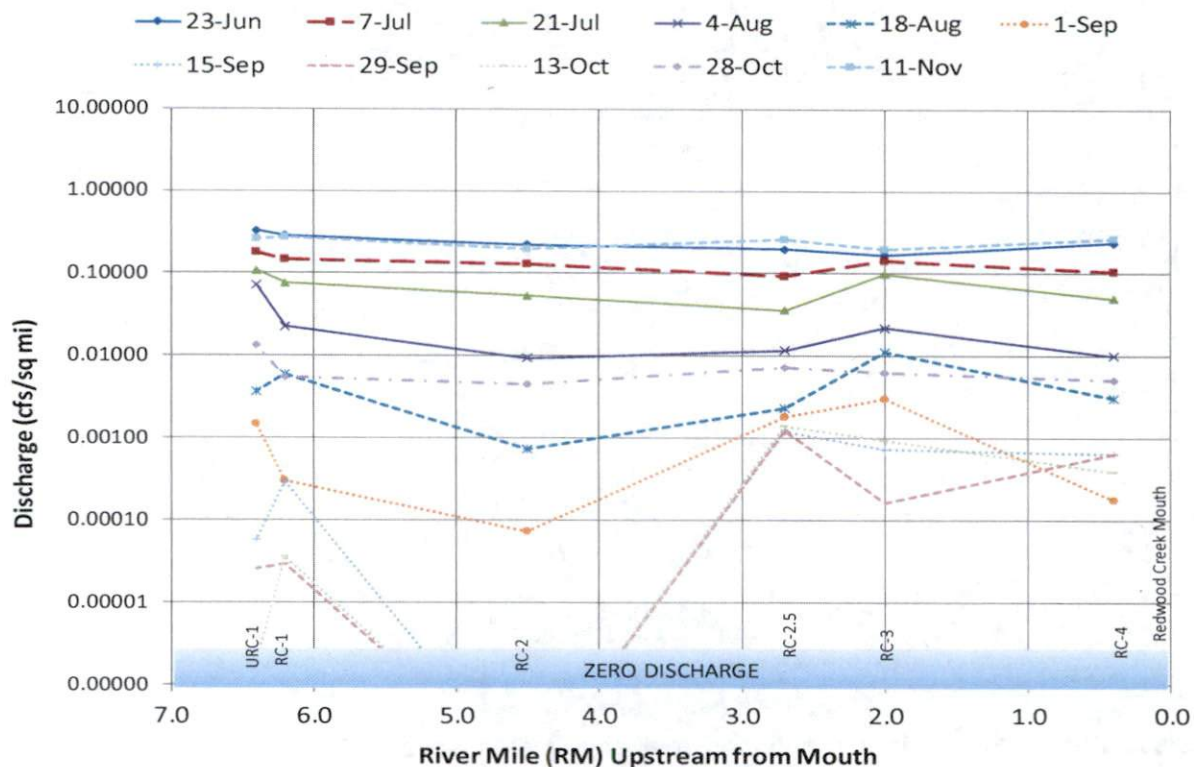


Figure 25. Discharge variations along Redwood Creek at mainstem sites, 2017.

Discharge Estimation and Forecasting Tools

Although not an explicit part of the Redwood Creek monitoring project, developing tools to allow estimation and forecasting of stream discharge would be valuable for Redwood Creek in the future. Klein (2017) investigated this in a similar project in the Upper Mattole River. He found that a USGS stream gaging station downstream of the project area (Mattole River at Ettersburg) as a reference gage with online, real time access was useful for estimating discharge at a key location for the forbearance program. A better tool was ultimately derived using a two-stage estimator, with higher flows based on the reference gage and an exponential recession equation for lower flows. The model assumes no unusual weather phenomena (rain, fog) will interrupt the flow recession during the summer months. The model was provided in the form of a spreadsheet and gave promising results for the dataset examined.

Although Redwood Creek may have no suitable reference gage (although this must first be explored to evaluate the existing candidate gages, such as South Fork Eel River near Miranda and Bull Creek near Weott), other avenues can be explored, such as using daily rainfall data to compute antecedent precipitation index (API). API is a running computation indexing the moisture content of the soil mantle, regolith and aquifers. It is computed by taking each day's rainfall starting before the dry season, adding any new rainfall each day to the previous day's API decayed by a constant. Earlier research (Klein, 2012) indicated the best correlation of API and low flow was derived using a decay factor of 0.98. Figure 26 shows API for 2015 and 2016, again from the Calfire rain gage at Redway, along with discharges measured at DC-1. In 2015, the drier year, API plots almost on top of the DC-1 data, indicating a relatively strong correlation. In 2016, there is similarity in the seasonal trend between API and discharge, but greater variability. Further work, including testing discharge recession coefficients or other parameters, could improve on tools to estimate and forecast discharge at Redwood Creek monitoring sites.

