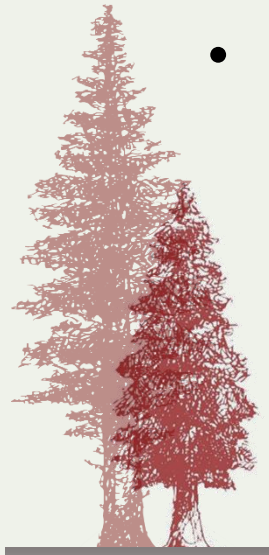
Wildland Urban Interface and Risk Mapping

Doug Grafe
Chief – Fire Protection
503-945-7204
doug.grafe@oregon.gov

Tim Holschbach
Deputy Chief – Policy & Planning
503-945-7434
tim.j.holschbach@oregon.gov

Overview

- Process to date
  - Wildland-Urban Interface definition and criteria
  - State-wide risk mapping



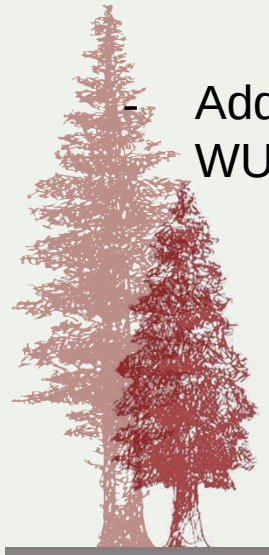
Wildland-Urban Interface
Requirement Review

- Significantly amends Oregon Revised Statutes (ORS) 477.015 to 477.064.

- Directs the Board of Forestry to establish a definition of Wildland-Urban Interface (WUI).

    - *The WUI definition must be adopted by rule within 100 days of the effective date of the bill.*

- Additionally, the rules must establish criteria to identify and classify the WUI.



Wildland-Urban Interface
Rules Advisory Committee Process

- The Rules Advisory Committee (RAC) met 4 times between July 27 – August 17th.

- Draft Wildland-Urban Interface definition were presented to the Board August 24th. Public hearings on the proposed rules will be conducted September 22-24.

- The Rules Advisory Committee resumes their work September 16, 2021, to begin development of criteria to further identify the Wildland-Urban Interface boundaries.

- The Department will return to the Board in March 2022 to present the draft criteria rules, with a request to conduct public hearings late April 2022.

Statewide map of Wildfire Risk

SB 762, Section 7

- Requires the Oregon Department of Forestry (ODF) to develop and maintain a comprehensive statewide map of wildfire risk by June 30, 2022.

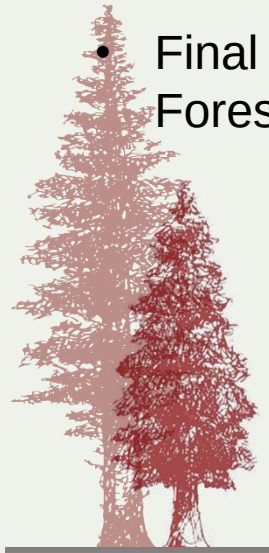
- Requires Oregon State University (OSU) to collaborate with ODF, the Oregon State Fire Marshal (OSFM), other state agencies, local governments, Indian tribes, other public bodies, and additional information sources to create the map.

- Requires the map to be publicly accessible and requires OSU to provide technical assistance to state and local governments who use the map and associated Oregon Explorer Wildfire Risk Portal platform.

- The final map is used to inform additional policy actions and programs as detailed in Senate Bill 762.

Statewide map of Wildfire Risk key dates

- The Rules Advisory Committee has met bi-weekly beginning August 5, 2021.
- The Department will return to the Board in March 2022 to present the draft rules, with a request to conduct public hearings late April 2022.
- Final rules presented to the Board for approval at June 2022 Board of Forestry meeting.



Oregon State University
College of Forestry

Oregon State University
College of Engineering

Science Foundation for Mapping the Wildland-Urban Interface, Socially Vulnerable Communities, and their Exposure to Wildfire

Dr. Thomas DeLuca, Cheryl Ramberg-Ford and Allyn C. Ford Dean, College of Forestry, OSU
Dr. Mindy Crandall, Dept. of Forest Engineering, Resources, and Mgmt., College of Forestry, OSU
Caitlyn Reilley, Dept. of Forest Engineering, Resources, and Mgmt., College of Forestry, OSU
Dr. Erica Fischer, School of Civil and Construction Engineering, College of Engineering, OSU
Dr. Christopher Dunn, Dept. of Forest Engineering, Resources, and Mgmt., College of Forestry, OSU

How to build fire adaptive communities for the future

Erica C. Fischer, PhD, PE
Assistant Professor, School of Civil and Construction Engineering
Oregon State University

Oregon State University
College of Engineering

Fire Impacts to Communities – *Fire Source*

Human-caused wildfires: Wildfires caused by electrical failures, smoking, arson, campfires

Naturally-caused wildfires: Wildfires caused by lightning

[1] Balch, J.K., Bradley, B.A., Abatzoglou, J.T., Nagy, R.C., Fusco, E.J., and Mahood, A.M. (2017). "Human-started wildfires expand the fire niche across the United States," *PNAS*, 114(11).
[2] https://www.iii.org/fact-statistic/facts-statistics-wildfires

Oregon State University

Fire Impacts to Communities – *Fire Source*

Human-caused wildfires: Wildfires caused by electrical failures, smoking, arson, campfires

Naturally-caused wildfires: Wildfires caused by lightning

84 - 90% of wildfires in the US are started by people[1, 2]

Length of human-caused wildfire season is 3x longer than naturally-caused wildfire season[1]

Human-caused wildfires are most common in intermediate levels of development of the built environment[1]

[1] Balch, J.K., Bradley, B.A., Abatzoglou, J.T., Nagy, R.C., Fusco, E.J., and Mahood, A.M. (2017). "Human-started wildfires expand the fire niche across the United States," *PNAS*, 114(11).
[2] https://www.iii.org/fact-statistic/facts-statistics-wildfires

Oregon State University

Fire Impacts to Communities

Regardless of the fire source:

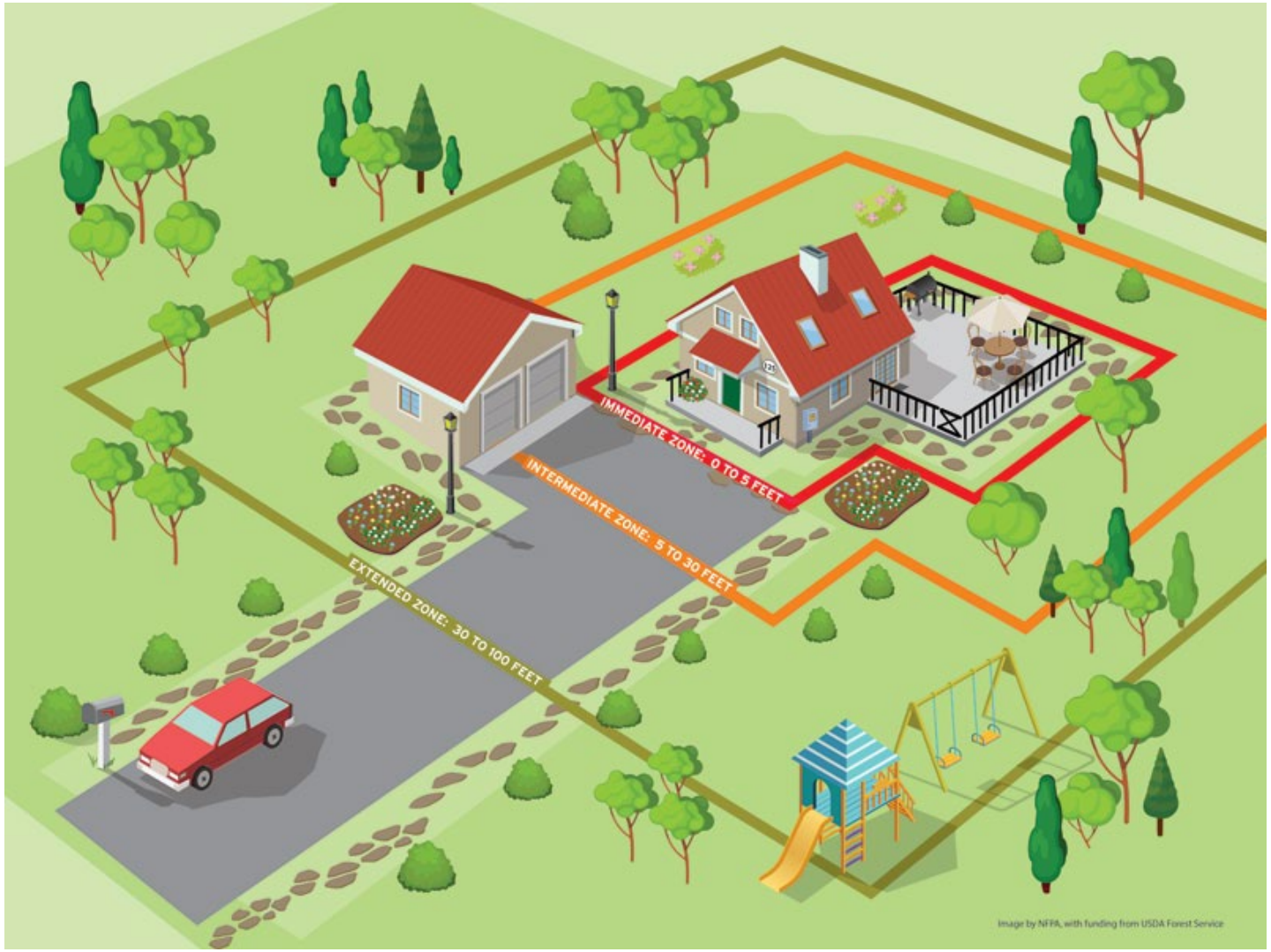
- The impacts to communities are wide-spread,
- Wildfire ignition methodology does not influence how structures ignite.

Oregon State University

Fire Impacts to Communities

Homes can ignite through:

1. Direct flame contact
2. Radiative heat transfer from nearby structures igniting
3. Embers/firebrands



Oregon State University

Fire Impacts to Communities

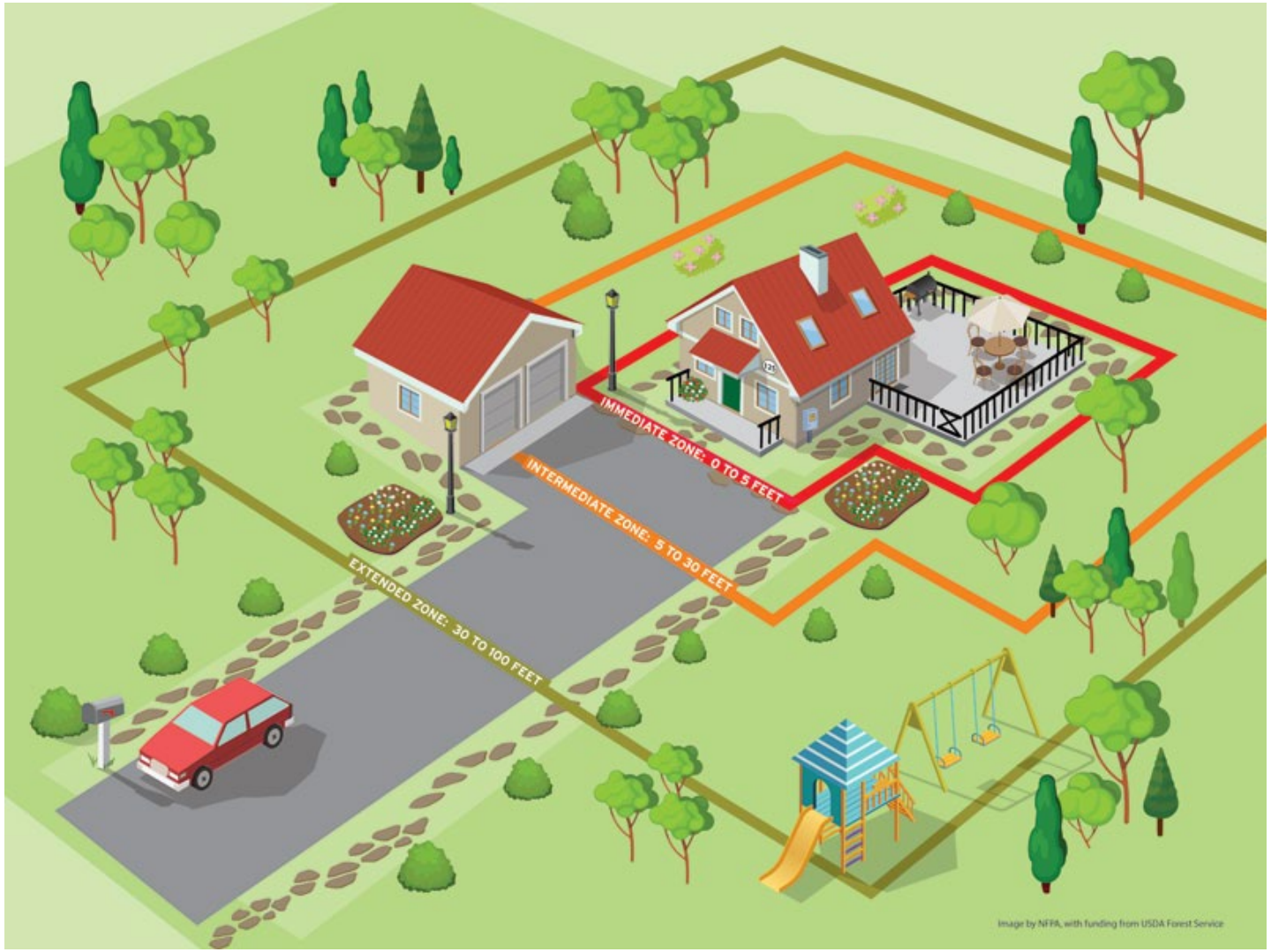
Homes can ignite through:

1. Direct flame contact

2. Radiative heat transfer from nearby structures igniting

3. **Embers/firebrands**

In the 2003 Canberra Fires[3]:
> 90% of burned structures were destroyed in the absence of direct flame contact



[3] Koo, E., Pagni, P.J., Weise, D.R., and Woycheese, J.P. (2010). "Firebrands and spotting ignition in large-scale fires," *International Journal of Wildland Fire*, 19.

