

Environmental Impacts from Marijuana Cultivation

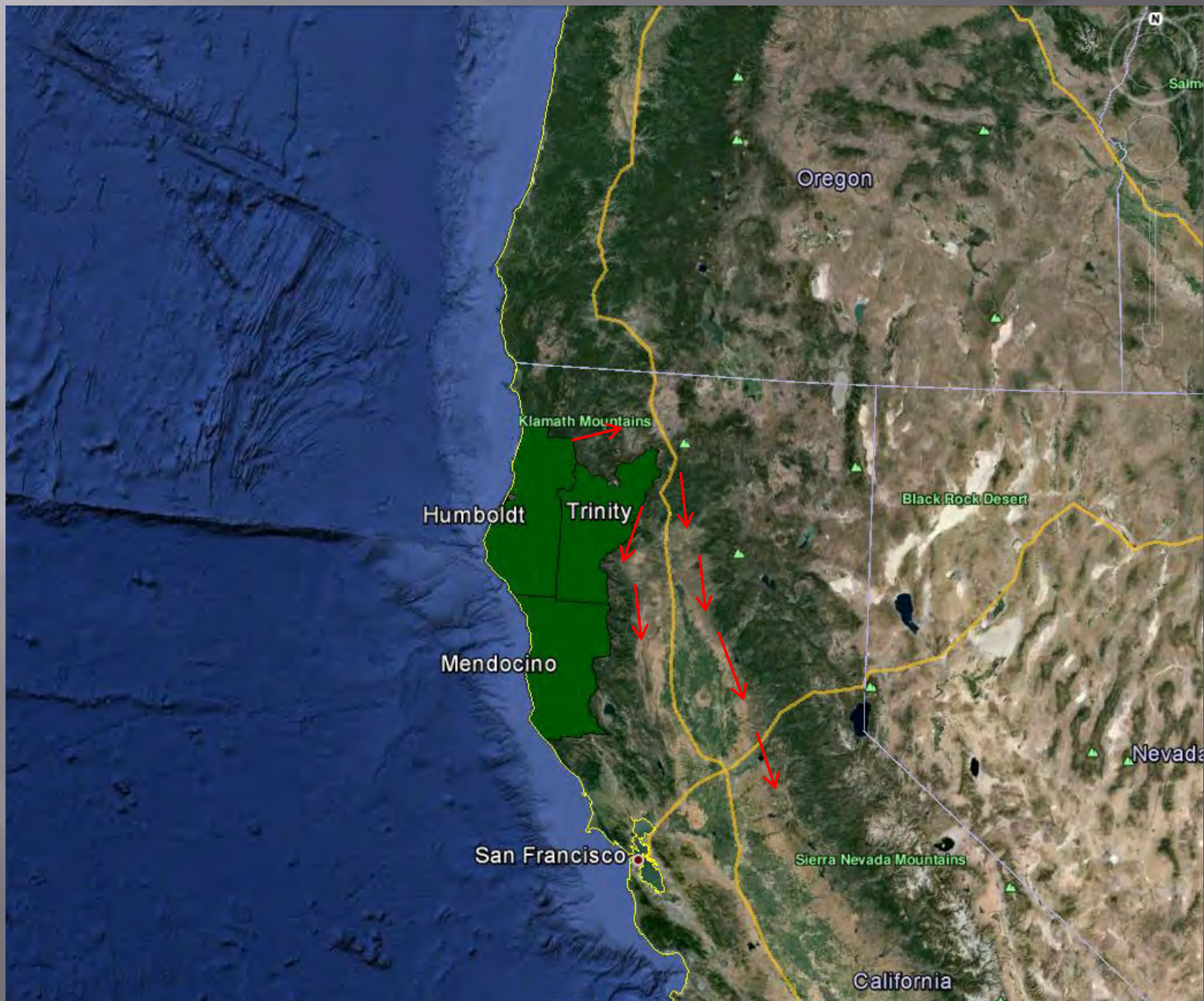


Coastal
Conservation
Planning
Branch,
CDFW Eureka

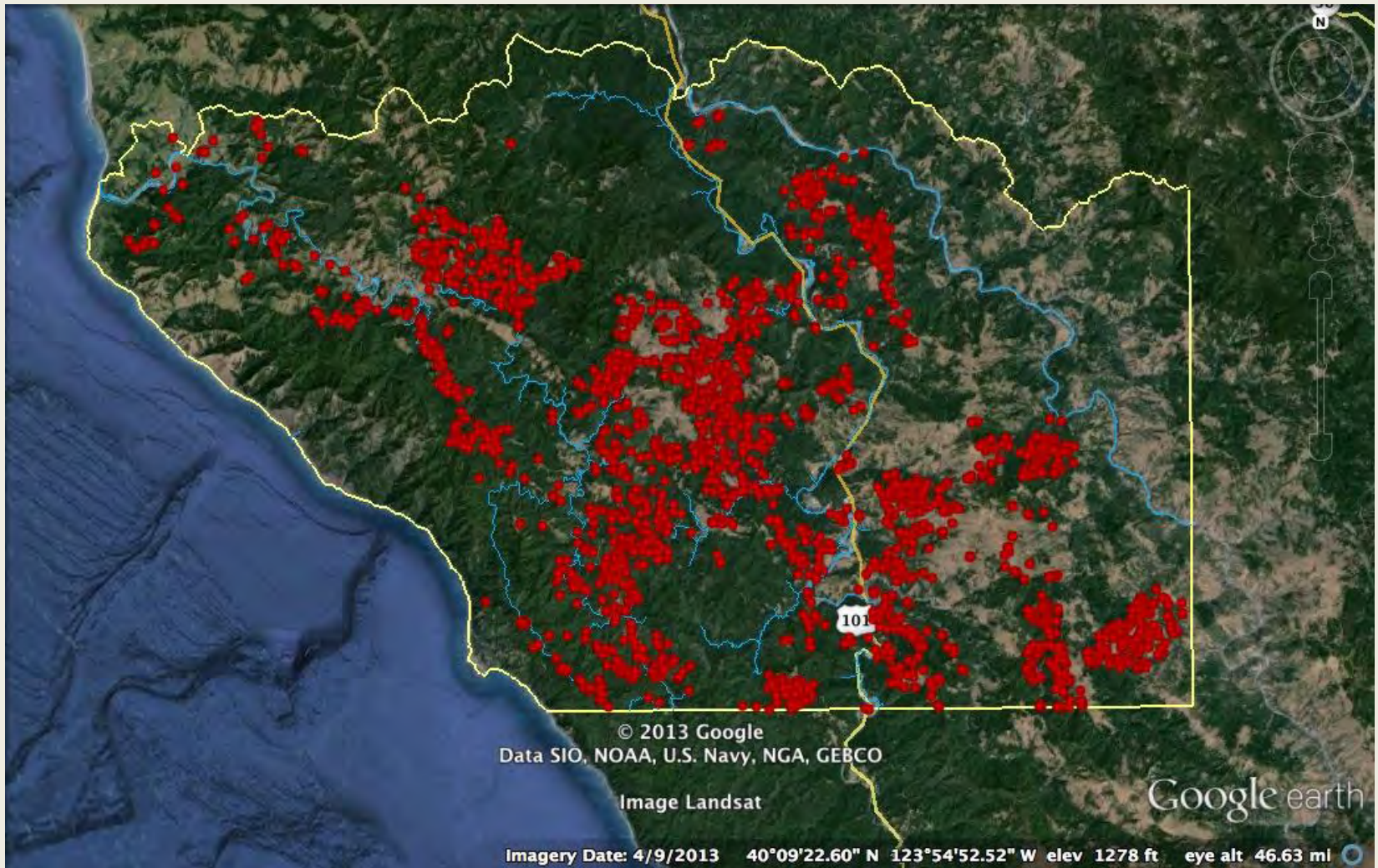


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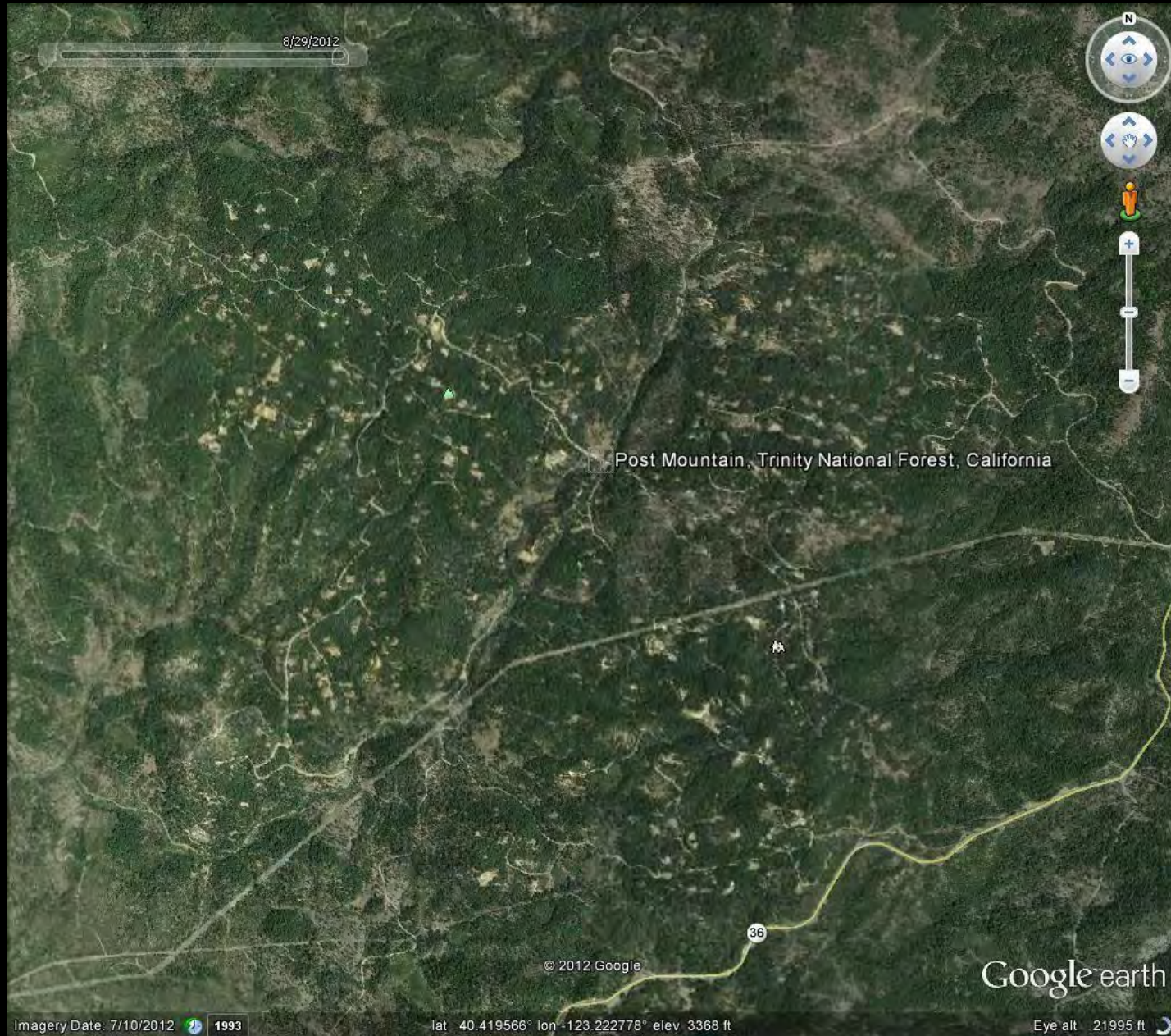
The Emerald Triangle



Southern Humboldt



Post Mountain –South Fork Trinity



Explosive Growth: Post Mountain 2005-2012



Explosive Growth: Post Mountain 2005-2012



'Typical' Private Land Marijuana Cultivation Site



10/4/2012

Large Scale Cultivation Expanding



Natural Resource Impacts

- Water Diversion: During low-flow periods, no screening, oversized pumps
- Pollutants: Sediment, petroleum products, fertilizers, pesticides
- No BMPS/ No Riparian & Stream Protection Areas
- Conversion/Fragmentation of lands

Sensitive fish and wildlife species



Southern torrent salamander, *Rhyacotriton variegatus*



Coho salmon, *Oncorhynchus kisutch*



Pacific fisher, *Pekania pennanti*
(formerly *Martes pennanti*)



Coastal tailed frog, *Ascaphus truei*



Steelhead trout, *Oncorhynchus mykiss*



Chinook salmon, *Oncorhynchus tshawytscha*

Habitat Destruction



Stream diversions come in all shapes and sizes



Ponds



All flavors of storage



06.22.2012 09:40



06.22.2012 14:18

Pollutants: sediment, petroleum products, fertilizers, killing agents





**Soil dumped near a grow above a creek –
fertilizers and fungicides leach into creek
below**

Grading and land clearing



Problem:

How do we quantify environmental impacts in the poorly studied and inaccessible regions where marijuana is cultivated?