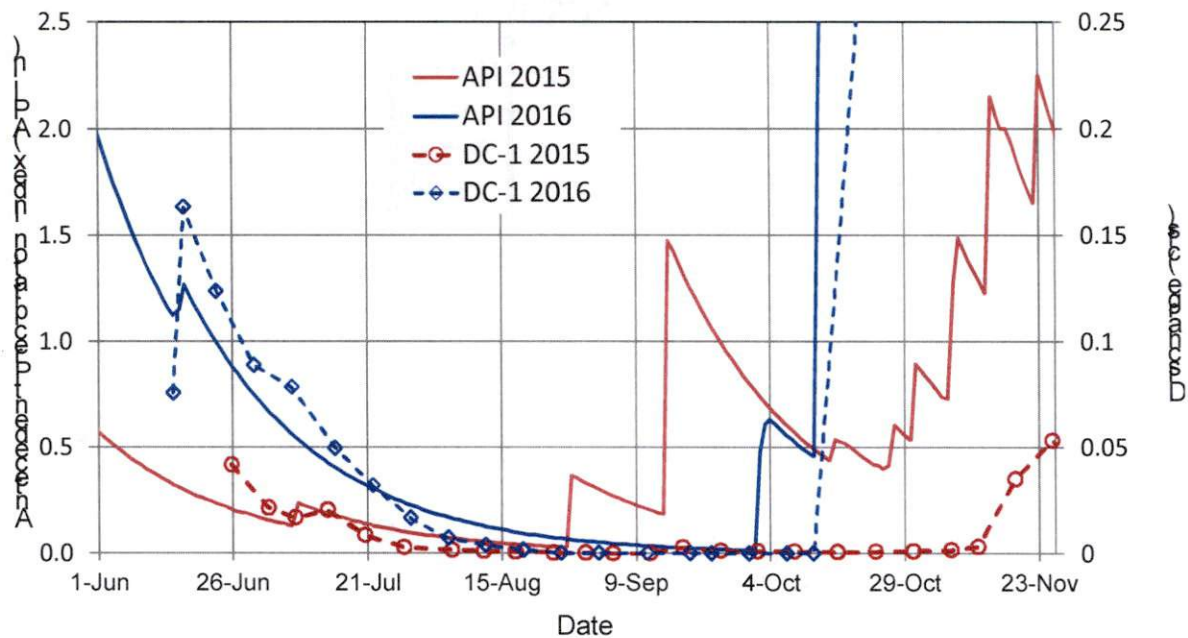


Figure 26. Antecedent precipitation index (API) and discharges at DC-1, 2015-16.

Streamlined Monitoring

There is interest by funding agencies in 'streamlining' future monitoring to reduce costs. An appropriate strategy for streamlining will depend on project goals and anticipated flow enhancement projects. Evaluating whether or not to retain other monitoring sites, or to establish new sites to bracket flow enhancement projects in the future, will depend on the available budget and any contributions from cooperators. **The reduction in the number of monitoring sites in 2017 could serve as a useful example.**

With enough prior data, there are several ways to reduce monitoring efforts that may not compromise the utility of monitoring data and thereby fail in providing the necessary minimum information: 1) reduce the number of sites monitored, 2) reduce the frequency of monitoring, and 3) cooperate with partners that could operate complementary monitoring sites (government agencies, volunteer interest groups or individuals). Reducing the number of sites must be done carefully so as to retain sites that are most representative of the overall hydrologic conditions of the watershed (i.e., reference sites that have little or no water extraction) and retain/add sites that focus on one or a cluster of flow enhancement sites to be able to evaluate their performance. Particularly with innovative approaches, post-enhancement project monitoring and evaluation is critical for design refinements and adaptive management. Sites that are most affected by unknown/unknowable sources of variability are the least informative to the broader goals of the study and thus the most likely candidates for omitting.

