Understanding Stream-Side Encampments in Alameda County and the Bay Area

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CONTRA COSTA RESOURCE CONSERVATION DISTRICT

Safety • Risk-Reduction • SafeR³ • Resilience • Reliability

NAPA RCD

UC DAVIS UNIVERSITY OF CALIFORNIA

North Santa Clara Resource Conservation District

UNIVERSITY OF CALIFORNIA Agriculture and Natural Resources

SJSU SAN JOSÉ STATE UNIVERSITY

What Is Homelessness?

- Experiencing Homelessness describes a person who lacks a fixed, regular, and adequate nighttime residence.
  - **>187,000 in California**
- Unsheltered Homelessness refers to people whose primary nighttime location is a public or private place not designated for, or ordinarily used as, a regular sleeping accommodation for people
  - **In California, >2/3 of total are unsheltered**
  - **In U.S., ~25% of unsheltered are 55+ years old (only 4% under 18)**
- Significant undercounting: many teams do not even leave their cars and very few know where to look for people in nature.

(Facts from U.S. Dept of HUD, 2024)

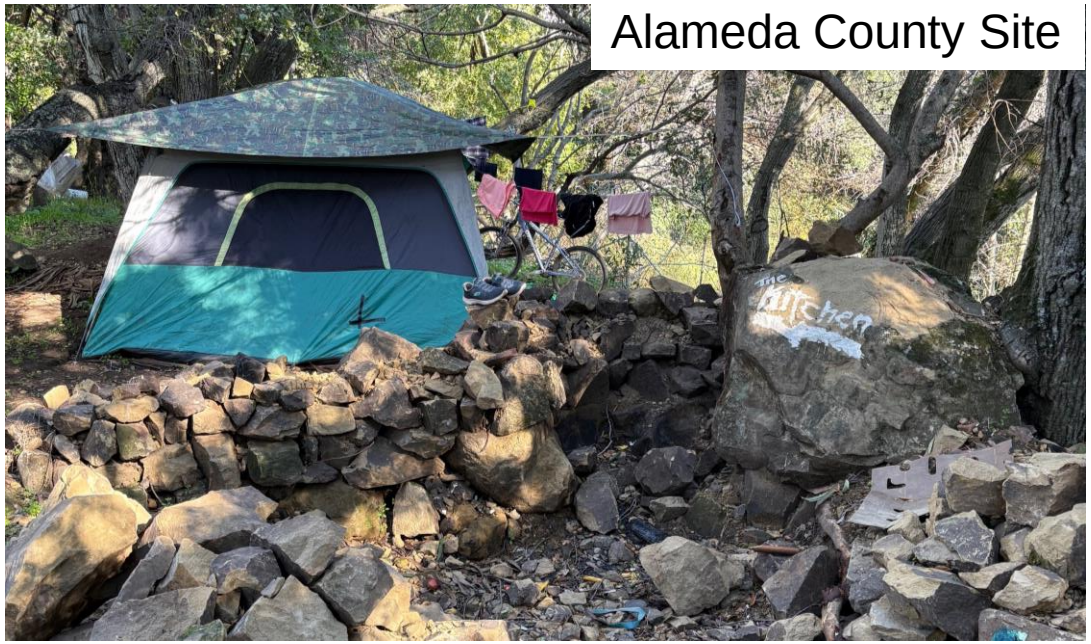
Alameda County 2024 Homelessness Estimates

- Of ~10,000 surveyed, 2/3 were unsheltered and 1/3 sheltered
- 78% were living in Alameda county before they became homeless
- 75% have lived in Alameda County for 10+ years
- Black/African/African American people have **~ 4x** their representation in the general population, far higher than any other group.

2024 Point-in-Time Count Report for Alameda County

Stream-Side Encampments

In California, thousands to tens of thousands of unsheltered folk are living along streams.


Alameda County Site

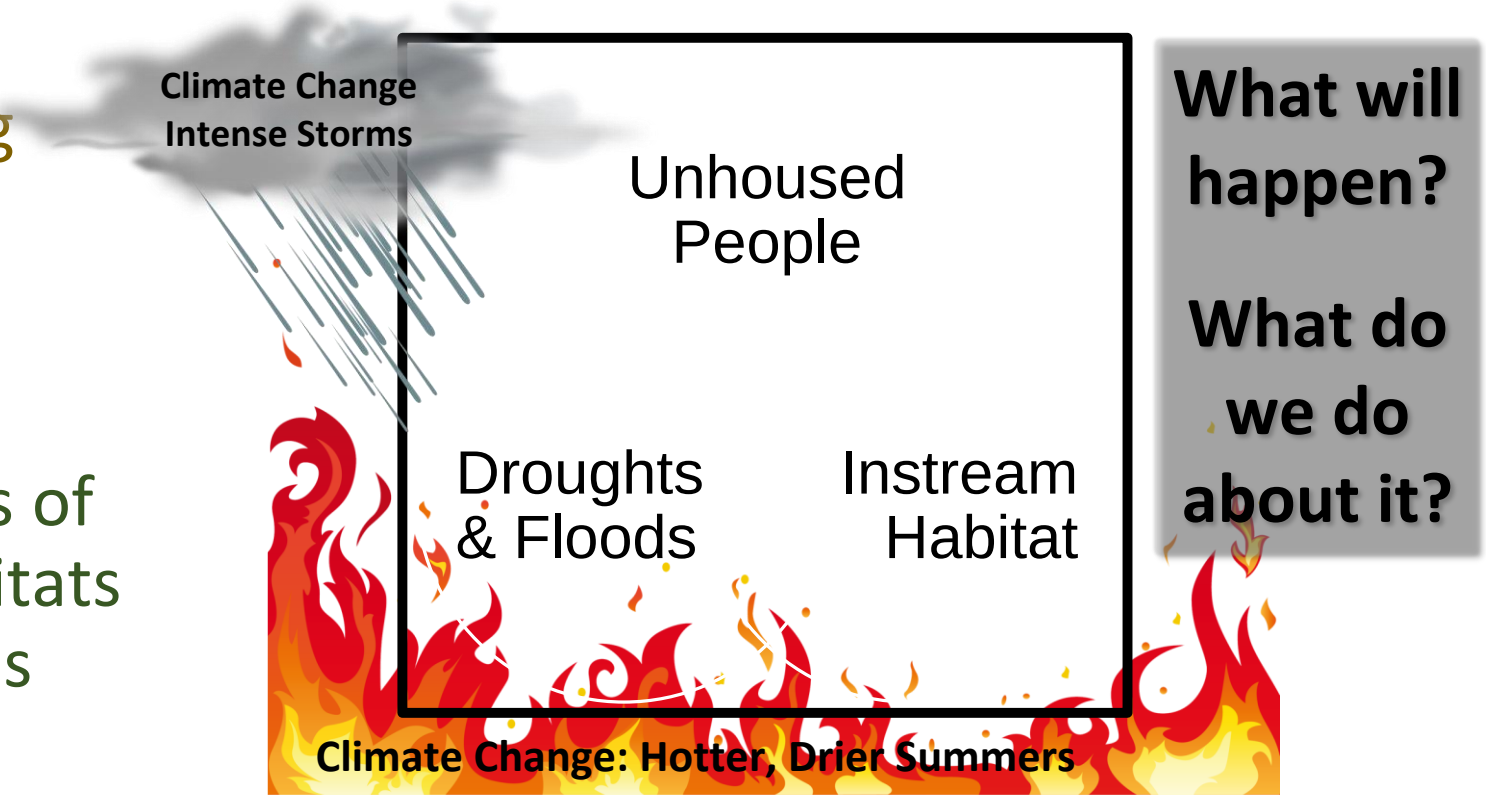

San Jose

Sacramento

SF Bay Area Climate Action Stream Encampment Study

Throughout the 9-County SF Bay Area

- Who are unhoused folk living along streams?
- What is their vulnerability to wind, rain, & flash floods?
- Do we even know what kinds of streams we have? What habitats we have? What flood regimes we have?



