

Wildfire Risk and Urban Expansion in South Kohala and North Kona, Hawai'i

Chanel Yee

Tree Canopy Fellow

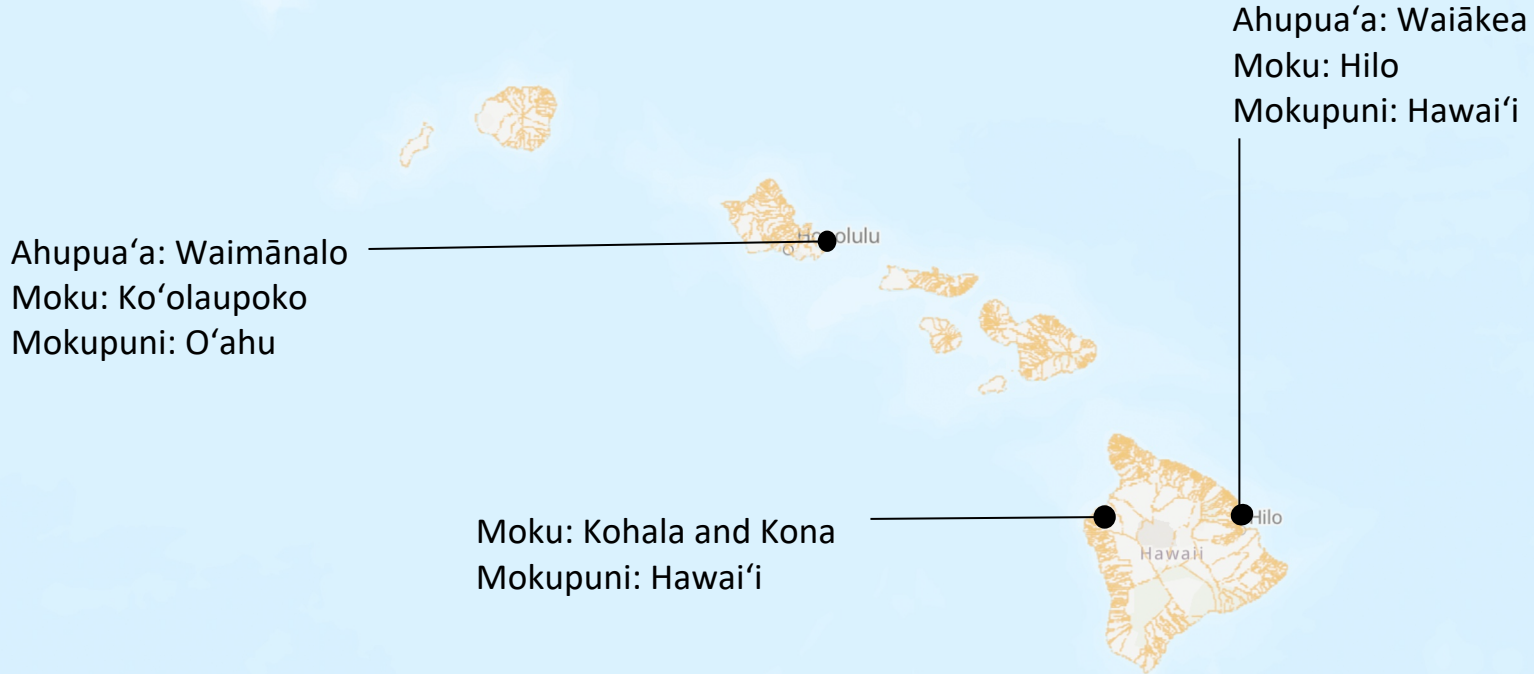
Bachelor of Urban Forestry

University of British Columbia



This project was made possible by the support of the Kaulunani Urban and Community Forestry Program of the DLNR Division of Forestry and Wildlife, and State and Private Forestry, branch of the U.S. Forest Service, Region 5. USDA is an equal opportunity provider, employer, and lender

Land Acknowledgement



Context



Chanel Yee, 2017

Tree Canopies



Ben Scheufler, 2019



Tree Canopy Viewer
The Division of Forestry and Wildlife and the U.S. Forest Service

Record-Breaking Fire in South Kohala

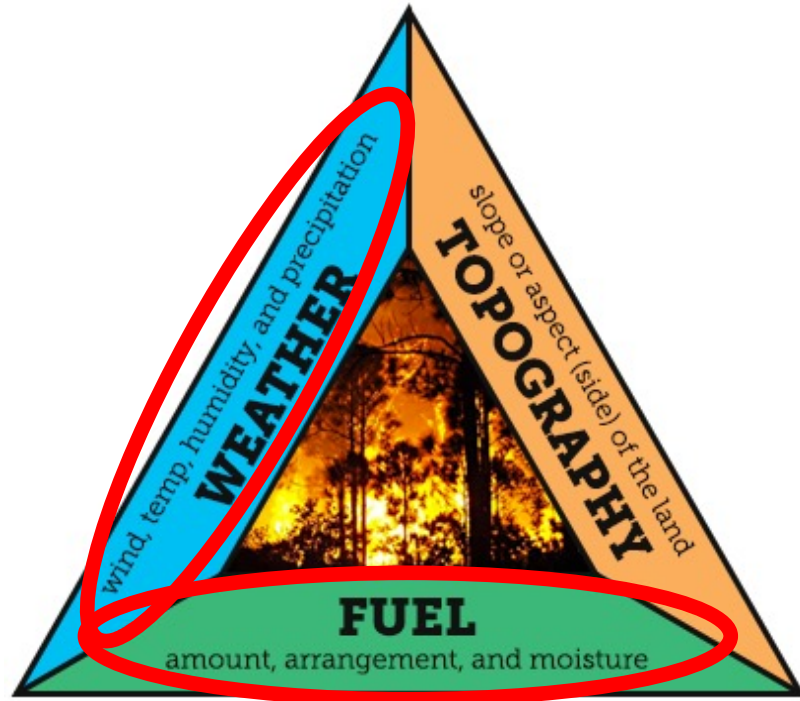


KHON2 News, 2021



Department of Land and Natural Resources, 2021

Changes to Fire Behavior



Fire Behavior Triangle

- Climate Change
- Hot Dry Summers + Drought
- Increased Fire Risk + Severity
- Urban Sprawl into Natural Areas
- High Risk for WUI Residents
- Human & Economic Costs

The Wildland Urban Interface and Increased Wildfire Risk



Waimea Brush Fire

Lynn Beittel, 2021

Project Goals

01

Review Plans for land cover and fire behavior relationship and synergies between goals