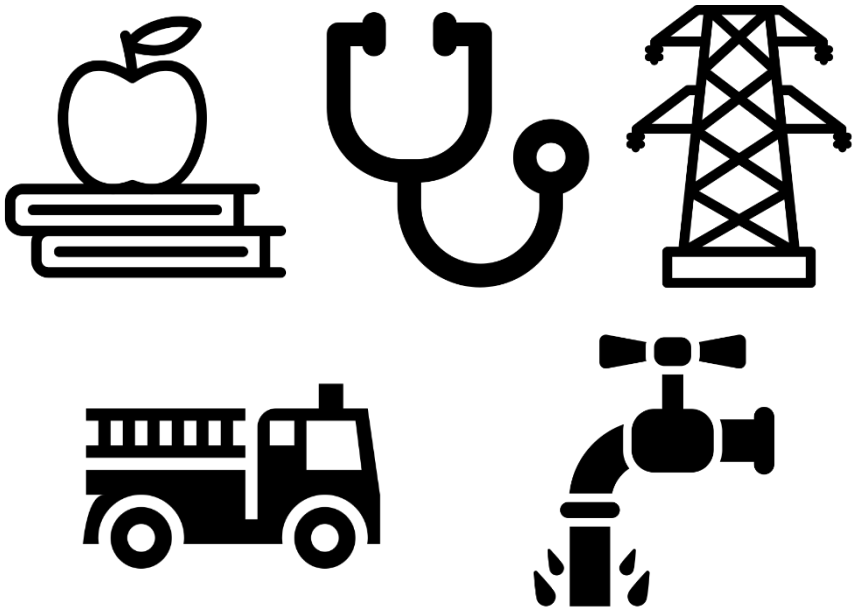
Oregon State University

Wildfire Mitigation for WUI Resilience

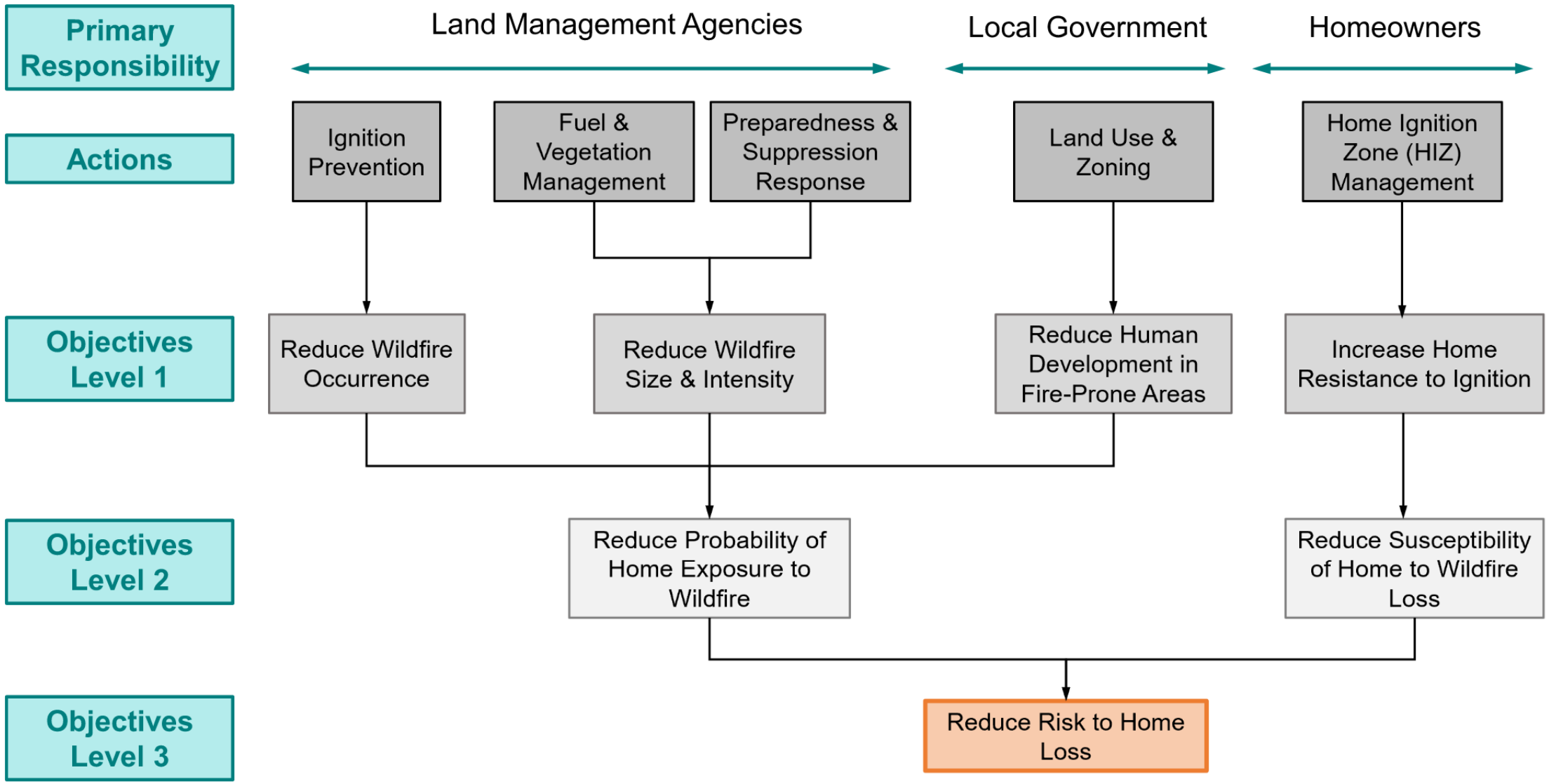
Reduce intensity, frequency, and acres burned by wildfires

Reduce ignitability of WUI communities

Increase resilience of WUI communities



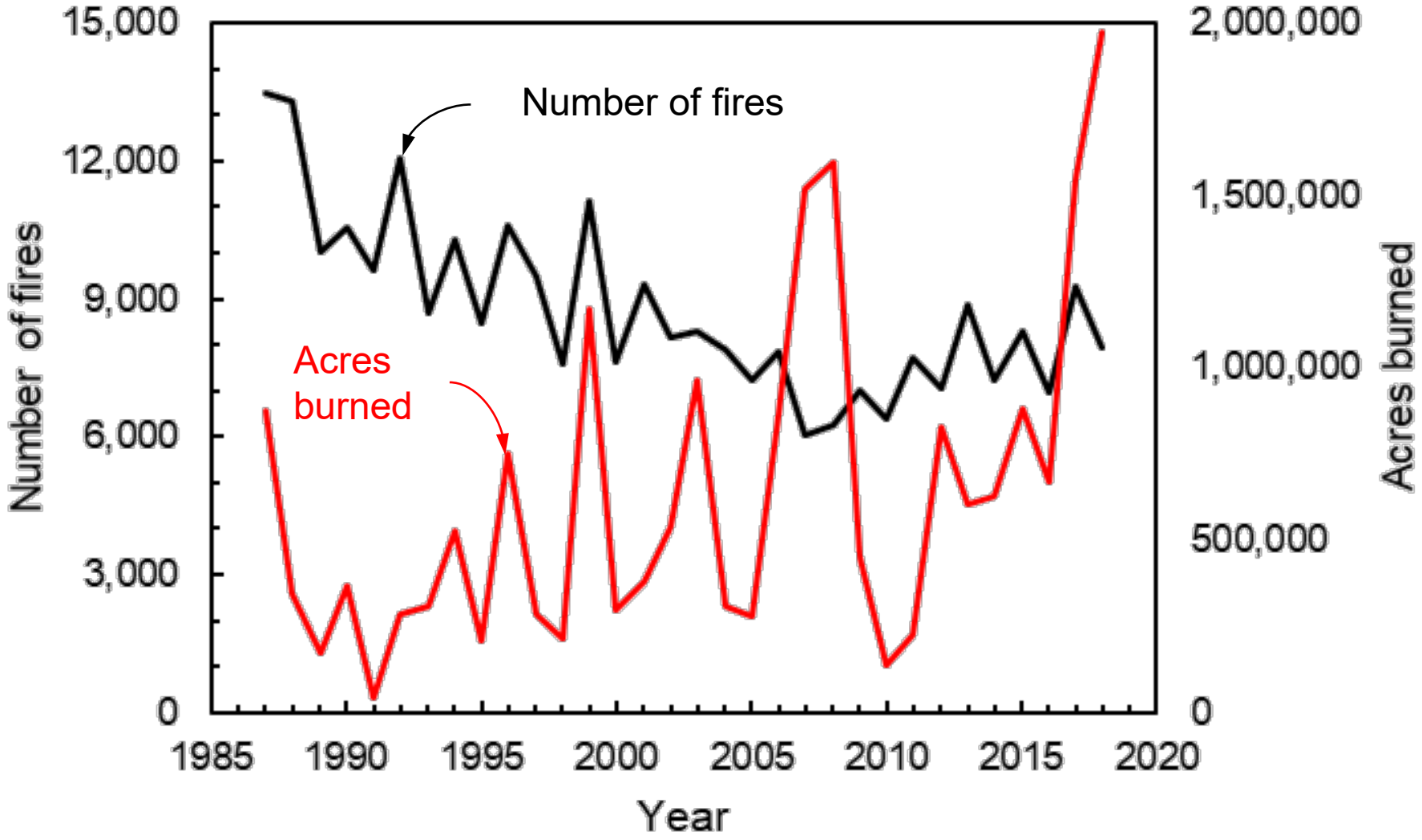
Wildfire Mitigation for WUI Resilience



Calkin, D.E., Cohen, J.D., Finney, M.A., and Thompson, M.P. (2014). "How risk management can prevent future wildfire disasters in the wildland-urban interface," *PNAS*, 111(2).

Oregon State University

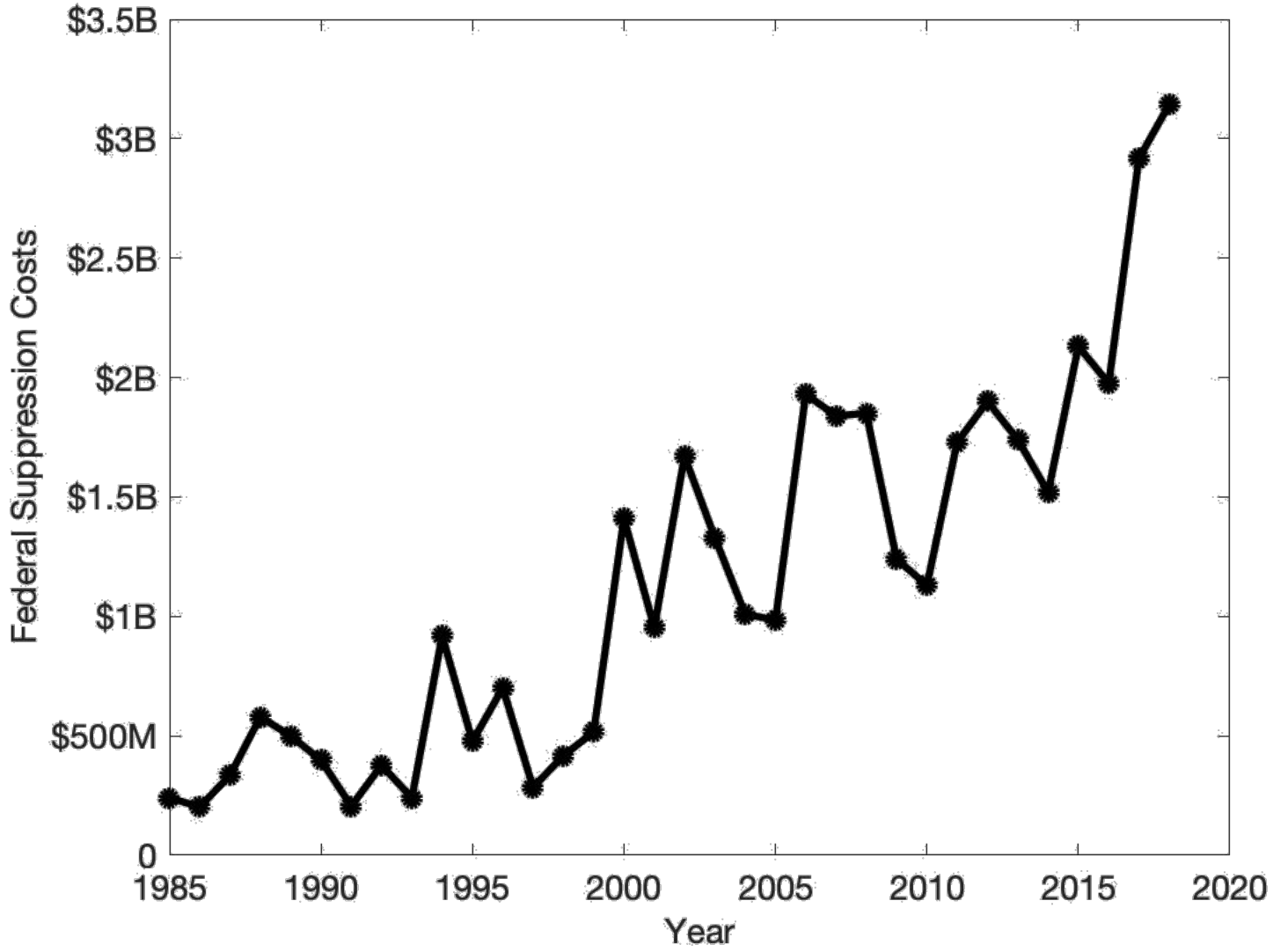
Wildfire Mitigation for WUI Resilience



Data from CalFire

Oregon State University

Wildfire Mitigation for WUI Resilience



Plot developed by Michael Gollner, UC Berkeley

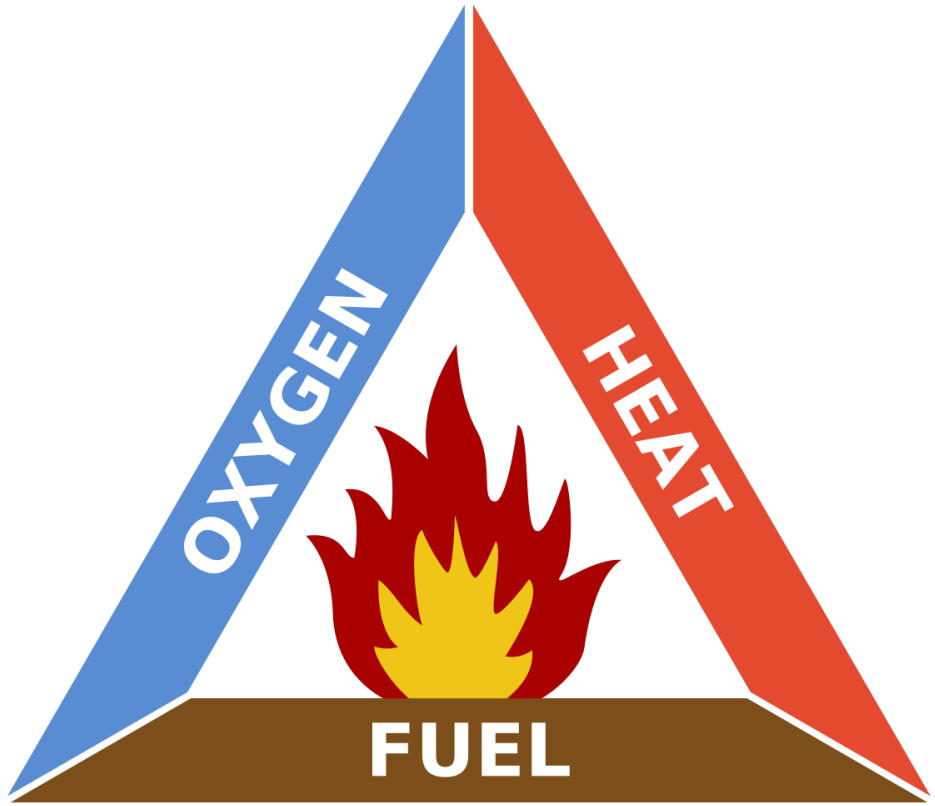
Oregon State University

Wildfire Mitigation for WUI Resilience

Home survivability within the WUI depends on whether it ignites.

→

Mitigation within the WUI aims to reduce home ignitability.



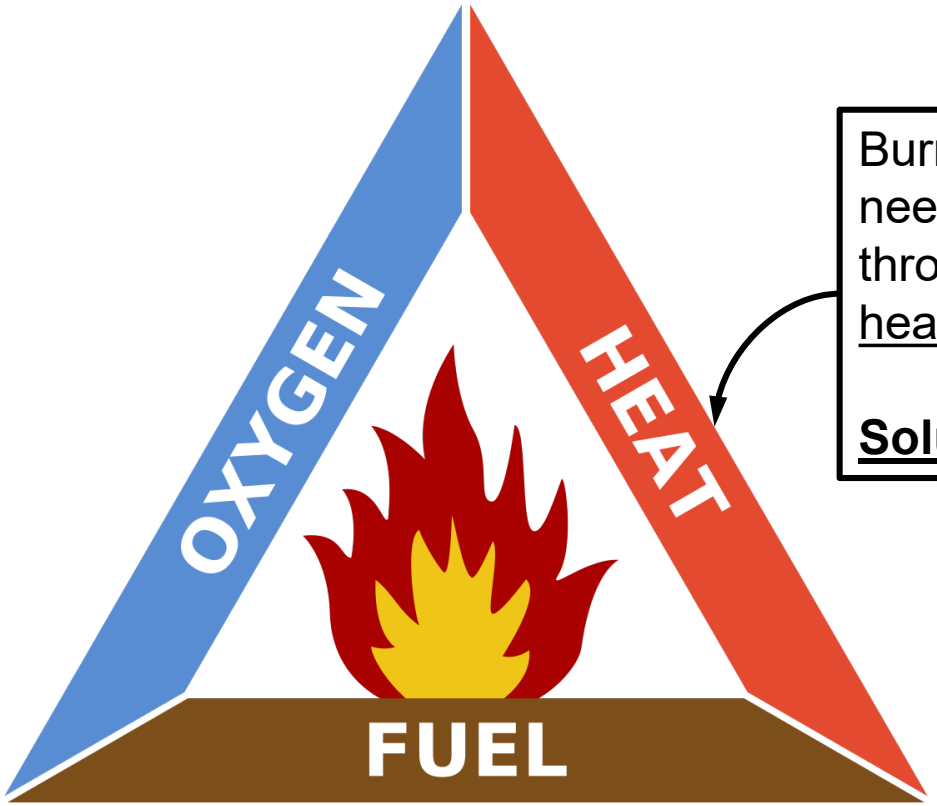
Oregon State University

Wildfire Mitigation for WUI Resilience

Home survivability within the WUI depends on whether it ignites.