What will happen?

What do we do about it?

Project Team: UC Davis, SJSU, RCDs (Napa, Contra Costa, and North Santa Clara), UC ANR, and SafeR3

Study Research Components

Camp social survey

Camp condition observational survey

Camp trash survey

Pollution, public transit, and land-use context of camps

Predictions of encampment, habitat, and flood probabilities per 200-m stream interval

Socio-ecological vulnerability & resilience assessment

Compound rain & wind extreme events 1982-2022, 2034-2066, 2067-2099

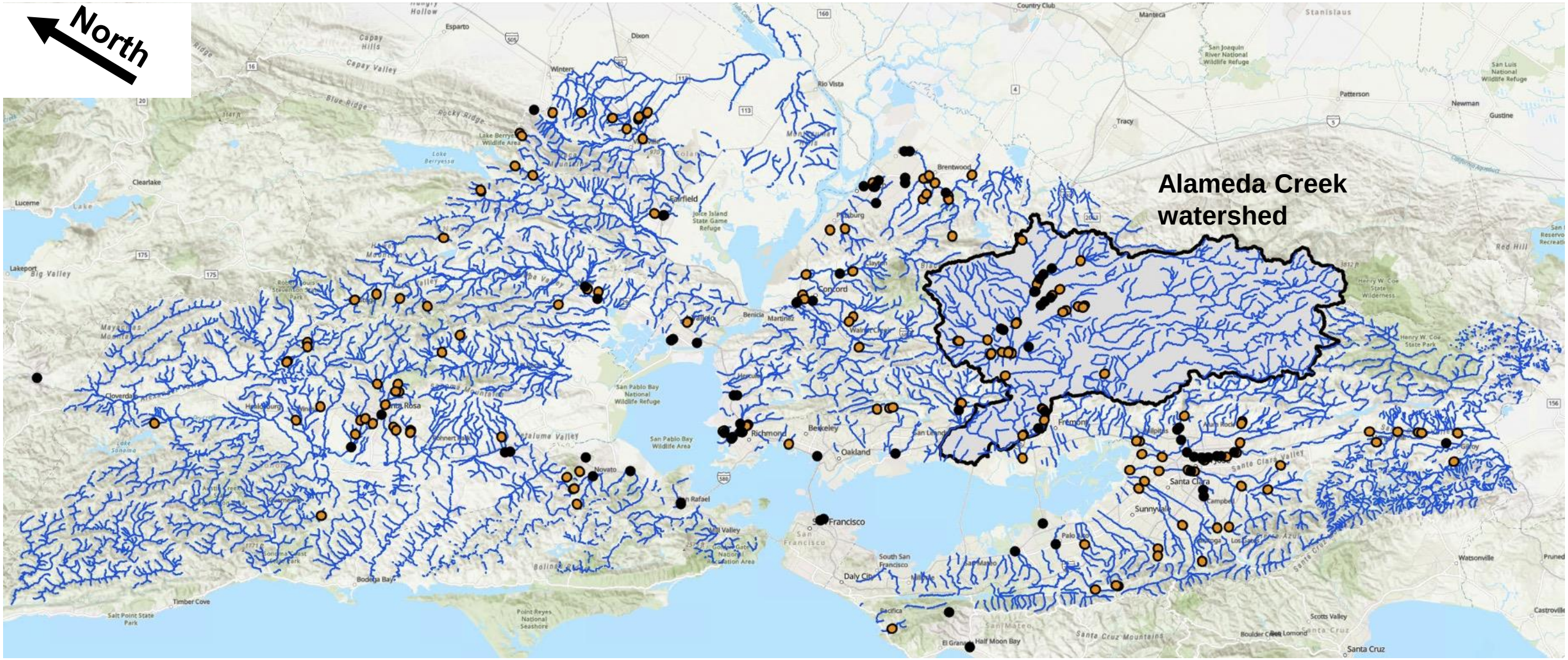
Stream geophysical surveys, regional stream classification, and ML prediction of type for all 200-m stream intervals

Mechanistic studies of fish habitat and flooding among stream types

Study Outreach Components

- Collaborated on 23 camp cleanups
- Shepherded $134,000 of private foundation support to 14 CA-based nonprofits.
- Biweekly meetings with RCDs
- Blogs & news stories
- CalEPA proposal for flash flood alerts
- Community engagement with
  - 12 state and local government entities
  - 22 NGOs
  - 6 water utilities/agencies/districts
  - 5 consulting firms
  - 2 research institutes

Treating The 9-County Region As A Single System



Study streams in blue. Geophysical sampling sites in orange. Known stream-side encampments in black.

Insights from 300 Interviews With Residents

Demographics & Structures

- Most camps were small (~10-24 structure), with Santa Clara County having the largest camps.
- Many semi-permanent structures and communal areas
- Excavation & caves when banks are cohesive
- Many people >50 years old
- Many pets and feral animals

Semi-permanent structure dug into riverbank that is a former landfill (San Jose area)