Reducing the frequency of monitoring site visits may be used instead of, or along with, reducing the number of sites, but there is higher risk of missing an important event (e.g., flow cessation) with fewer visits. Monitoring streamflow using data loggers provides a continuous data set that can reduce the need for frequent site visits while providing information on stream conditions when no one is on site. A caveat: there must still be enough discharge measurements taken to develop a good stage-discharge rating curve if the flows estimated from data logger stages are to be used in quantitative analyses. And a caution: if a data logger fails or is vandalized, that will not be known until the next site visit which, with reduced frequency of site visits, may result in a long period of lost data. More importantly, waiting for a data logger download to determine the date at which some target flow threshold was attained, or flow cessation occurs, may result in a missed opportunity to avert harm. Thus, there is inherent risk in relying too heavily on automated data collection. Recent technological advances in real-time data access, using cellular phone services, may provide a viable solution for the conflict between cost and timely knowledge of streamflow conditions.

As partner in this project, Stillwater Sciences has developed conceptual designs for flow enhancement in Redwood Creek, focusing primarily on Miller Creek and a reach of mainstem Redwood Creek downstream of

their confluence. Five project areas lie upstream from monitoring sites MC-1 and MC-2. Thus, it would be advantageous to retain one or both the sites to evaluate benefits from these projects, particularly because of the advantage of having prior data. Likewise, sites RC-1 and RC-2 could serve for monitoring future enhancement projects in both Miller Creek and along the mainstem. If these four sites were all that were to be included in streamlined monitoring in Redwood Creek, the number of sites would be reduced by two-thirds (from 12 to 4 sites). It cannot be known beforehand whether or not the scale of flow enhancement projects now conceptualized would result in measurable increases in discharge at these sites, but if not monitored, it will surely not be known.

Stillwater's Enhancement Site #1 is conceptualized as a very large infiltration pond, and as such has the greatest likelihood of creating measurable increases in discharge, at least locally. However, the relatively long distance between the existing monitoring sites (RC-1 and RC-2) and the project area reduces the ability to quantify the potential benefits. A better configuration would be to position monitoring sites just upstream and downstream of the project area.

Conclusions

- Substantial amounts of late spring rainfall, such as that occurring in 2016 and 2017, postpone the date at which minimum low flows are attained, potentially shortening the amount of time low flow conditions persist and maintaining year-round flow at some reaches that might otherwise go dry.
- The extreme droughts of 2013 and 2015 were certainly exacerbated by human water withdrawals, which tended to increase with drier conditions as crop irrigation demands intensified. Although water withdrawals certainly reduced flows in 2014, 2016, and 2017 as well, the much larger amount of rainfall that preceded the low flow seasons in those years moderated the impacts, as did the earlier onset of the fall wet season.
- Despite relatively low rainfall in 2013 (only 12.2 in. by June 1), summer flow recessions at several mainstem monitoring sites were nearly identical to those in 2016, which had much higher spring rainfall (39.7 in. by June 1). This may suggest an increase in water extraction during the intervening years affecting an extensive reach (over 4 miles) of the mainstem Redwood Creek.
- Even small amounts of rainfall (e.g., 0.25") in the driest time of the year can increase discharge and provide temporary relief for fish from drought conditions. Summer fog, a relatively unusual occurrence, can also reduce the recession rate of low flows and perhaps temporarily elevate low flows.
- Longitudinal flow anomalies along the mainstem Redwood Creek were large in the late summer, highlighting the benefits of targeting such areas for more detailed investigations that could lead to relatively rapid and inexpensive fixes.
- Data collected for this project strongly suggest that water withdrawals are impairing streamflow throughout the Redwood Creek watershed, and that the effects are quite serious at some times in some locations.
- Inconsistencies were found across monitoring years as to which sites had more or less discharge. This is most likely due to water extractions differing in timing and location from year to year.
- Periods of highly fluctuating, semi-regular discharge measured with data loggers suggest water extraction effects near the sites exhibiting this behavior. More detailed investigations could reveal if these represent real discharge fluctuations and possible sources.
- Monitoring can be streamlined while still yielding informative results if done carefully. Future monitoring should include continued monitoring of sites that could help elucidate flow enhancement effects as well as new sites to closely bracket relatively large-scale enhancement sites.