02

Map land cover of current and future communities at risk to wildfire

03

Spatially identify wildfire risk mitigation strategies in relation to tree canopy

Hawai'i's Fire History

1. Controlled fires for resources



2. European colonization

3. Cattle and nonnative grass spread

4. Grazing stops and agricultural fields abandoned

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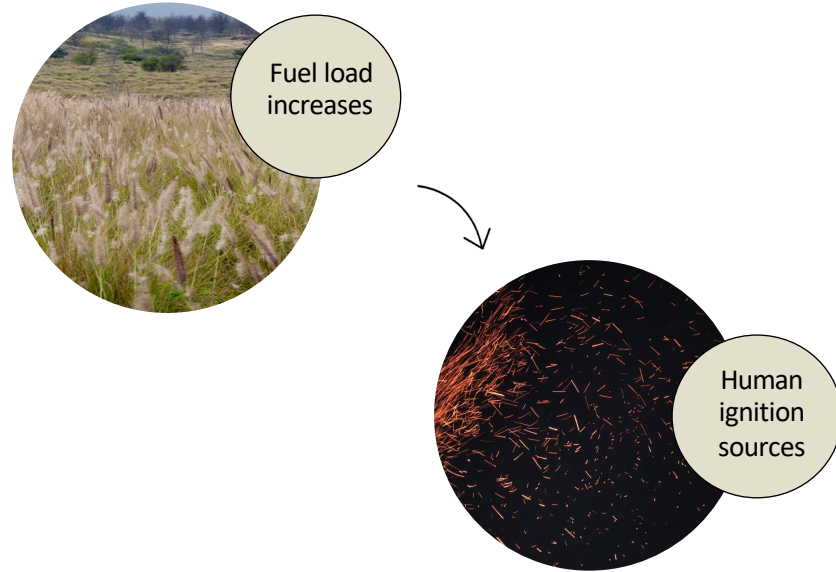
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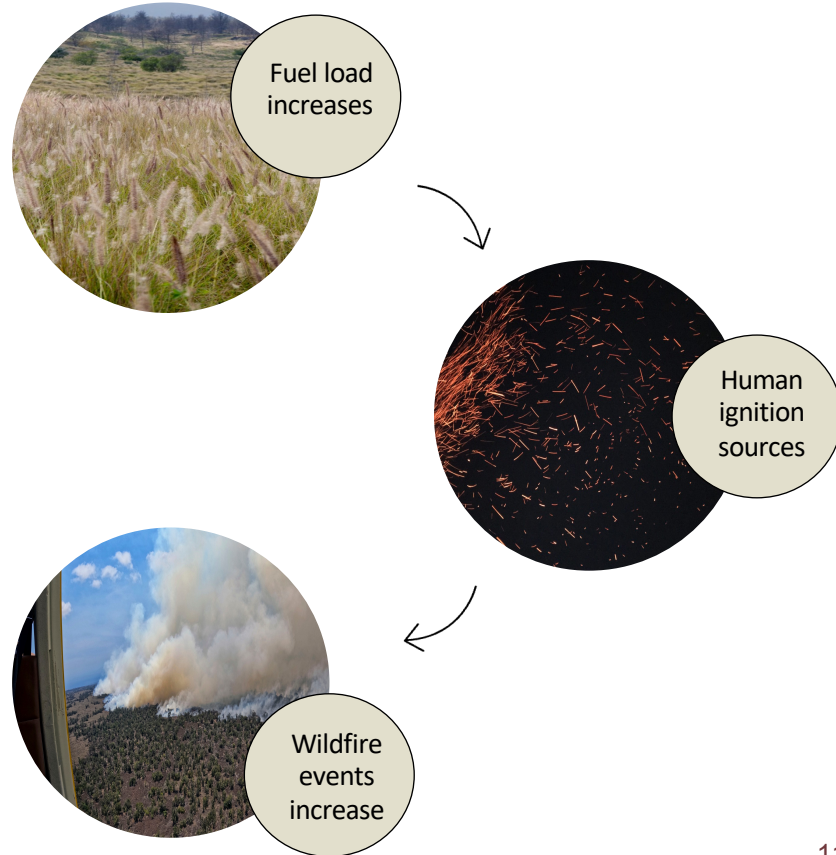
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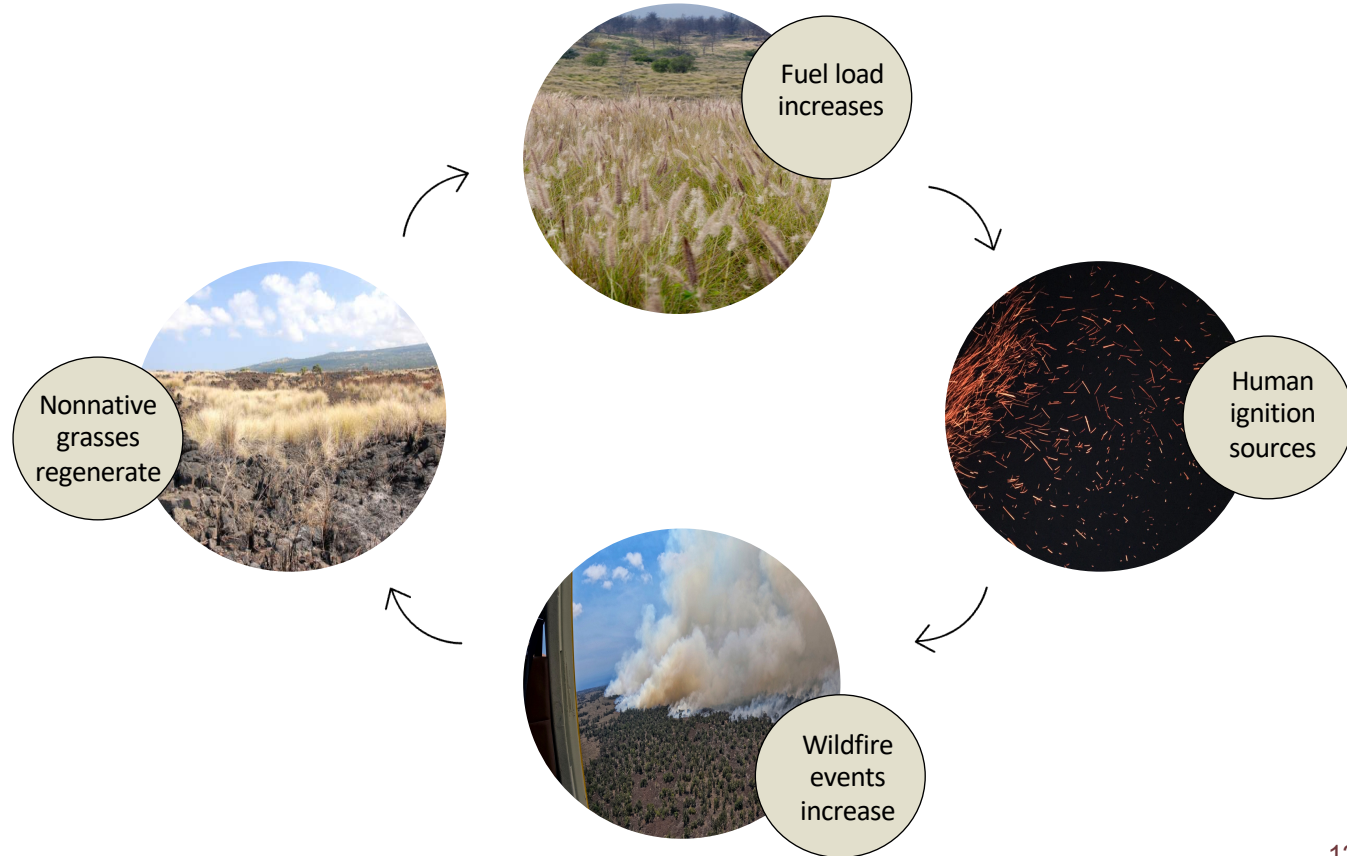
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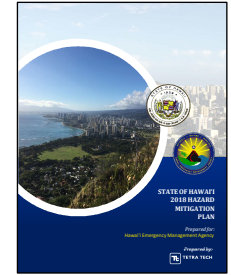
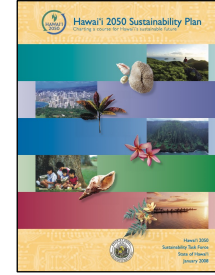
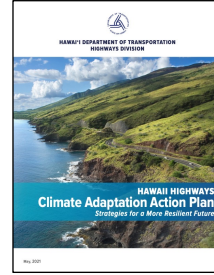
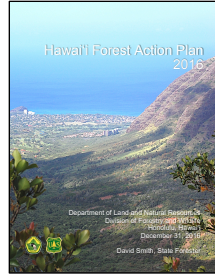
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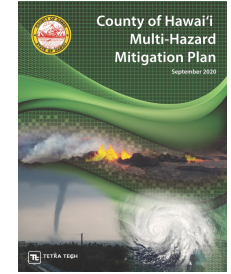
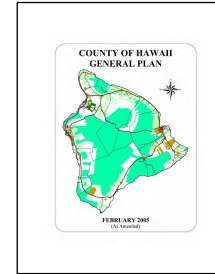
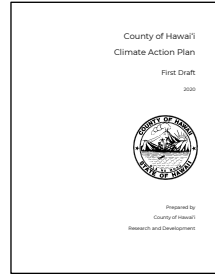