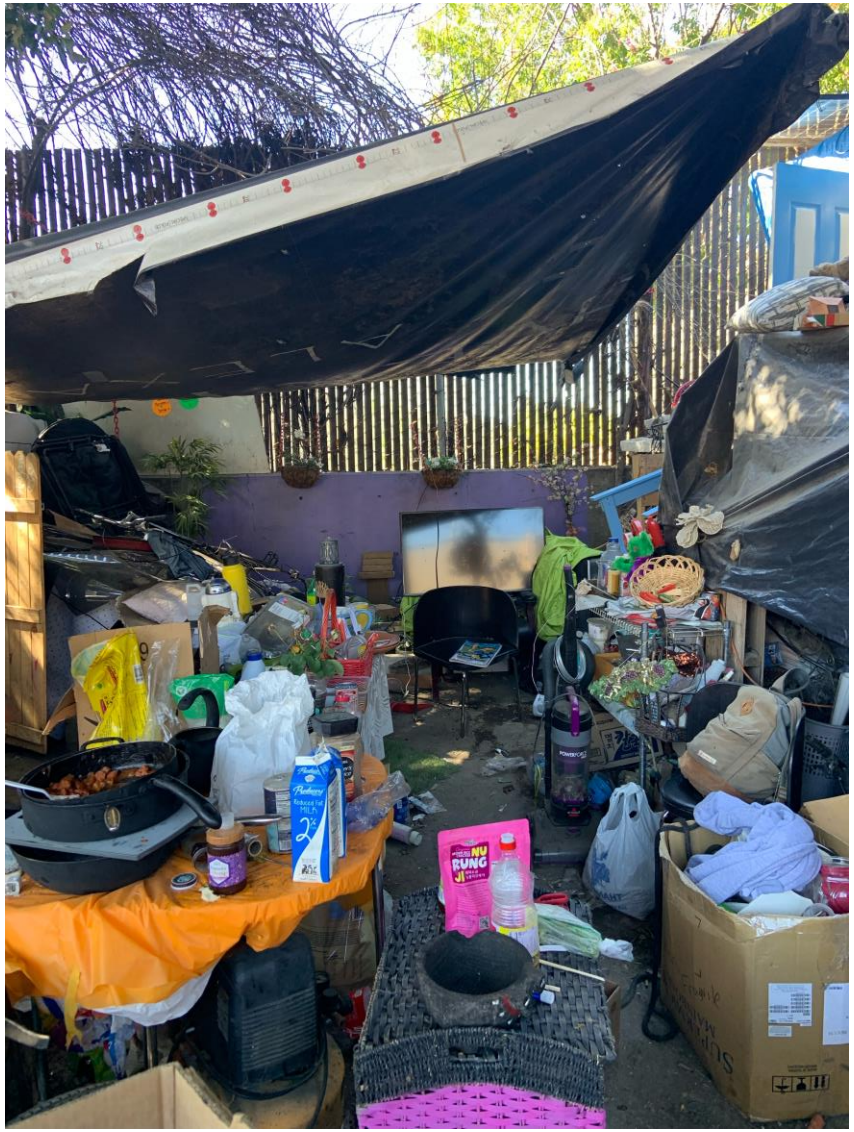
Analysis by Prof. Costanza Rampini &
Abby Espinosa-Gonzalez Bellolio

Insights from 300 Interviews With Residents

Why Along Streams?

- Value closeness to nature
- Enjoy that it “feels like camping”, “out of sight”, “secluded”
- Canopy cover and a cool breeze as advantages of living along waterways
- No drinking or fishing in streams
- Shelters are considered unsafe, do not allow pets or belongings, have many rules.

San Mateo County site communal kitchen and garden



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Insights from 300 Interviews With Residents

Climate & Natural Hazard Awareness?

- Many do not actively seek information about weather, ‘take it as it comes’.
- Most never received early warning about heatwave or flash floods, only word of mouth.
- Almost none have gone to a cooling center or warming center to protect themselves against extreme weather events.
- Spend more time in local stores when it gets really hot and they spend more time in their tents when it’s raining
- Living with floods: putting pallets under tents, adding tarps, moving to higher ground
- Almost everyone has experienced a fire.

Burned Tree From Fire In Camp

Analysis by Prof. Costanza Rampini & Abby Espinosa-Gonzalez Bellolio

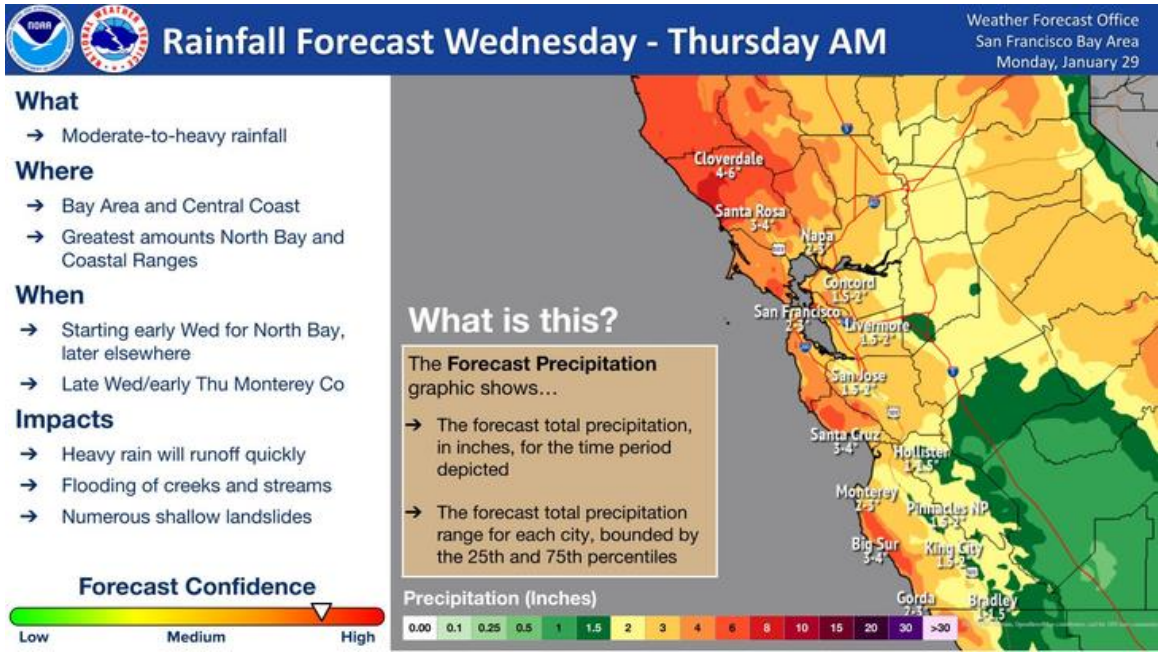
Compound Wind-Rain Extreme Events

Rain risks

- Drives people into ad hoc shelter on site.
- Mud widespread; fall hazard
- Drives flash floods.