→

Mitigation within the WUI aims to reduce home ignitability.



Burning vegetation, wood piles, pine needles, etc. can cause home ignition through direct flame contact or radiative heat transfer[4].

Solution: **Defensible space**

[4] Cohen, J. (2000). "Preventing Disaster: Home Ignitability in the Wildland-Urban Interface," *Journal of Forestry,* 98(3).

Oregon State University

Wildfire Mitigation for WUI Resilience

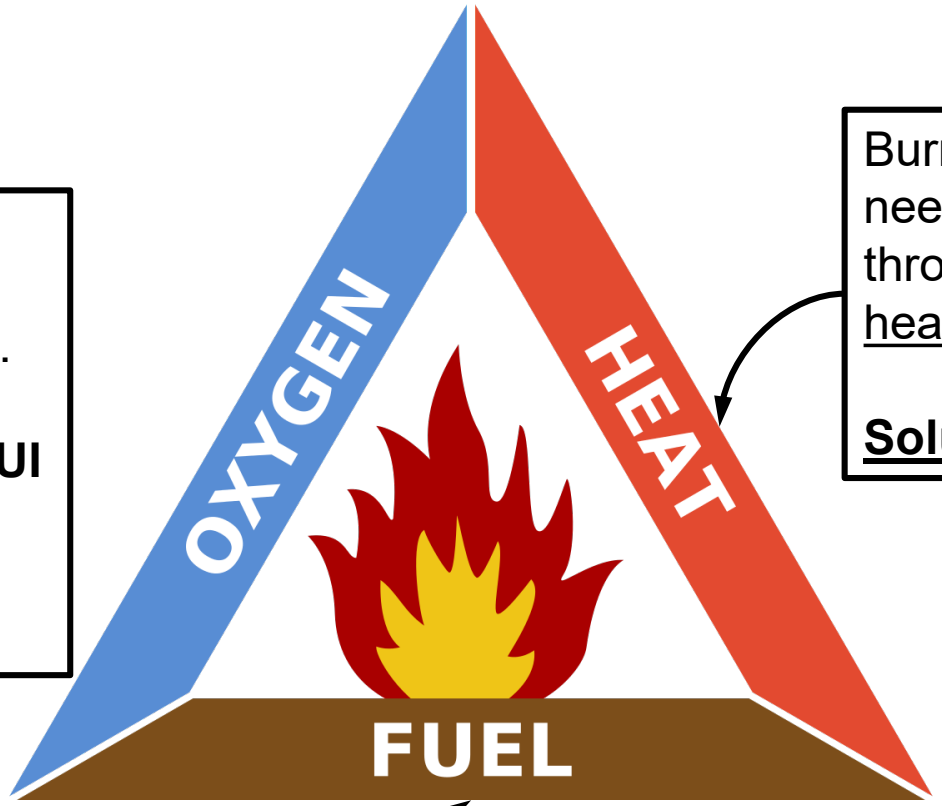
Home survivability within the WUI depends on whether it ignites.

→

Mitigation within the WUI aims to reduce home ignitability.

Reducing the ignitability of the house itself reduces fuel for fire spread through <u>embers/firebrands</u>.

<u>Solution:</u> **Homes meeting IWUI code for noncombustible construction** (siding, roofing, windows, vents)



Burning vegetation, wood piles, pine needles, etc. can cause home ignition through <u>direct flame contact</u> or <u>radiative heat transfer</u>[4].

<u>Solution:</u> **Defensible space**

[4] Cohen, J. (2000). "Preventing Disaster: Home Ignitability in the Wildland-Urban Interface," *Journal of Forestry,* 98(3).

Oregon State University

Wildfire Mitigation for WUI Resilience – *The Data*

Construction material:

Homes with nonflammable roofs had a 70% survival rate (compared with 19% for flammable roofs)[5, 6]

Homes with a nonflammable roof and minimum of 10 m of clearance had a 86% survival rate[7]

Wildland flame fronts will not ignite wood surfaces greater than 40 meters away[8]

[5] Foote, E.I.D. (1994). "Structure survival on the 1990 Santa Barbara Paint fire: A retrospective study of urban-wildland interface fire hazard mitigation factors," MS thesis, University of California, Berkeley.

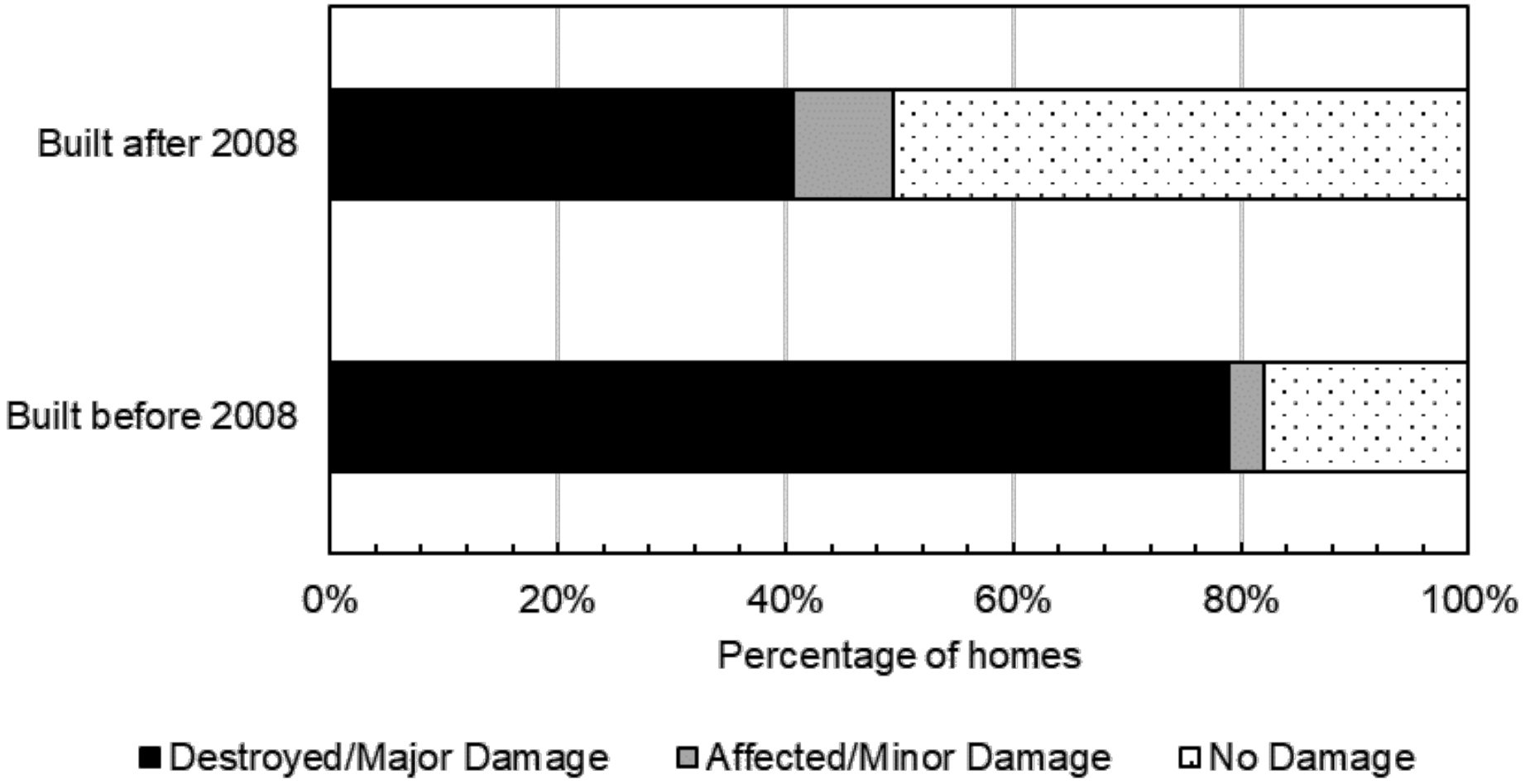
[6] Davis, J.B. (1990). "The wildland-urban interface: Paradise or battleground?," *Journal of Forestry*, 88(1).

[7] Howard, R.A. North, D.W., Offensend, F.L, and Smart, C.N. (1973). Decision analysis of fire protection strategy for the Santa Monica mountains: An initial assessment (on file). Menlo Park, CA: Stanford Research Institute.

[8] Cohen, J.D. and Buttler, B.W. (1998). "Modeling potential structure ignitions from flame radiation exposure with implications for wildland/urban interface fire management," In: *Proceedings of the 13th Fire and Forest Meteorology Conference, International Association of Wildland Fire*. p. 81-86

Oregon State University

Wildfire Mitigation for WUI Resilience – *The Data*



Data from Paradise, CA after the 2018 Camp Fire

Oregon State University

Wildfire Mitigation for WUI Resilience – *The Data*

Construction material:

Homes with nonflammable roofs had a 70% survival rate (compared with 19% for flammable roofs)[5, 6]

Homes with a nonflammable roof and minimum of 10 m of clearance had a 86% survival rate[7]

Wildland frame fronts will not ignite wood surfaces greater than 40 meters away[8]

Designation of WUI region:

Buildings near pre-existing Firewise communities had a lower rate of destruction than those further from Firewise communities[9]

86% of the residential housing burned from 2000-2018 were designated in a WUI zone before their respective fires as either interface or intermix WUI regions[10]

[9] Kramer, H.A., Mockrin, M.H, Alexandre, P.M., Stewart, S.I., Radeloff, V.C. (2018). "Where wildfires destroy buildings in the US relative to the wildland-urban interface and national fire outreach programs," *International Journal of Wildland Fire*, 27.

[10] Caggiano, M.D., Hawbaker, T.J., Gannon, B.M., and Hoffman, C.M. (2020). "Building Loss in WUI Disasters: Evaluating the Core Components of the Wildland-Urban Interface Definition," *Fire*, 3(73).

Oregon State University

Wildfire Mitigation for WUI Resilience – *The Data*

Construction material:

Homes with nonflammable roofs had a 70% survival rate (compared with 19% for flammable roofs)[5, 6]

Homes with a nonflammable roof and minimum of 10 m of clearance had a 86% survival rate[7]

Wildland frame fronts will not ignite wood surfaces greater than 40 meters away[8]

Designation of WUI region:

Buildings near pre-existing Firewise communities had a lower rate of destruction than those further from Firewise communities[9]

86% of the residential housing burned from 2000-2018 were designated in a WUI zone before their respective fires as either interface or intermix WUI regions[10]

Role of vegetation:

100% of burned homes (2000 – 2018) occurred within 850 m of wildland vegetation; 80% of burned homes occurred within 0 km of wildland vegetation[10]

10% of the burned homes (2000 – 2018) occurred in regions with < 25% vegetation cover; 80% of the burned homes were located in regions with > 50% vegetation cover[10]

[10] Caggiano, M.D., Hawbaker, T.J., Gannon, B.M., and Hoffman, C.M. (2020). "Building Loss in WUI Disasters: Evaluating the Core Components of the Wildland-Urban Interface Definition," *Fire*, 3(73).

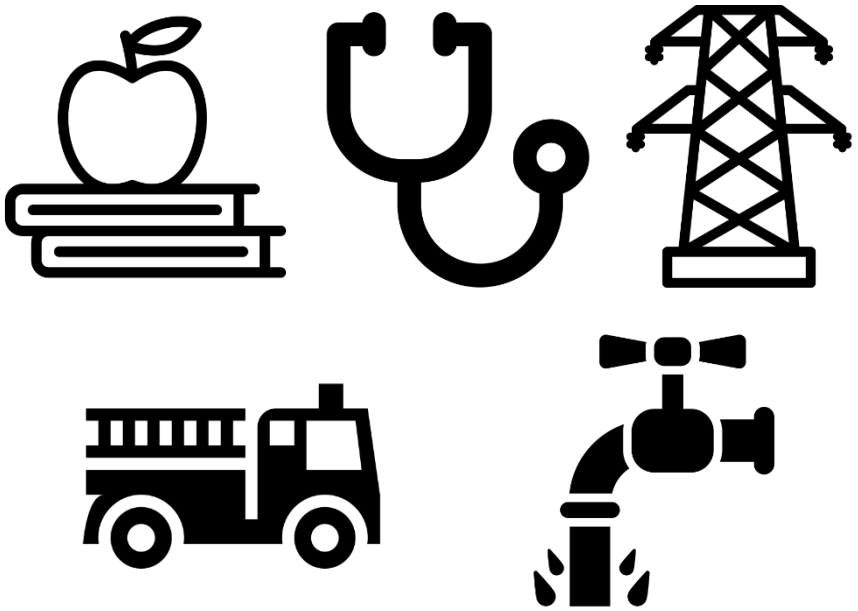
Oregon State University

Wildfire Mitigation for WUI Resilience

Reduce intensity, frequency, and acres burned by wildfires

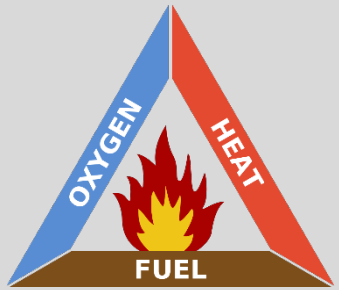
Reduce ignitability of WUI communities

Increase resilience of WUI communities



Wildfire Mitigation for WUI Resilience

Reducing available fuel in WUI communities

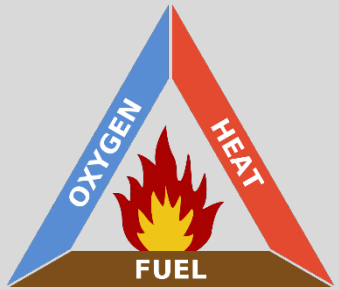


Reduce ignitability of WUI communities

Oregon State University

Wildfire Mitigation for WUI Resilience

Reducing available fuel in WUI communities



Reduce ignitability of WUI communities

Reduction of personal loss/shelter[11]
Reduction of damage to buried water infrastructure[12]
Reduction of damage/loss of schools and hospitals

[11] Bris, P. & Bendito, F. (2019). "Impact of Japanese Post-Disaster Temporary Housing Areas' (THAs) Design on Mental and Social Health," International *Journal of Environmental Research and Public Health*.16(23).
[12] Schulze, S. and Fischer, E.C. (2020). "Prediction of Water Distribution System Contamination Based on Wildfire Burn Severity in Wildland Urban Interface Communities," *AC&S Water.*

Oregon State University

Thank you!