Land Cover and and Fire Representation

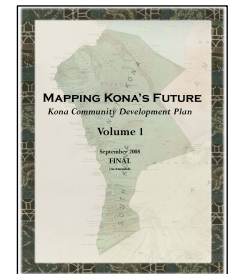
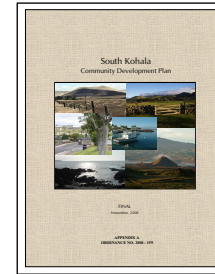
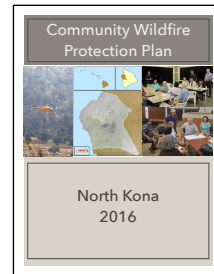
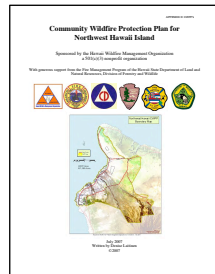
State- Level Plans



County- Level Plans



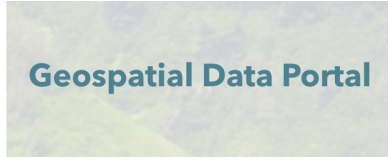
District- Level Plans



Spatial Analysis Mapping Tools



**Land-Use Pattern
Allocation Guide**



Site Analysis



**Hawai'i Tree
Canopy Viewer**

Discrepancies Between Plans in Addressing Wildfire and Land Cover Change

Management Plans/Policies

| Themes in Management | CWPP-Northwest Hawai'i Island | CWPP-North Kona | County of Hawai'i Climate Action Plan | County of Hawai'i Multi-Hazard Mitigation Plan | State of Hawai'i 2018 Hazard Mitigation Plan | South Kohala Community Development Plan | Kona Community Development Plan | County of Hawai'i General Plan | |
|----------------------|--|-----------------|---------------------------------------|--|--|---|---------------------------------|--------------------------------|----|
| | Urban expansion in the WUI or near | -- | -- | -- | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Wildfire risk presence | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Wildfire exacerbated by land cover change and or/climate change | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | -- | -- |
| | Wildfire adaptation initiatives (Firewise, fuels mitigation) | ✓ | ✓ | -- | ✓ | ✓ | ✓ | ✓ | -- |
| | Wildfire mitigation initiatives (carbon sinks, fuels conversion, green breaks) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | -- |
| | Key actions and initiatives for fire resilient landscapes | ✓ | ✓ | -- | ✓ | ✓ | ✓ | / | -- |



Presence of theme in plan

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Absence of theme in plan

/

Vague inclusion of theme in plan

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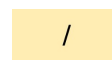
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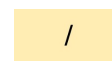
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Environmental Plans Support Fire Mitigation/Adaptation While Some Lack

Management Plans/Policies

| Environmental Goals | CWPP- Northwest Hawai'i Island | CWPP- North Kona | Vegetation Management Rapid Mapping Assessment and Collaborative Action Planning Hawai'i Island Report | County of Hawai'i Climate Action Plan | County of Hawai'i General Plan | Hawai'i Forest Action Plan | Hawai'i 2050 Sustainability Plan | Hawai'i Highways Climate Adaptation Action Plan | |
|---------------------|--|---------------------|---|--|---|----------------------------------|--|---|-----|
| | Tree Planting/canopy goals | - | (+) | (+) | i | i | i | - | - |
| | Invasive species removal | (+) | (+) | (+) | - | - | i | i | - |
| | Native species planting | (+) | (+) | (+) | i | i | i | i | - |
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i Has a specified goal independent as a means of fire mitigation and adaptation