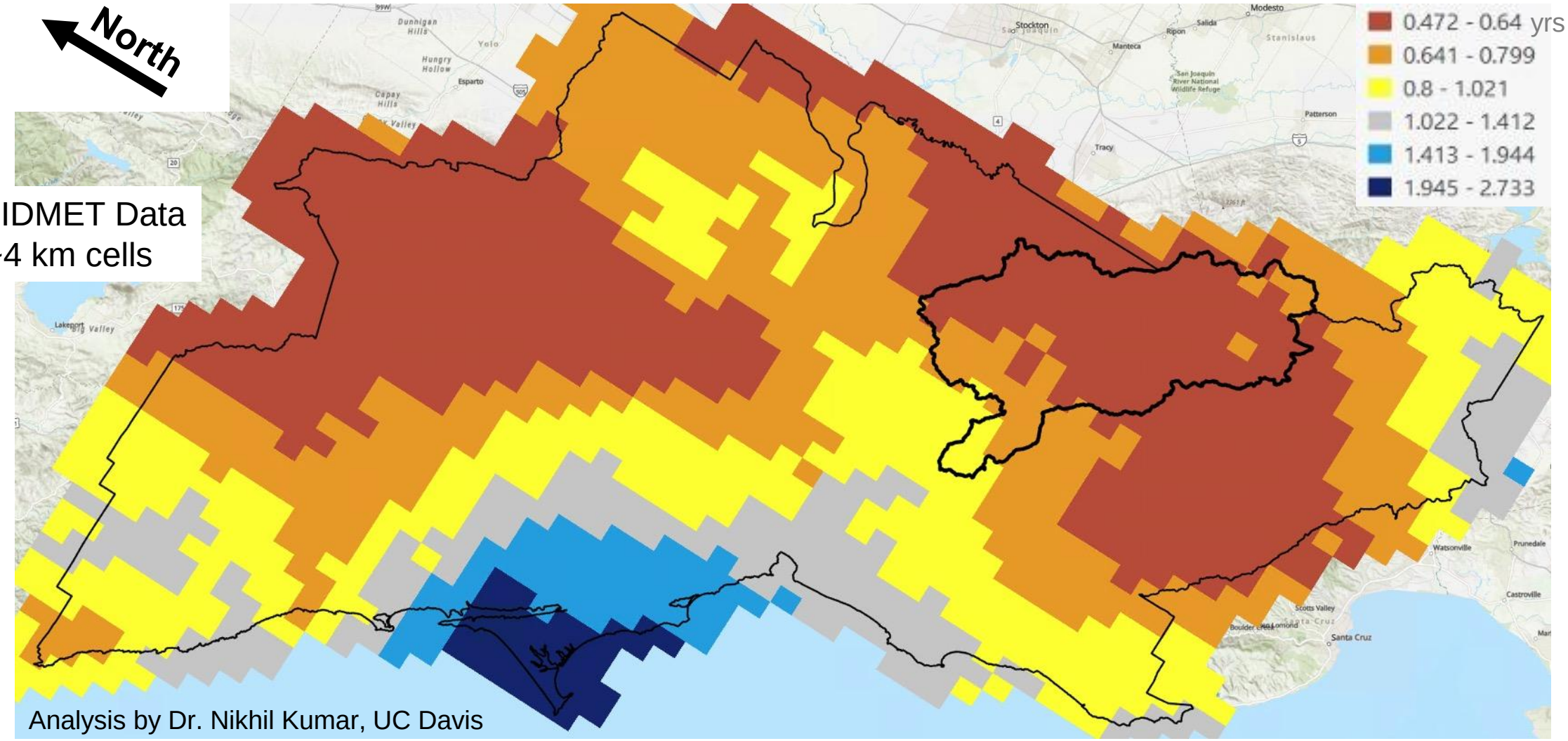
Wind risks

- Damage and destroy ad hoc shelters.
- Cause trees and large branches to fall on people.



"Winds topped 50 mph in some areas. A woman was killed in the East Bay suburb of San Ramon on Saturday when she was struck by a falling tree at a golf course amid heavy winds." – LA Times, Jan 5, 2017

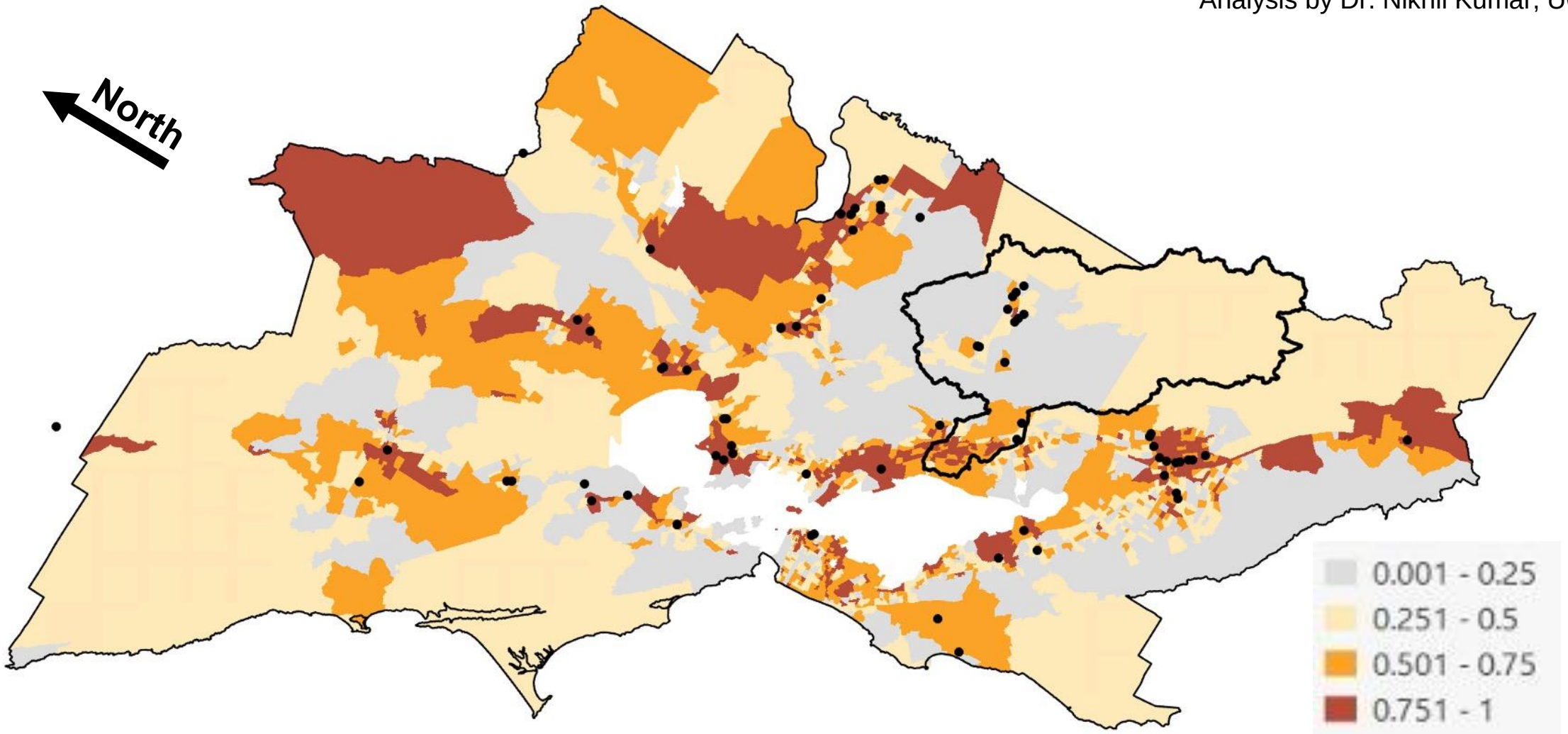
Compound Wind-Rain Extreme Events



Return Period in years (red is worse = more frequent compound extreme events)

