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Is the Grass Really Green?

Conservation perils from illegal marijuana cultivation in California: current knowledge and unanswered questions

Mourad W. Gabriel M.S., Ph.D.

Integral Ecology Research Center & University of California, Davis

What this talk will cover:

- Current data we have on this issue
- Potential impacts to forest communities
- Barriers in addressing threats
- Potential solutions and future directions

What this talk will <u>NOT</u> cover:

- Ethical or morality issues of marijuana
- Medicinal qualities
- Policy or legality concerns

Collaborative Efforts

- Interdisciplinary approach
- Working with Federal, State, Academia and NGO's "Out of the Box" approach.

Background

In 2004 USFWS ruled that the fisher (*Martes pennanti*) was

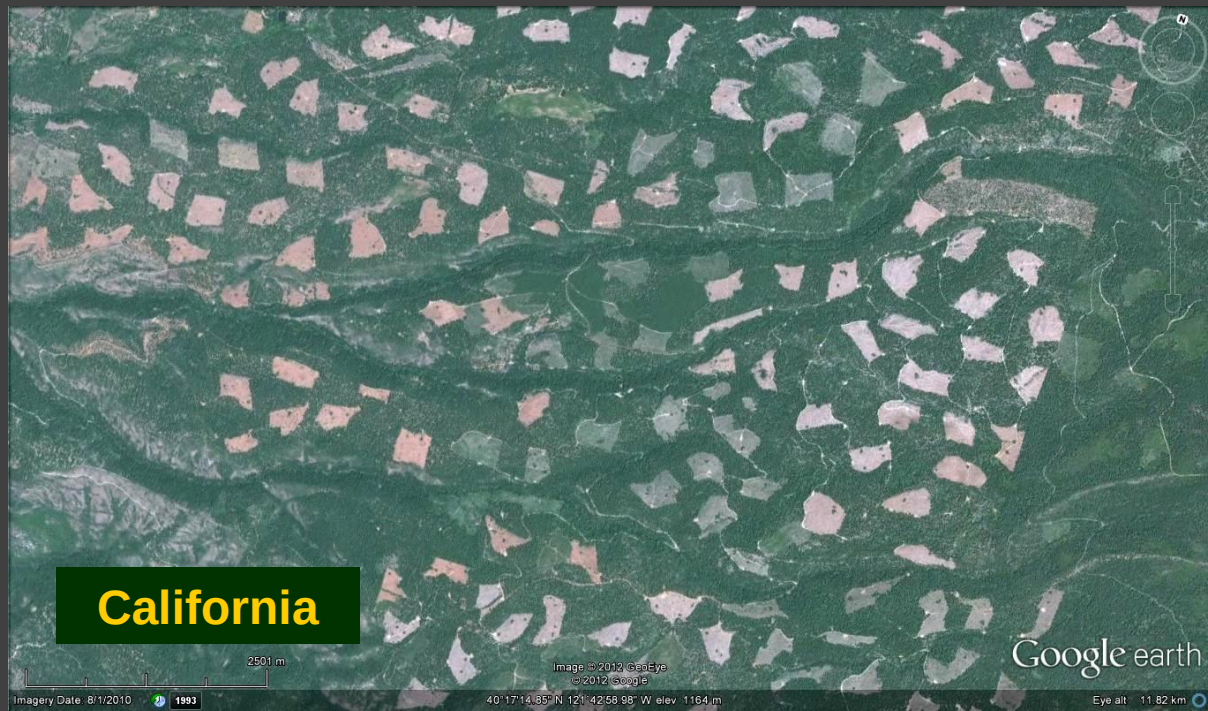
Warranted for listing under the Endangered Species Act

What is a Fisher?

Fisher (*Martes pennanti*)

- Forest specialist mid-sized carnivore
- **Habitat:** Mid-late stage continuous coniferous & mixed forests
- **Diet:** Omnivore (rodents, carrion, berries)
- **Size:** Males 8-10 lbs, Females 4-6 lbs
- **Reproduction:** Mate and raise young March –September
- **Range in CA:** Two isolated populations

Oregon
5.50 km
© 2012 Google
Google earth
Imagery Date: 8/18/2011
43°41'53.03" N 122°53'06.94" W elev 634 m
Eye alt 24.06 km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40°17'14.85" N 121°42'58.98" W elev 1164 m
Eye alt 11.82 km

Range of the Fisher

Fishers are Associated with Continuous Forest Cover

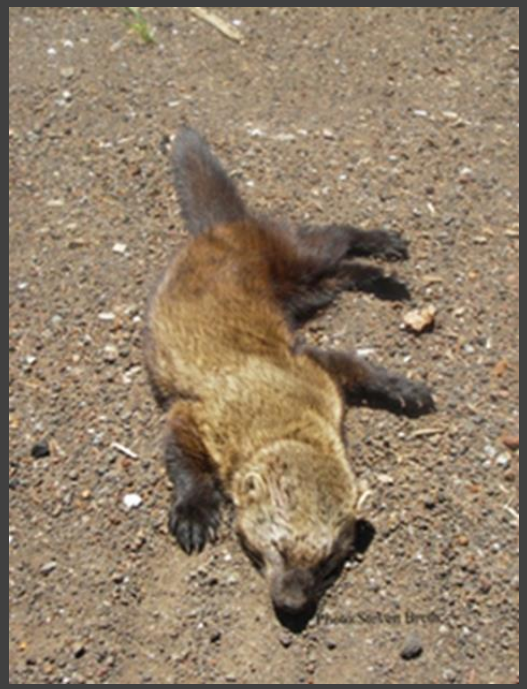
Fisher (*Martes pennanti*): VIDEO

Photo: Rebecca Green: Video: Hoopa

How are fishers impacted by MJ grow sites?

?

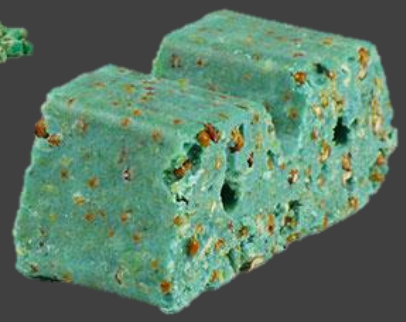
Fisher Monitoring Research Projects

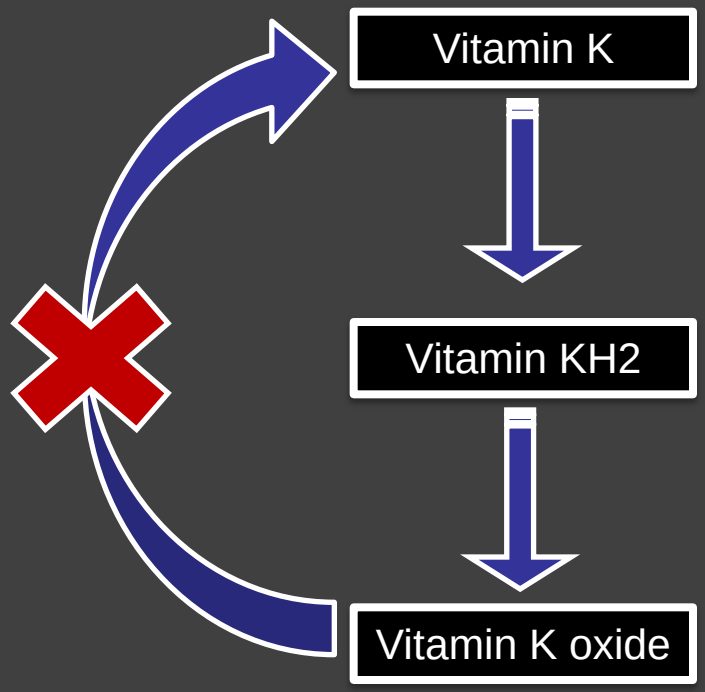


What are Anticoagulant Rodenticides (AR)?