Email: erica.fischer@oregonstate.edu

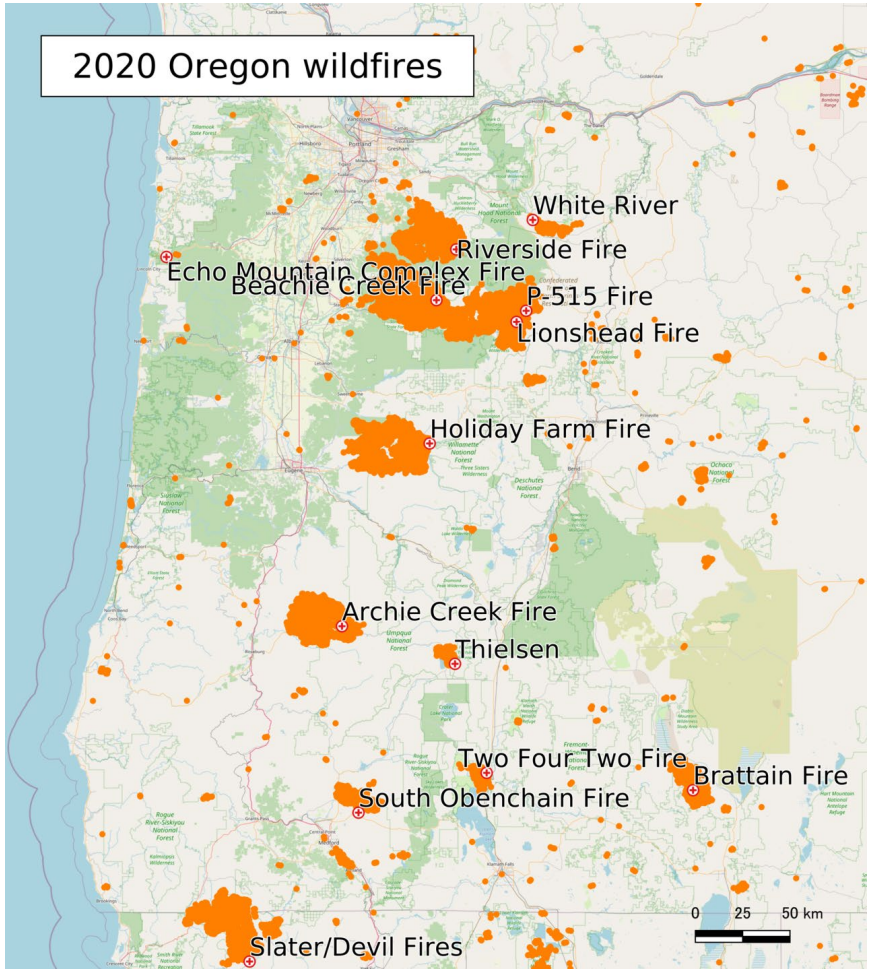
Oregon State University

Identifying Socially Vulnerable and Distressed Communities in Oregon

Mindy S. Crandall, Ph.D.
Caitlyn Reilley, M.S. Student
Christopher Dunn, Ph.D.
Department of Forest Engineering, Resources, and Management
College of Forestry, Oregon State University

Lionshead Fire, Warm Springs Oregon, September 2020. Photo Credit: Warm Springs Agency, OregonLive.com

Why look at human communities?



MODIS Active Fire Detections for CONUS (2020), Geospatial Technology and Applications Center, U.S. Forest Service, USDA

- Human alterations of the landscape and shifts in climate have increased wildfire frequency, severity and season length [1]
- Expansion of human communities into forested landscape (WUI) is putting more lives and homes at risk [2]
- **Not all communities are equally equipped** to prevent, respond to and recover from environmental hazards [3]

1 Cattau et al., 2020, Prestemon et al., 2013. 2 Radeloff et al., 2018. 3 Cutter et al., 2003, Coughland et al., 2019

SB 762 - Wildfire Risk Map

Directs Board of Forestry to oversee a comprehensive statewide map of wildfire risk that:

- Includes wildfire risk classes (extreme, high, moderate, low and no risk)...
- Includes boundaries of the wildland-urban interface (as defined in ORS 477.015)
- **Identifies socially and economically vulnerable communities**

Includes provisions to support socially vulnerable communities:

- Specifically prioritizing support to **socially and economically vulnerable communities**, persons with limited proficiency in English and persons of lower income.
- YCC grants to be awarded **equitably by identifying and supporting populations with greater vulnerability**.
- Oregon Health Authority to establish a program to increase the availability of residential smoke filtration devices among **persons vulnerable to the health effects of wildfire smoke** who reside in areas susceptible to wildfire smoke.

The Social Side of Wildfire Risk

Wildfire risk is a function of an area's physical climate and geography as well as the **social factors of a community**.

Social vulnerability or adaptive capacity here refers to the **social, economic and cultural attributes that can limit access to resources**, making some communities more vulnerable and exacerbating the impacts of wildfire.

Fig 1. Wildfire Vulnerability Framework illustrates community vulnerability as a function of both the physical wildfire risk and the adaptive capacity of a community.[1]

1 Davies et al., 2018

Social Vulnerability Index

Social vulnerability is commonly used by agencies and measured using a Social Vulnerability Index (SVI).

SVI is quantified through population demographic data that are indicators of social status and access to resources.

SVI can also include place-based factors like community dynamics, urban development, and community economic strength or weakness [1].

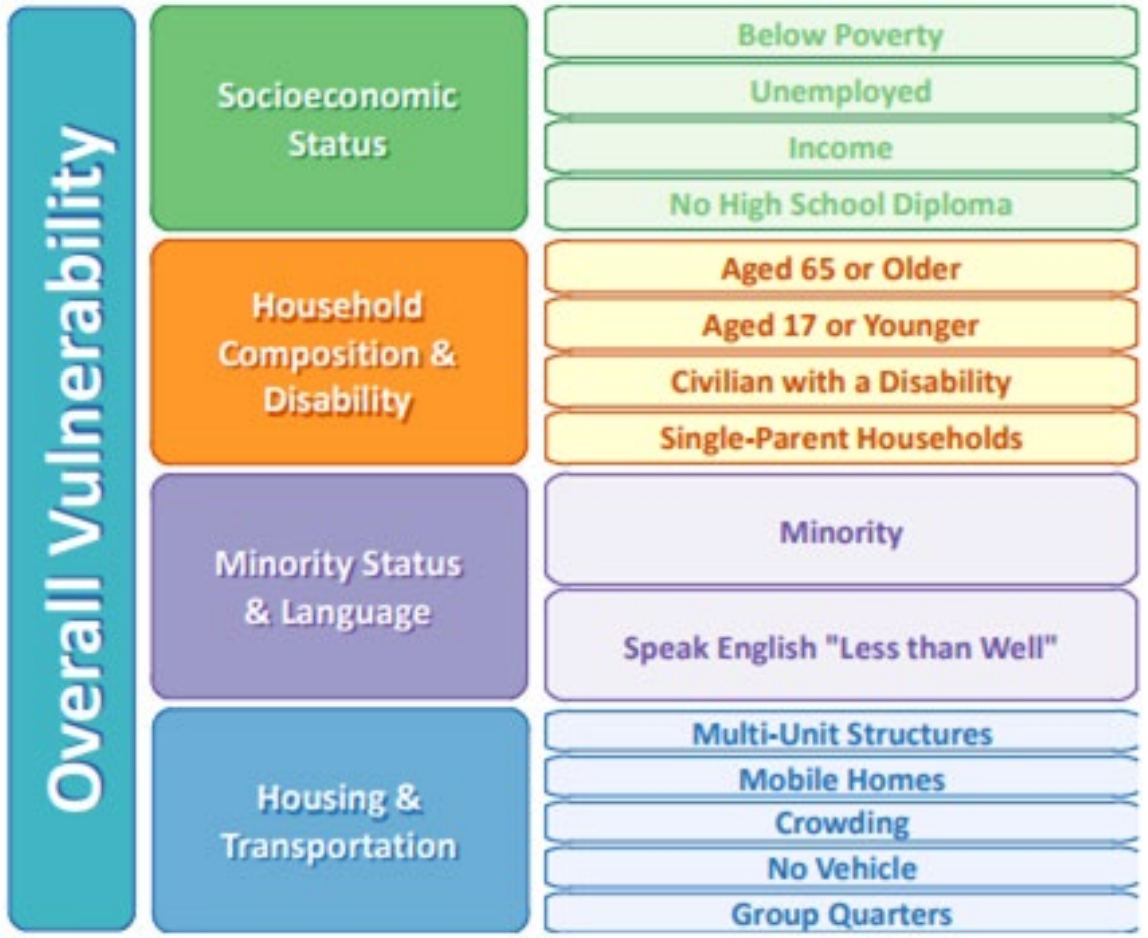


Fig 2. Social Vulnerability Index developed by the Centers for Disease Control, using American Community Survey data.

1 Coughland et al., 2019; Cutter, Boruff, and Shirley, 2003

Distressed Communities Index

The Distressed Communities Index (DCI) quantifies **community economic well-being.**

Developed by the Economic Innovation Group, the DCI combines seven indicators into a single score.

DCI scores rank communities as prosperous, comfortable, mid-tier, at risk, and distressed.

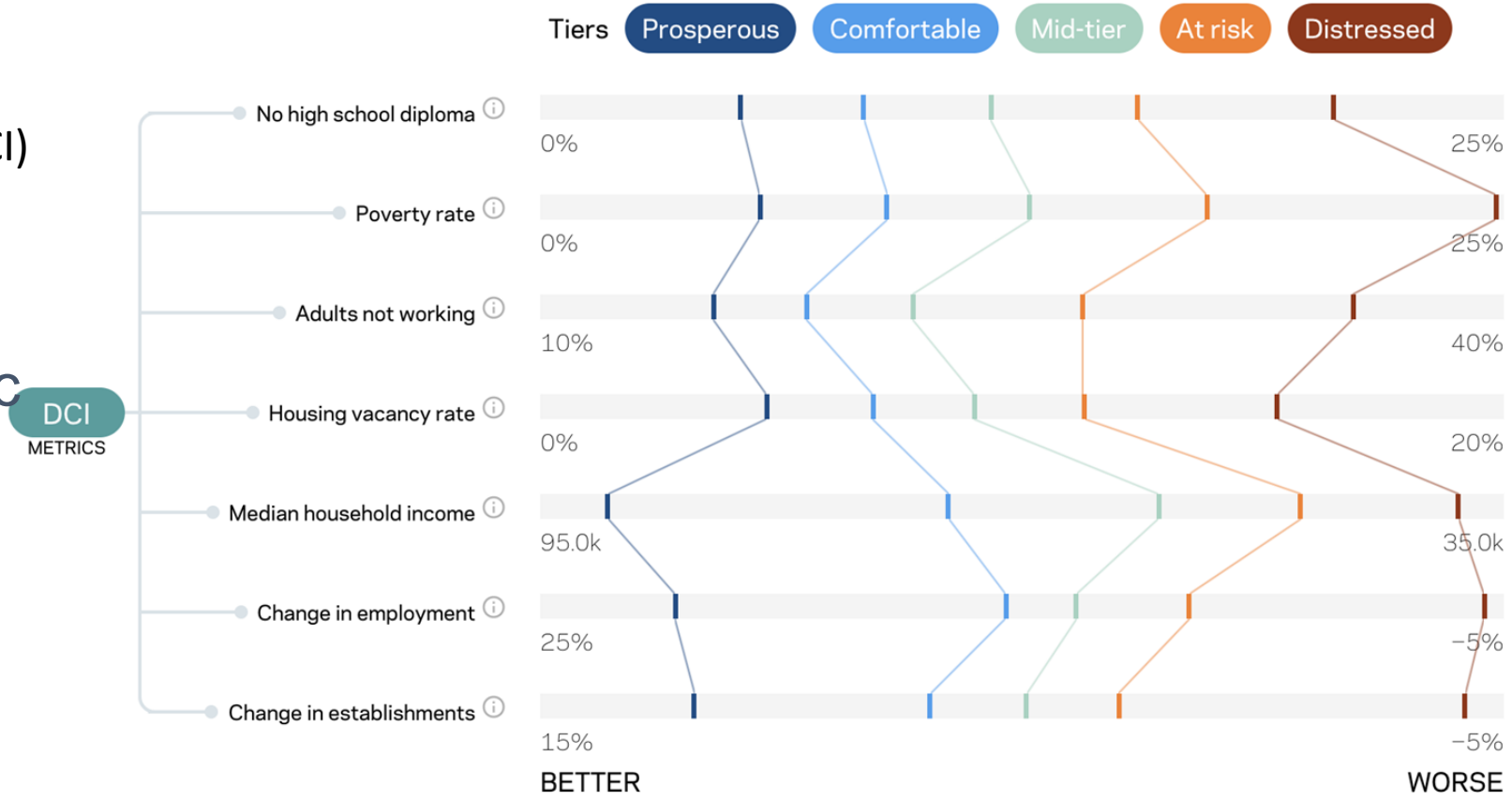
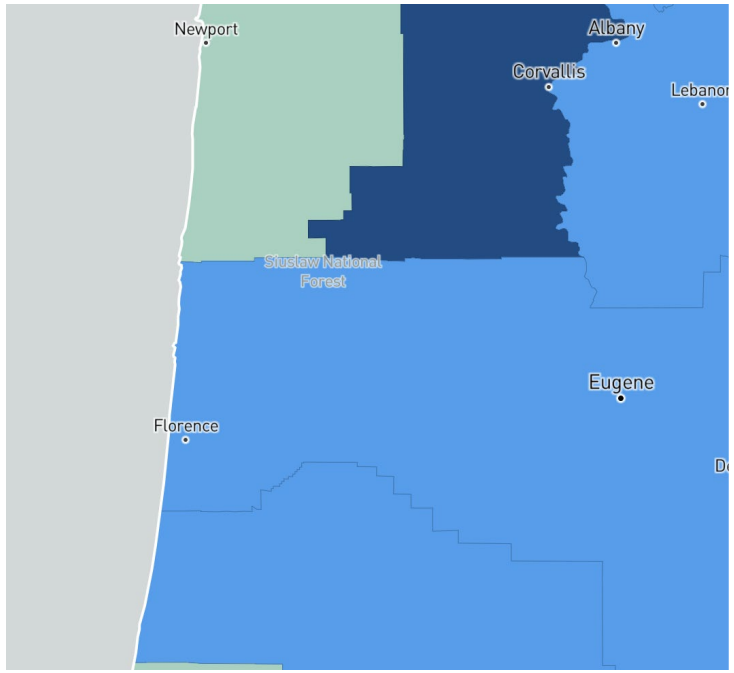


Fig 3. Chart displays average national values for the seven component metrics of the DCI across the five tiers of communities.