American Community Census
Social Vulnerability Index, 2018-2022

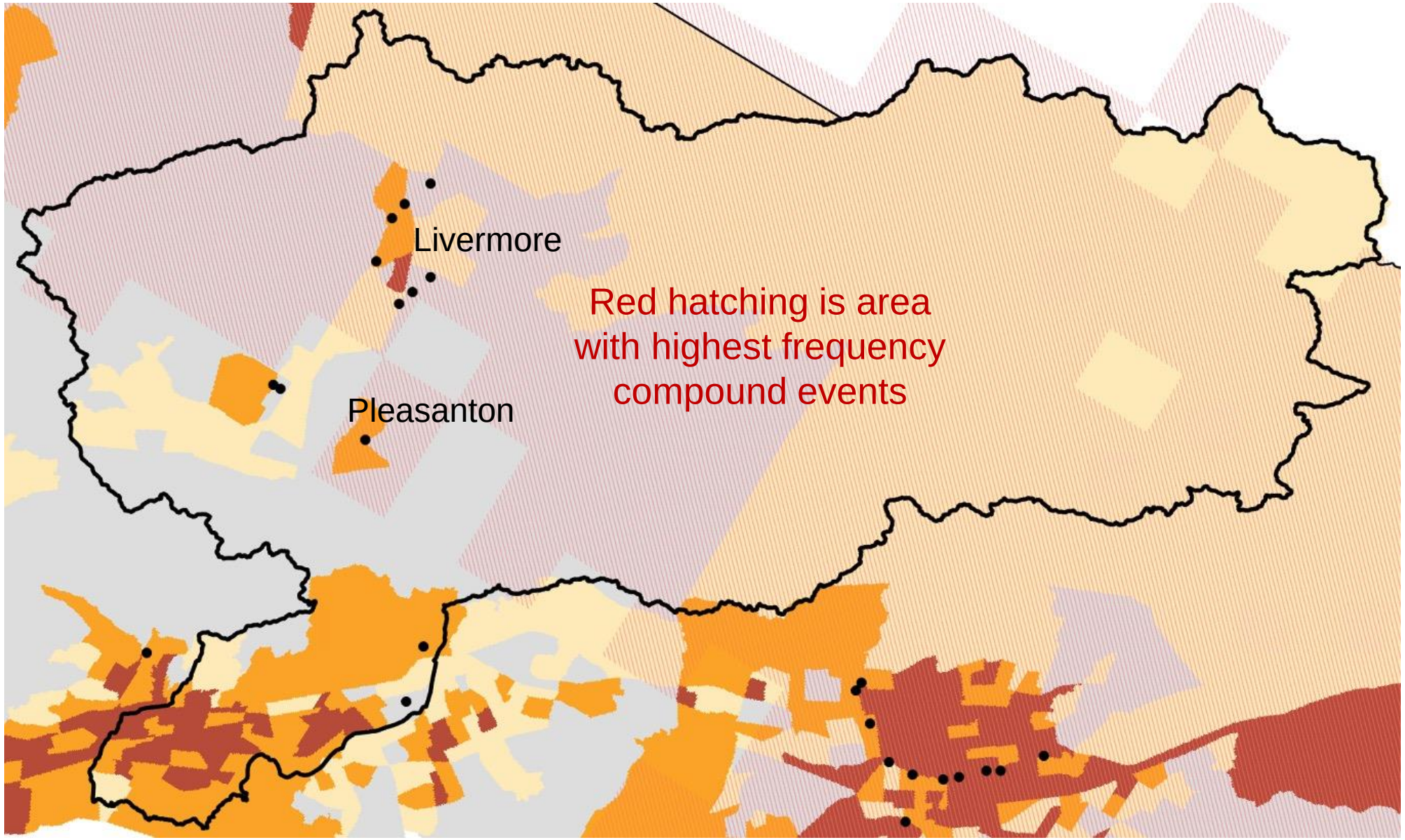
Analysis by Dr. Nikhil Kumar, UC Davis



Black dots are encampment sites

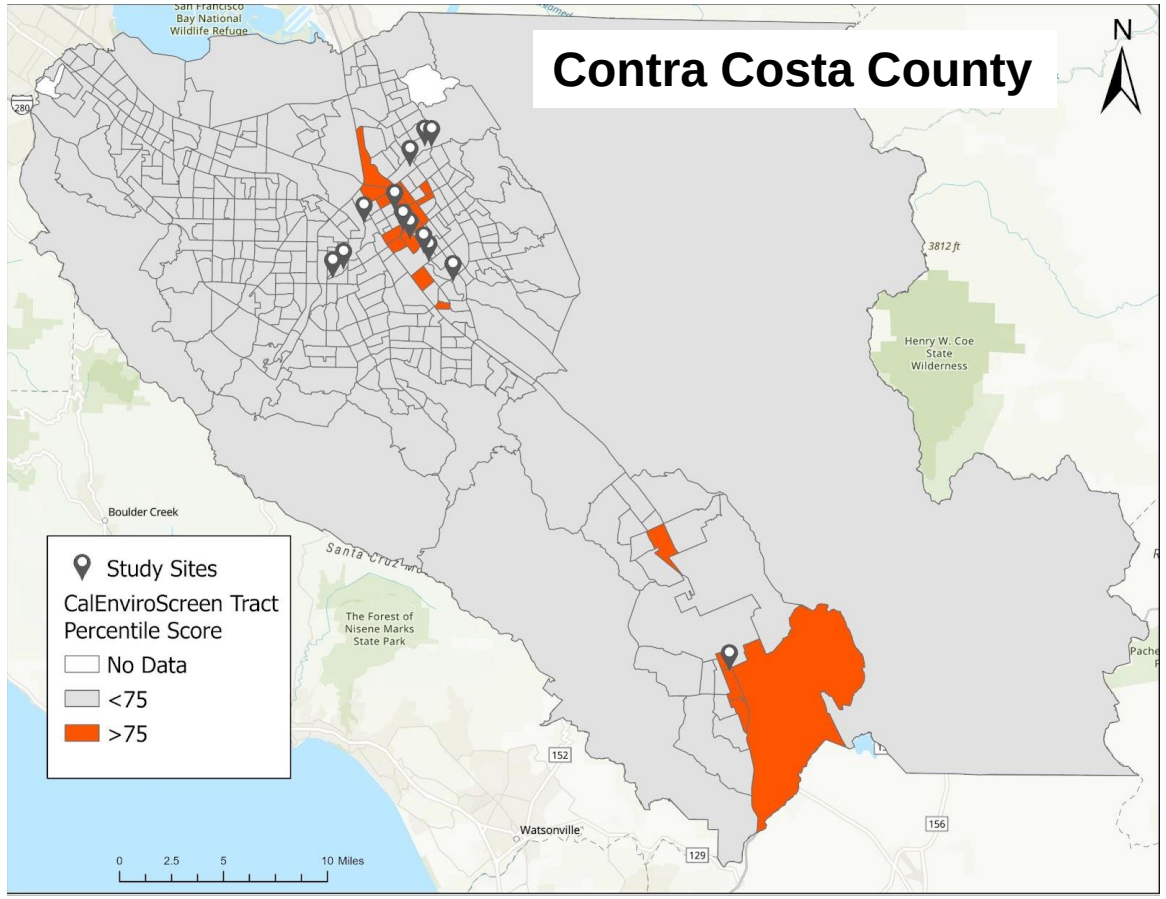
Red is highest vulnerability

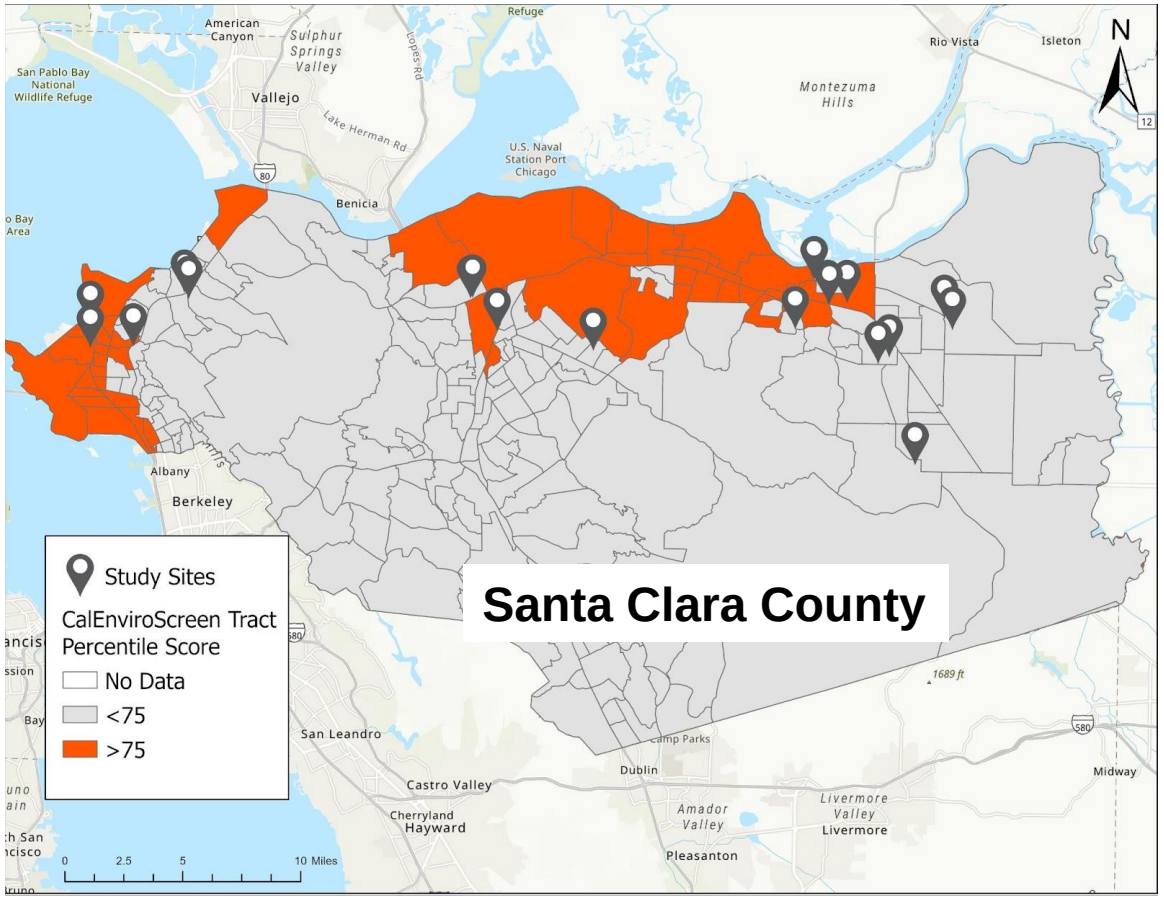
