Environmental Impacts from Illegal Cannabis Cultivation in California: Old Problems and New Approaches

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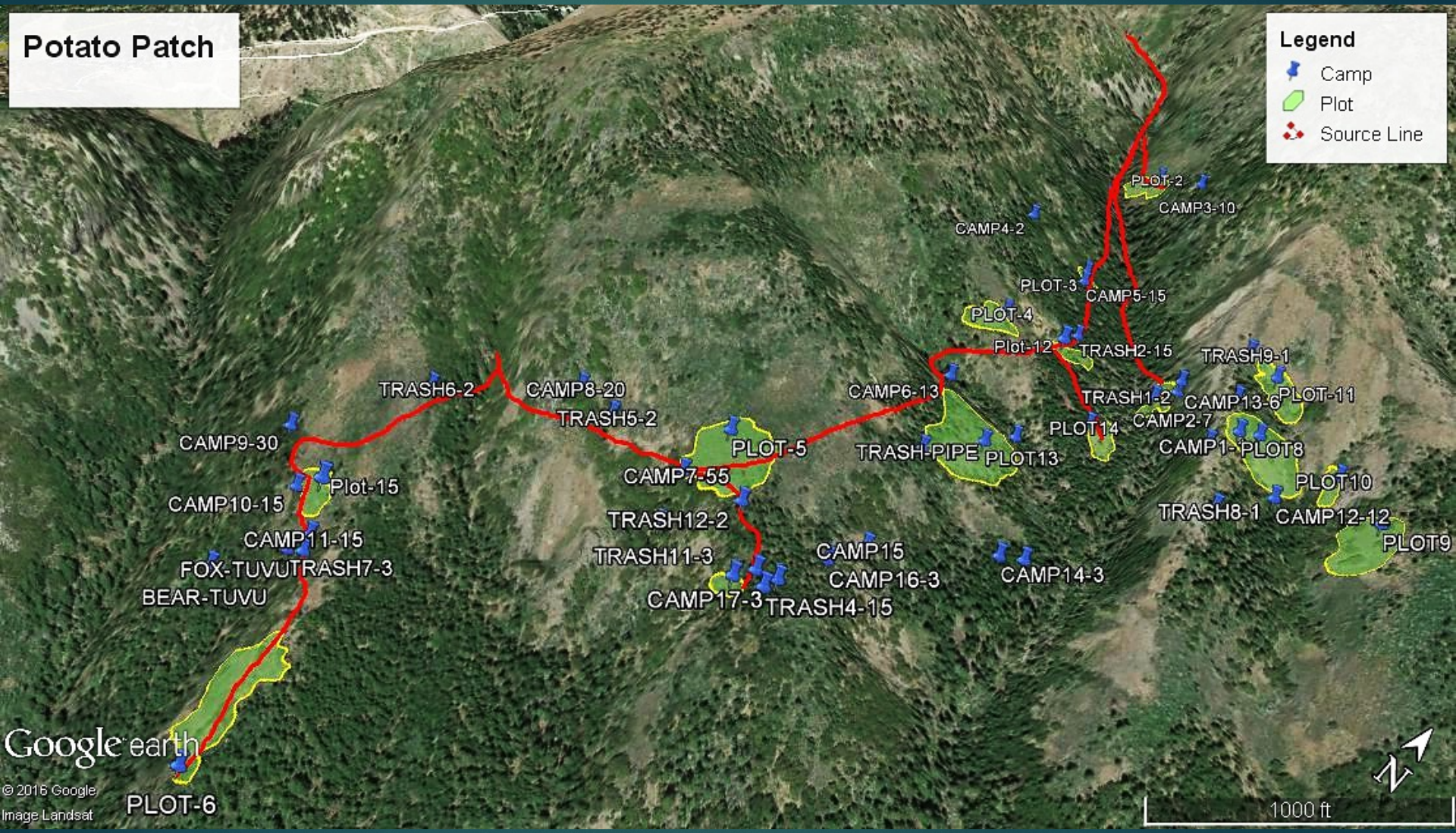
Integral Ecology Research Center

Why are there concerns about environmental impacts?
Cultivation is legal, right?