Recommendations

- Continue monitoring low flows in Redwood Creek, but reduce the frequency of site visits. Combined with continuous data from water level recorders, fewer site visits than were done in 2015-16, say once every two weeks, could provide sufficient data for evaluating hydrologic conditions and benefits from

enhancement projects. Site visits in 2017 were, in fact, reduced to about once every two weeks, and for the sites monitored, this seemed to provide a sufficient data set for evaluating hydrologic conditions.

- Network with potential collaborators monitoring flows in Redwood Creek and nearby watersheds. Ensure data collected are complementary and not redundant, and pool data to enable more robust analyses.
- Inventory, to extent feasible, water usage in Redwood Creek, particularly at locations identified as those potentially most impaired by water extraction. Use this information in an outreach program to heighten awareness of the effects of water extraction and target stream reaches that offer the most benefits of water conservation.
- Establish a water right forbearance program for Redwood Creek, modeled on Sanctuary Forest's program in the Upper Mattole River. Identify 'early adopter' landowners willing to participate in a forbearance program to demonstrate the potential benefits and encourage more participants.
- Implement low flow enhancement projects that are either already proven to be effective (e.g., forbearance, storage tank installation) or are innovative approaches that, with pre- and post-project monitoring, can be tested to determine their effectiveness and formulate design improvements for future projects.

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Appendix A. Field Observations of Low Flow Conditions In the Redwood Creek Watershed

Bill Eastwood

TRIBUTARY STREAMS

James Creek: James Creek has a fish barrier waterfall about ¼ mile upstream from the confluence with Redwood Creek. Any salmonid presence in the lower reach is unknown. The Eel River Salmon Restoration Project (ERSRP) had a salmonid fish rearing facility upstream for about 5 years.

Seely Creek: In late summer of 2016 ERSRP did a low water assessment of 2 1/3 miles of previously inaccessible Seely Creek to determine, water extraction impacts, salmonid presence, and any need for habitat improvement projects. The new owner of this section of the stream is fish minded and enthusiastically gave us access. We were guided by a landowner who was familiar with Seely Creek. We surveyed downstream from a 20 foot high waterfall that is as far as salmonids can travel upstream. Water extractions, likely for agriculture, above the waterfall have dried up the stream except for occasional bedrock pools. Our guide was shocked by the lack of stream flow. This condition persisted for about a half mile downstream until a large landslide with a jumble of trees blocked walking in the stream bed. The slide took us about a half hour to get around. We were pleasantly surprised to find that there was a spring somewhere in the slide that provided enough water to the stream that downstream flow was pretty much continuous and the pools were full. Salmonids, primarily steelhead and possibly Coho, were present in many of the pools. Rains made us cancel a planned dive of this reach to confirm the presence of Coho. Unfortunately our monitoring site SC-1 at the confluence with Redwood Creek was several hundred yards downstream from this long section of continuous flow. This next season ERSRP plans to assess this section of Seely Creek for the presence of Coho and the need for habitat improvement. Water extractions above the water fall also need to be further investigated.

Somerville Creek: in the past was found to have some Chinook spawning and pretty much dried up in the summer.

Miller Creek: has a long history of steelhead, Coho, and Chinook presence. Flow gets quite low in the summer time but somehow over-summering Coho and steelhead juveniles have always hung on. Tributary Buck Creek usually continues to flow all summer, providing a salmonid refuge when Miller Creek has dried up in the lower reaches. Pumping by several landowners in lower Miller Creek has dried up the lower section for at least the last few years. When the effects of this pumping were pointed out in the summer of 2016 the landowner became concerned and promised to solve this problem before next summer. We'll see. It should be noted that the Brice Land Water District gets its water from a good spring on a Miller Creek tributary about half way upstream from the confluence with Redwood Creek. Minimal storage capacity precludes the possibility of dry season forbearance.

China Creek: also has a long history of steelhead, Coho, and Chinook presence. Water extractions are probably greater than in the past.

Dinner Creek: A fish habitat structure that the ERSRP put in upper Dinner Creek more than 15 years ago has inspired a promising future project to increase the number of over-summering Coho salmon. The structure is near the highway culvert where it is easy to check on. The pool is 2 to 3 feet deep and has a lot of wood. Every year we have seen a significant number of Coho in this pool! Flow sometimes stops in the creek but the pool formed by the structure always stays full. In 2015 we walked the upper reaches of Dinner Creek after flow had stopped to see where there were any other residual pools. We found about 15 shallow pools which were photographed and locations taken with a

GPS. Several of these pools even had a few Coho. Most were very shallow - just a few inches deep. We reasoned that, given access for equipment, some of these pools would be very good prospects for boulder/log scour structures similar to the one we have been watching for many years. Placement in locations where there is known water during the driest conditions would guard against the all too common practice of choosing "good" locations when the stream is flowing only to find that many of the structures ended up in dry locations when the water stopped flowing.