- Chemical pesticide
  - Pellets or bait blocks, flavorizers

- Vitamin-K antagonist
  - Disrupts normal blood-clotting
  - Hemorrhaging





Flavorizers?

- AR compounds are bitter and unpalatable
- Flavorizer emulsions include
  - Peanut butter
  - Apple
  - Cheese
  - Bacon
  - Fish, Meat and Chocolate
- Risk of both primary or secondary poisoning

PLOS ONE

Anticoagulant Rodenticides on our Public and Community Lands: Spatial Distribution of Exposure and Poisoning of a Rare Forest Carnivore

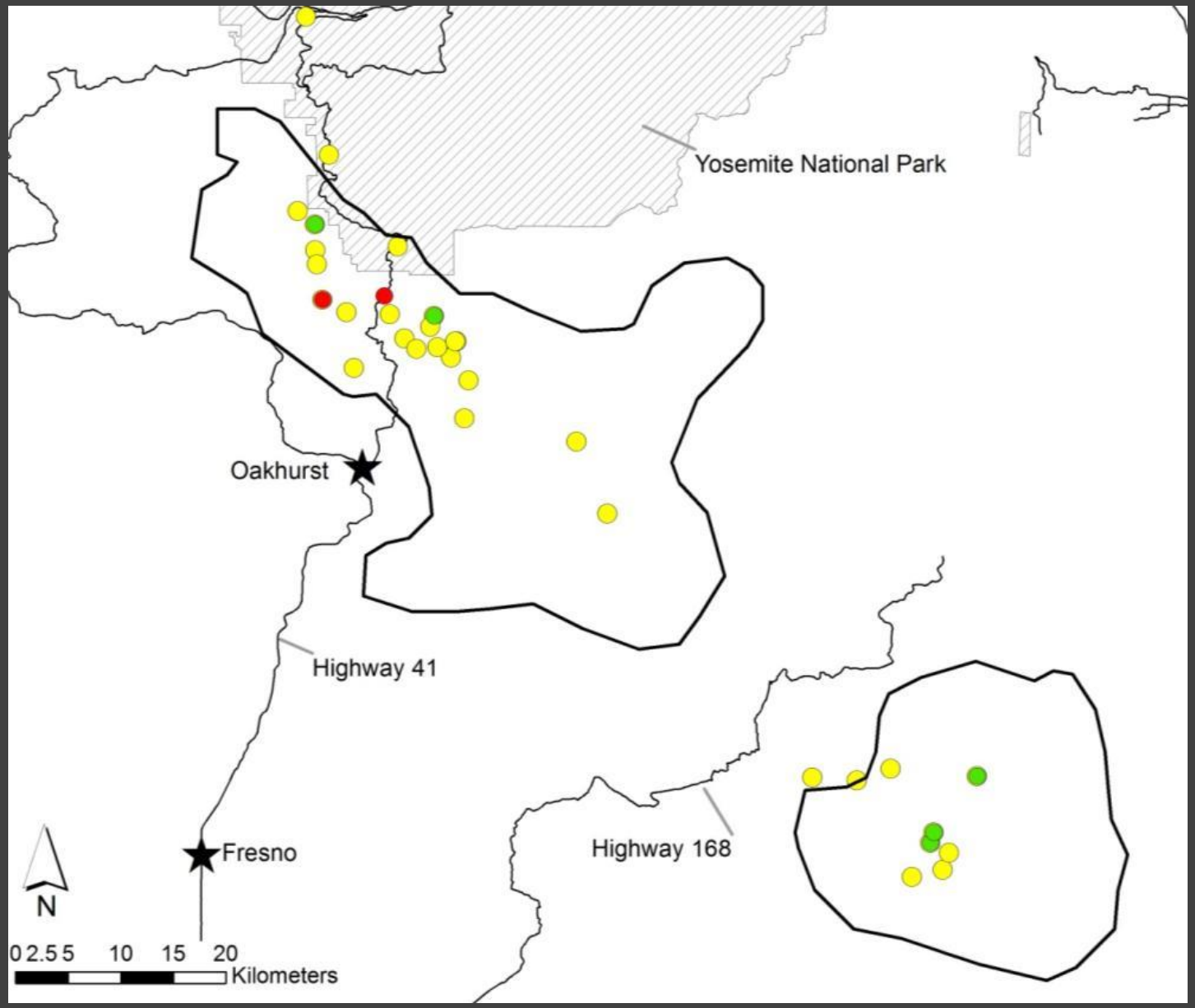
~ 80%
Exposed to AR

- <u>Four Mortalities</u> were due to AR poisoning.
- Spatial modeling: exposure was ubiquitous in study areas.
- Neonatal or milk transfer of AR to fisher kit.

Results for Sierra Nevadas

- Non-exposed
- Exposed
- AR Mortality

No Clusters



After the PLoS paper……

- Collaborated with law enforcement to start documenting environmental impacts.

What we started to see…. Illegal use of rodenticides.

After the PLoS paper……

…. Illegal use of numerous other toxicants,

After the PLoS paper……

…. Fragmented landscapes,

After the PLoS paper……

…. Water diversions and toxicant filled slurry ponds.

Conservation Letters
A journal of the Society for Conservation Biology

Impacts of rodenticide and insecticide toxicants from marijuana cultivation sites on fisher survival rates in the Sierra National Forest, California

- Avg. # of MJ grow sites per ♀ Home Range: 5.3 sites
- AR Exposed Females: 4 sites vs. non-exposed: 0.67 sites
- # of MJ grow sites influenced female survival rates

Showed that grow site densities are correlated with female fisher survival rates.

New emerging data: Fisher Cases

- Three more fisher rodenticide poisoning cases (7 total)
- Fisher exposure up from ~80% to now **86%**
- Case of poisoning with “Restricted Use” pesticide.
  - Hot dog laced with carbamate insecticide.
  - Found dead less than 20m from small grow site.

New emerging data: Spotted & Barred Owls

- Northern Spotted Owls
  - Two owls tested, both positive for AR.
- Barred Owls
  - Tested 10 owls and 50% were positive for AR.

New emerging data: Invertebrates

- Invertebrates sampled at a grow site
  - Total of 5 pooled samples
- Tested for AR
  - All 5 came back positive
    - Positive for AR

Synopsis of “What we know”

- A rare, terrestrial CA carnivore (fisher) is exposed to and poisoned from toxicants from MJ grow sites.
- Grow sites impact fisher survival.
- Northern spotted and barred owls are exposed to AR.
- Inverts are exposed to ARs and other toxicants & still alive.

Yet, do we know how extensive this is in CA?