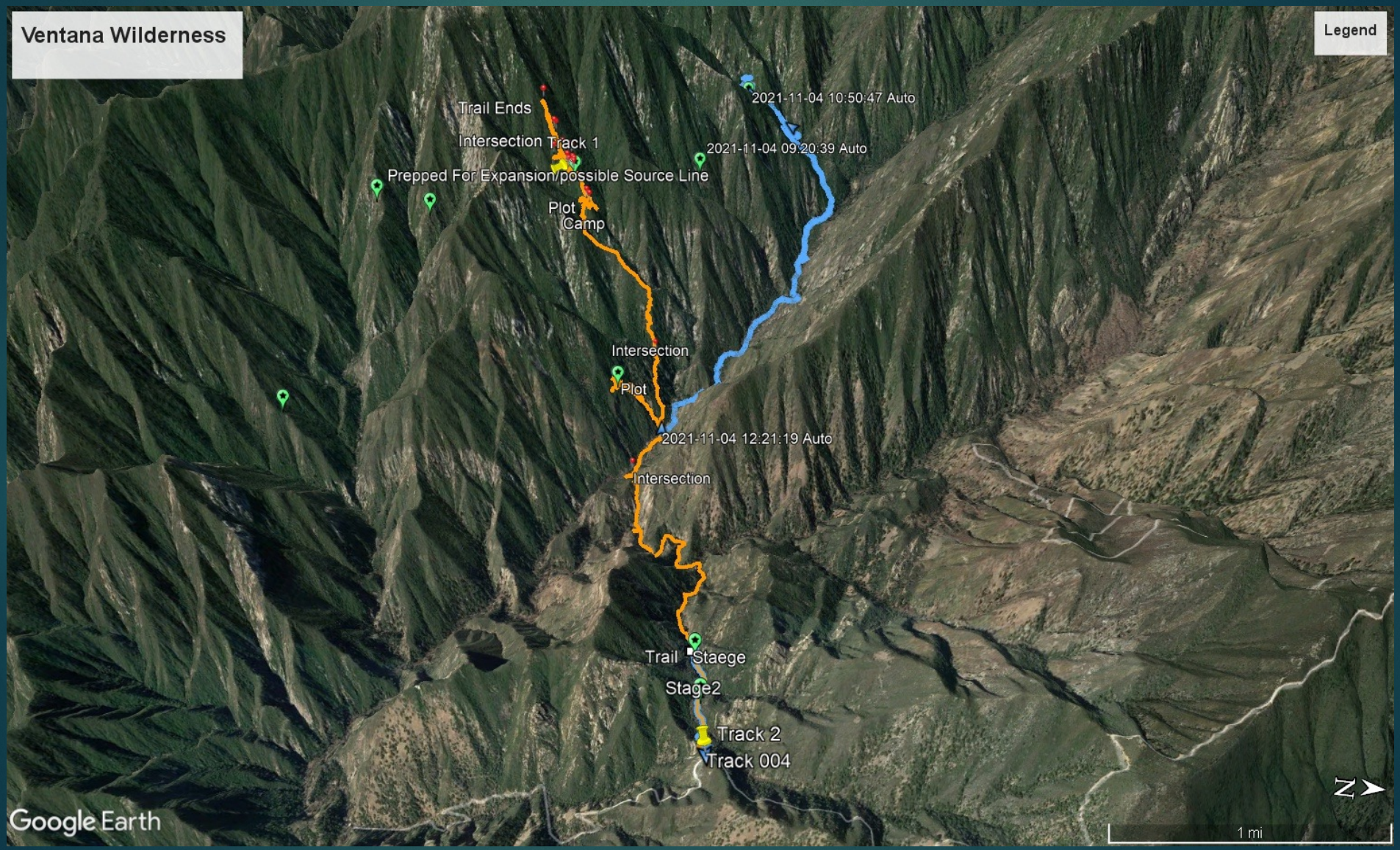
- The vast majority of cannabis cultivation in California is unpermitted and illegal
  - Any cultivation on public lands, or trespass cultivation on private lands
  - Unpermitted cultivation on private lands
- Who are the cultivators?
  - Your average American citizen
  - International Drug Trafficking Organizations
  - Everyone in between
- Unpermitted means no regulation
  - No limits on resource extraction (water, soil) and contamination (water, soil, wildlife, plants)

Some grows are easy access

Some grows are very complex



Some grows are extreme and complex



Some are on private land, bordering public land, in sensitive habitats

Problem

Likely tens of thousands of sites remain on our National Forests and adjacent private lands

Estimated Water Use Rates

Humboldt County Outdoor Medical Cannabis Ordinance Draft (2010)

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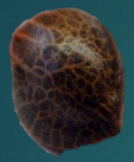
6 gallons a day