(+) The specified goal exists as a *means* of fire mitigation and adaptation

- The plan does not include the specified goal

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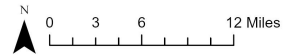
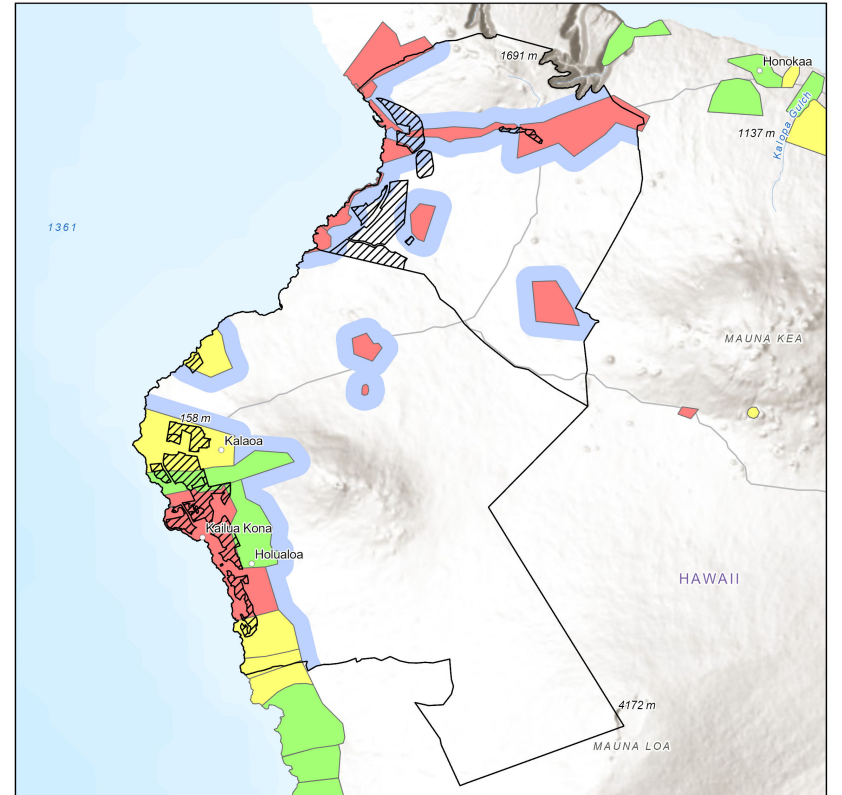
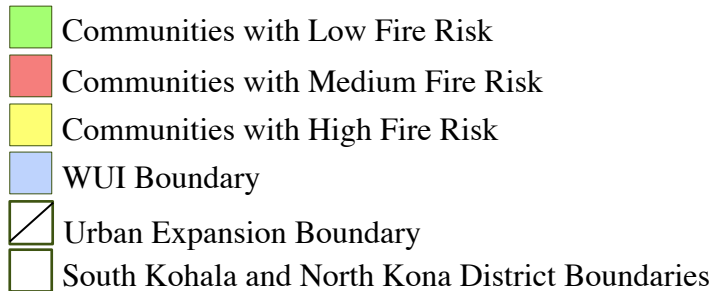
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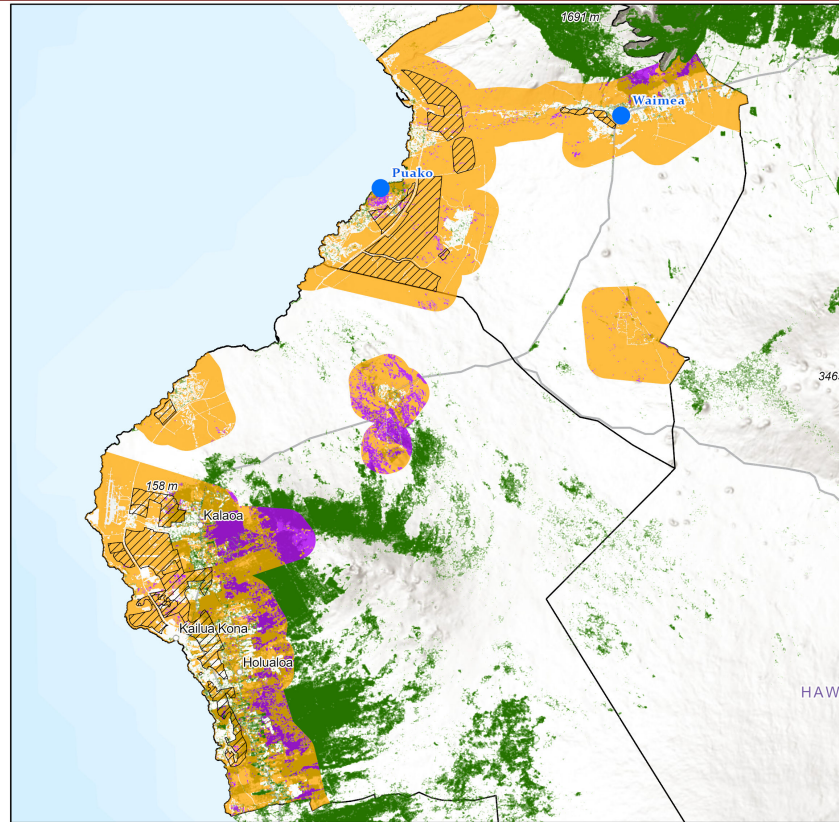
Proposed Urban Expansion Expands the WUI and Creates New Communities at Risk

Projected urban expansion:

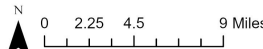
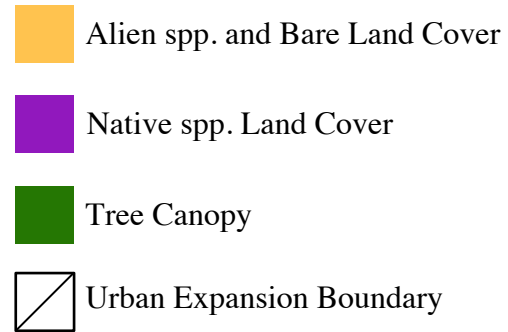
- South Kohala: 12, 264 acres
- North Kona: 11, 995 acres
- Invites opportunities for fire events