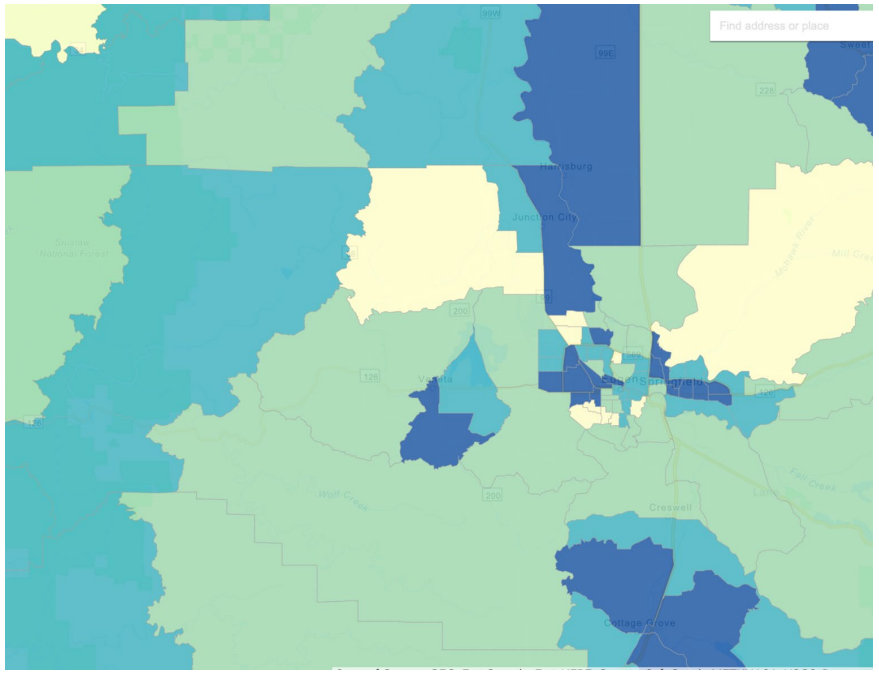
Oregon State University

Limitations of Currently Available Maps

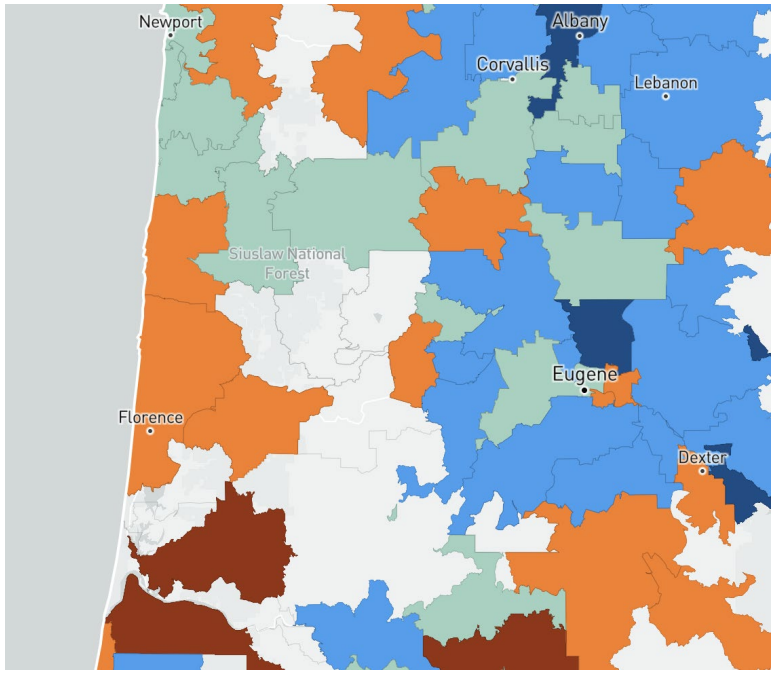
Oregon's SVI and DCI map layers need to be created with the most up to date US Census and American Community Survey data and be available at a level of geography that, to the extent possible, represents Oregon communities.



Current SVI & DCI - County level - too coarse to detect individual communities (ex. many communities within Lane county)



Current SVI - Census Tract level - boundaries do not necessarily represent communities (communities contain multiple tracts in some places)



Current DCI - Zip Code level - gaps in coverage, inconsistent for community (white areas are missing data)

Oregon State University

Delineating Communities

Deciding on the definition and boundaries of communities is an important aspect of quantifying and mapping social vulnerability & distress.

Census geographies can pose challenges, especially when trying to represent small, rural populations.

Census Blocks are the smallest census geographic unit, containing an average of 30 people, but very limited data is available at this smallest level.

Block Groups are groups of census Blocks (typically 250 to 550 housing units or an average of 700 people). They are the smallest unit for which most census summary statistics are available.

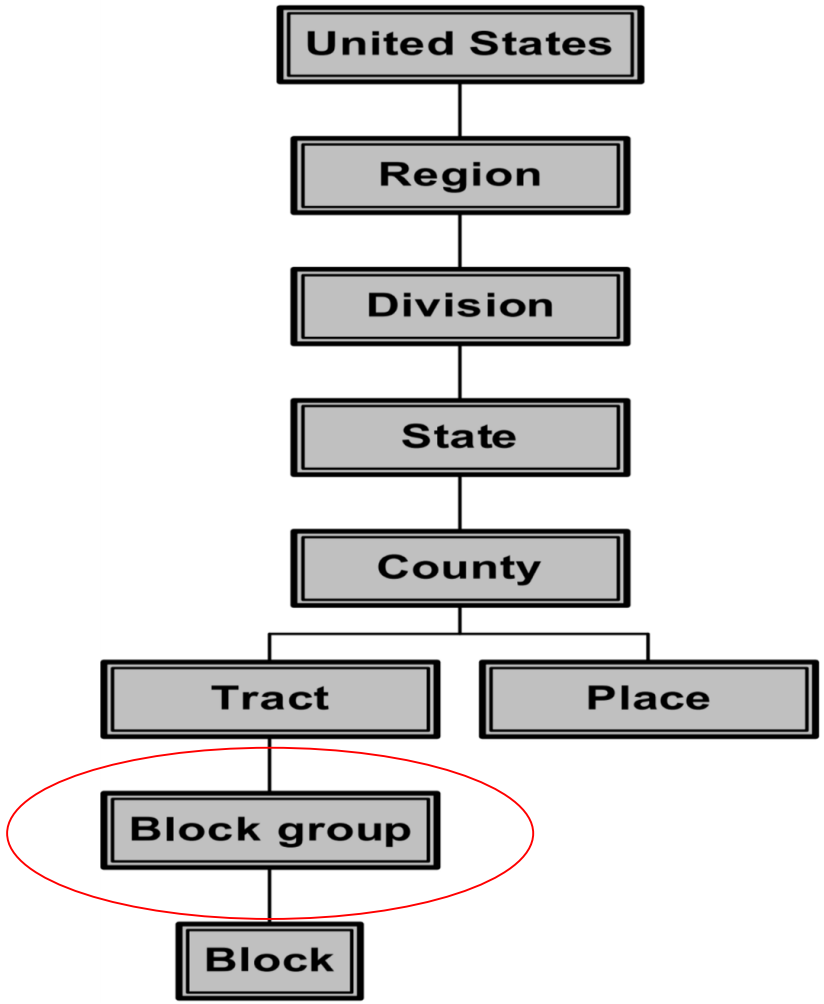


Fig 4. Hierarchy of US Census Geographic levels. County, Tract, and Place are commonly used in mapping community SVI.[1]

1 Donoghue et al., 2003

Oregon State University

Possible Definitions of Community

Census geography	Pros	Cons
County	Political definition - very stable More data available	Much larger than community Too coarse to identify SVI or DCI
Census tract	Relatively well-known Relatively stable	Variable in size (rural to urban) Multiple tracts in a community
Place or zip code	Well-known Relatively stable	Doesn't encompass all settlement
Block group aggregations	Good representation of community	Needs to be created

Delineating Oregon Communities

A method for **aggregating block groups** was developed by Donoghue et al. (2003) as a part of the NWFP planning process in order to better represent the many rural communities of the western PNW.

Benefits of Aggregated Block Groups:

- Captures rural communities
- Geospatial map layers contain polygons and a points for each community facilitating future analysis and display of socioeconomic data
- Can be related to socioeconomic data at the county level, providing context to socioeconomic conditions and trends at the community level.

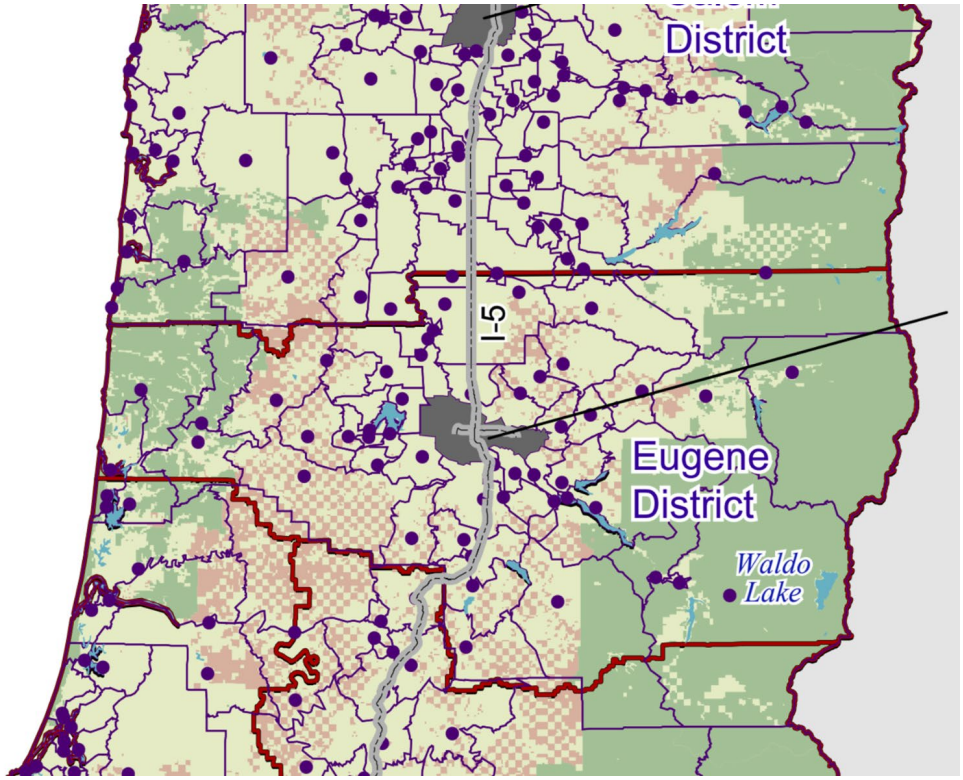


Fig 5. Map of Aggregated Block Groups in the Eugene, OR area from Donoghue (2003) illustrating proposed level of geography delineating communities for mapping SVI and DCI in Oregon.

Socioeconomic Indicators

Proposed indicators used for building the SVI based on current literature; subject to availability of data from the American Community Survey and US Census:

Demographics

- Percent Elderly (over 65)
- Percent Youth (under 18)
- Percent in poverty
- Near Poor Rate (below 185% of poverty rate)
- Median Household Income
- Per Capita Income
- Educational Attainment (25+ w/ Bachelor's degree)
- Percent of population in rural area

Labor Force & Unemployment

- Unemployment rate
- Labor force participation rate
- Community reliance on single economic sector
- Percent of persons in low wage occupations

Minority Status & Language

- Percent minority
- Percent of households w/ limited English proficiency

Housing & Transportation

- Percent of housing occupied by renters
- Percent mobile homes
- Median home value
- Percent vacation homes
- Percent of homes in rural areas
- Percent of multi unit structures (more than 10 units)
- Percent of households lacking complete plumbing or kitchen
- Percent of households w/ rent/mortgage <30% of income
- Percentage of crowding (more than 1 occupant per room)

Household Composition & Disability

- Percent of civilian noninstitutionalized population w/ disability
- Percent of households w/ no vehicle
- Percent of households w/ no health insurance

Ranking & Mapping SVI

Each socioeconomic indicator is assigned a percentile rank for each community as compared to all communities.

Then, the sum for each of the percentile ranks for a community is taken.

These summed values are ordered and an overall percentile ranking is calculated that represents the final SVI or DCI for a given community.

Community SVI is then mapped using geospatial information systems to produce map layers that can be tied to Oregon Risk Explorer.

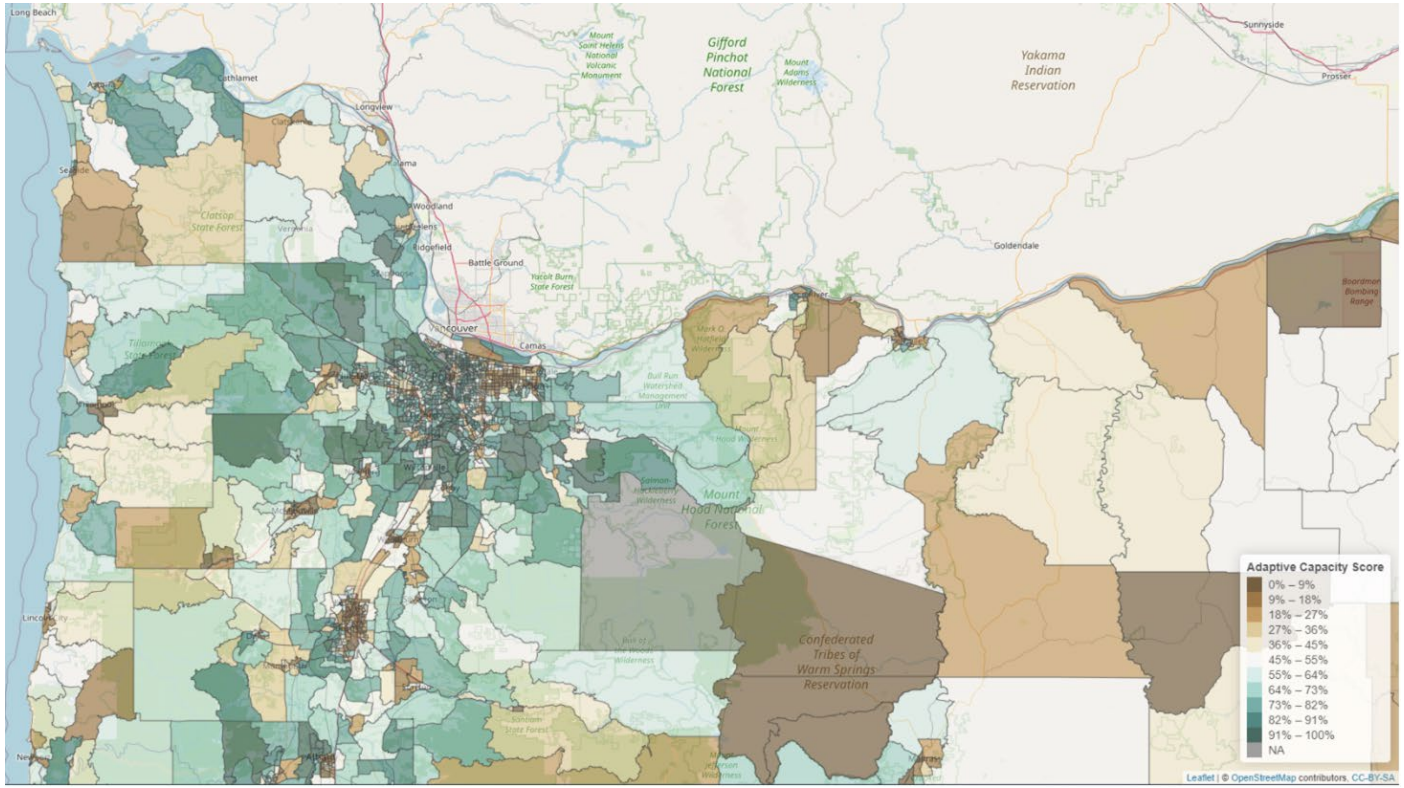


Fig 6. Example SVI calculated at the block group level (not aggregated) for Oregon (Holmes, 2020).

Oregon State University

Timeline

- Ongoing: communicate and coordinate with other agency efforts.
- Fall 2021: Delineate communities.
- Winter 2022: Gather socioeconomic data - 2020 ACS/Census data (release date Dec 2021).
- Spring 2022: Calculate SVI and DCI; Rank and map for all communities in Oregon.
- Spring 2022: Integrate with Oregon Wildfire Explorer Interface and map of biophysical wildfire risk.

The SVI and DCI will provide an indication of a community's relative vulnerability and ability to respond to disasters such as wildfire. Together these map layers can be used to identify areas and communities at an increased risk and target appropriate response, recovery and mitigation efforts.

Literature Cited

Cattau, Megan E., Wessman, Carol, Mahood, Adam, & Balch, Jennifer K. (2020). Anthropogenic and lightning-started fires are becoming larger and more frequent over a longer season length in the U.S.A. *Global Ecology and Biogeography* 00:1-14. DOI: 10.1111/geb.13058

Coughlan, Michael R., Ellison, Autumn, & Cavanaugh, Alexander. (2019). *Social Vulnerability and Wildfire in the WIldland-Urban Interface: Literature Synthesis.* Ecosystem Workforce Program Working Paper No 96, 24 p. Eugene, OR.

Cutter, Susan L., Boruff, Bryan J., & Shirley, W. Lynn. (2003). Social Vulnerability to Environmental Hazards. *Social Science Quarterly* 84(2): 242-261.

Davies, Ian P., Haugo, Ryan D., Robertson, James C., & Levin, Phillip S. (2018). The unequal vulnerability of communities of color to wildfire. *PLoS ONE* 13(11), E0205825. https://doi.org/10.1371/journal.pone.0205825

Donoghue, Ellen M. (2003). *Delimiting Communities in the Pacific Northwest.* Gen. Tech. Rep. PNW-GTR-570. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 51 p.