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150 days

900 gallons per plant/season

Our data show higher rates of diversion

- an average of 9.5 gallons/ plant/ day

A remote grow in Trinity County

Amounts of chemicals per site

Soluble Fertilizers	900 lb
Liquid Fertilizers	9 gallons

Pesticides	11 lb

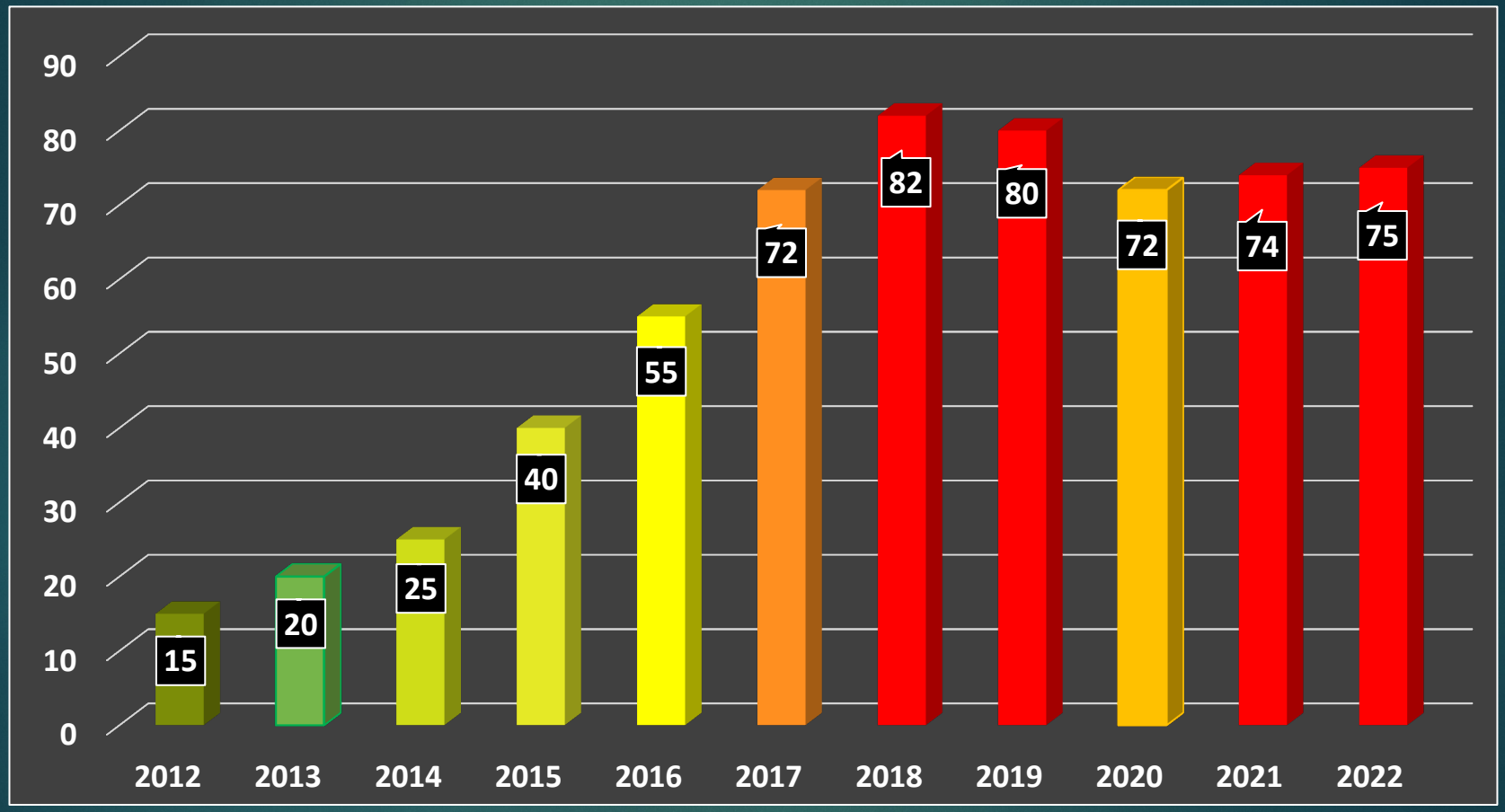
Anticoagulant Rodenticides	9.5 lb
Neurotoxicant Rodenticides	4.25 lb
Phosphides	1.5 lb

Carbofuran and other banned pesticides

- Carbofuran banned for use in the United States
- High toxicity to humans and the environment.
- ¼ Teaspoon can kill an African Lion
- Commonly smuggled into US by DTOs
- Others (e.g. methamidophos) equally as toxic

And other rare and less understood carbamates

Percent of Sites in California where Banned and Restricted Pesticides were Detected