Climate Overlay With Vulnerability



Encampments Are Located In Highly Polluted Areas

Camps are 3 times more likely to occur in highly polluted areas than would occur by random chance, >95% statistical confidence.





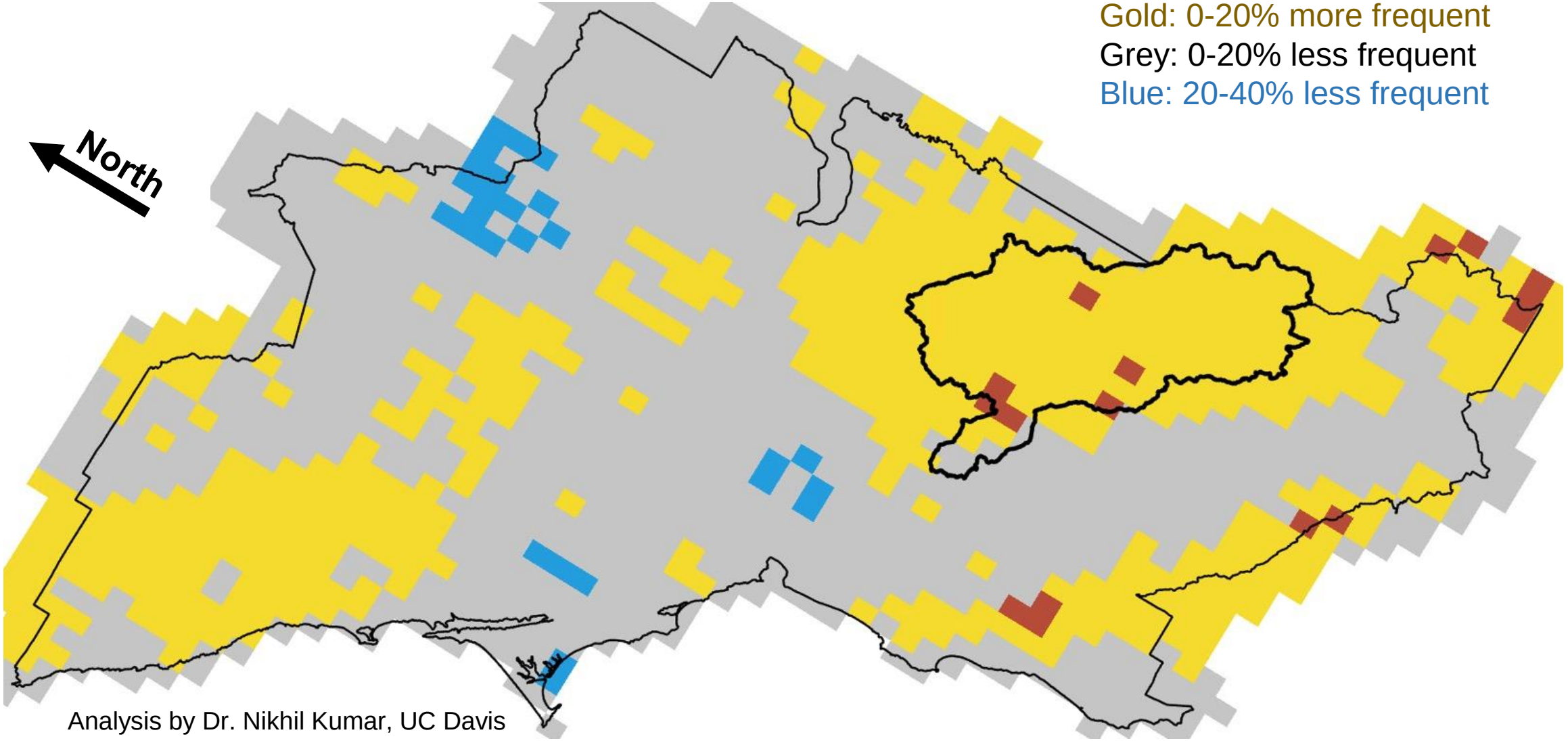
Analysis by Jeff Wooton and Bennett Williamson, SJSU