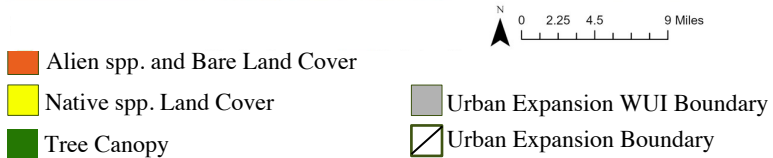
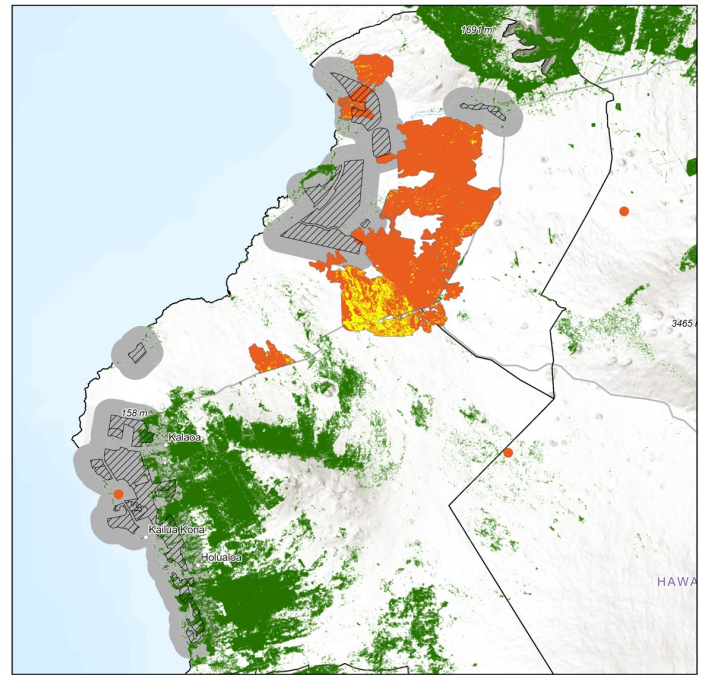
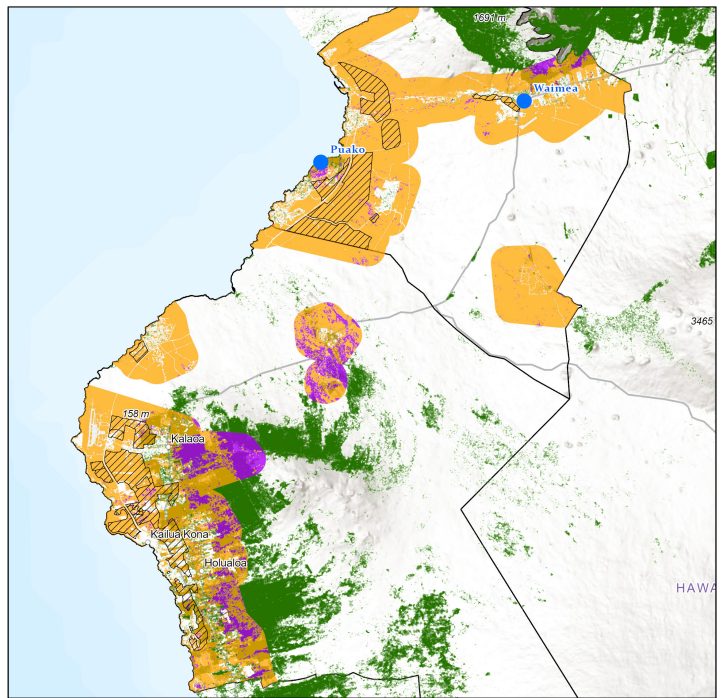
Urban Expansion Land Cover is Nonnative Grass Dominant and Low in Tree Canopy



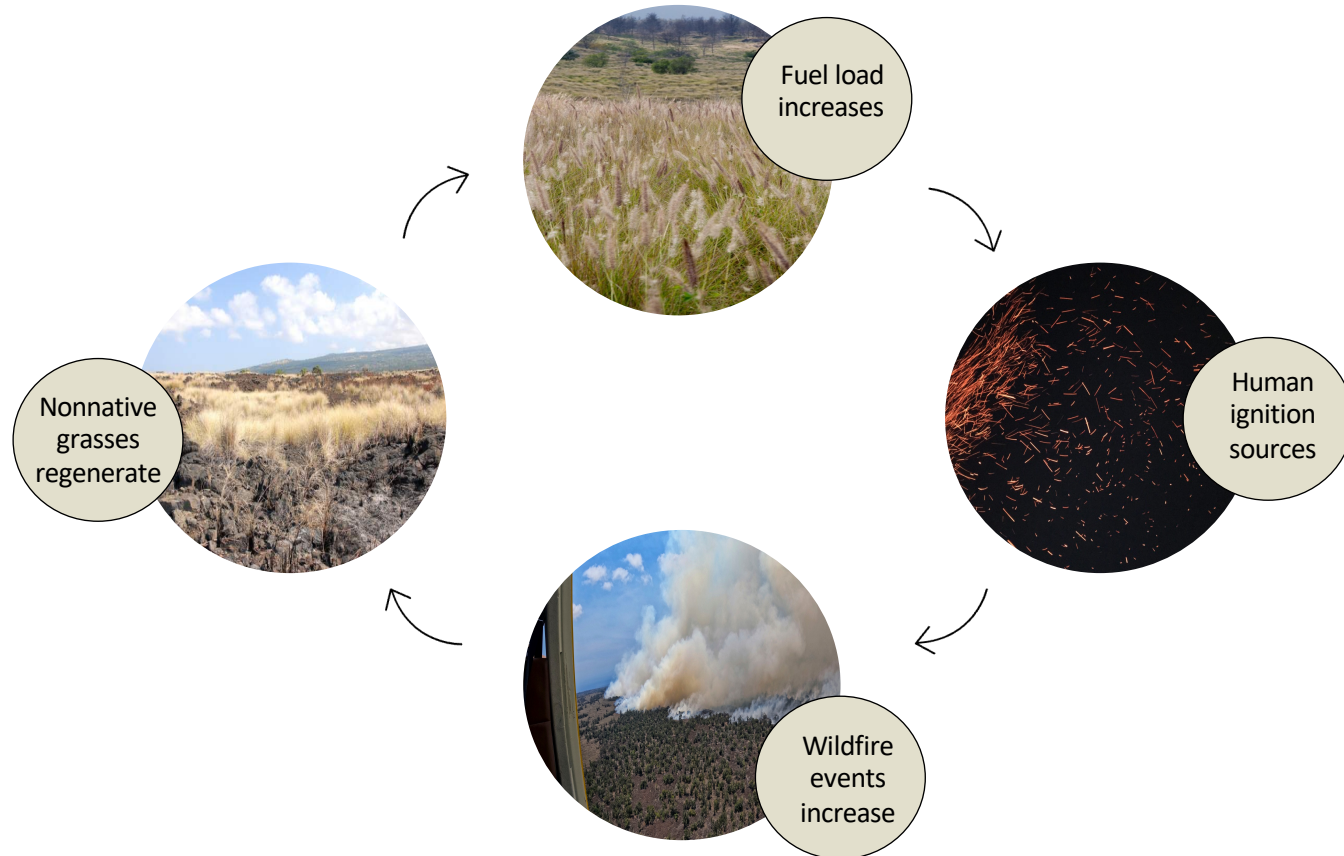
- development encroaching into dense nonnative grassland
- urban development in/next to natural areas with high fuel loads



