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Black Bear Aware: Predicting Human-Black Bear Conflict Likelihood in a Changing Climate

Executive Summary | Spring 2023

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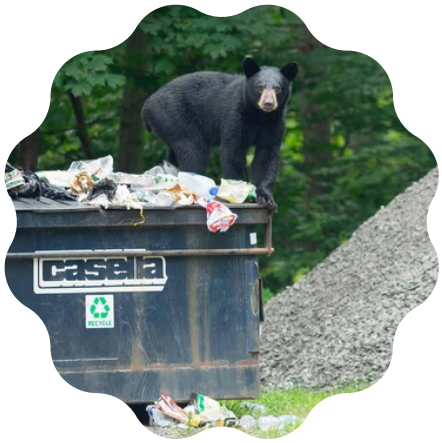
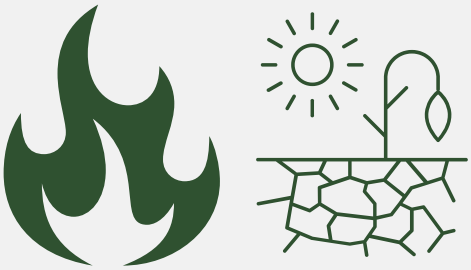
THE PROBLEM

Black Bears (Ursus americanus) frequently come into conflict with humans when utilizing human resources, especially for food. This conflict is expensive to manage, and often involves unpopular methods like relocation and euthanasia. Conflict is best avoided by proactively discouraging bears from seeking human resources, but this requires the ability to identify conflict-prone regions both now and in the future.

In California, climate impacts are causing more intense and frequent wildfires and drought. Fire and drought alter bear habitat and resource availability, causing them to move into new spaces and potentially increasing or introducing conflict there. Understanding the relationship between climate change and human-black bear conflict will allow for better-informed management techniques, including targeted outreach to communities likely to be experiencing new or increased conflict under a changing climate. This study, in collaboration with the California Department of Fish and Wildlife (CDFW), explores human-black bear conflict across California by modeling conflict likelihood under current and future condition and identifying potentially under-served areas as well as future high-risk areas. This model can be used by CDFW as a predictive tool to aid in current and future black bear management efforts.



KEY FINDINGS



Fire and drought impact human-black bear conflict risk

Conflict is predicted to shift south and inland in the future due to climate change

Under-reporting areas have larger minority populations and higher social vulnerability than reporting areas

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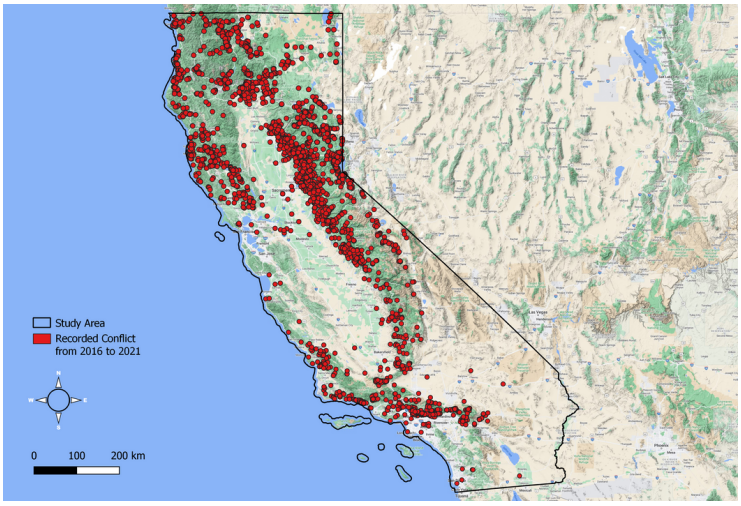


CONFLICT IN CALIFORNIA

4,663

Human-black bear conflicts were recorded in California between 2016 and 2021

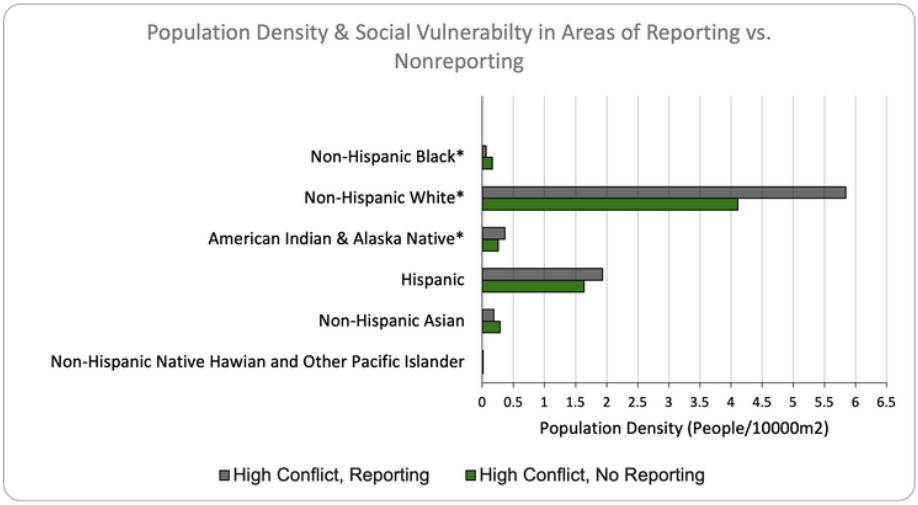
Over 50%

Of these conflicts included harm or damage to personal property, pets or livestock

KEY FINDINGS

Modeling human-black bear conflict provides key insights into how conflict risk is affected by different factors. We found that increasing drought intensity reduces conflict risk, meaning where water is more available, conflict is more likely. We also found that proximity to recent wildfires increases conflict risk with black bears, with fires 2-3 years ago having the strongest effect. Other factors that had strong effects on conflict risk were land cover, distance to urban areas, and population density. Low-intensity developments having the highest relative conflict likelihood.