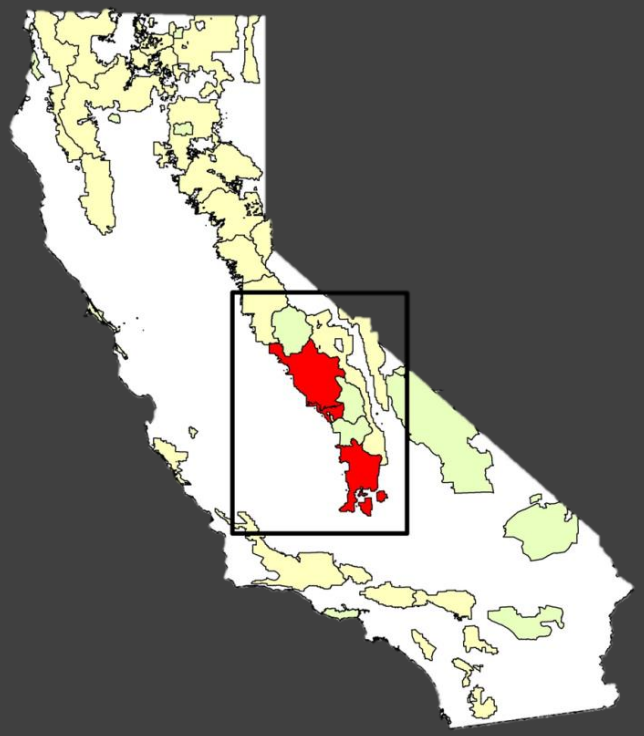
HUMAN-WILDLIFE CONNECTION

The Wildlife Professional: Volume 7:1:46-50

Silent Forests?

RODENTICIDES ON ILLEGAL MARIJUANA CROPS HARM WILDLIFE

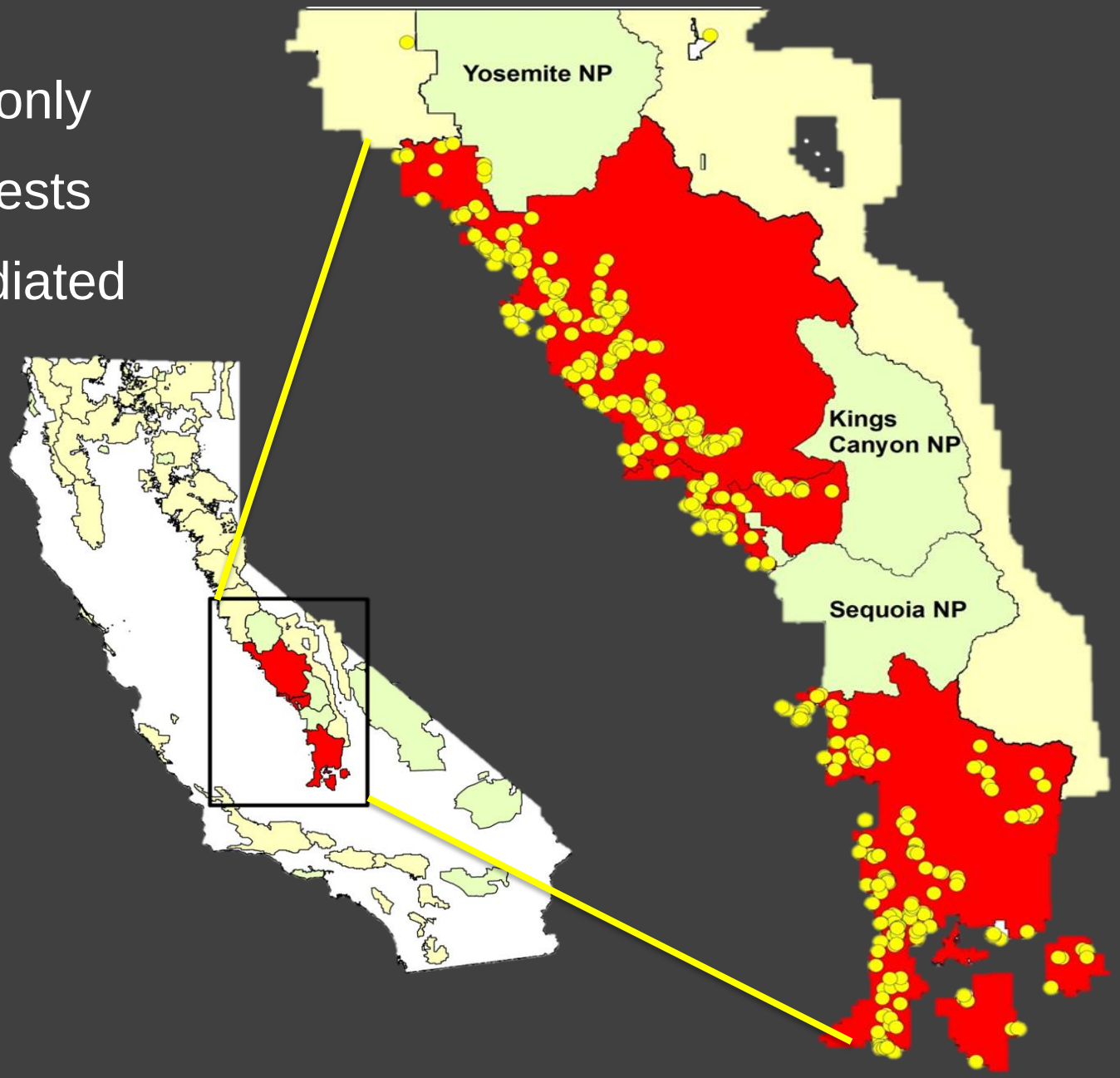
By Mourad W. Gabriel, Greta M. Wengert, J. Mark Higley, Shane Krogan, Warren Sargent, and Deana L. Clifford



