

Pacific Fire Exchange

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Wildfire in Hawai'i

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Over the past decade, an average of >1000 wildfires burned >17,000 acres each year in Hawai'i, with the percentage of total land area burned comparable to and often exceeding figures for the fire-prone western US (Fig. 1). Humans have caused much of the increase in wildfire threat by increasing the abundance of ignitions (Fig. 2) and introducing nonnative, fire-prone grasses and shrubs. Nonnative grasslands and shrublands now cover nearly one quarter of Hawaii's total land area and, together with a warming, drying climate and year round fire season, greatly increase the incidence of larger fires (Fig. 3), especially in leeward areas. Wildfires were once limited in Hawai'i to active volcanic eruptions and infrequent dry lightning strikes. However, the dramatic increase in wildfire prevalence poses serious threats to human safety, infrastructure, agricultural production, cultural resources, native ecosystems, watershed functioning, and nearshore coastal resources statewide.

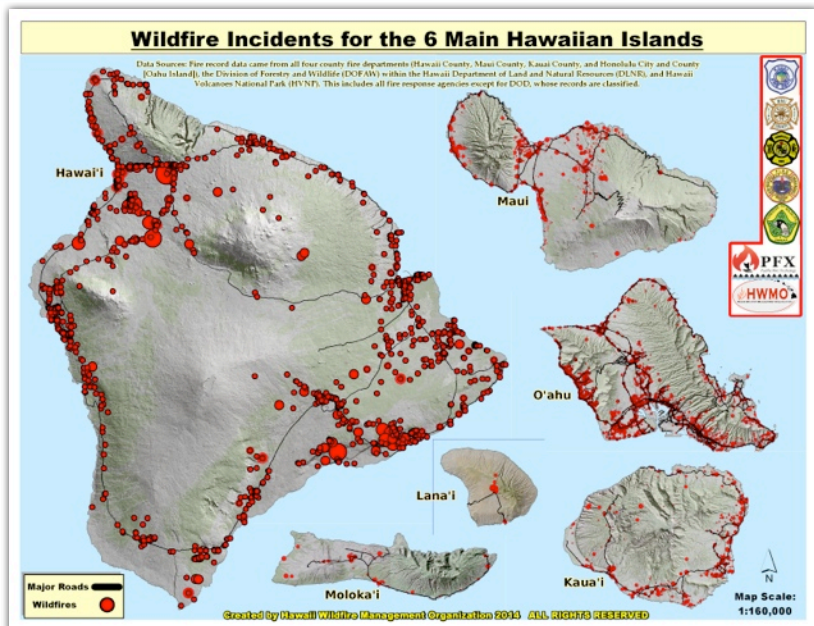


Figure 3: Wildfire incident maps for 2000-2012 for each of the six main Hawaiian islands. Red dots indicate wildfire ignition points (the larger dots indicate larger fires in terms of acreage). Notice the roadside and island-wide ignition patterns on all islands.

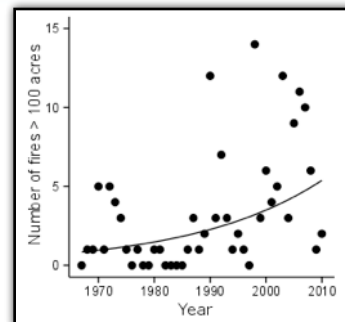


Figure 2: The number of large fires (over 100 acres) has steadily increased over the past 50 years across the state of Hawai'i.

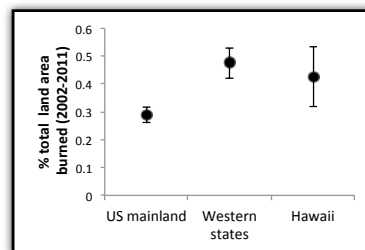


Figure 1: A greater percentage of Hawaii's land area burns annually than the U.S. national average, and some years exceeds the 12 most fire-prone western states.

Did You Know?

- The average area burned per year in Hawai'i has increased 17x over the past century.
- According to a recent assessment by the Western Council of State Foresters, a greater percentage of Hawai'i's land area is under high risk of wildfire than the 16 western-most US states.
- People start nearly all wildfires in Hawai'i.
- Non-native grasses and shrubs that produce significant amounts of fine fuels and promote wildfires cover nearly 25% of Hawai'i and continue to expand their coverage.
- Wildfires are more frequent in drier parts of Hawai'i, but with the abundance of human-caused ignitions, wildfires occur across the state.