CalEnviroScreen 4.0 data

2034-2066 Compound Extreme Storms

MHP-CUS-V1.1 CMIP6 Dataset With SSP5-8.5 High Emission Scenario

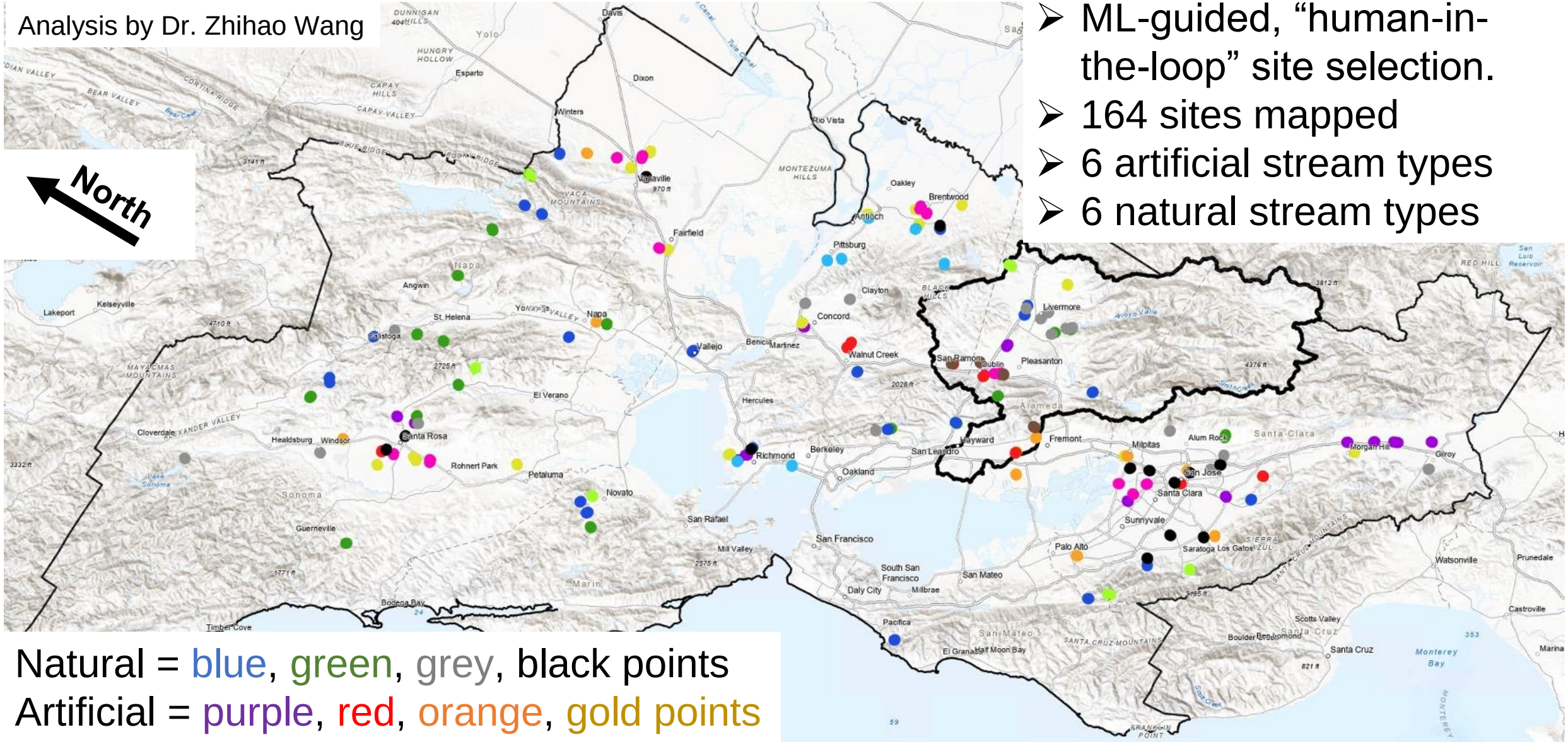
Red: 20-40% more frequent events
Gold: 0-20% more frequent
Grey: 0-20% less frequent
Blue: 20-40% less frequent



Analysis by Dr. Nikhil Kumar, UC Davis

Bay Area Stream Classification

Analysis by Dr. Zhihao Wang



- ML-guided, “human-in-the-loop” site selection.
- 164 sites mapped
- 6 artificial stream types
- 6 natural stream types

Natural = blue, green, grey, black points

Artificial = purple, red, orange, gold points

Natural Vs Artificial Streams

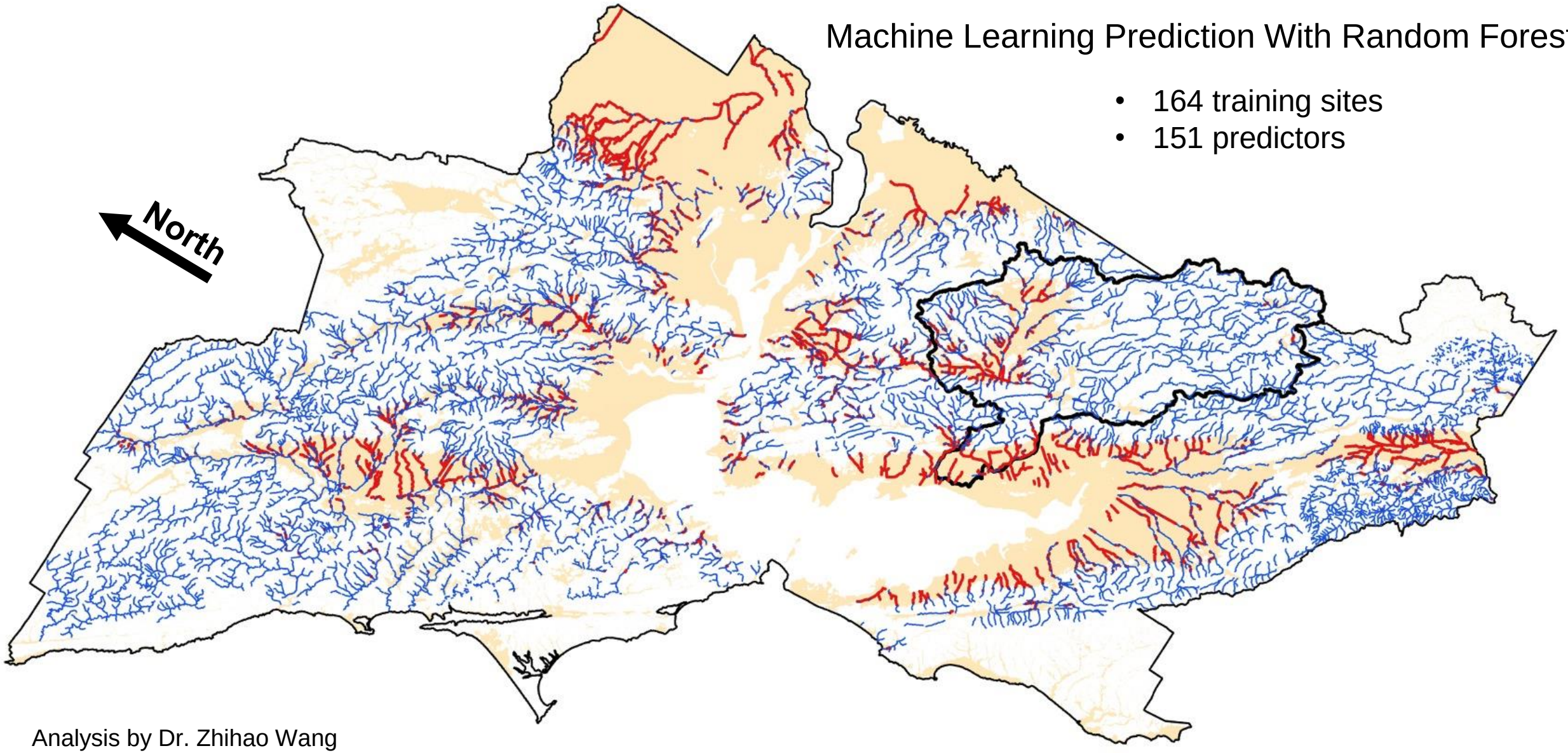
Artificial: >50% of site has artificial shape and/or composition for its bed and/or banks.