This year we repeated the Dinner Creek stream walk to see how consistent our data was. We found all the pools from last year plus a few more. It was decided that we would use the locations from 2015 for proposed pool habitat improvements because 2016 was slightly wetter than 2015. Now we need to figure out which sites have decent equipment access and write up a proposal to the California Department of Fish and Wildlife. This project stands an excellent chance of getting funded. Little is known about the level of water extraction in this watershed although it appears to be fairly low.

Mainstem Redwood Creek: Over-summering Salmonid presence is in general confined to the cooler upper reaches of Redwood Creek downstream as far as the Briceland area. Steelhead juveniles are also found in pools downstream to about monitoring site R-2.5.

Upper Redwood Creek above the confluence with China Creek is entirely on timber-company and undeveloped private land. There are no residents in this area and, as confirmed by an overflight, there is no observable marijuana growing activity. So it is likely that this watershed has no water extractions for human use. It is interesting that this watershed shows similar low flow declines as populated tributary watersheds where we know there is a large amount of water withdrawal.

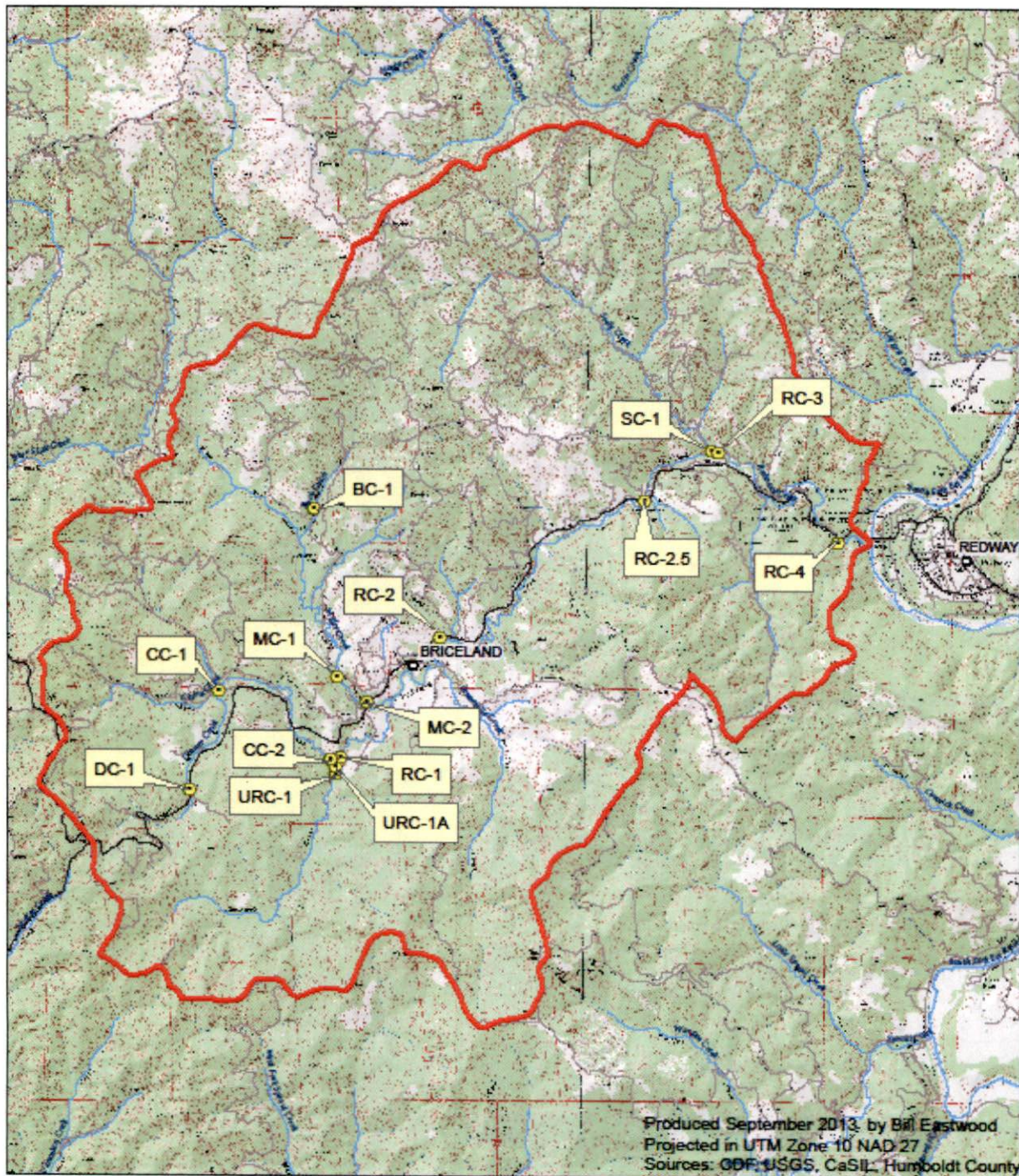
There is a dry season flow anomaly between Redwood Creek monitoring sites RC- 2.5 and RC-3. There has always been good low water flow at RC- 2.5 but by the time Redwood Creek reaches RC-3 it is usually dry. Where did all the water go? A stream walk of this half mile reach confirmed that there is one residence that pumps water from the creek and is possibly responsible for the impaired flow. Another possibility is that the water flowing past RC 2.5 has a single source upstream that is diminished downstream by vegetation and evaporation. The land owner that pumps from the stream has been made aware of the problem and has been increasing his water storage to decrease pumping during the dry period. He is cooperative and we hope to monitor this situation next season.