STUDY:

Impacts of surface water diversions for marijuana cultivation on aquatic habitat in four northwestern California watersheds

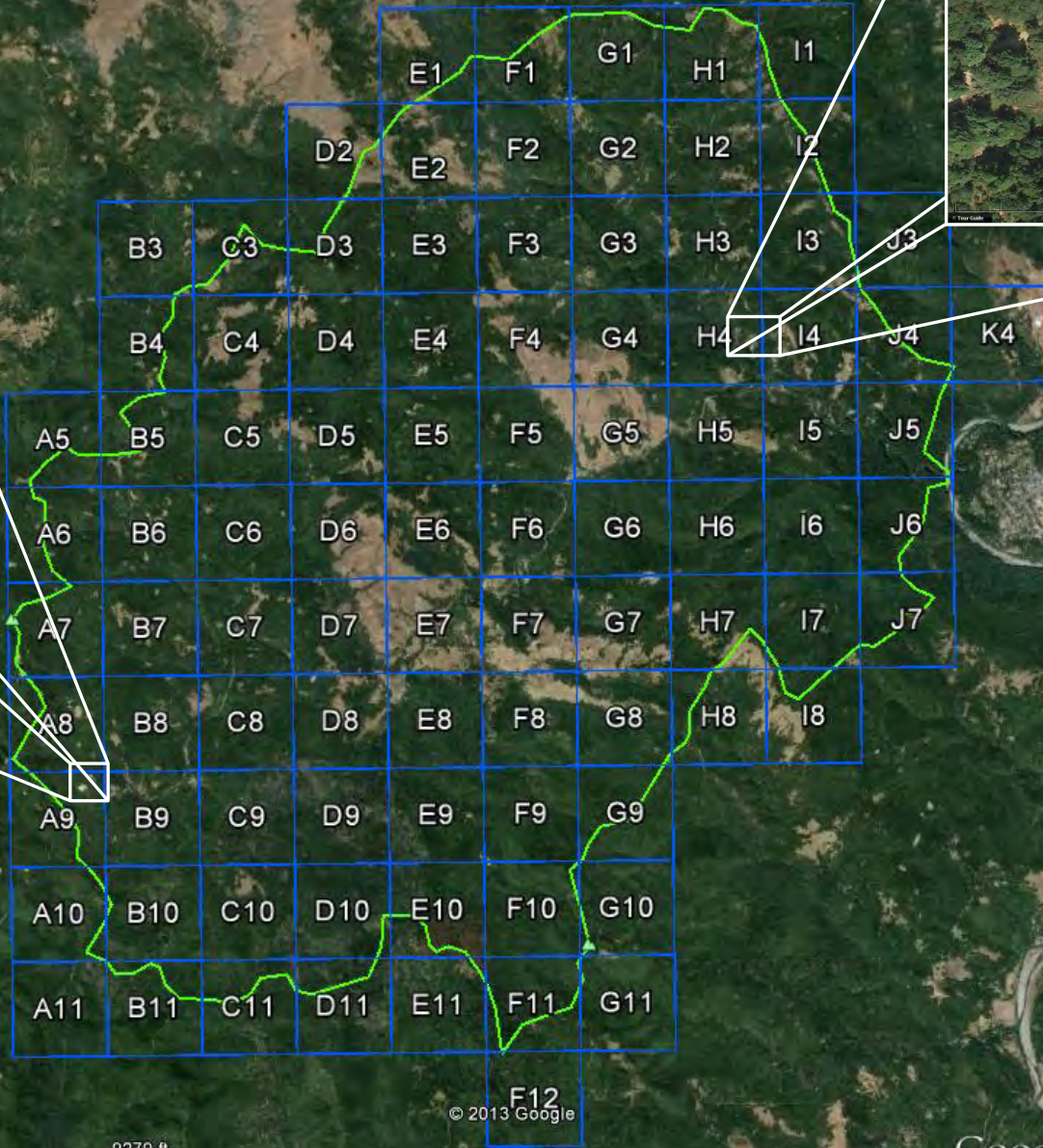
Methods



- From low-elevation flights and search warrants, the authors gathered limited base-line data.
- Used high-resolution imagery (Google Earth) in conjunction with ArcMap to locate and digitize marijuana cultivation sites (MCSs) in four watersheds.
- Estimated plant water demand (HGA 2010, 6gpd) and compared these values to summer low flows.
- Measured growth in MCSs over time (2009-2012).