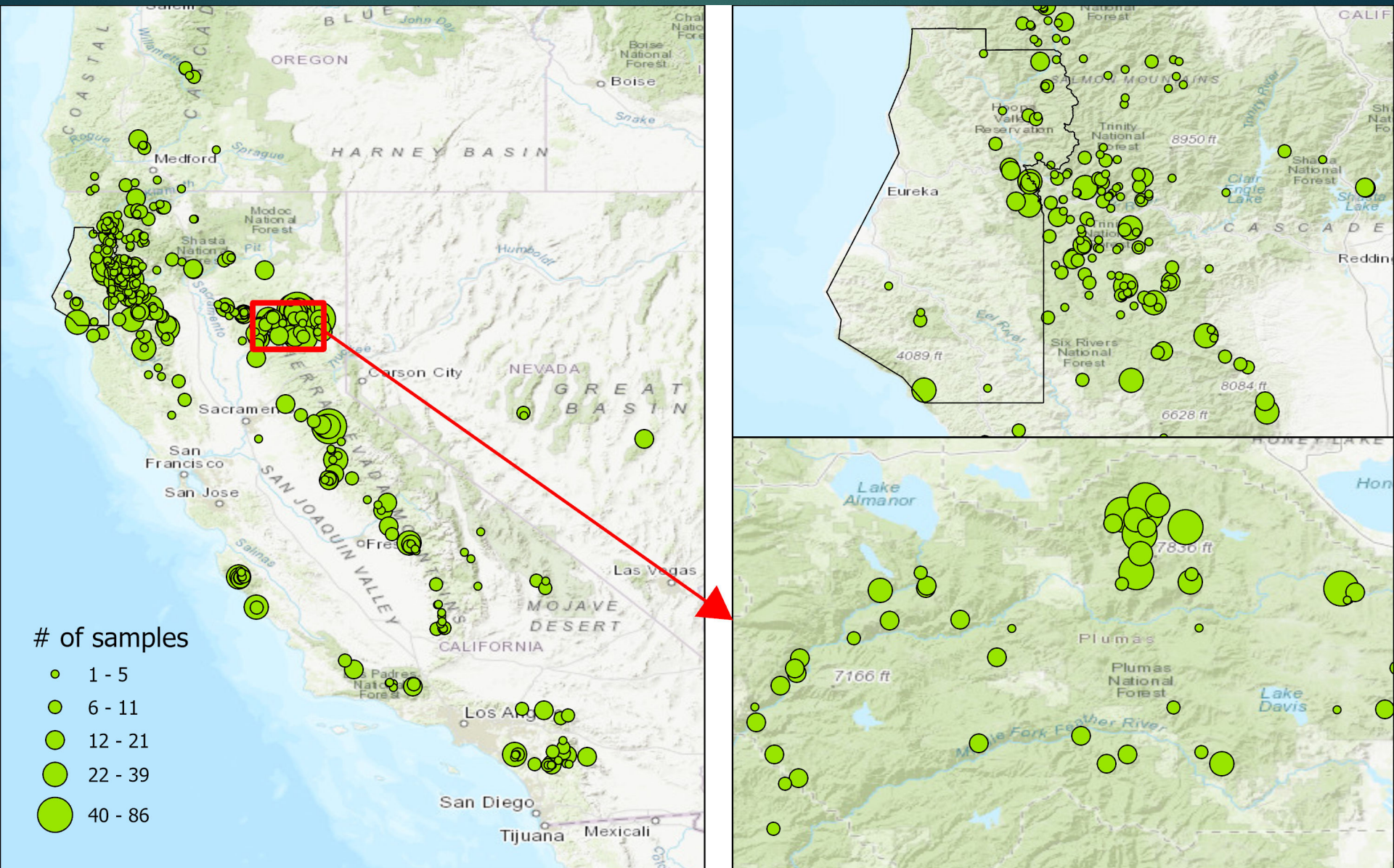


Cannabis, Soil and Water Project Objectives

- Test for toxicants that pose both environmental & human health risks
  - Soil
  - Water
  - Native vegetation
  - Cannabis plants and product

Toxicology Sampling, 2014-2023

402 sites: 2,644 total samples



Current Data: California Grow Sites

Water

Detected pesticides: 7 of 44 complexes (16%)

Soil

Detected pesticides: 78 of 130 complexes (60%)

Plant

Detected pesticides: 66 of 141 complexes (47%)

- 15 pesticides detected
- Most of these data are from public land grow sites
- Illegal, private land data match this very well

How Long do these Pesticides Persist?

Cultivation Soil

Site #	Year 1	Year 2	Year 3	Year 4
1	Negative	Negative	POSITIVE	NA: Untested
2	POSITIVE	Negative	POSITIVE	Negative
3	POSITIVE	Negative	POSITIVE	NA: Untested
4	POSITIVE	POSITIVE	POSITIVE	POSITIVE
5	POSITIVE	POSITIVE	Negative	Negative
6	POSITIVE	Negative	Negative	NA: Untested
7	Negative	POSITIVE	Negative	NA: Untested
8	POSITIVE	POSITIVE	Negative	Negative
9	Negative	Negative	Negative	NA: Untested
10	Negative	Negative	Negative	NA: Untested

Native Vegetation

Site #	Year 1	Year 2	Year 3	Year 4	Year5
1			Negative	Negative	Negative
2			Negative	Negative	POSITIVE
3			Negative	POSITIVE	
4			Negative	Negative	
5			Negative	Negative	
6			Negative	Negative	
7			Negative	Negative	
8			Negative	Negative	
9			POSITIVE	Negative	
10			Negative	Negative	

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Water Quality Research Journal

Check for updates

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Passive monitoring of soluble pesticides linked to cannabis cultivation: a multi-scale analysis