(2005-2010) in only

two national forests

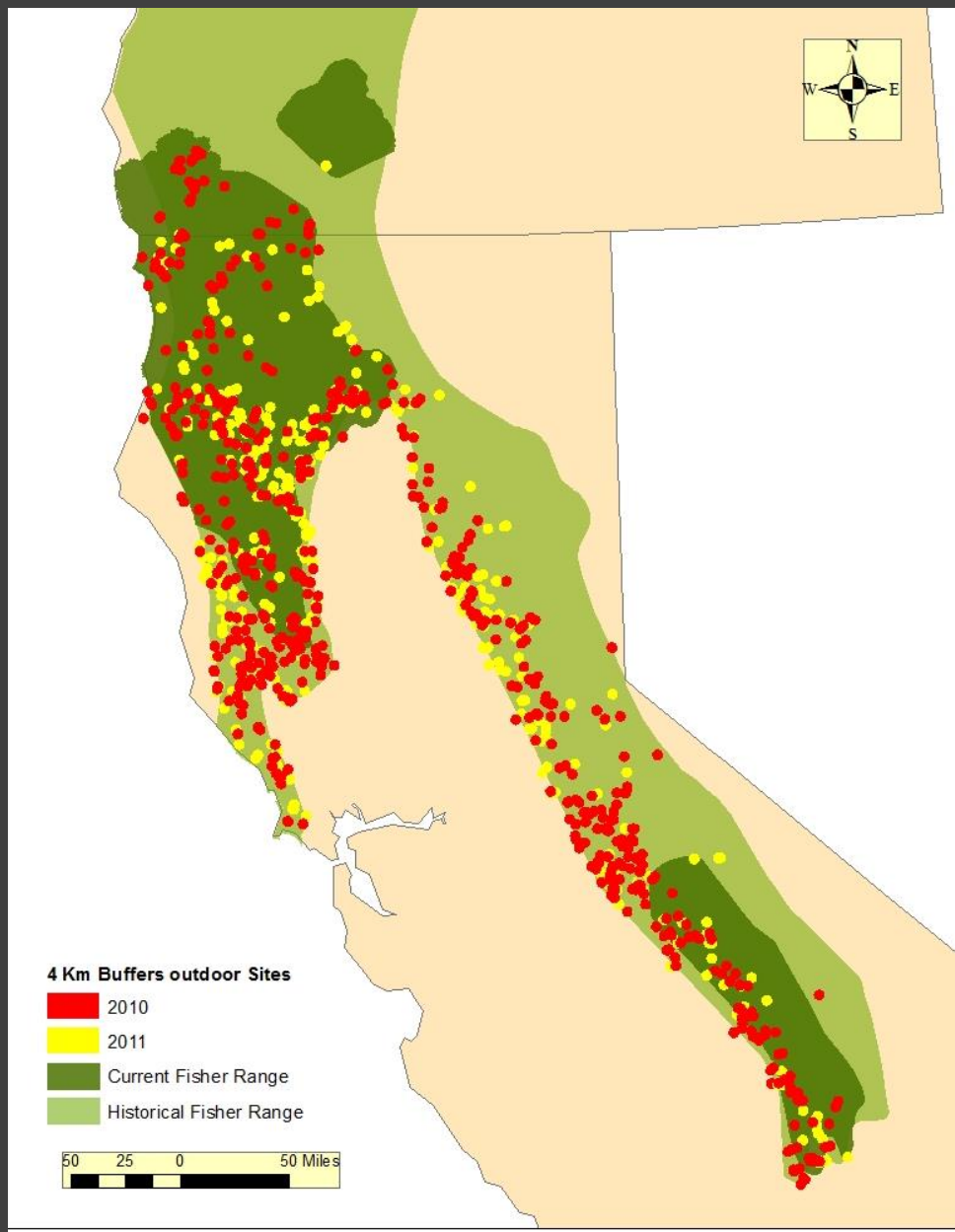
637 sites remediated



2010 -2011

Marijuana Sites within the Fishers Range

- ~1,100 trespass grow sites eradicated
- Conservatively, only 40-60% sites are discovered.
- Only a fraction are cleaned.
- Sites have the potential to impact 30-38% of fisher's current range.



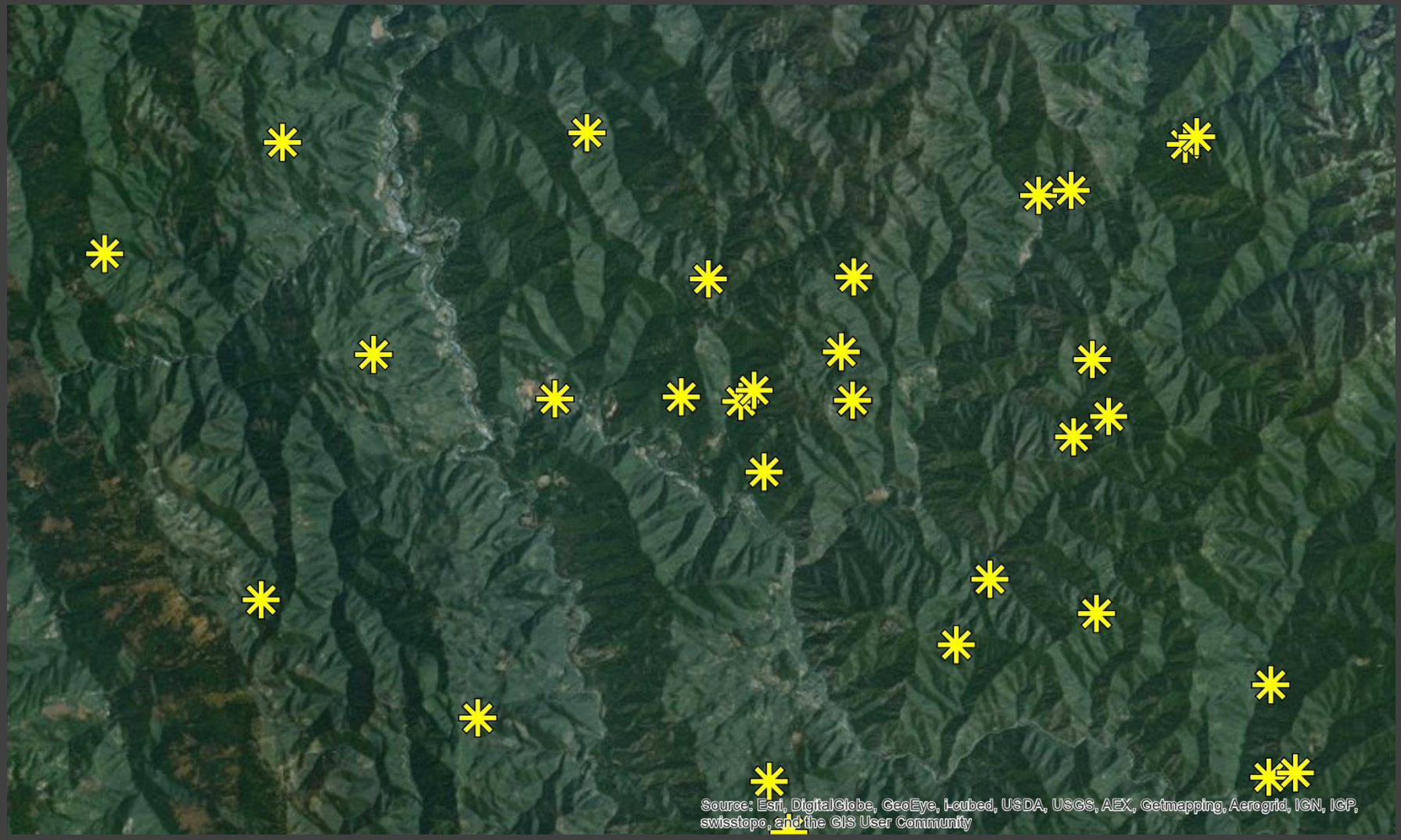
Are the potential conservation threats seen at each and every grow site?