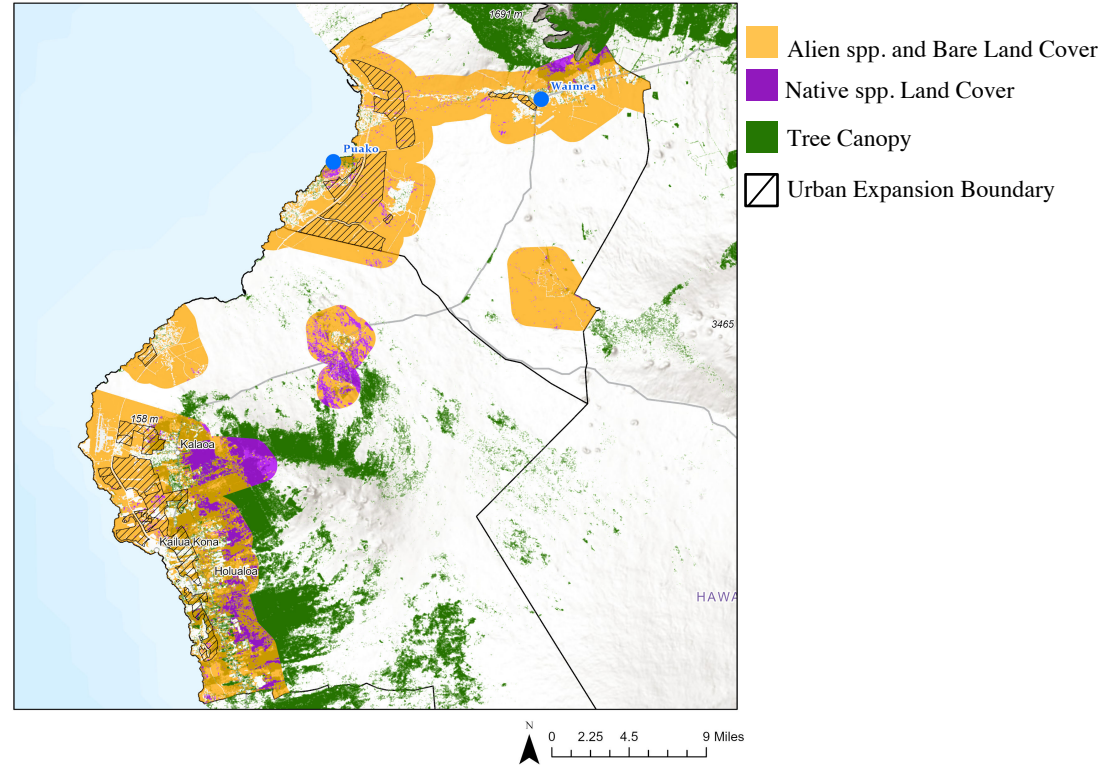
Urban Expansion in Land Cover Type of Historical Fires



Break the Cycle!

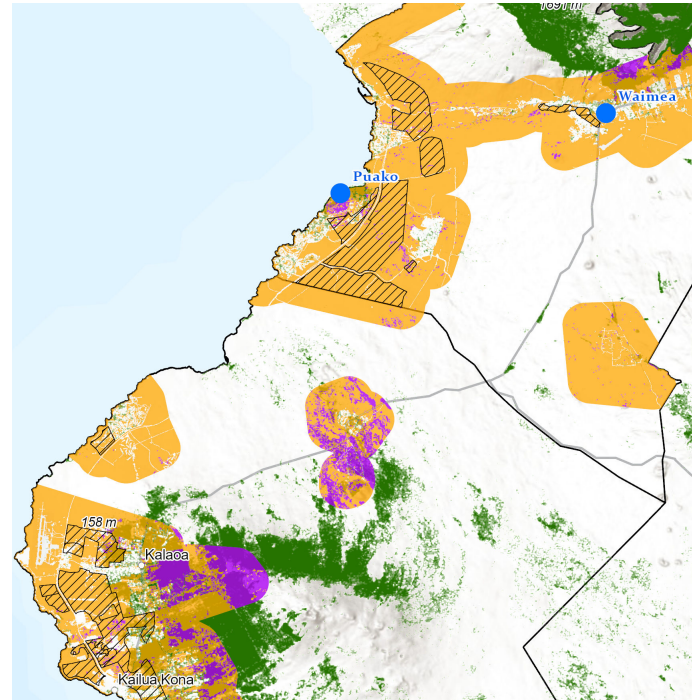
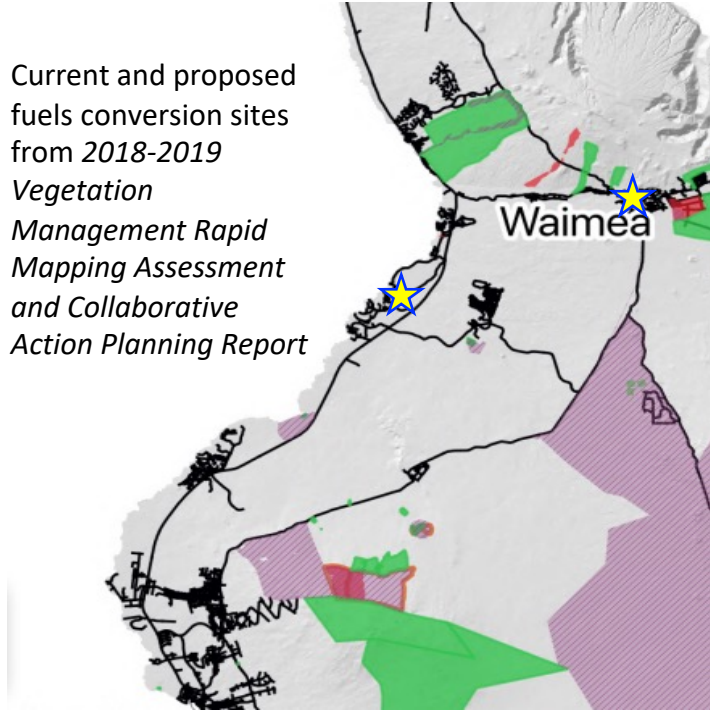