Four Study Watersheds in Humboldt and Mendocino County





9279 ft

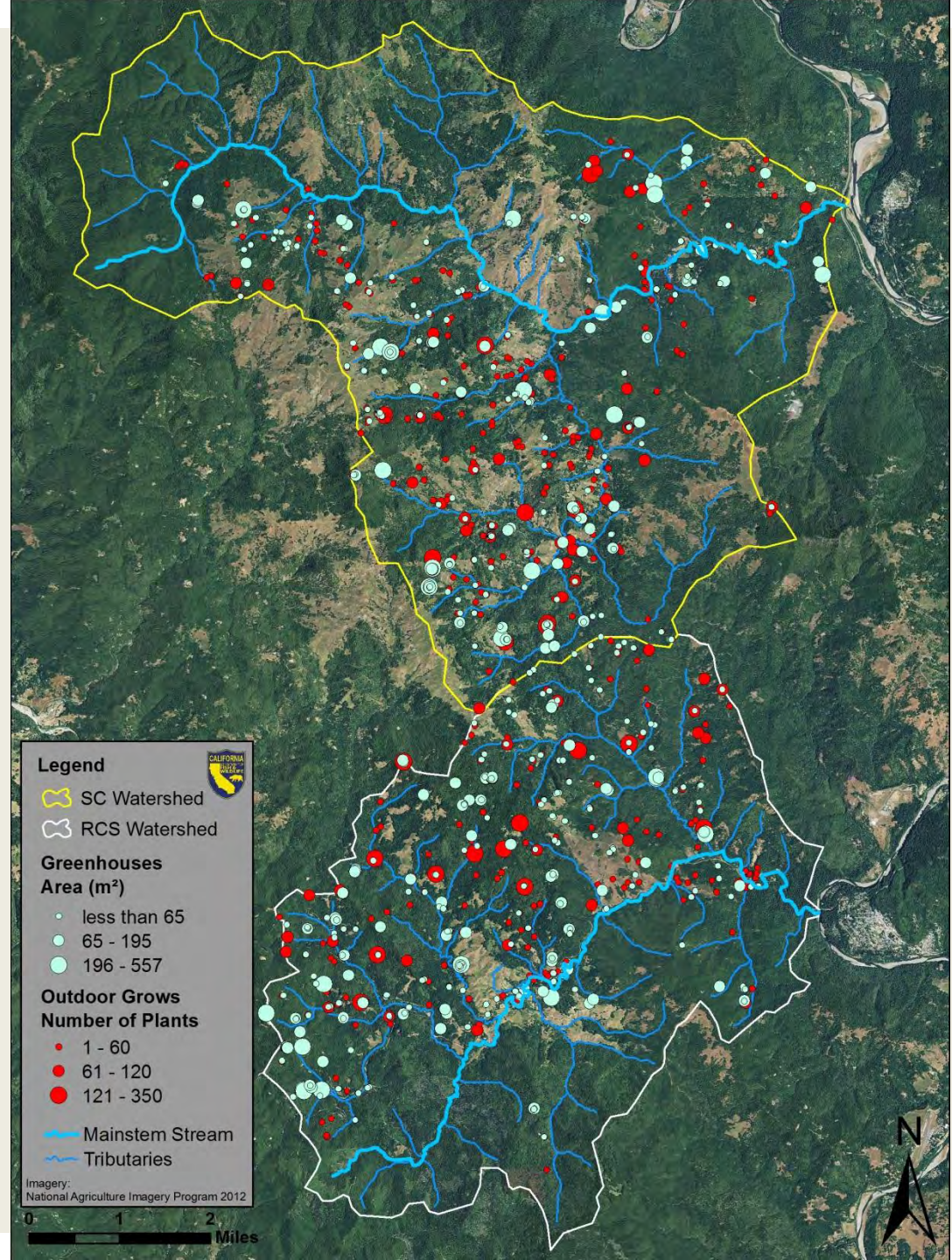
Google earth

Measuring increase in land area over time

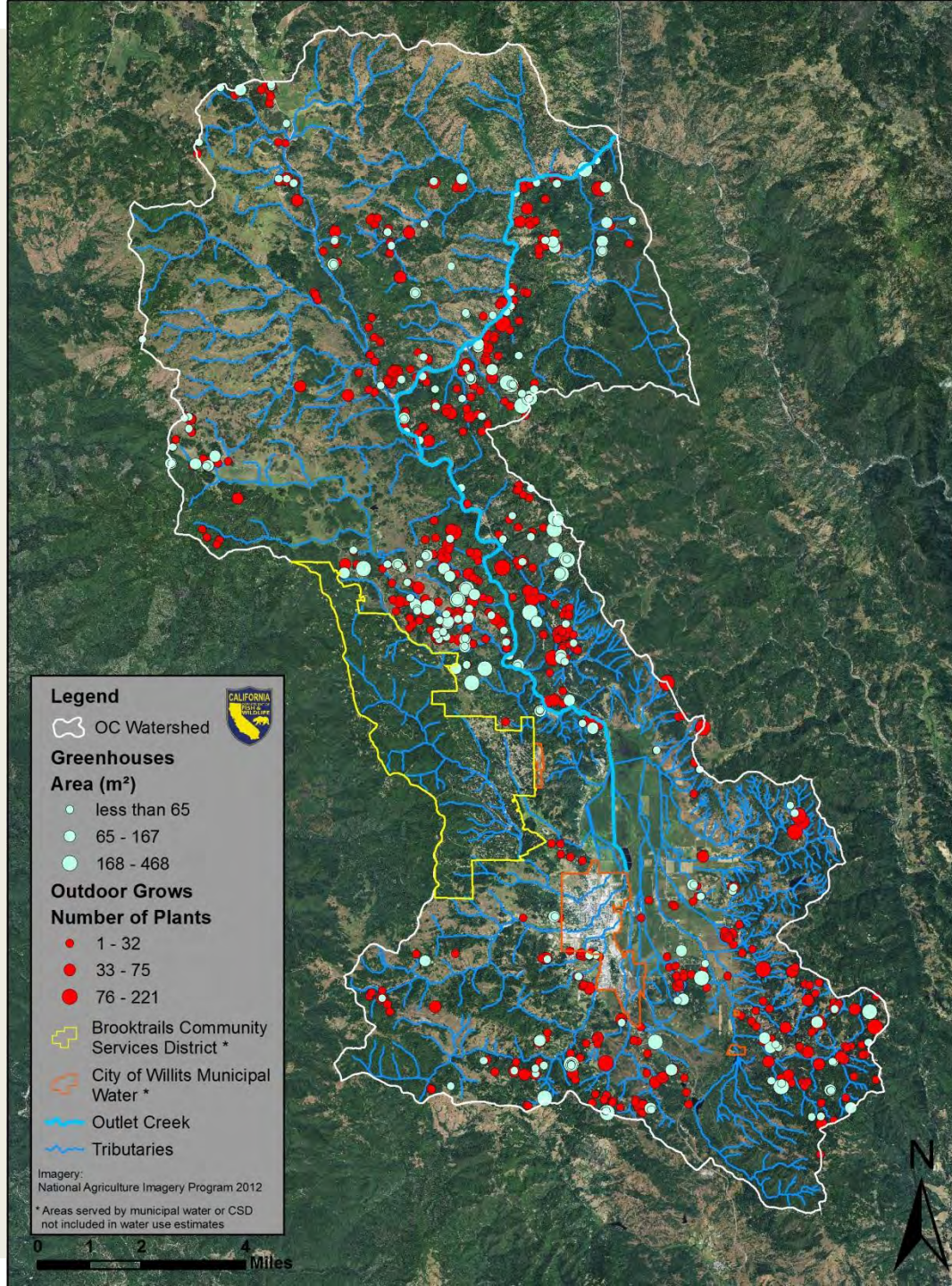


Salmon Creek Watershed near Miranda, CA

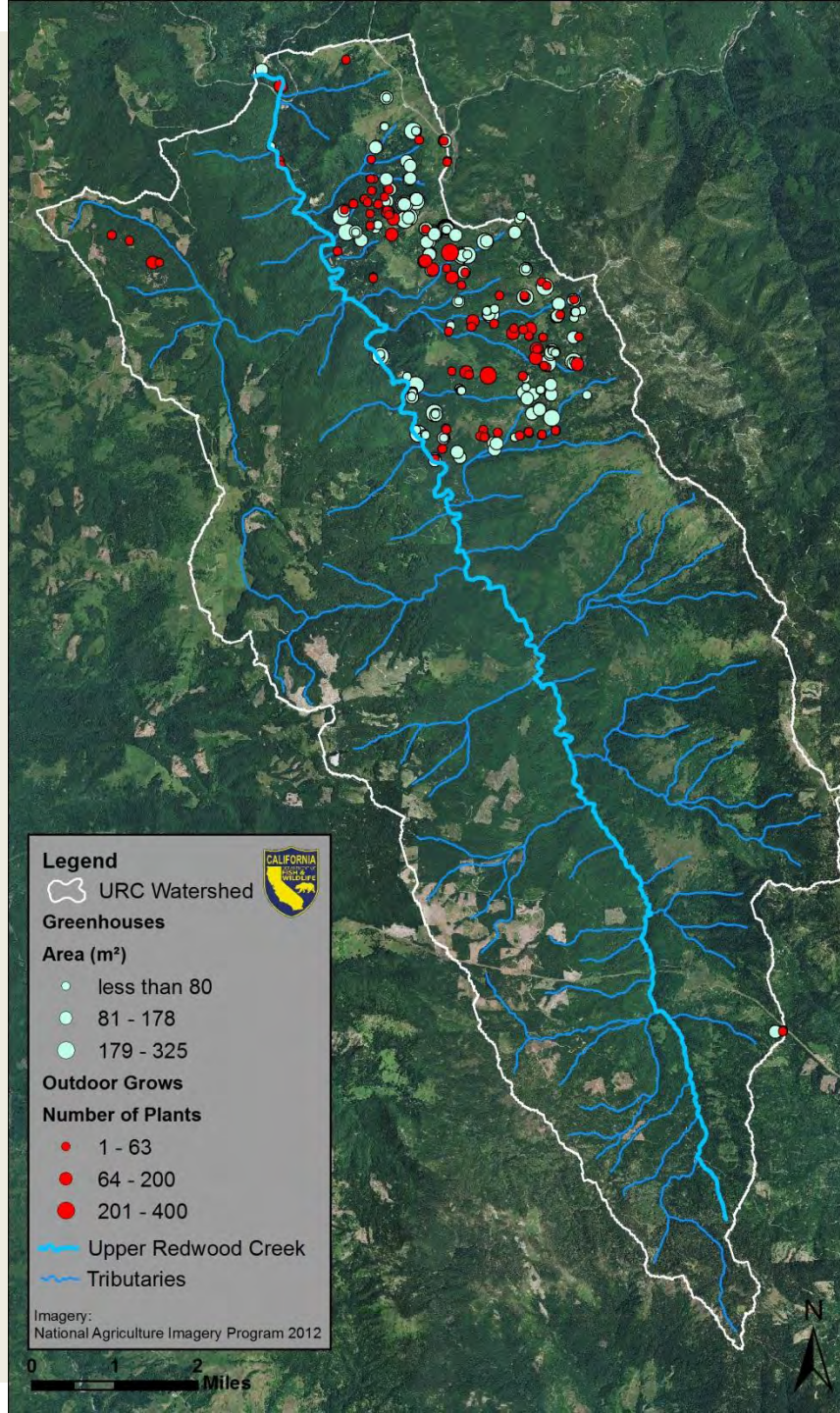
Redwood Creek Watershed near Redway, CA



Outlet Creek Watershed near Willits, CA

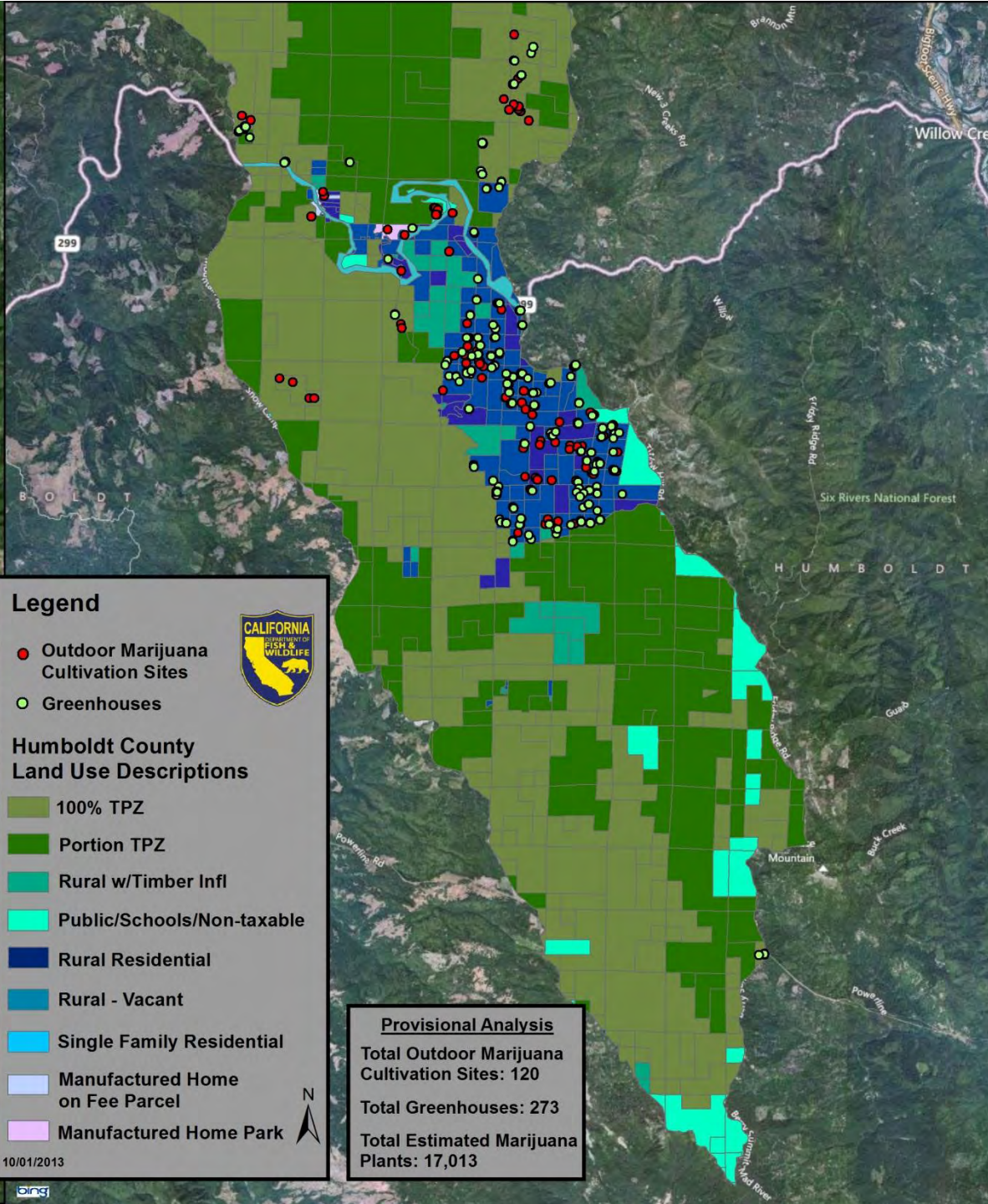


Upper Redwood Creek Watershed near Blue Lake, CA



Redwood Creek Watershed, Humboldt County, CA

Redwood National and State Parks



Legend

- Outdoor Marijuana Cultivation Sites
- Greenhouses

Humboldt County Land Use Descriptions

- 100% TPZ
- Portion TPZ
- Rural w/Timber Infil
- Public/Schools/Non-taxable
- Rural Residential
- Rural - Vacant
- Single Family Residential
- Manufactured Home on Fee Parcel
- Manufactured Home Park

10/01/2013



Provisional Analysis

Total Outdoor Marijuana Cultivation Sites: 120

Total Greenhouses: 273

Total Estimated Marijuana Plants: 17,013

Plant Totals per Watershed

Table 1. Marijuana mapping summary of four watersheds in northwestern California.

Watershed	Outdoor Plants	Greenhouses	Est. Plants in Greenhouses	Est. Total Plants in Watershed
Upper Redwood Creek (URC)	4,434	220	18,612	23,046
Salmon Creek (SC)	11,697	302	18,440	30,137
Redwood Creek South (RCS)	10,475	324	16,777	27,252
Outlet Creek (OC)*	15,165	266	16,730	31,895

*Greenhouses and outdoor plants within municipal water district boundaries were excluded for water-use estimates in the Outlet Creek watershed.