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A Closer Look: Wildfire in Hawai'i

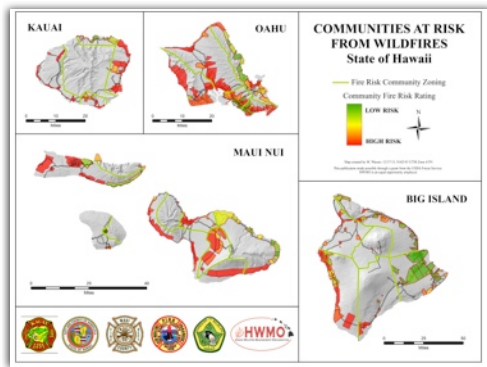


Figure 4: 2013 Communities at Risk (CAR) maps of the 6 main Hawaiian Islands based on 36 different wildfire hazard ratings per area. The maps were made to aid prioritization of the most at-risk developed areas throughout the state.

Natural resource managers, fire response agencies and landowners must increasingly focus limited resources and personnel on a rapidly growing wildfire threat in the Hawaiian Islands. Nonnative, fire-prone grasslands and mixed grass/shrublands (e.g., Guinea grass-haole koa) dominate abandoned agricultural lands and have invaded and replaced native

ecosystems across a huge portion of the state, about a quarter of the state's land area. Combined with drought, warmer temperatures, and an increasing number of human ignition sources, the risk and occurrence of wildfire have dramatically increased statewide. Wildfires can impact large areas (100s-1000s of acres) very quickly, affecting resources and communities mauka to makai (mountains to the ocean). In addition to direct threats to human safety and Hawaii's native ecosystems, the loss of vegetation after

"Although people have increased wildfire risk through ignitions, plant introductions and land use change, these same relationships provide the keys to reducing wildfire threat through community action and cooperation."



Figure 5: The Waikoloa Fuelbreak prevented the largest wildfire in Hawai'i State history from entering Waikoloa.

wildfire increases rates of erosion, landslide danger, and the amount of sediment deposited into streams and nearshore coral reef ecosystems. This has serious implications for tourism as well as commercial, recreational, and cultural use by local communities. Over the longer term, conversion of forest to grassland also reduces water table depth and increases surface water runoff, which can dramatically increase flood danger. Increased wildfire risk also means increasing costs and danger for Hawaii's fire response community.

Management Implications

Although wildfire cannot be eliminated from Hawai'i, the occurrence and impacts of wildfire can be reduced through prevention, preparedness, and pre-fire management such as reducing fuels and constructing fuelbreaks (Fig. 5). These actions can create safer conditions and increase the effectiveness of wildfire suppression. Post-fire response such as erosion control and replanting in burned areas also helps to reduce the immediate impacts of wildfire and the establishment of nonnative grasses, which can reduce the risk of future fires. Given limited resources for land management and the ability of wildfire to cross property boundaries, building collaborative relationships among land managers, landowners, scientists, fire responders and the public is key to addressing wildfire in Hawai'i. The relationship between people and wildfire ignitions means that communities can make a difference through action. Community Wildfire Protection Plans, Firewise landscaping, and increased education and awareness of Hawaii's wildfire problem (Fig. 4) can help reduce risk to human lives and property and the natural resources we value.

Further Information & Resources

- Hawai'i Wildfire Management Organization Fire History Map information (<http://hawaiiwildfire.org/post-fire.html>)
- CTAHR Geportal: HWMO and PFX Hawaii State Wildfire History Interactive Map (<http://gis.ctahr.hawaii.edu/WildfireHistory>)
- Hawai'i Wildfire Management Organization Wildfire Hazard Assessment Maps (<http://hawaiiwildfire.org/hwmo-products.html>)

References

1. Cram, D., Cordell, S., Friday, J.B., Giardina, C., Litton, C.M., Moller, E., & Pickett, E. (2013) Fire and drought in paradise - say it isn't so smokey. *Rural Connections*. 7. 19-21. http://wrdc.usu.edu/files/publications/publication/pub_7956191.pdf
2. LaRosa, A., Tunison, J., Ainsworth, A., Kauffman, J., & Hughes, R. (2008). Fire and nonnative invasive plants in the Hawaiian Islands bioregion (pp. 225-241) in: Zouhar, Kristin et al., editors. *Wildland fire in ecosystems: fire and nonnative invasive plants*. Gen. Tech. Rep. RMRS-GTR-42-vol. 6. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 355 p.
3. Pierce, A., and E. Pickett. *In Press*. Building a spatial database of recent fire occurrence for management and research in Hawai'i. *Fire Management Today*.
4. West Wide Wildfire Risk Assessment Project Summary Statistics of Published Results. 2012. Sanborn Map Company. Available online http://www.odf.state.or.us/gis/data/Fire/West_Wide_Assessment/AddendumIV_WWA_RegionalSummaryStatistics.pdf

Collaborators:

- Clay Trauernicht, Extension Fire Specialist, Dept. of Natural Resources and Environmental Management, College of Tropic Agriculture and Human Resources, University of Hawai'i at Mānoa - Analyzed the fire history database and wrote the narrative.
- Hawai'i Wildfire Management Organization - Created the fire history database for analysis, the fire history maps, and the CAR map, and provided the photos.
- Pablo Beimler, Hawai'i Wildfire Management Organization - Designed and welded Fact Sheet.