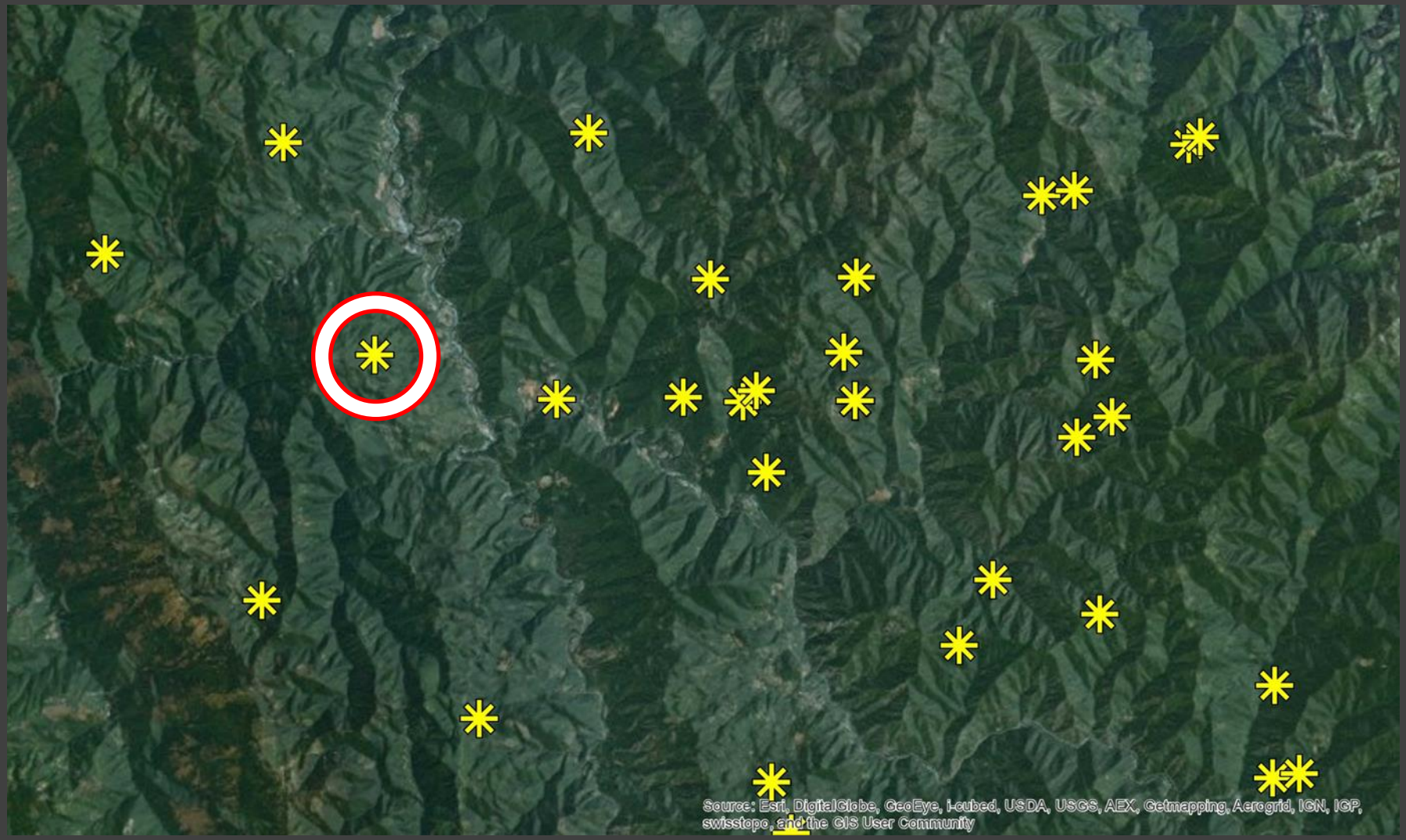
- Massive use of toxicants
- Fragmented landscapes
- Water diversions

Unknown at this time

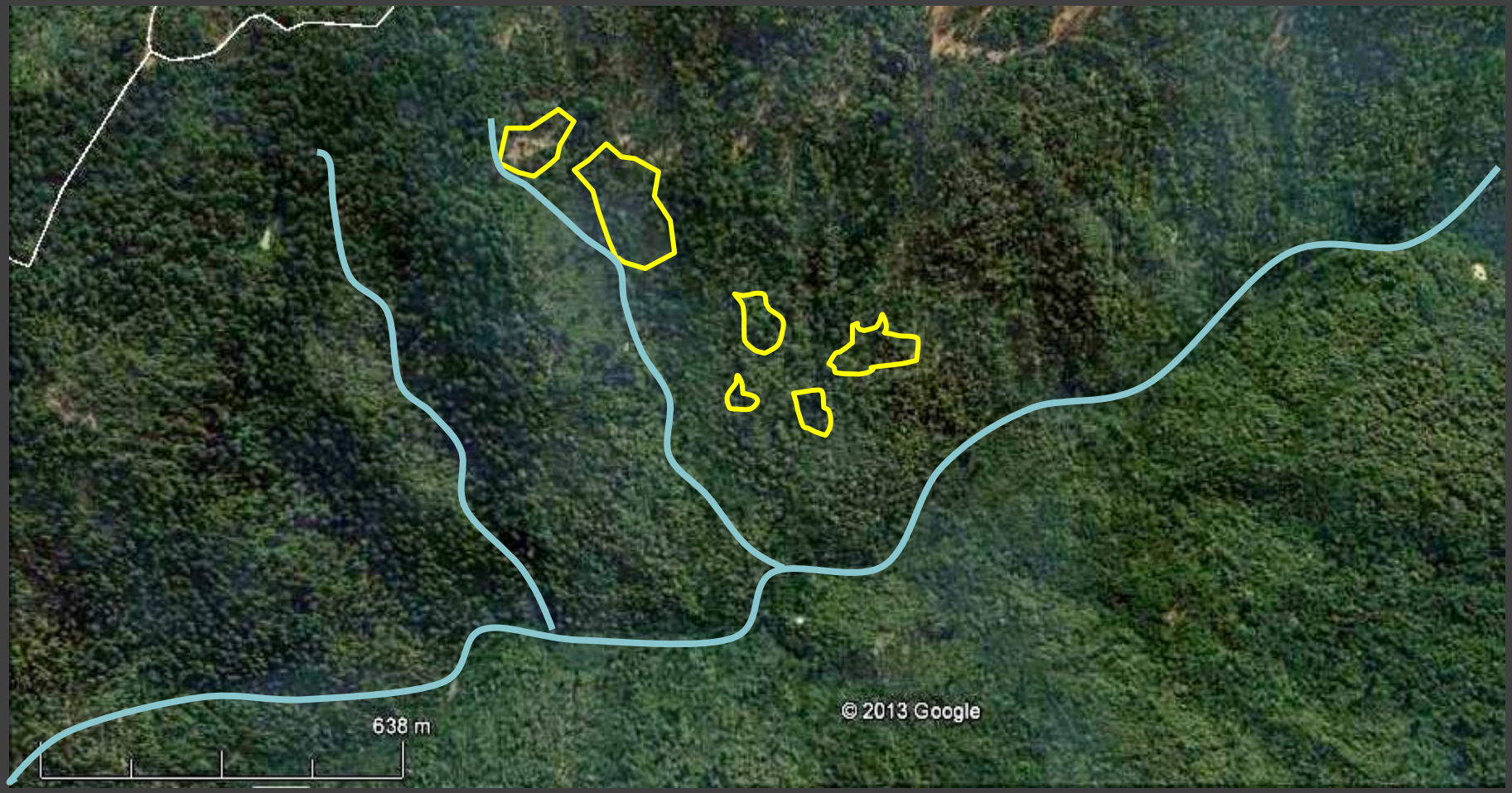
However, of the 20+ sites visited in 2 years, all have had the above present.