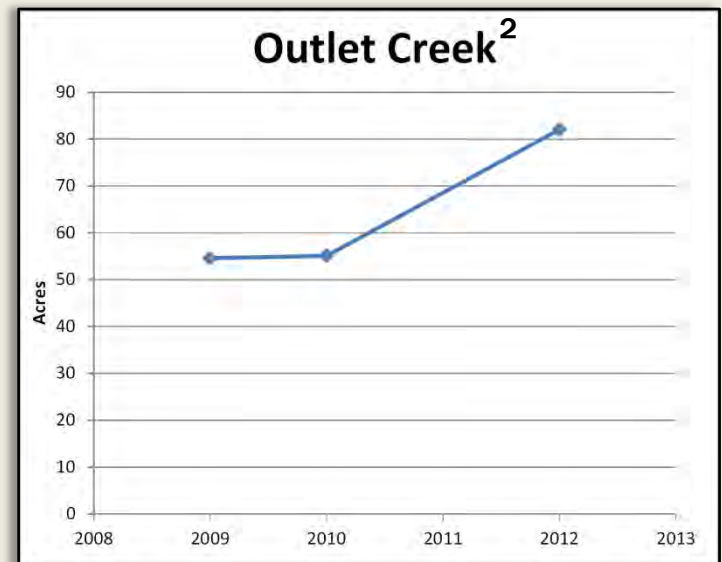
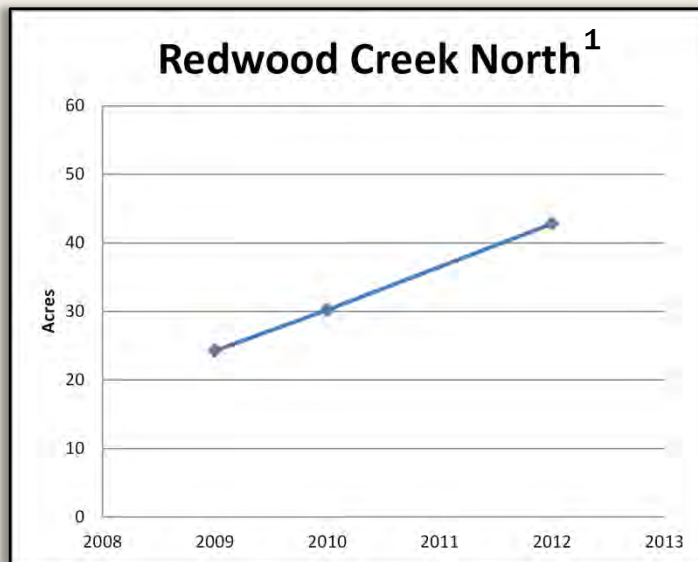
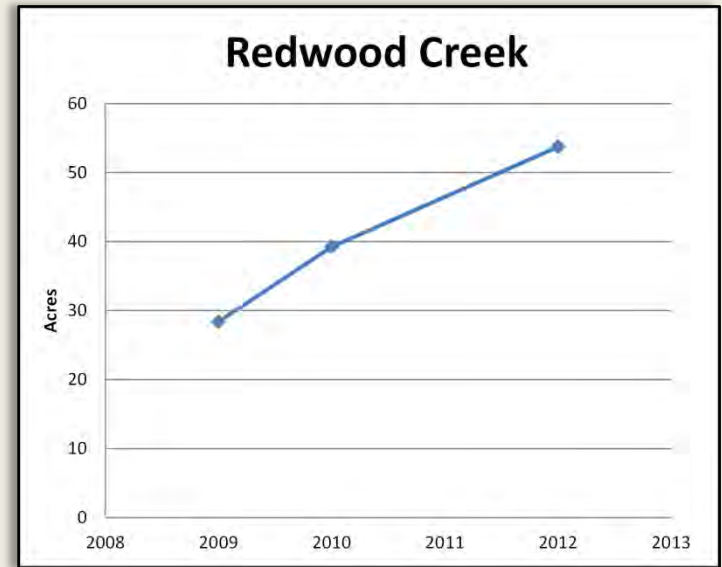
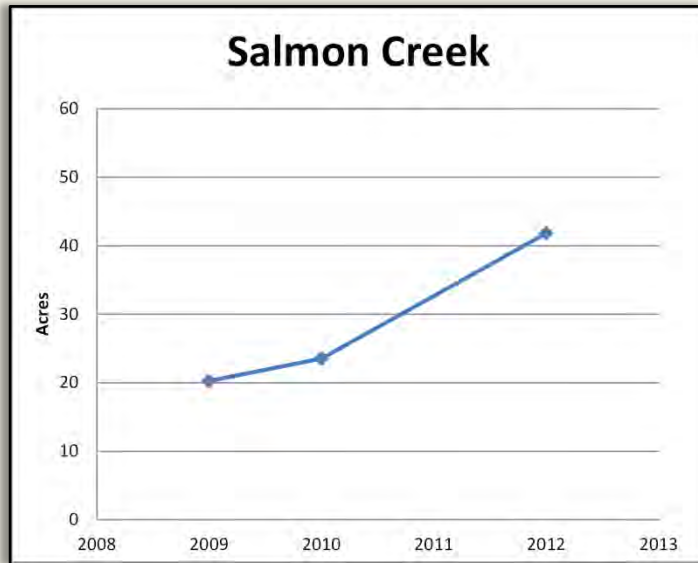
Water demand expressed as a percent of low flow

Table 3. Estimated water demand for marijuana expressed as a percent of low flow in four study watersheds. Water demand was compared to high flow and low flow estimates for seven-day low flow.

Watershed	Area (km ²)	Plants per km ²	Demand as percent of seven-day low flow	
			Based on <i>maximum</i> low flow estimate	Based on <i>minimum</i> low flow estimate
UCR	175.3	131.6	2%	23%
SC	95.1	316.9	36%	159%
RCS	64.7	421.2	34%	179%
OC	419.1	76.1	17%	**

**The seven-day low flow minimum was less than 0.0 L/s at the gage.

Increase in Cultivation in all Four Watersheds



¹ Includes land area of MCSs throughout the larger watershed.

² Includes land area of MCSs within municipal water districts.

China Creek water diversions

May 2013



August 2013
(riffles de-watered)