When we modeled current conflict risk, we identified several areas of potential under-reporting (high predicted conflict risk but low report numbers). These under-reporting regions are significantly more socially vulnerable** and have significantly higher population densities of some ethnic and racial minority groups compared to areas that report conflict ($p < 0.05$).



*statistically significantly different

**Social vulnerability is based on a metric that measures vulnerability based on 4 factors - socioeconomic status, household composition & disability, minority status & language, and housing & transportation

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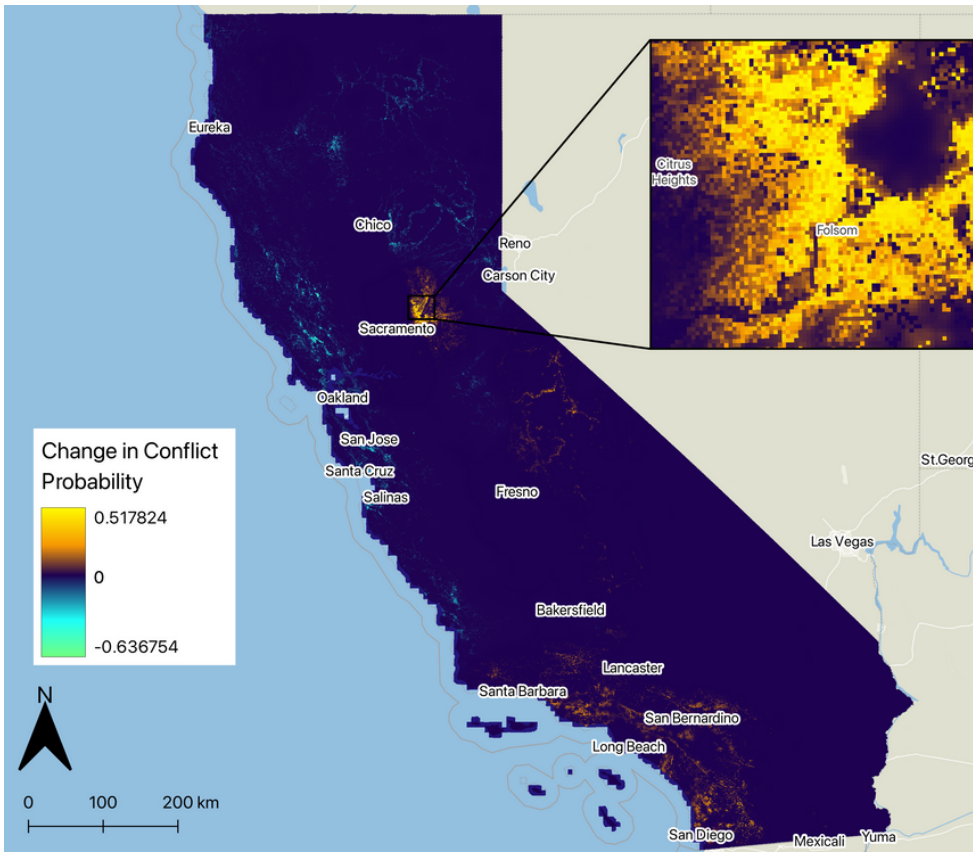
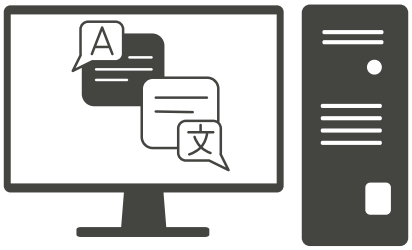
KEY FINDINGS (CONT.)

When we modeled conflict risk with black bears 2030, conflict risk increased (yellow areas) around the Sacramento area and the southern coast and decreased (blue and light green areas) throughout northern California and around the San Francisco Bay Area. The top 5 counties with the largest projected area of high conflict risk are San Bernardino, Placer, San Diego, El Dorado, and Riverside, in that order. The change in conflict risk from current day to 2030 is shown on the map.

Identifying areas of high conflict likelihood allows CDFW to focus management and outreach efforts in these communities to prevent future conflict. The scope of this change also indicates a need for flexible management strategy that can be adjusted in a short period of time in response to changes in fire, drought, and other factors such as population growth.

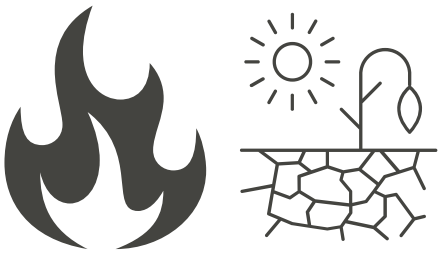


RECOMMENDATIONS



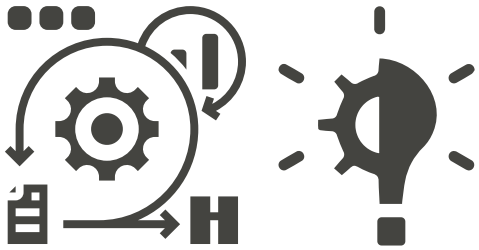
Diversify Accessibility of the WIR System

Potential outreach includes our ArcGIS Storymap that highlights conflict trends across the state and provides resources detailing how to report conflict



Continue to Explore the Role Fire and Drought Have on Conflict

Climate variables have a significant effect on conflict, indicating a need for further exploration of this relationship



Develop an Agile Communication and Management Strategy

Change in conflict regions over time indicate the necessity to have flexible management techniques