Spatial Analysis + Plan Review



Spatial Analysis + Plan Review

Current and proposed
fuels conversion sites
from 2018-2019
*Vegetation
Management Rapid
Mapping Assessment
and Collaborative
Action Planning Report*



- Alien spp. and Bare Land Cover
- Native spp. Land Cover
- Tree Canopy
- Urban Expansion Boundary

Tree Canopy as Wildfire Risk Mitigation

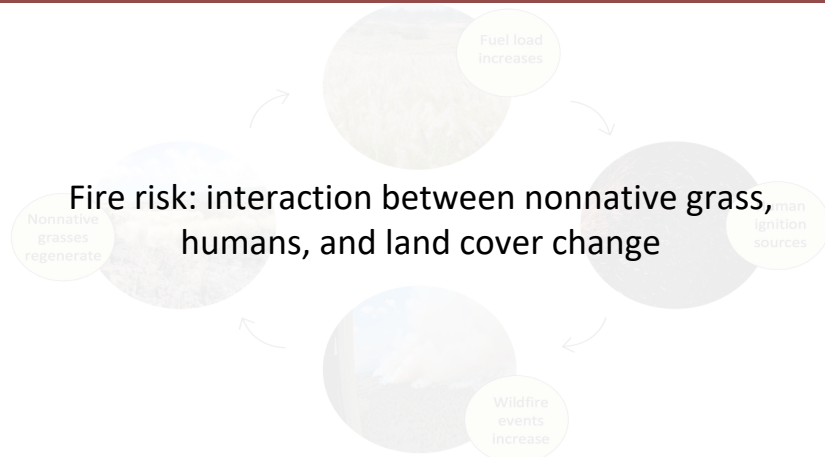
Management Plans/Policies

Environmental Goals

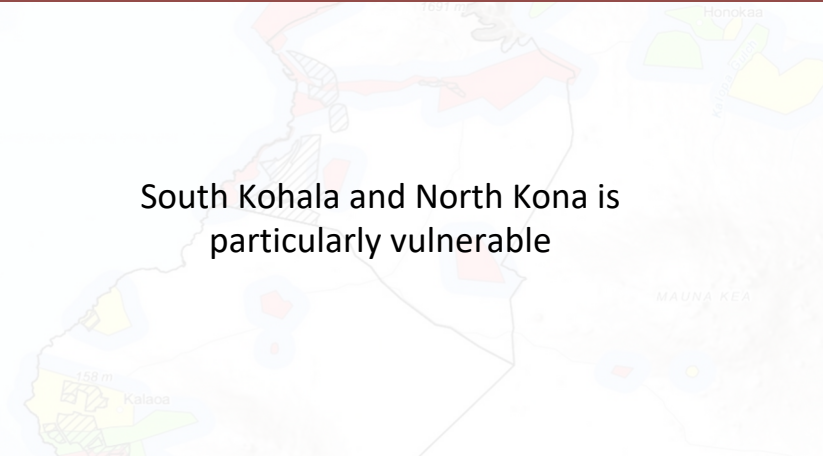
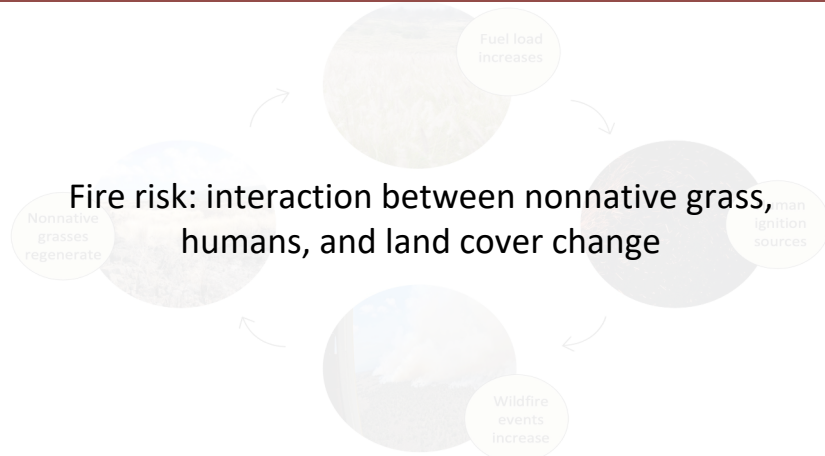
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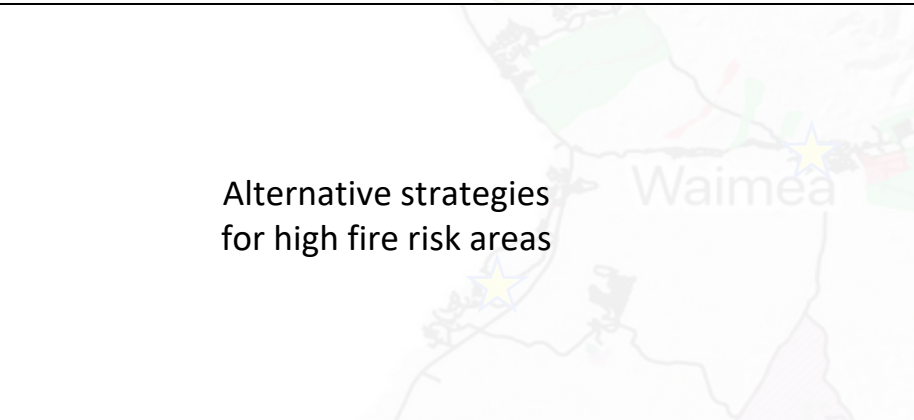
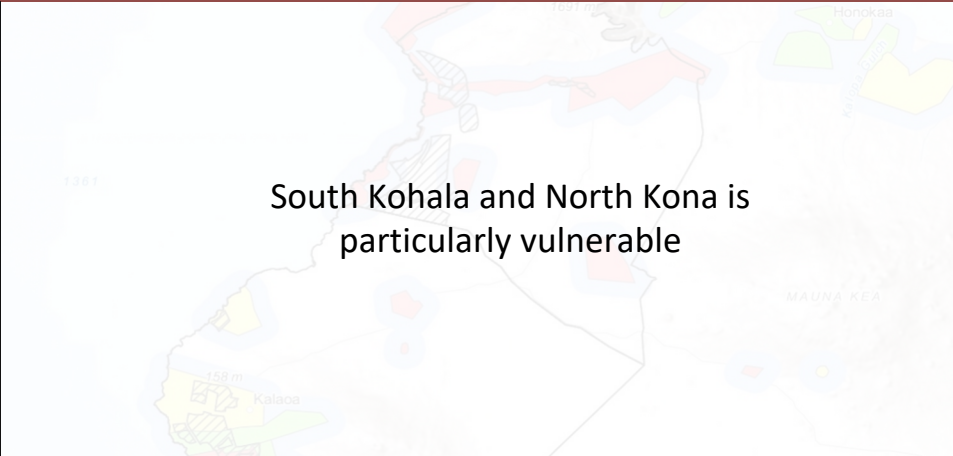
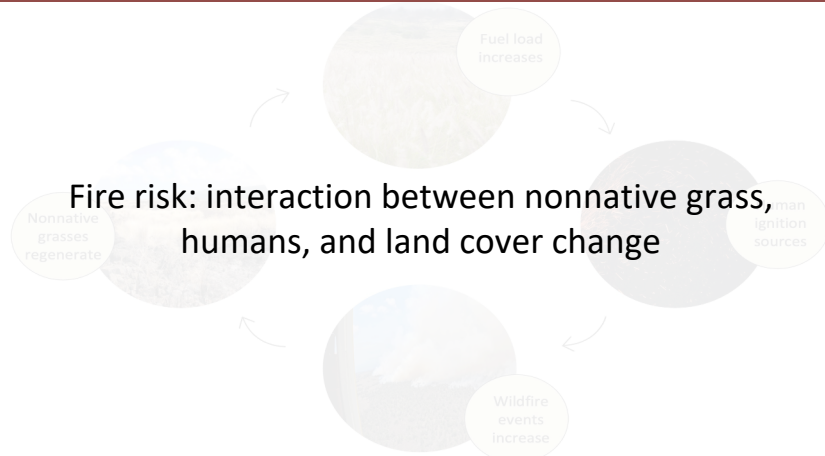
Conclusion