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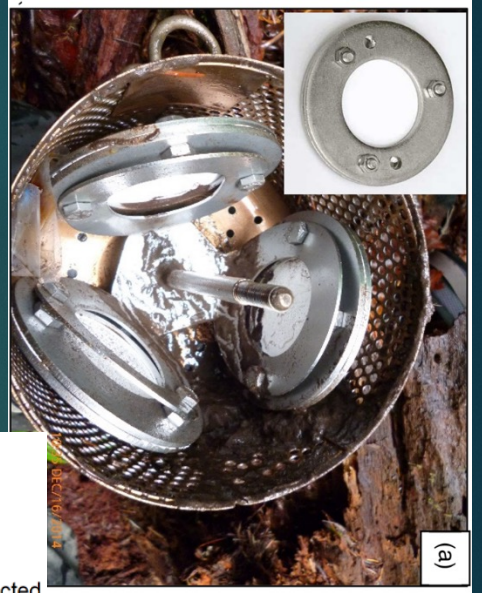
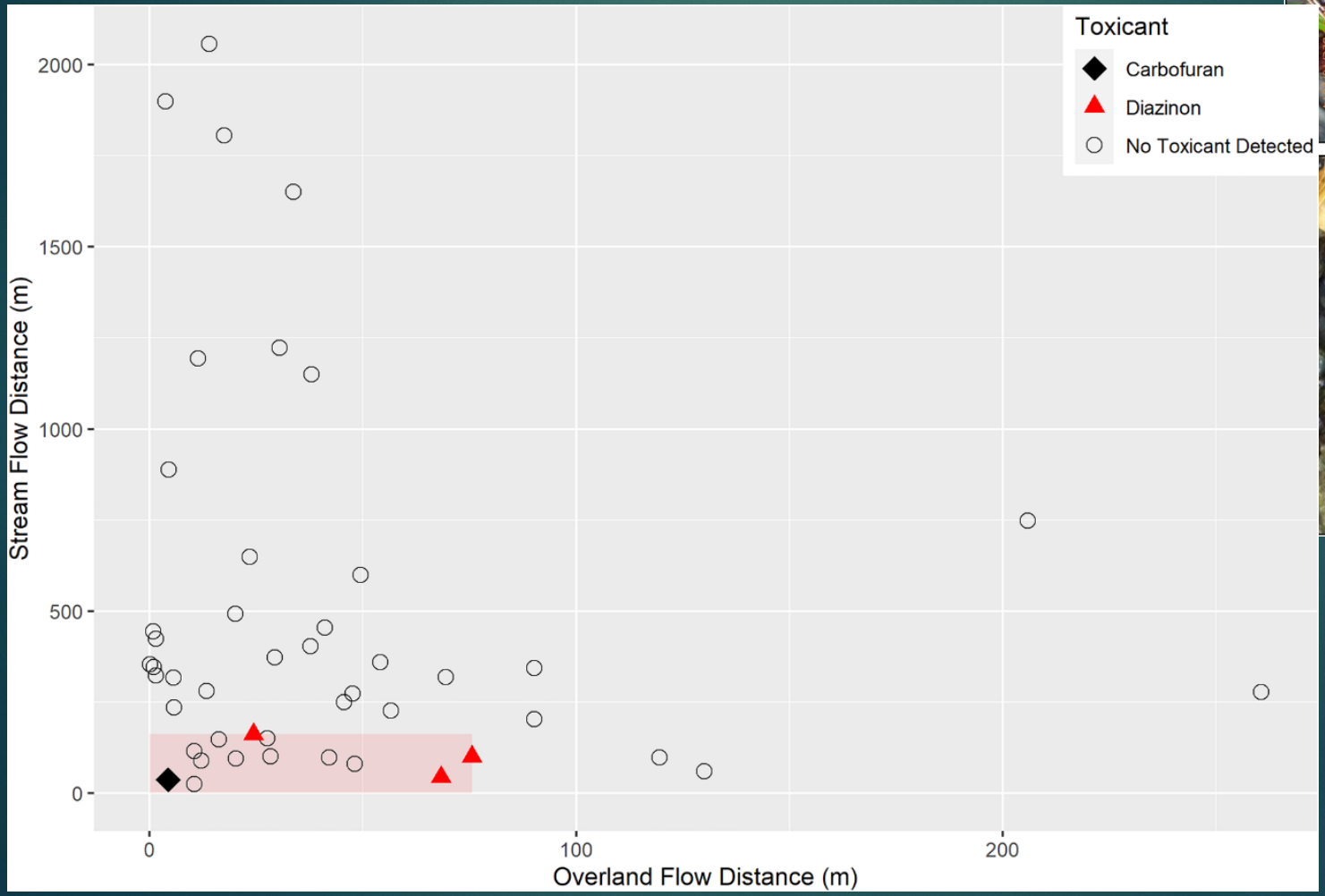
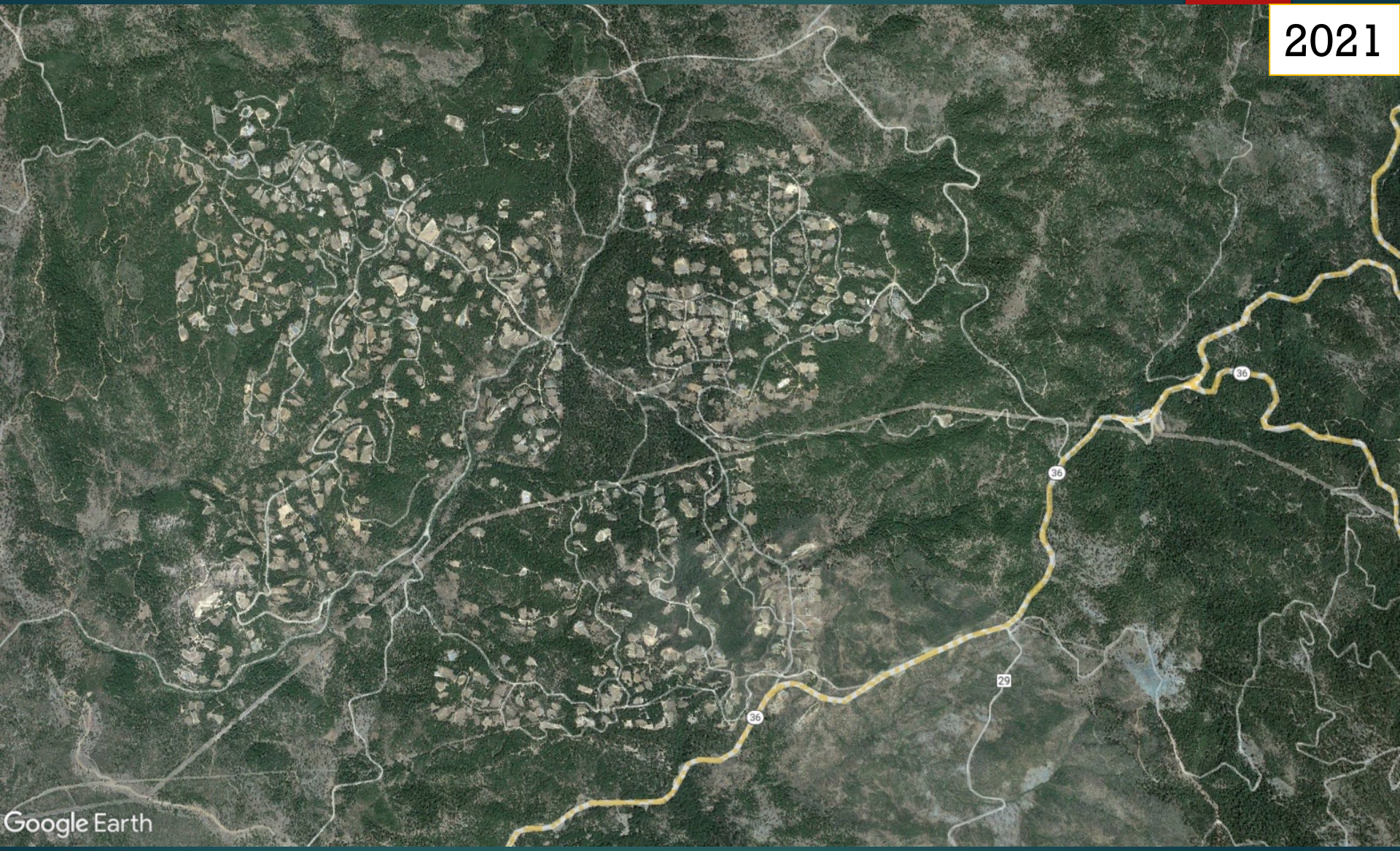
[b] United States Forest Service, Law Enforcement and Investigations, Pacific Southwest Region, Arcata, CA, USA