Natural: can be severely degraded and have artificial features, but is >50% not directly modified

Artificial Vs. Natural PRELIMINARY Map

Machine Learning Prediction With Random Forest

- 164 training sites
- 151 predictors



Analysis by Dr. Zhihao Wang

Artificial Vs. Natural PRELIMINARY Results

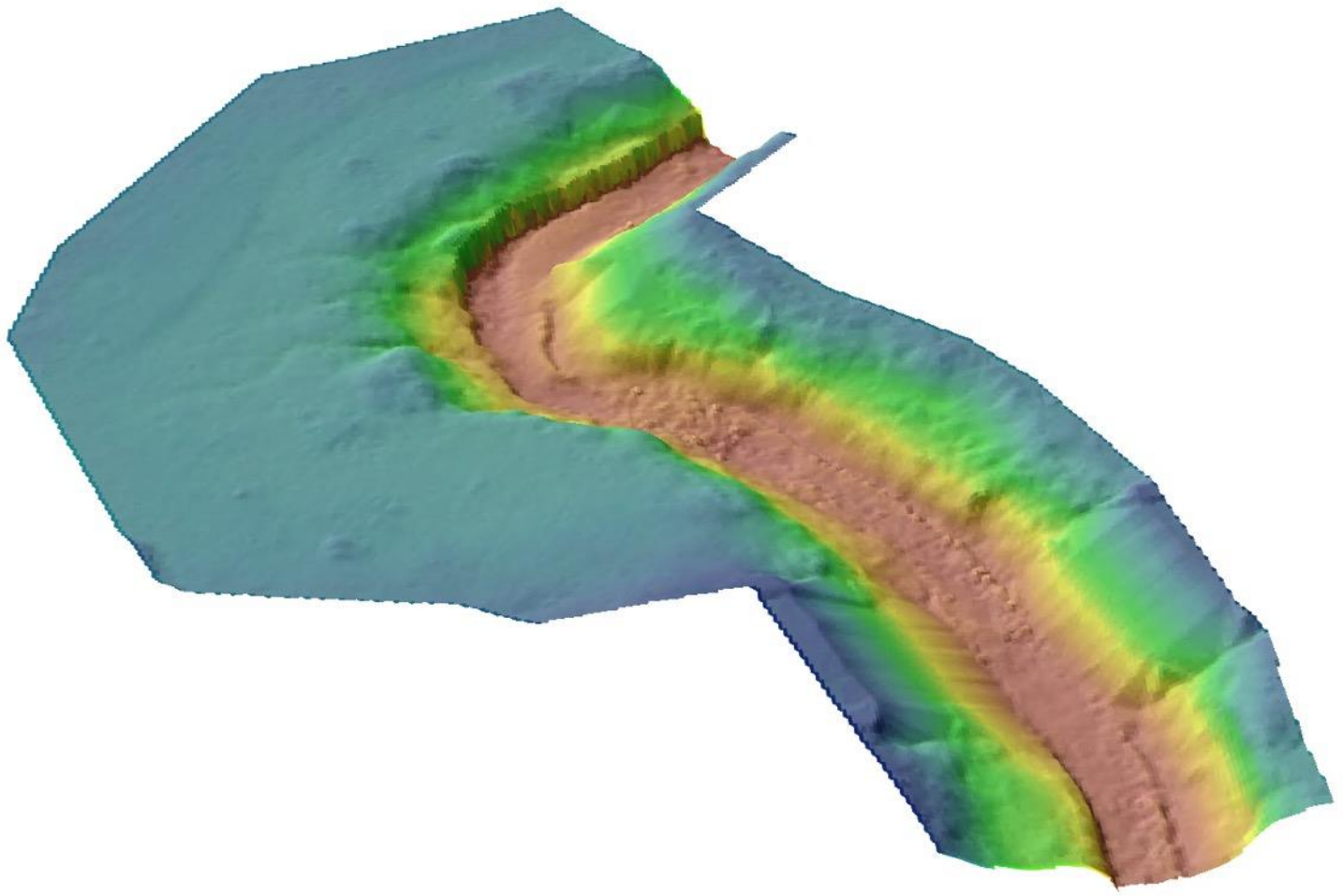
What fraction of streams are artificial?

	Total Area	Valley Floors (>5 km²)
Bay Area	**17%**	**28%**
Alameda Creek Watershed	**13%**	**26%**

47% of encampments are along artificial streams (2.8x random)

93% of encampments are on valley floors > 5 km²

Process-Based Studies of Streams



- Scientific question & hypothesis
- Field data collection
- 2D Modeling
- Algorithm to process 2D model results to obtain test variables
- Statistical testing of hypothesis

Prognostications & Insights

- Government behavior is highly unpredictable but unless someone builds ~3 million new homes by 2031 AND government support of citizens increases significantly, then expect MORE people living along streams over time, including in the Alameda Creek watershed.
- Counties are taking very different approaches to stream-side camps. Contra Costa is being most compassionate while others are being extremely punitive.
- Environmental & Social Service sectors need to engage each other and learn how to work together.
- University + local government + nonprofit partnerships can produce a systemic approach to monitoring what is happening and guide action.