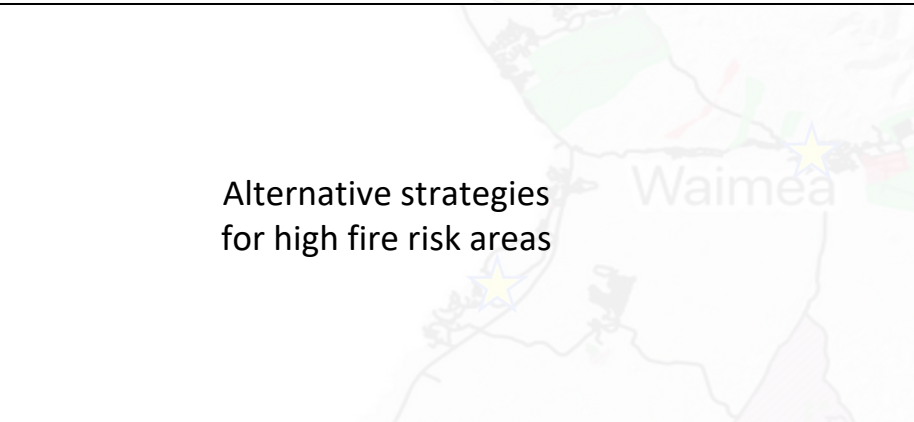
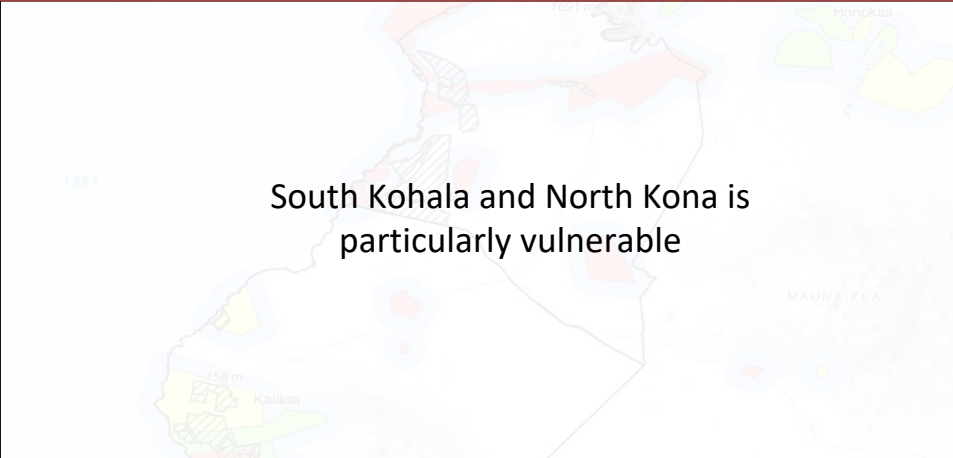
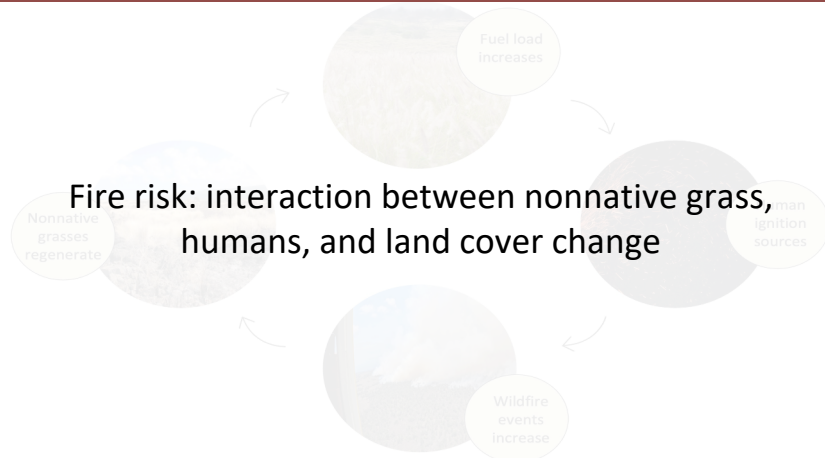
Conclusion



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Synergies and opportunities for alignment between various plans

Thank You!



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References

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