2013 China Creek Fish Kill



What we saw in 2014

July



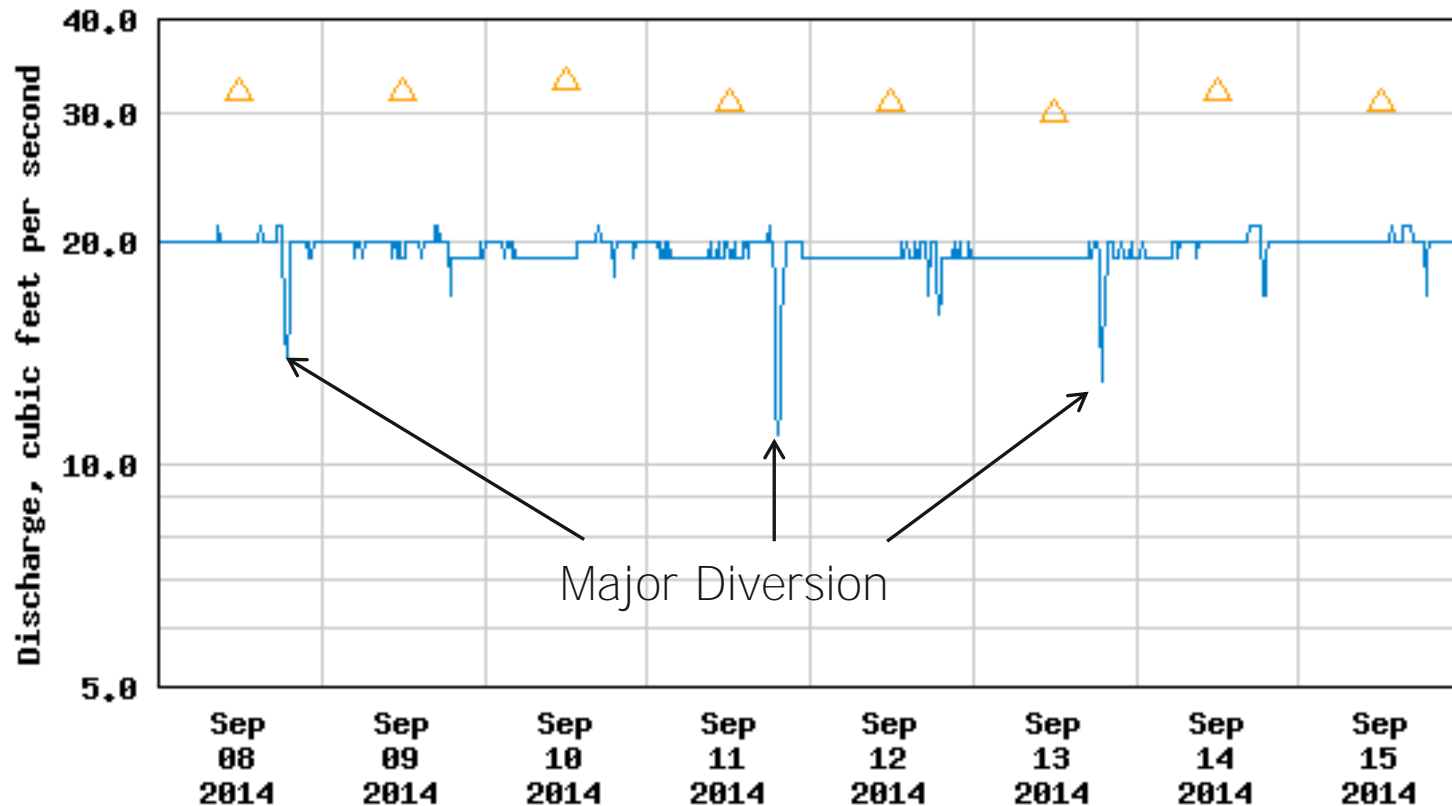
August



Water Withdrawals



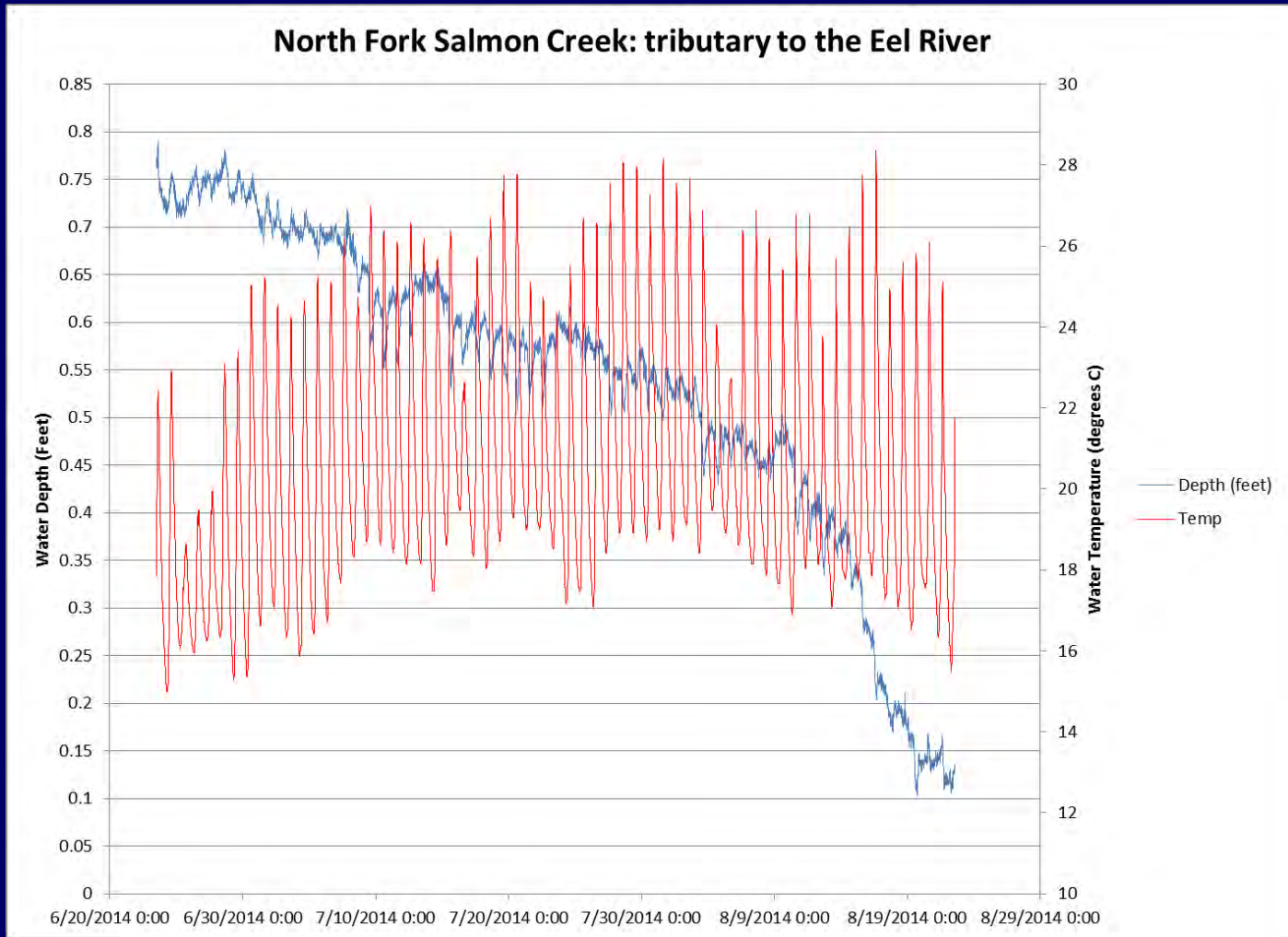
USGS 11475000 EEL R A FORT SEWARD CA



----- Provisional Data Subject to Revision -----

△ Median daily statistic (59 years) — Discharge

Flow Monitoring Efforts



Grows are getting bigger



FUTURE EFFORTS

- \$1.5 million in budget for DFW Marijuana related enforcement effort. Joint effort with State Waterboard (\$1.8 million).
- DFW granted administrative authority for some F&G Code violations (sections 1602, 5650 and 5652).
- Monitor stream flow, water use, and water quality (SWAMP).
- Map additional watersheds?
- Continue public outreach efforts. Since January 2012, we have talked with 78 groups and more than 2,650 people.

05.25.2012 11:01

A photograph of a forest clearing. In the foreground, there are several young green plants growing in a cleared area. A large tree trunk is visible on the left side. The background is filled with tall evergreen trees under a cloudy sky.

Thank you!

Questions?

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