Holmes, Anthony. (nd) B*uilding an Adaptive Capacity Index Using TidyCensus in R.* Prepared on behalf of The Nature Conservancy - Oregon. Available online at https://github.com/azh2/Social-Vulnerability-R (accessed August 31 2021).

Prestemon, Jeffrey P., Hawbaker, Todd J., Bowden, Michael, Carpenter, John, Brooks, Maureen T., Abt, Karen L., Sutphen, Ronda, & Scranton, Samuel. (2013). *Wildfire Ignitions: A Review of the Science and Recommendations for Empirical Modeling.* Gen. Tech. Rep. SRS-171. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 20 p.

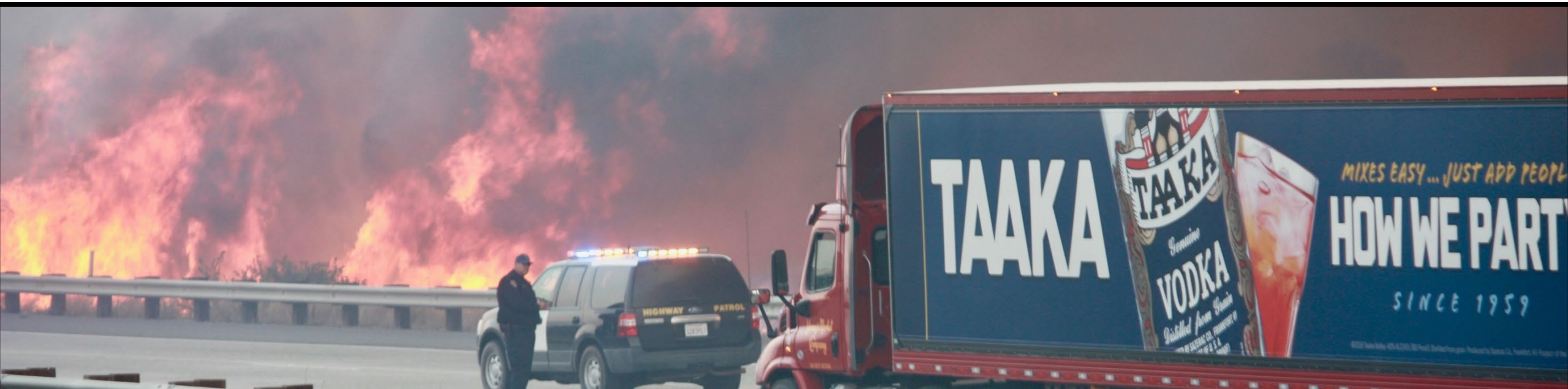
Radeloff, V. C., Helmers, D. P., Kramer, H. A., Mockrin, M. H., Alexandre, P. M., Bar-Massada, A., Butsic, V., Hawbaker, T. J., Martinuzzi, S., Syphard, A. D., & Stewart, S. I. (2018). Rapid growth of the US wildland-urban interface raises wildfire risk. *Proceedings of the National Academy of Sciences,* 115(13), 3314–3319. https://doi.org/10.1073/pnas.1718850115

Oregon State University

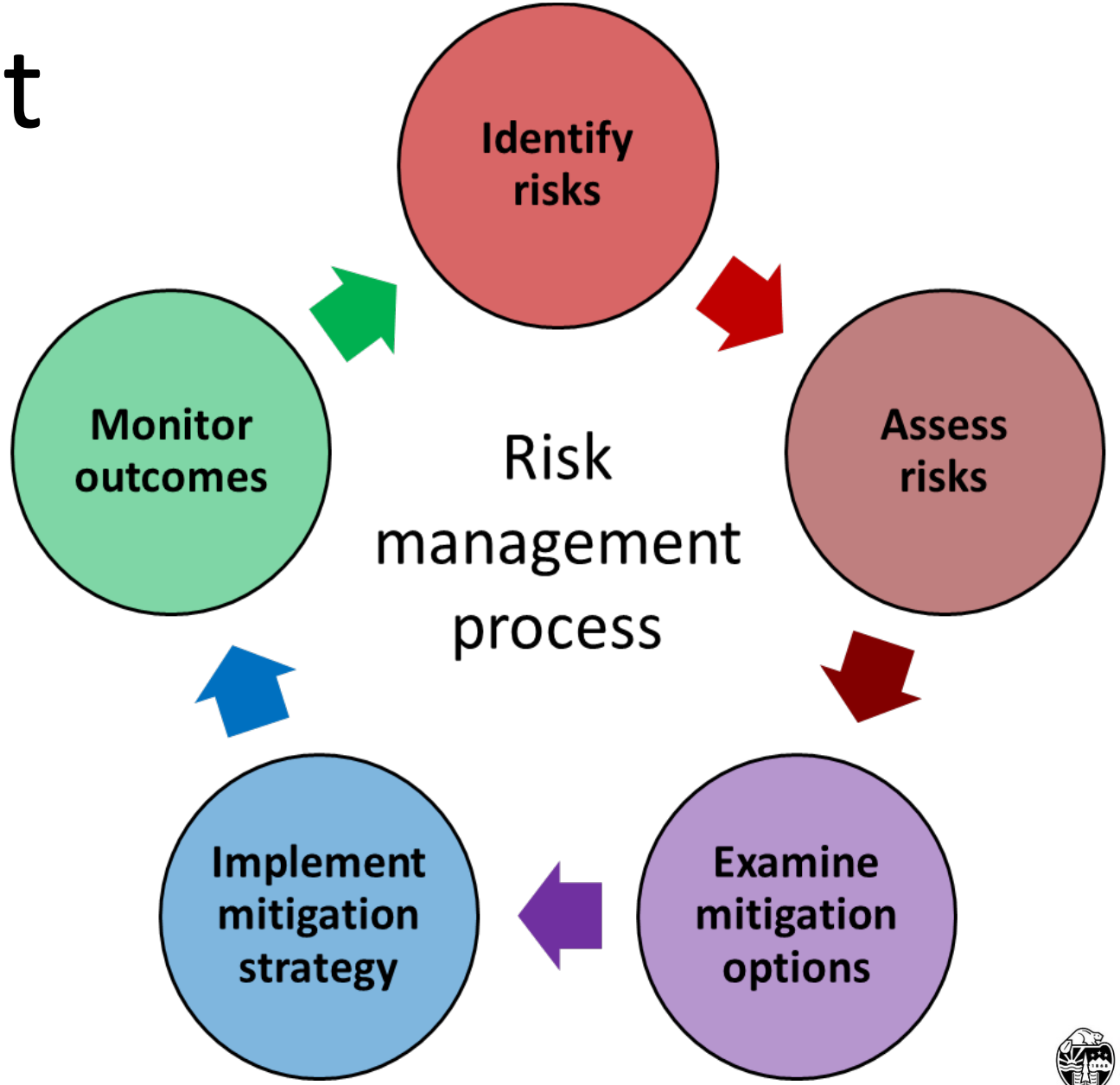
Oregon State University
College of Forestry

Integrating the Quantitative Wildfire Risk Assessment

Dr. Christopher J Dunn, College of Forestry, Oregon State University, chris.dunn@oregonstate.edu