Total of 30 sites in Six Rivers National Forest




Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

638 m
© 2013 Google



Water Course

Grow site Polygon

Potential Indirect Effects

Hoopa Tribe
Fisher Demographic Study

Short Video of a suspected toxicosis case of a fisher (*Martes pennanti*)

Integral Ecology Research Center

WILDLIFE CONSERVATION SOCIETY

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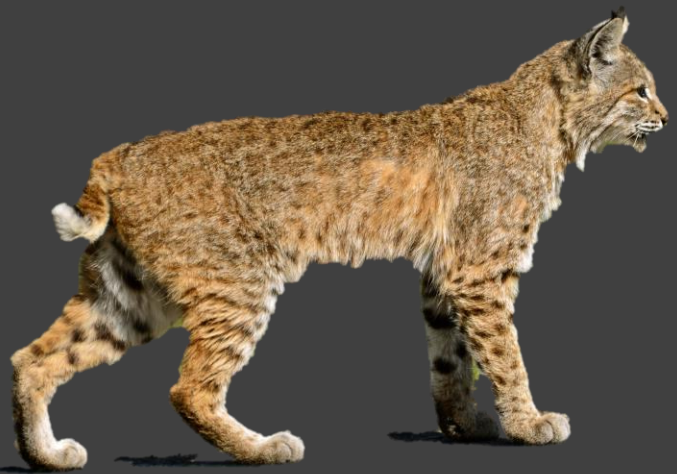
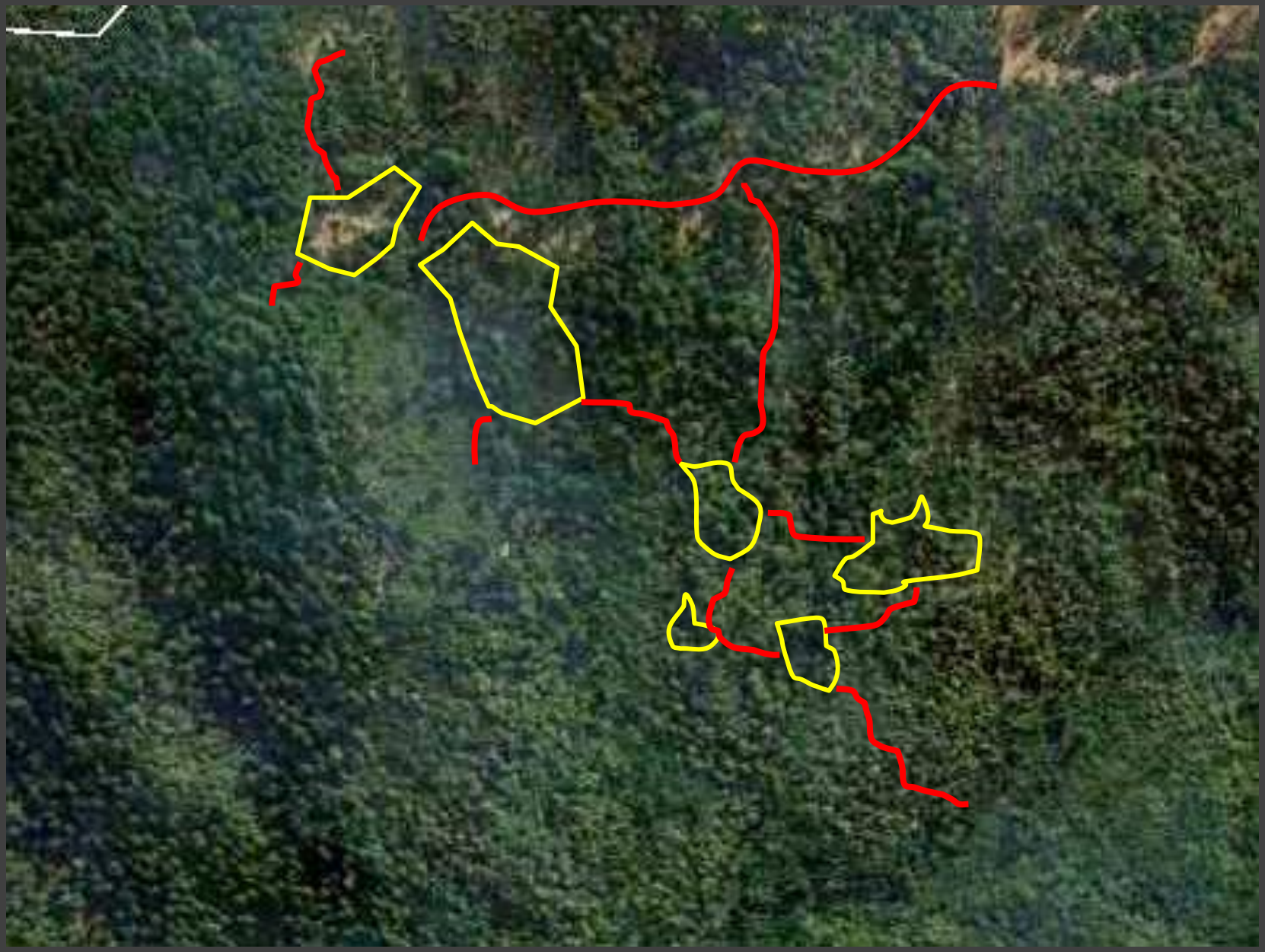
Can these grow sites facilitate an increased risk to conservation concerned species?

- Predation on fisher
  - Previous thought, only weak or vulnerable
- Current data for CA fishers
  - Predation #1 mortality factor; 58% of all mortality
  - Bobcat is the #1 predator

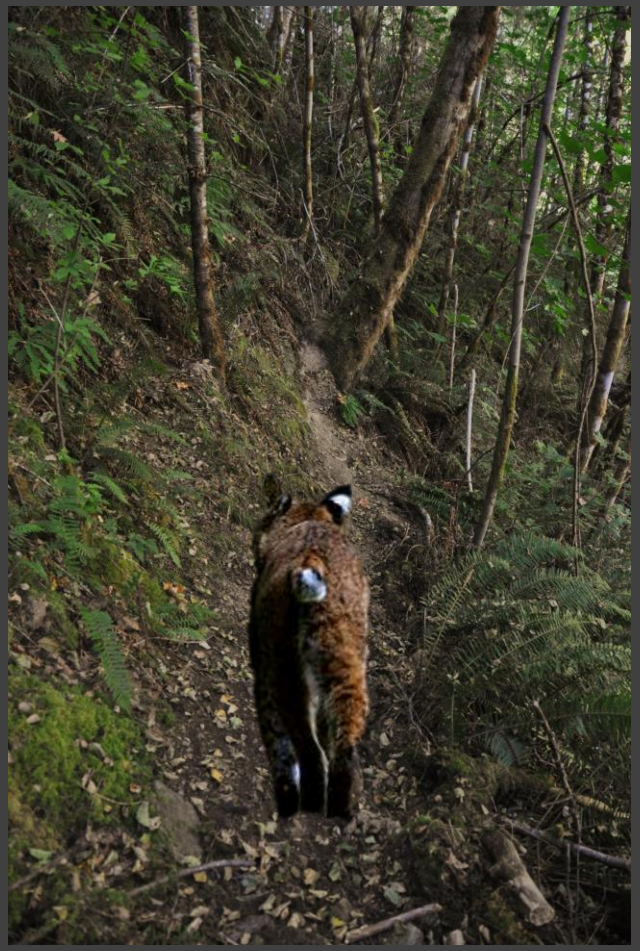
Why such an elevated rate of predation?