Evolution of a private cultivation community



> 400 individual sites (~10% in the licensing process)

RESEARCH COMMUNICATIONS RESEARCH COMMUNICATIONS

Cannabis, an emerging agricultural crop, leads to deforestation and fragmentation

Ian J Wang[1*†], Jacob C Brenner[2], and Van Butsic[1†]

- Compared to commercial timberland clear cuts.
- Private grows proportionally created greater edge habitat than timber clear cuts.
- Clearcutting and habitat fragmentation was one of the driving factors for northern spotted owl's listing.

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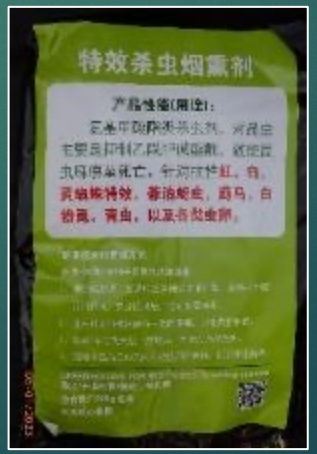
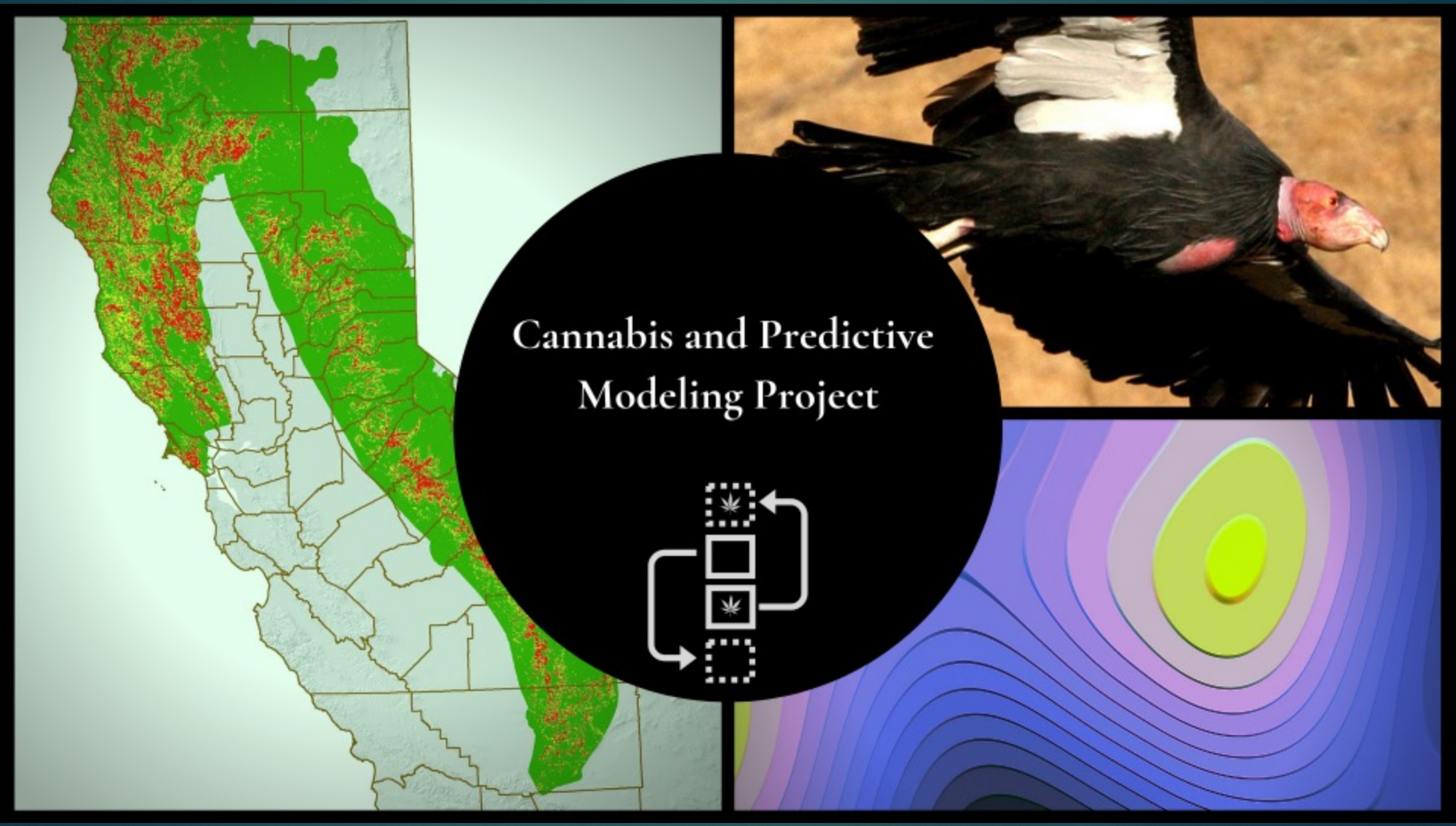
Emerging Trends in Siskiyou County



What's left behind….