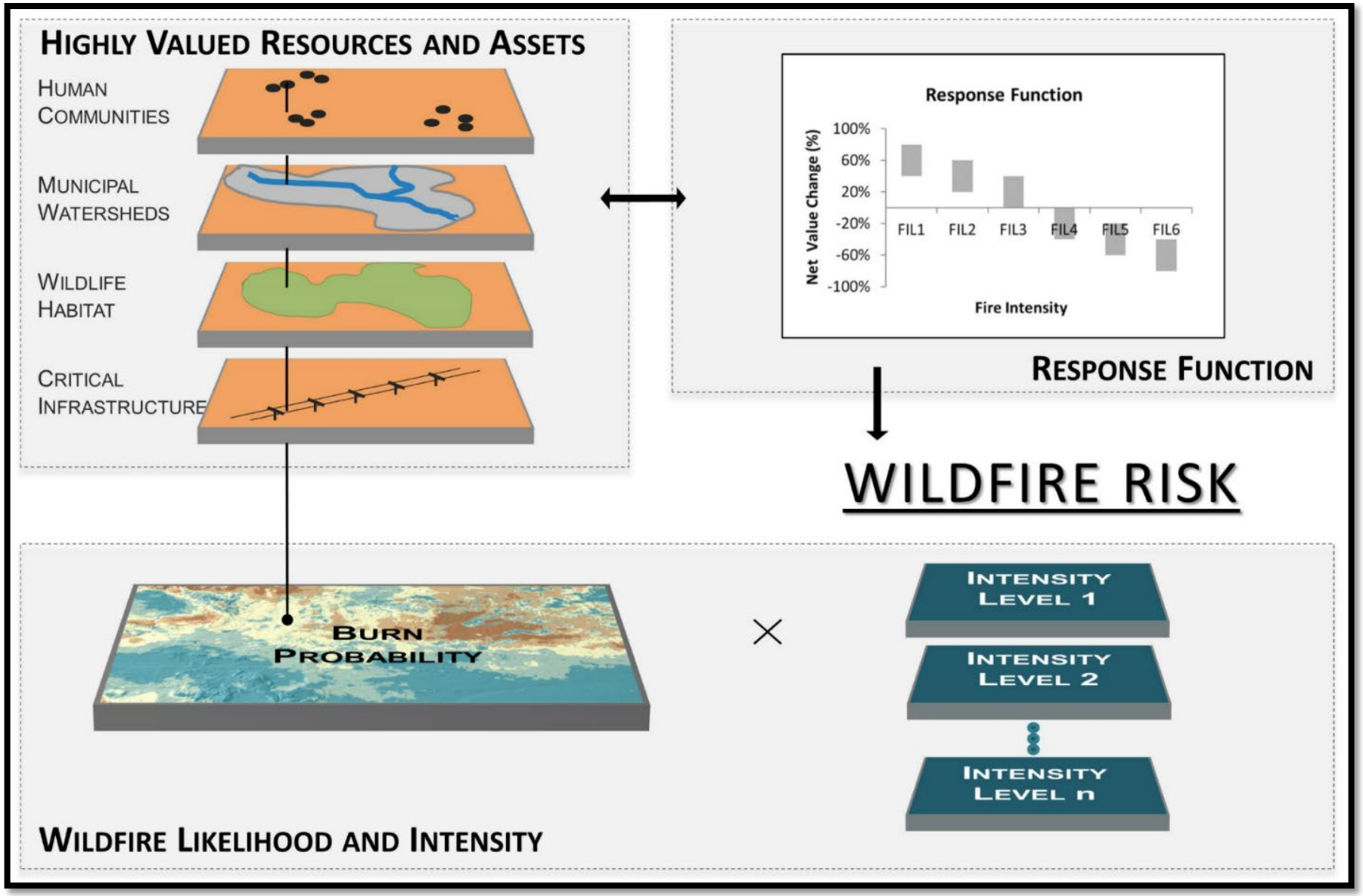
Risk management process



Fundamentals of wildfire risk assessment

2018 Camp Fire

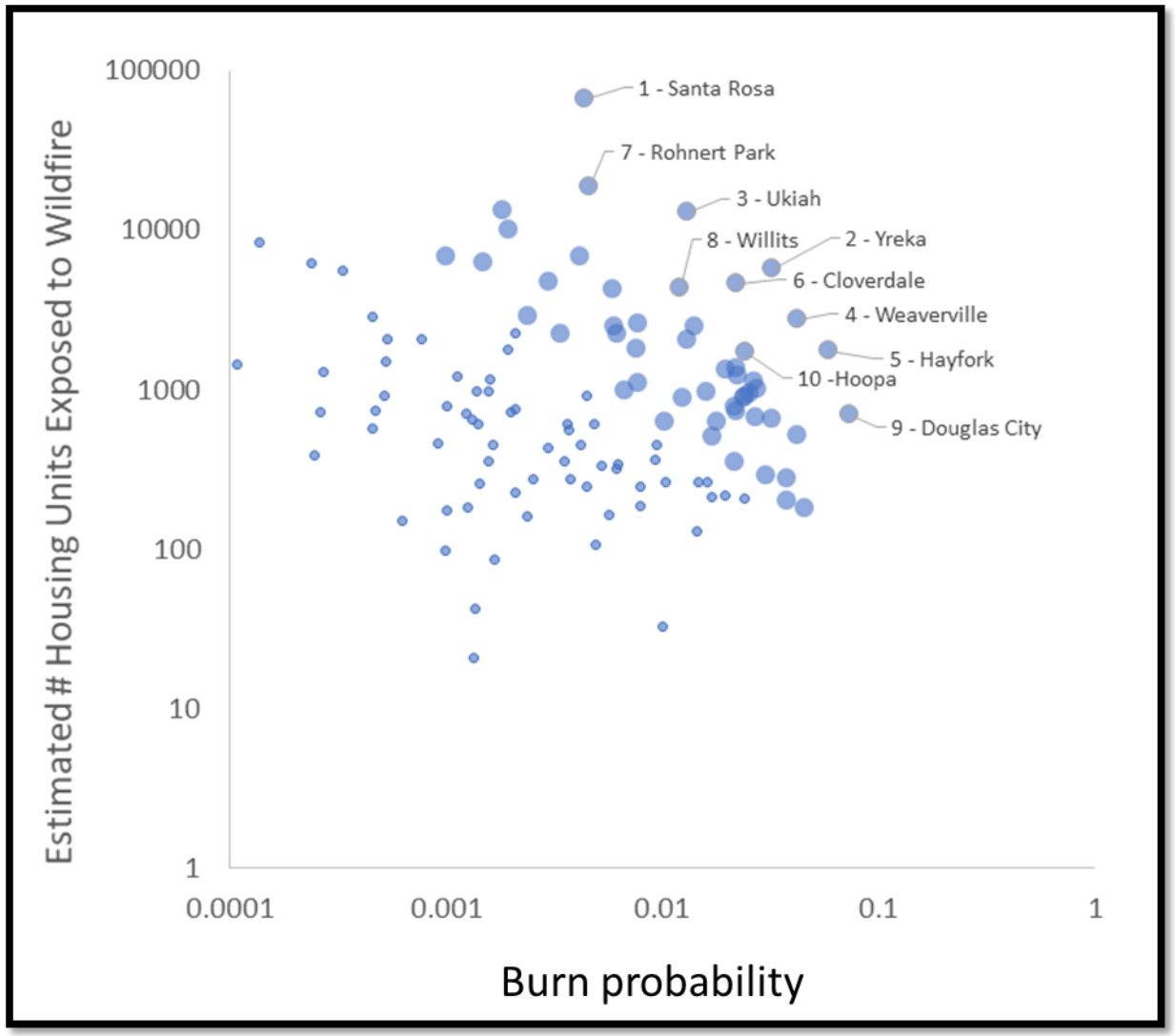
Oregon State University

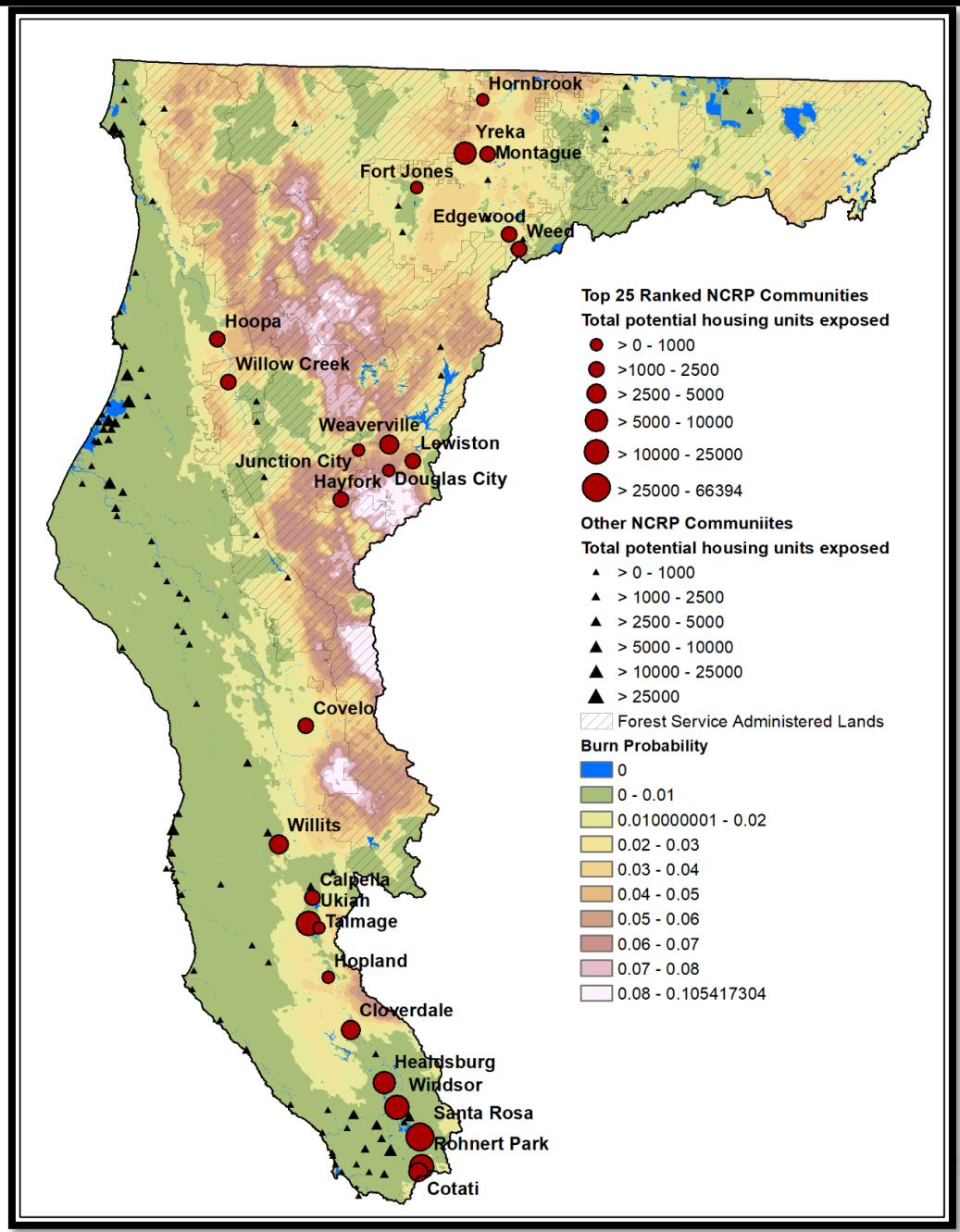


Scott et al. 2013

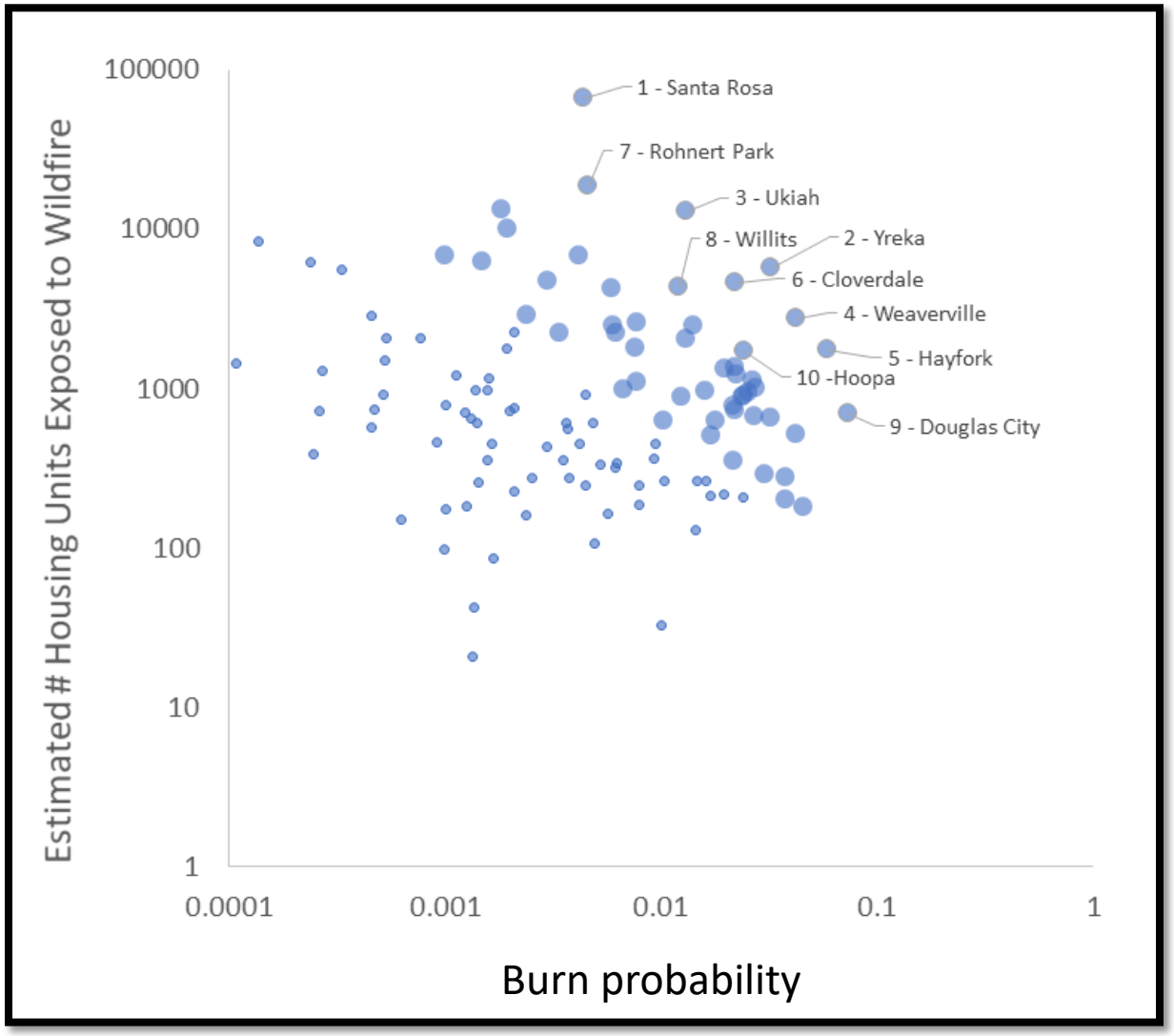
Oregon State University

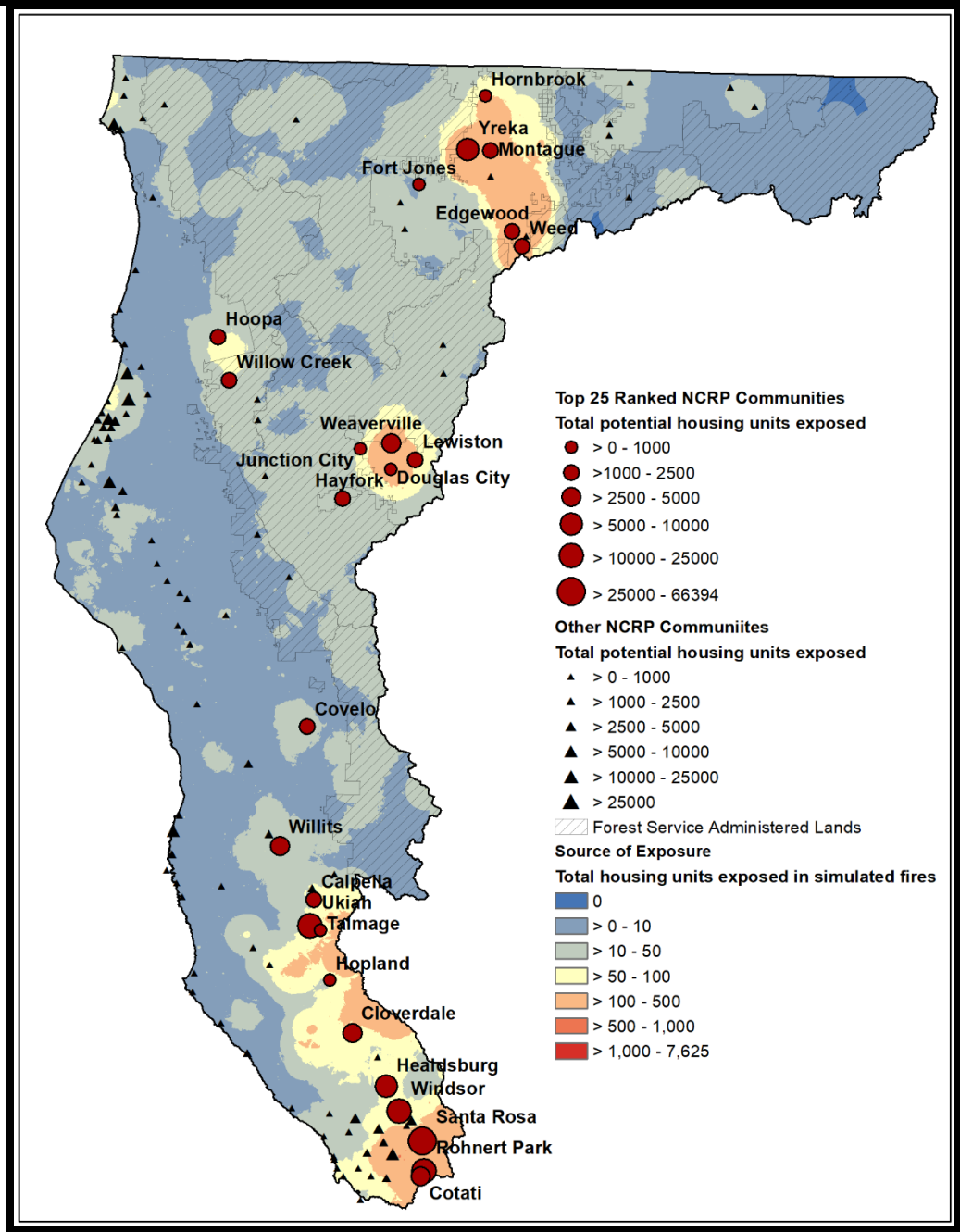
Community exposure

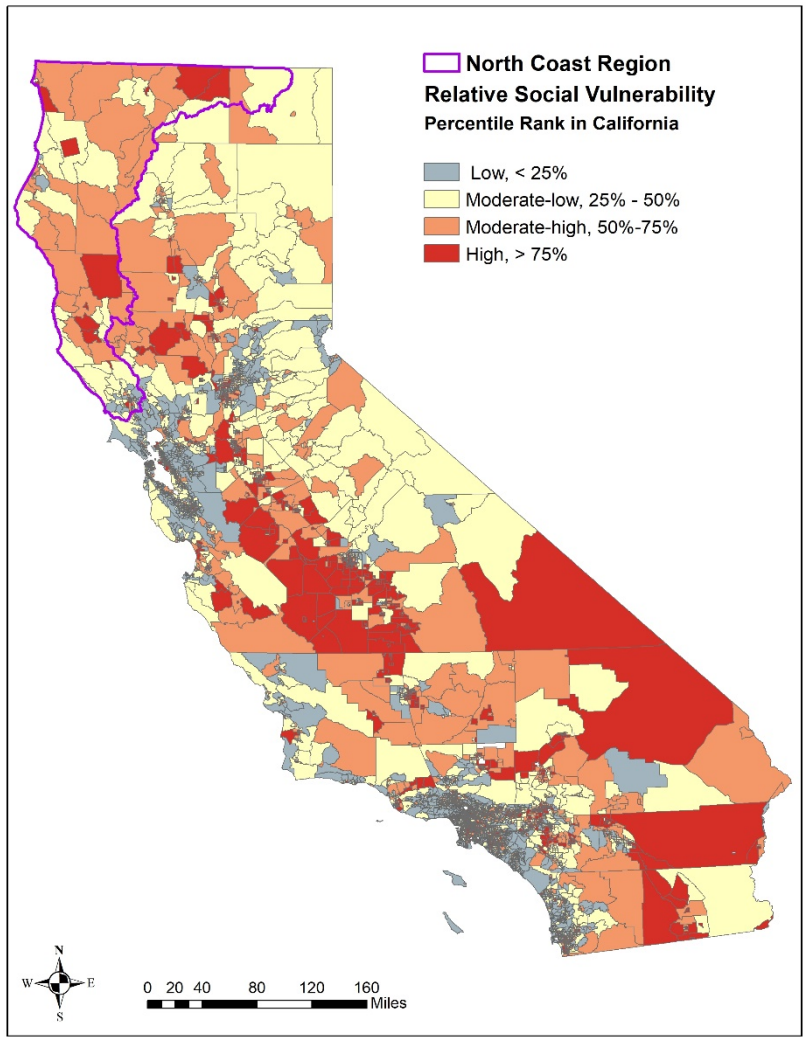


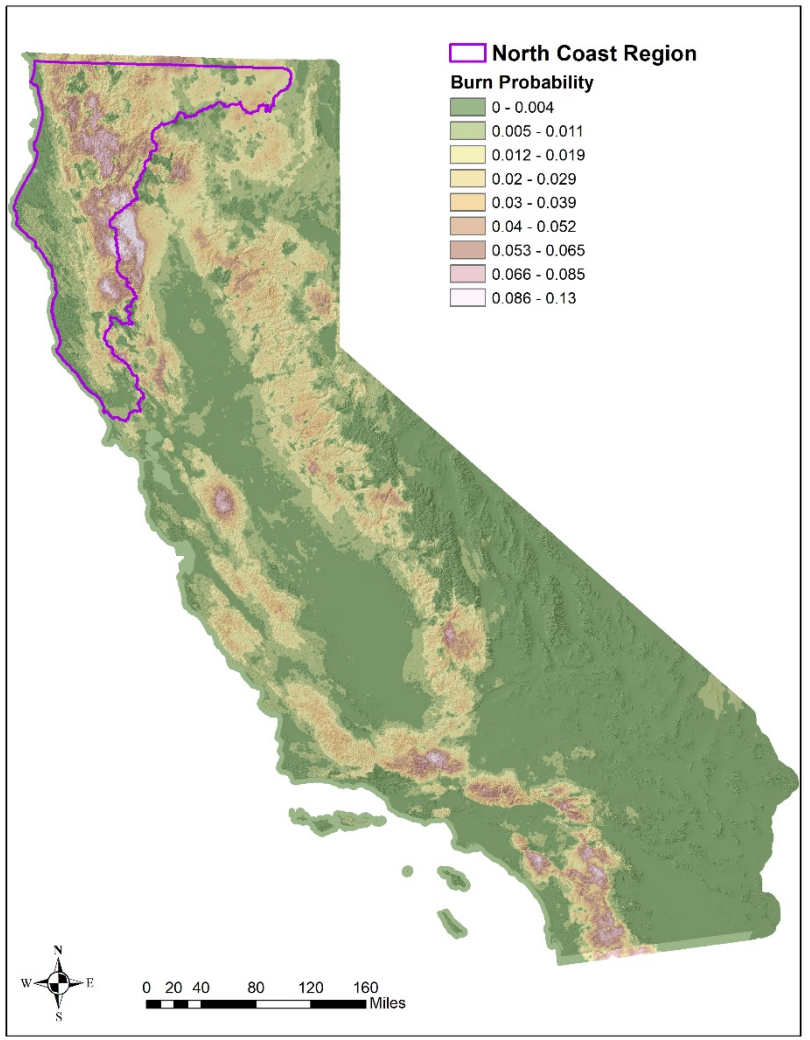


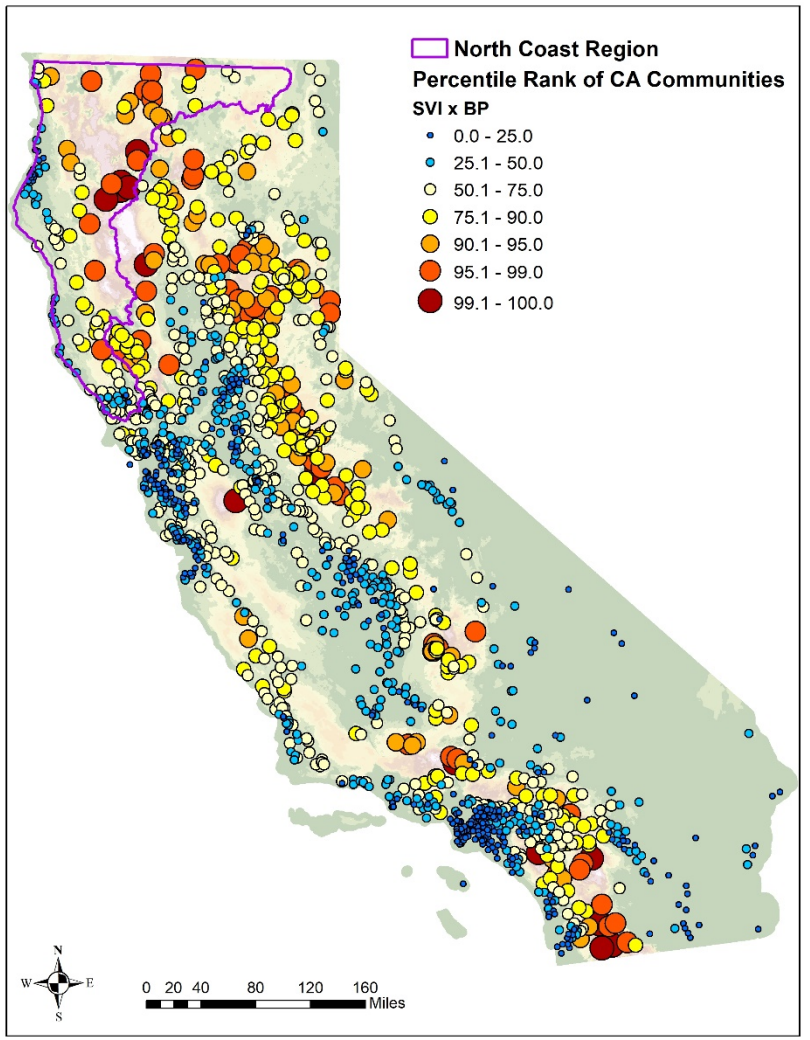