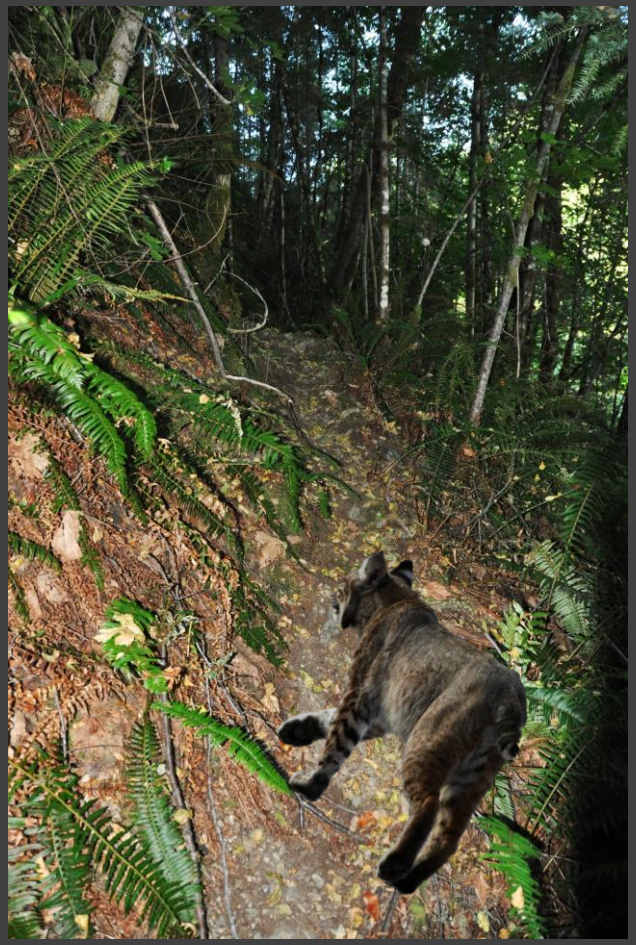




Trail System

Could these trails heighten predator movement within and between these sites?

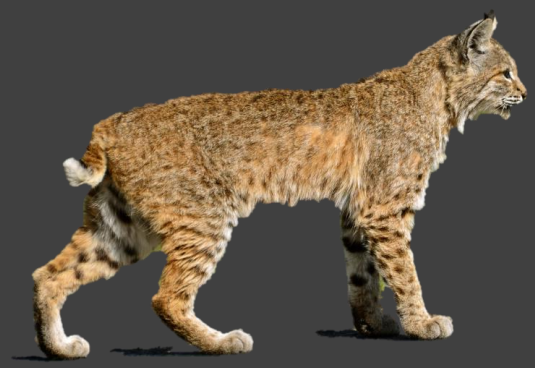


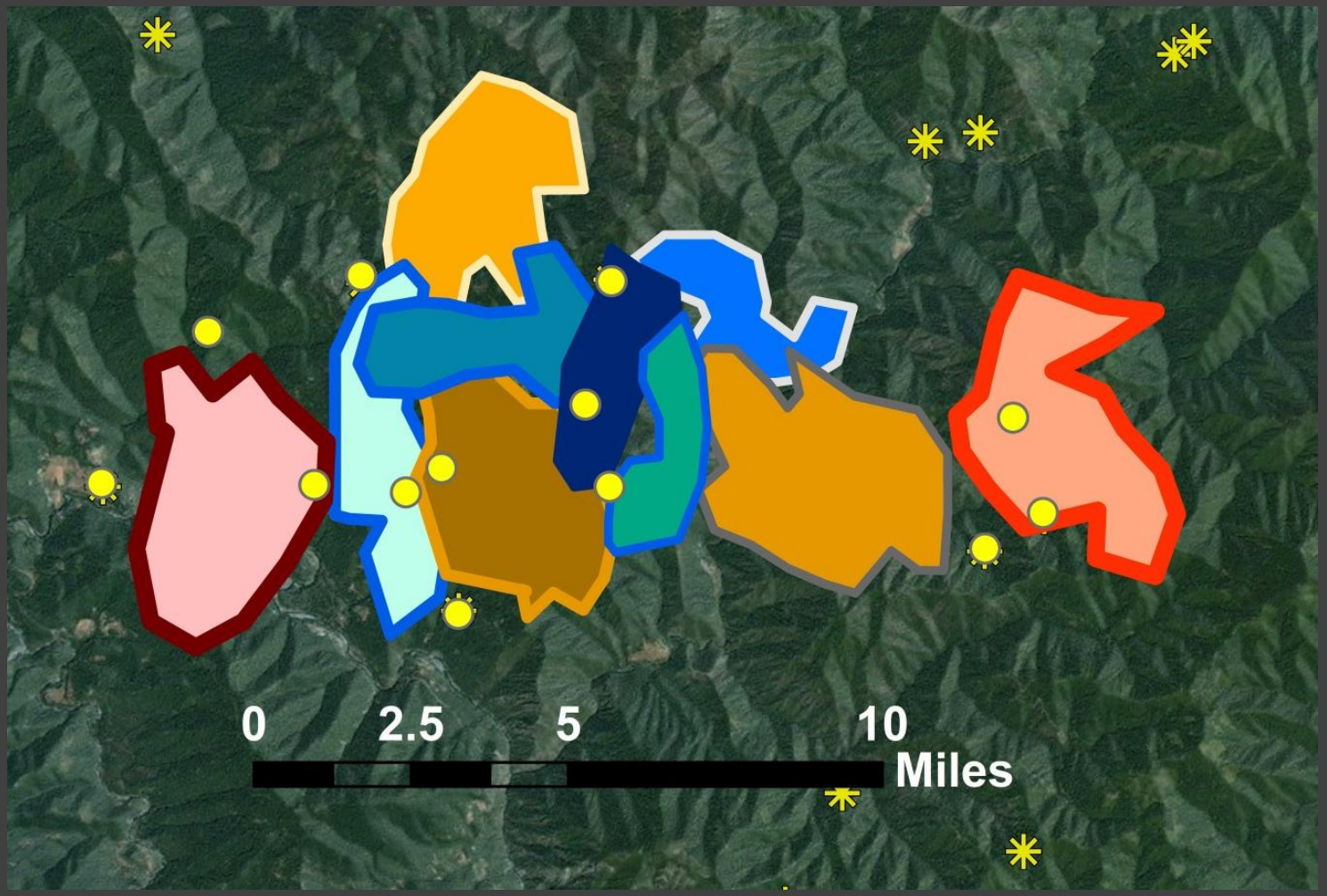


Expand home range to encompass more prey opportunities.

Heightened competition leads to interspecific killing among competitors.

- Example: bobcats and fishers compete for prey
  - bobcats increase predation rates on fishers.

