

Wildfire Risk Reduction Through Wetland and Riverine Restoration

Wildfires have devastating impacts on communities and the natural environment in Hawai'i, but nature can help reduce this risk.

Aquatic habitats such as wetlands, rivers, and streams increase the fire resilience of an area.

Wetlands reduce the risk to people in the Wildland Urban Interface (WUI)

The term 'wildland-urban interface' (WUI) describes how human development intersects with wildfire prone areas.

- In the WUI, residents are at a higher risk of catastrophic wildfire due to their proximity to lands surrounded by highly flammable vegetation.
- Nearly all homes in Hawai'i (94%) are in the WUI compared to less than half (42%) nationwide (Yee, 2025).
- In Hawai'i, wildfire is not part of the natural ecology; Hawaiians used fire rarely as a tool for agriculture (Yee, 2025).
- The frequency and scale of wildfires have increased in recent years.



The community of Lahaina, Maui suffered a severe wildfire.
State Farm / Wikicommons



Wetlands in urban areas can slow the spread of wildfires. H. Raine



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How Wetlands Protect the WUI and Beyond

Reduced Fuel Availability:

- The high water content of wetland vegetation slows the transmission of fires and can extinguish 67% of grassland wildfires (Just et al. 2016).
- Well-managed wetlands have less invasive grasses and therefore a lower fuel load.



Well managed wetlands, such as the DOFAW Kawaiʻele Waterbird Sanctuary, reduce fuel load. H. Raine

Natural Firebreaks:

- Streams and rivers act as natural fire breaks supporting defensible space around communities (Trauernicht et al. 2019).
- This provides additional time for first responders to reach a community.
- Higher water tables and high moisture plants can limit smoldering and extinguish wind carried sparks.



The Spryfield, Halifax wildfire stopping at a wetland. D. Patriquin

Carbon Sequestration:

- Wetlands store large amounts of carbon dioxide, which can influence wildfire frequency and intensity.



Loko iʻa and loʻi provide wet habitat to minimize fire impacts. Koloa maoli, aeʻo and ʻalae keʻokeʻo also use these spaces

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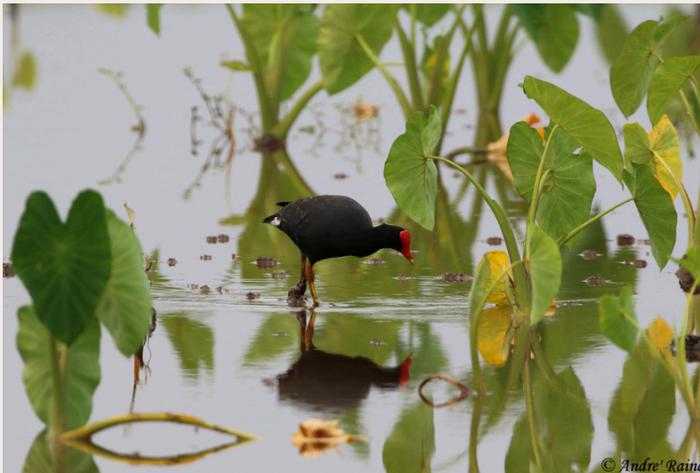
How Wetlands Protect the WUI and beyond



Officer Ryan C. McGinley dropping water on a fire.
U.S. Navy, Defense.gov



Wetlands provide recreation opportunities like kayaking, birdwatching, and more. A. Raine



'Alae 'ula benefit from wetland and lo'i restoration. A. Raine

Wetlands Provide:

- A nearby **water source** for fire crews.
- A **fire refuge** for wildlife and farm animals to retreat to.
- **Community Services** such as flood control, sediment trapping, water quality improvements through filtration, and recreation opportunities.
- Habitat for four Endangered and culturally important **Hawaiian Waterbirds**.
- The 'alae 'ula, for example, is a native Hawaiian bird that features heavily in Hawaiian mo'olelo and numbers **fewer than 700 birds in the world**. They rely on wetlands, riverine habitats and lo'i kalo (taro fields) for survival.

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- Goals**
1. Reduce wildfire risk and intensity in key areas by restoring wetlands and riverine vegetation.
 2. Protect human communities and infrastructure by expanding defensible space of wetland and riverine vegetation buffers.

Key Actions to maximize wetland fire-fighting effectiveness

- **Restore degraded wetlands and rivers and expand existing ones** in fire-prone areas to serve as natural firebreaks.
- **Create Strategic Wetland Buffers:** Implement wetland zones in high-risk wildland-urban interface (WUI) areas to reduce fire fuel continuity.
- **Improve Water Retention and Management** in wetland systems to maintain soil and vegetation moisture during peak fire seasons.
- **Vegetation Management:** Remove non native flammable vegetation in wetlands. Replant with fire-resistant native species.
- **Community Engagement and Land Stewardship:** Involve local communities and landowners in wetland protection for fire prevention efforts.



The removal of invasive grass at wetlands improves fire reduction function. H. Raine



'Alae 'ula and chick thriving in wetland. Hob Osterlund



Lo'i and other aquatic agriculture provide fire reduction and community benefits.