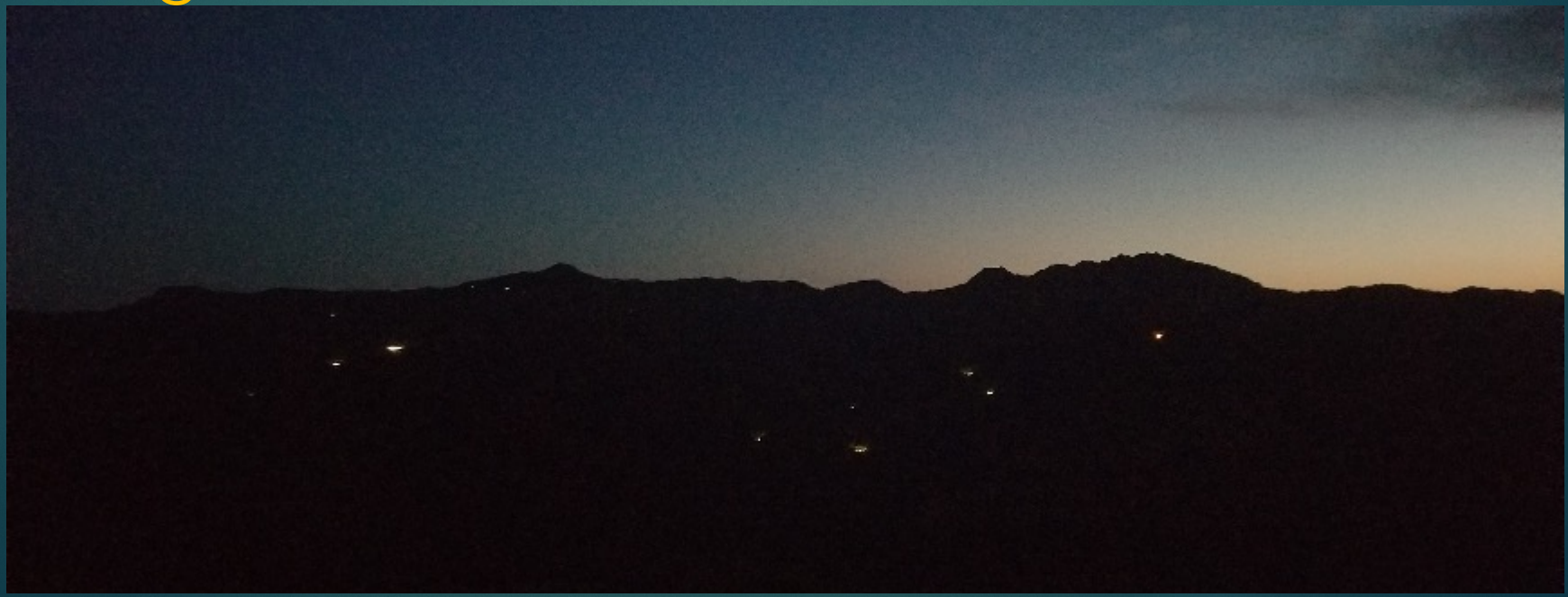
Photo: HM Jones, Integral Ecology Research Center