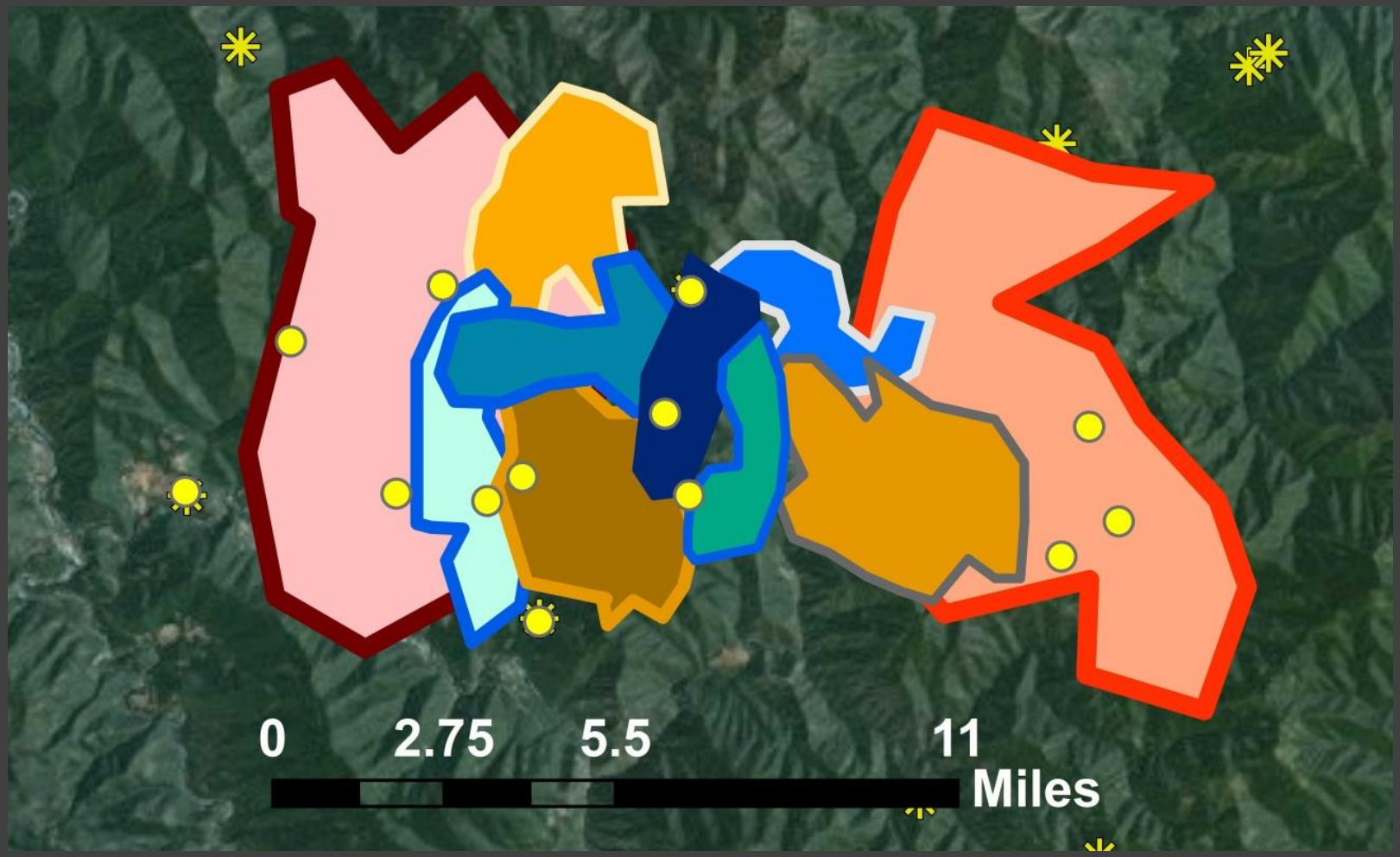




Male Fisher Home Range

Female Fisher Home Range

Bobcat Home Range



- Past studies; prey ↓ bobcat ↑ home range, 200-500%
- 200% ↑ lead to bobcats increased interaction probability

Critical Habitat or Wildlife Lost from Grow Site Initiated Fires

2006-2011

- **Confirmed <u>93,535 acres</u>**

Total cost <u>> $35 Million</u>

Suppression Cost <u>Only</u>

USFWS Candidate or Listed Wildlife/Habitat Affected

Fisher

Marbled murrelet

Northern spotted owl

California condor

California red-legged frog

And many others…..

What about the impacts to aquatic organisms within these watersheds?

- The direct and indirect impacts have not been addressed.
- Average of 2,000 lbs of high grade (25%-50% Nitrogen) dry fertilizer per site.
- Average of 25 gallons of concentrated fertilizer per site.
- Numerous banned, restricted and over the counter insecticides used. Illegal to use near water sources.

Toxicants and fertilizer poured directly into stream channels and water diversion ponds.

Is this depleting prey for aquatic food webs or reducing oxygen levels by increasing nitrogen loads in watersheds?

Is the massive use of insecticides affecting insectivores ?

- Many of these toxicants do not affect invertebrates.
  - AR ½ life could be months in invertebrates.
  - Bioaccumulatiion and amplification through food webs.

- Similar to terrestrial carnivores?

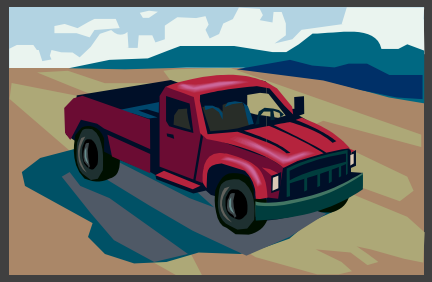
Barriers to collecting data

- Collection of Data
  - Dangerous
    - Armed growers, toxicants and traps.
- Grants and Resources
  - Limited and expensive

Budget Concerns On Conservation Research

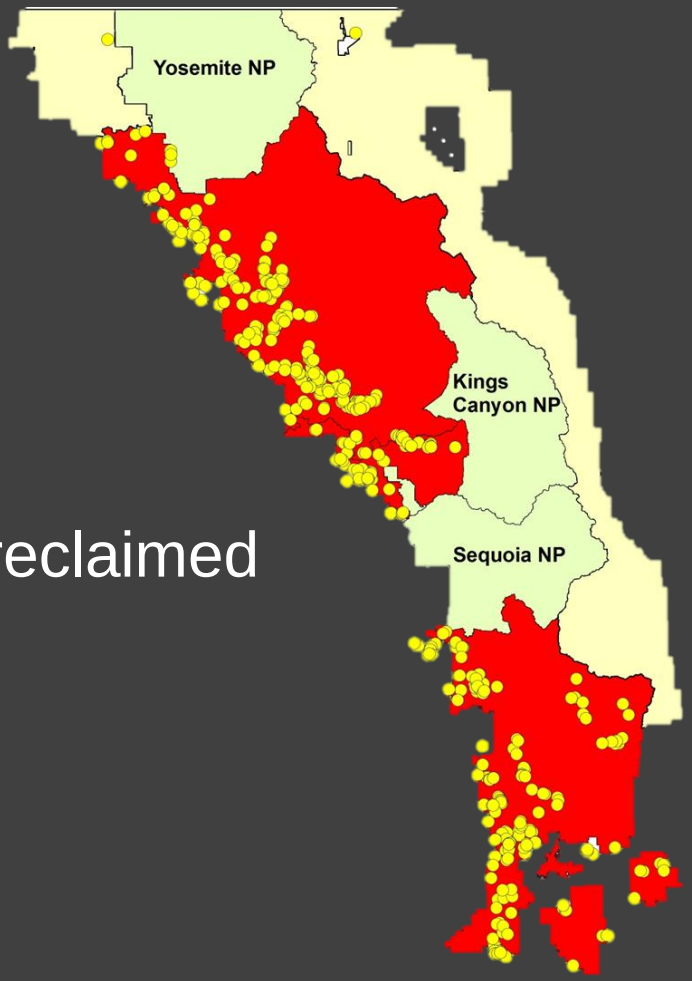
Fisher Projects in California

- Extra personnel, vehicles and supplies
- **~ $48,000** increase in budgets, **PER YEAR**
- Incurred to date: **>$240,000**
- Projected for life of project: **$500,000 to $750,000**



Barriers to collecting data

- Volunteer lead: Non-Profit
- Additional ~500 sites
  - <u>No funding</u>
- Estimated 25-50% of sites are 100% reclaimed
  - Lack of funding



Solutions

Generate more Science-based Information

- Inform agencies, managers and policy-makers.
- Educate the public on this issue.

Create Mechanisms of Support

- Support to document, test and analyze samples
- Reclamation to remove these threats!

“The public must decide whether it wishes to continue on the present road, and it can do so only when in full possession of the facts.” *Silent Spring* - Rachel Carson

Thank You

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