General Observations: In general, observations at the monitoring sites, indicated that there was a decline in the number of salmonid young-of-the-year from 2013 to 2016. There is no question that the human population of the watershed is increasing and that marijuana production is a major economic activity that has expanded substantially. The resulting increased water demand has to have had a negative effect on summer time low flows. The move to legalize marijuana production has resulted in the sale of a very large number of water tanks. The effect of this increase in water storage on summer stream flow is unknown. The water situation is so bad that some landowners are resorting to buying water from sources outside the watershed. There is also a substantial increase in the number of wells that are being drilled, again with unknown effects on stream flow.

Another factor that may very well be reducing dry season stream flow is a likely increase in water intake by our growing forests, especially due to region-wide Douglas fir encroachment. In addition to low flow problems, the increase in population and marijuana activity has markedly increased the traffic on the watershed's unpaved rural roads, greatly increasing the amount of harmful sediment being delivered to fish bearing streams. This sediment problem has been especially bad this winter with the near record rainfall. Road maintenance of many major rural roads has gotten so far behind that two wheel drive vehicles often have major problems negotiating the muddy messes that many of these roads have turned into.

Conditions for salmon survival in the Redwood Creek Watershed are not looking good. It seems unlikely that the residents of the watershed will be able or willing to forbear enough water use during the low flow period to increase the flow significantly. Perhaps, as has been proposed, we could resort to the supplementation of stream flow with water from specially designed large ponds that are filled during the winter.

Appendix B. Map of monitoring sites in the Redwood Creek Watershed (B. Eastwood, 2015)



REDWOOD CREEK LOW FLOW STUDY MONITORING STATIONS, AUGUST, 2015



SALMONID RESTORATION FEDERATION

Legend

DC = Dinner Creek, CC = China Creek
URC = Upper Redwood Cr., RC = Redwood Creek
MC = Miller Creek, BC=Buck Creek, SC = Seely Creek

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Miles

****CONFIDENTIAL OUTLINE FOR SETTLEMENT****

Parties continue to stay the case. If/when items (1) and (2) below occur, FOER will dismiss its case:

(1) The legislature approves, and the governor signs, a bill substantially similar to SB1029, with the addition of FOER's CEQA language, and FOER has reviewed and confirmed the final bill signed by the governor is substantially similar; and

(2) If either the US Supreme Court denies cert or FOER prevails in the US Supreme Court, the parties will submit a stipulated judgement to the court stating that FOER is entitled to collect its reasonable attorneys' fees and costs to date. The amount to be collected shall either be agreed upon by the parties or, in the event the parties cannot agree, by the court. The amount shall be apportioned between NCRA and NWPCo. as agreed by the parties or determined by the court. If NCRA has been dissolved or is otherwise unable to pay FOER by the time the amount is determined, NCRA's portion shall be paid as determined by the legislature.