New Approaches to Address an Old (but evolving) Problem

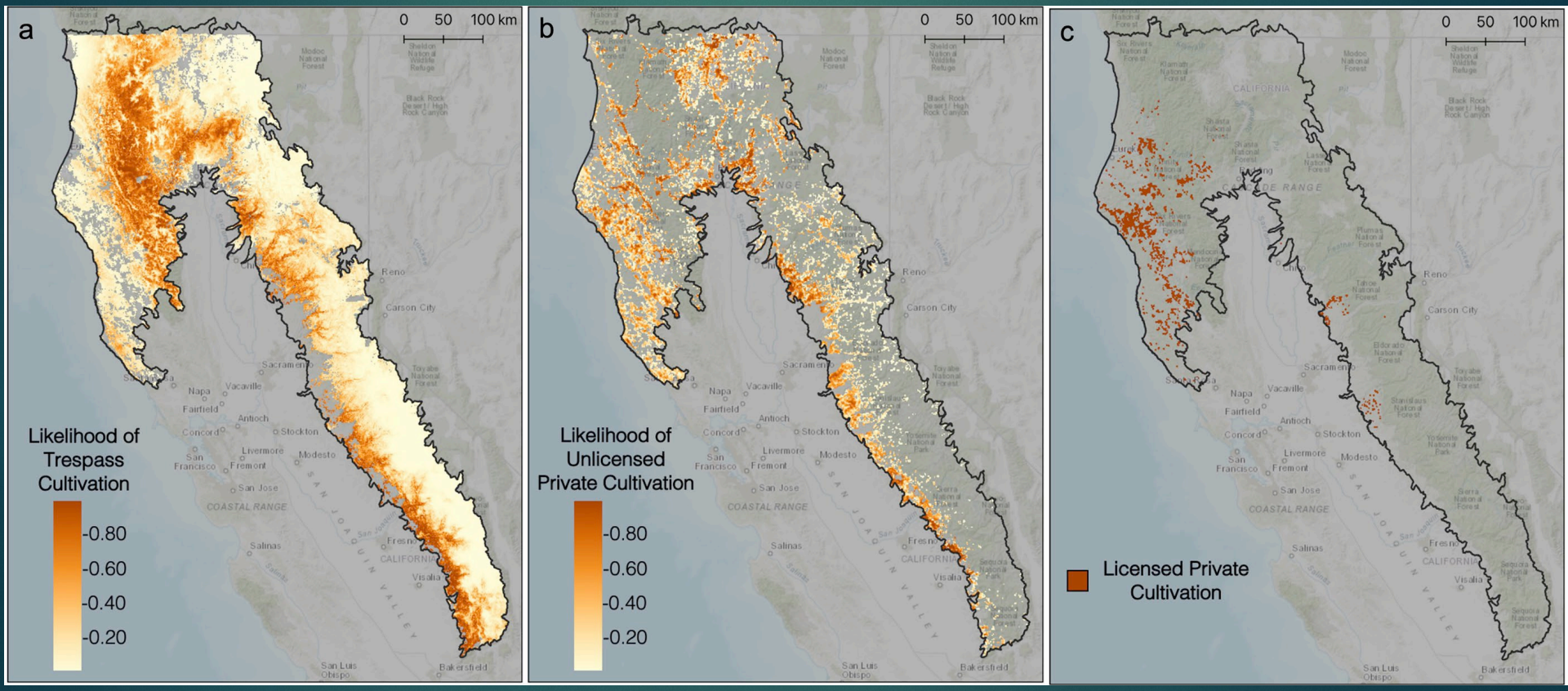


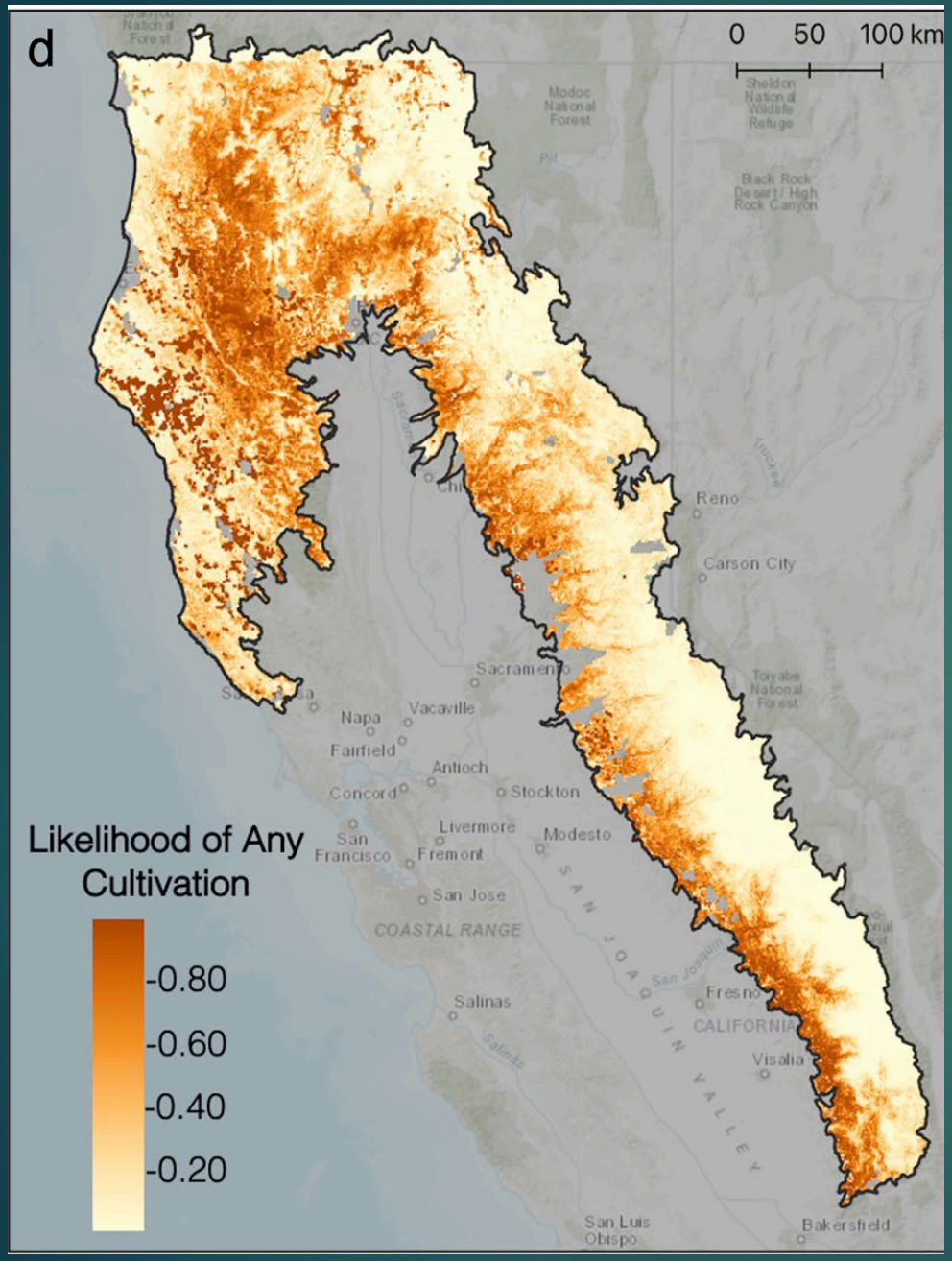
Modeling Risk of Illegal Private Land Cultivation

- Partnering with CDFW
- Objective: Identify high-risk areas associated with sensitive wildlife and habitats
- To assist in surveillance, reconnaissance, and regulation, on a cumulative basis



Likelihood of Cultivation in California (Rich et al. 2023)





- Cultivation risk continues to be high in the Emerald Triangle (Humboldt, Mendocino, Trinity Co.)
- Siskiyou faces an emerging threat
- Sierra Nevada foothills at risk

Thank you !
Questions ?

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