Community exposure





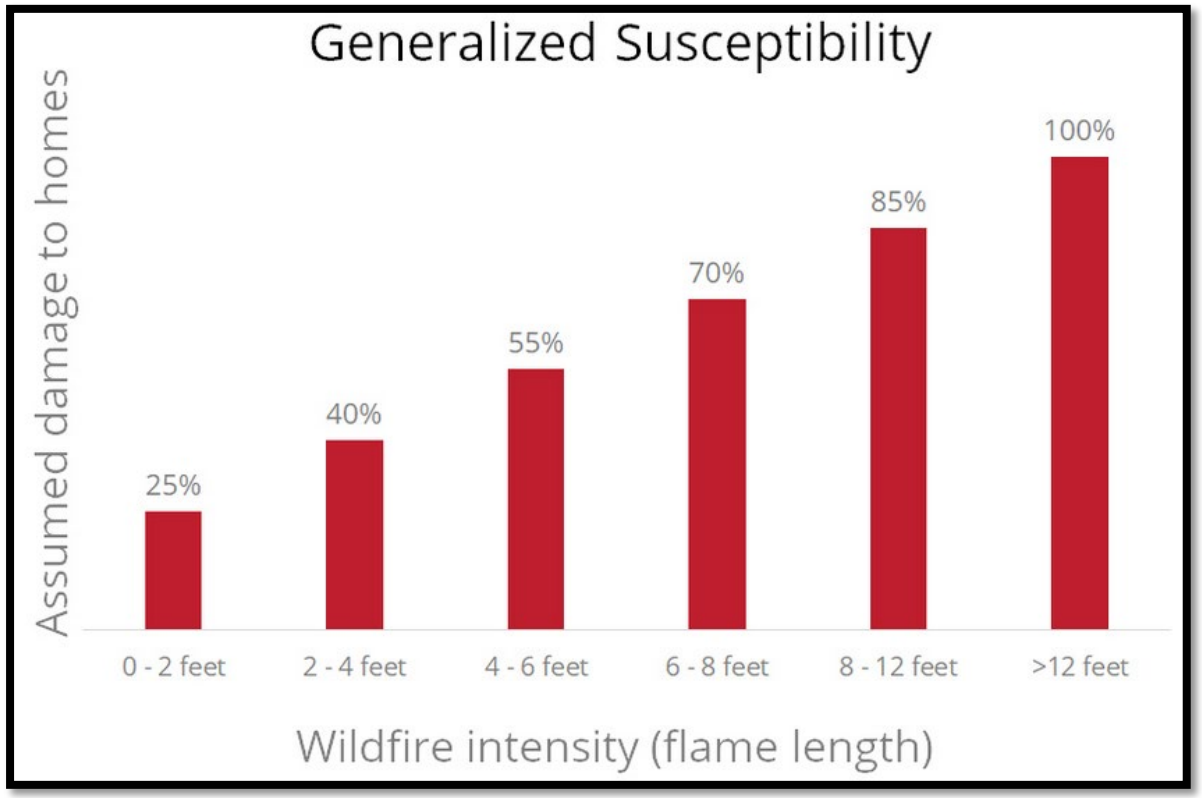






https://storymaps.arcgis.com/stories/794c3b1766174ab08dbafed05cb68a54

Oregon State University



https://wildfirerisk.org

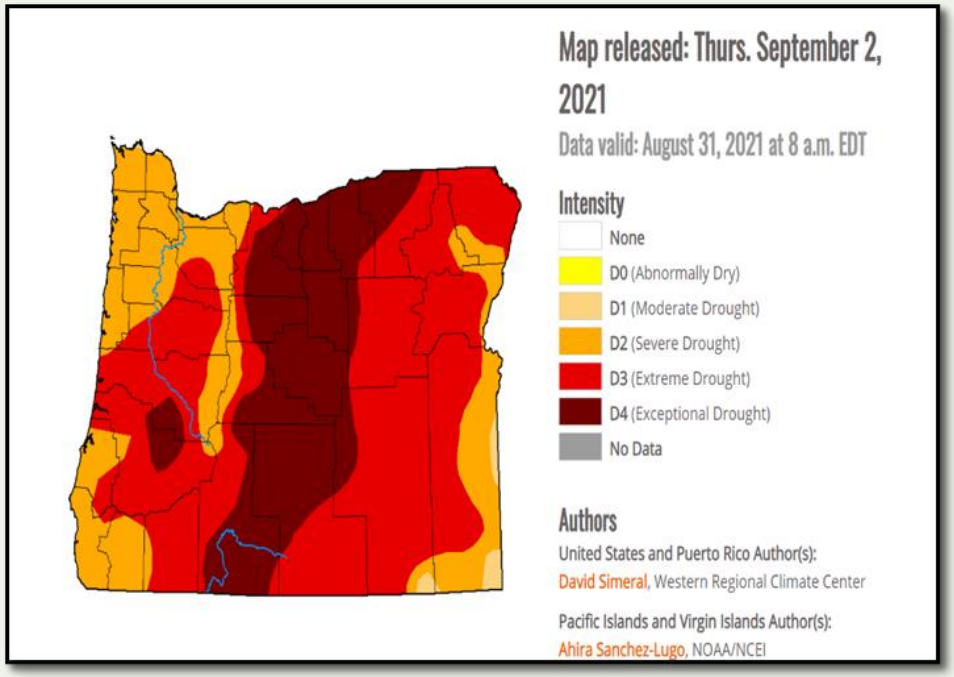
Oregon State University

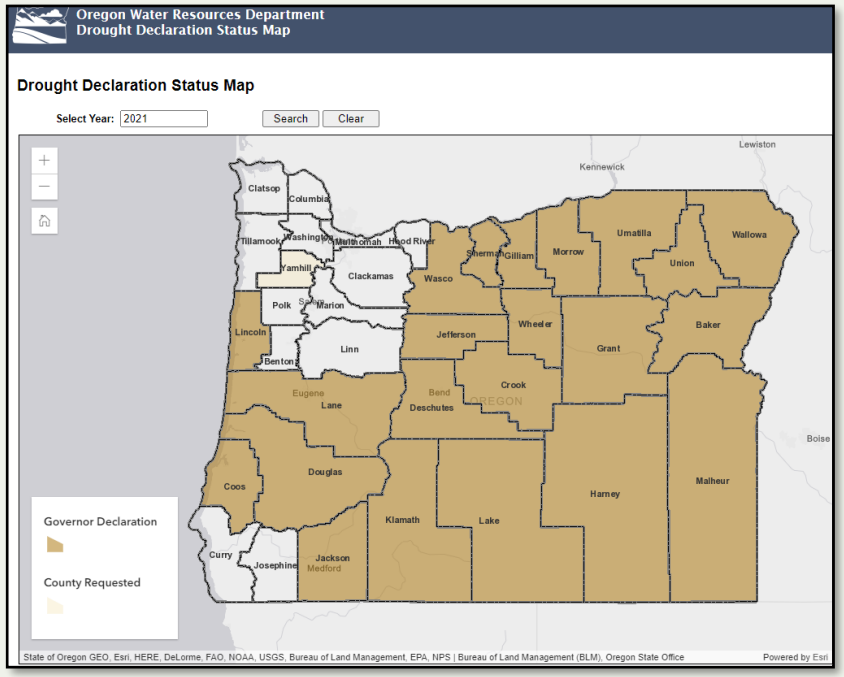
2021 Fire Season

Board of Forestry

September 08, 2021

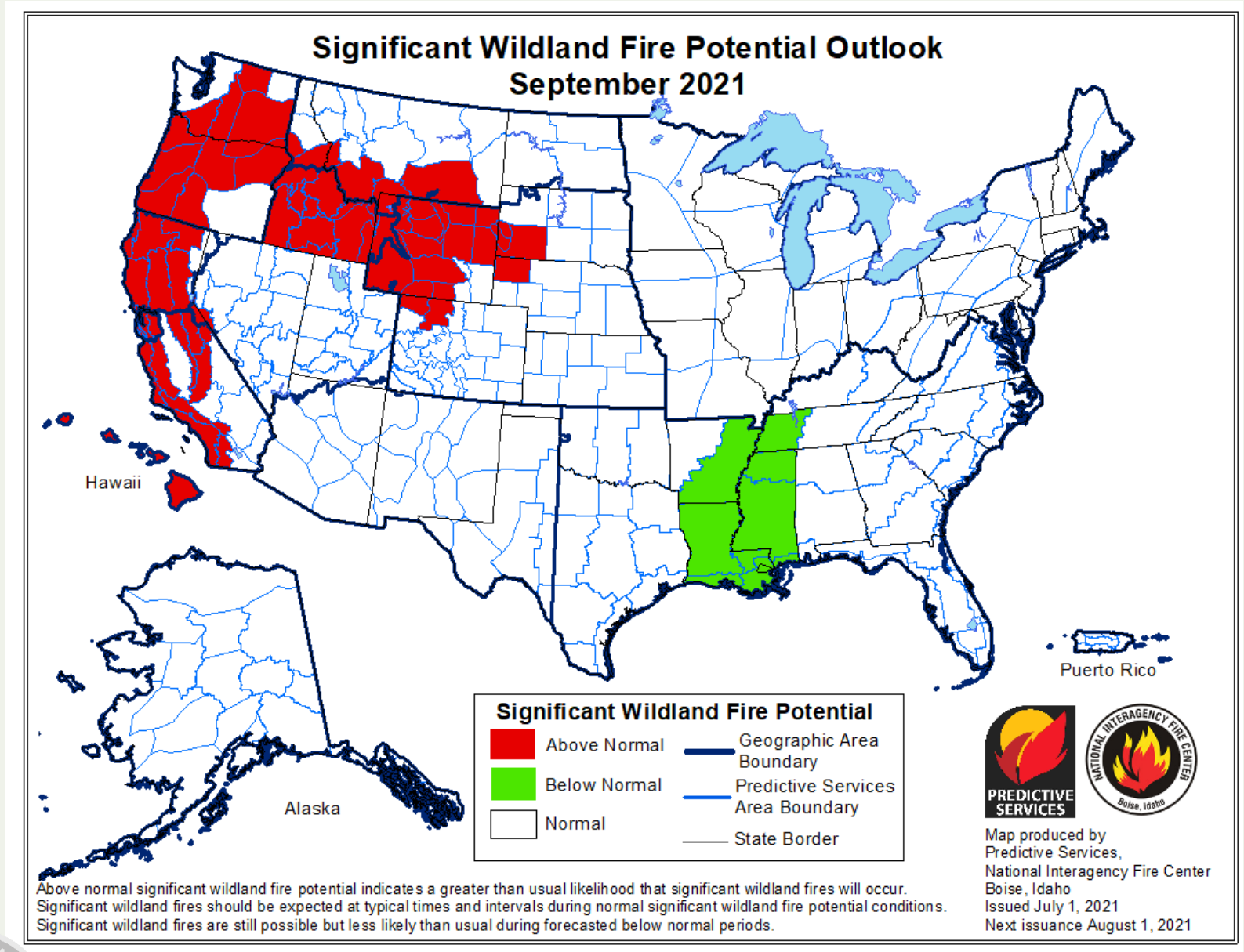
Doug Grafe, Chief of Fire Protection
Ron Graham, Deputy Chief of Fire Protection

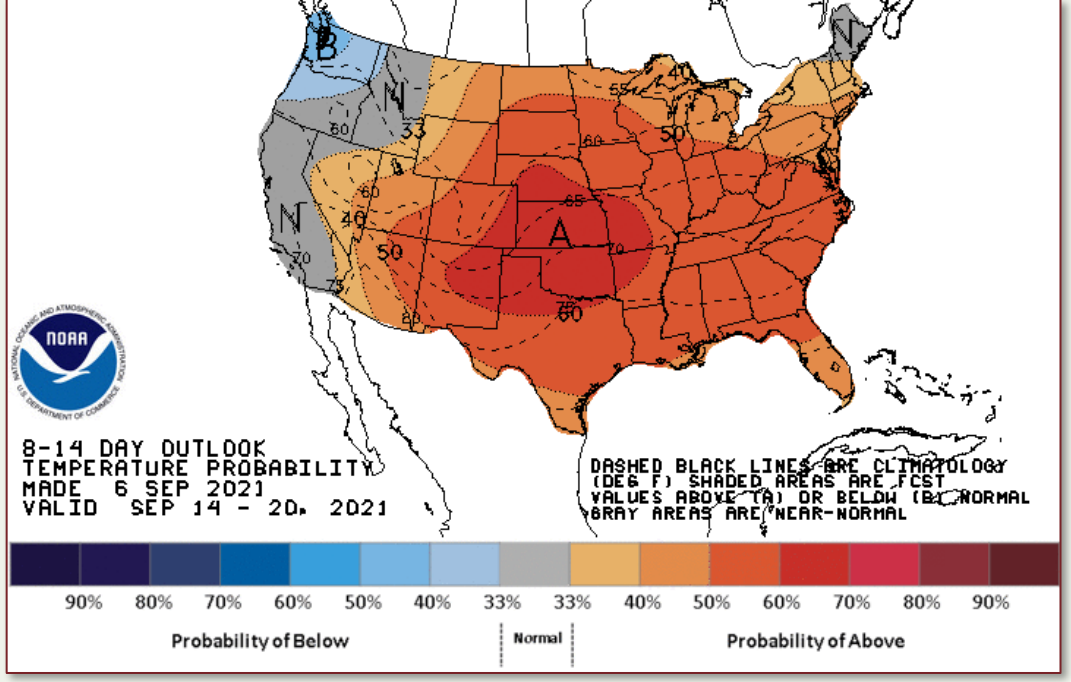


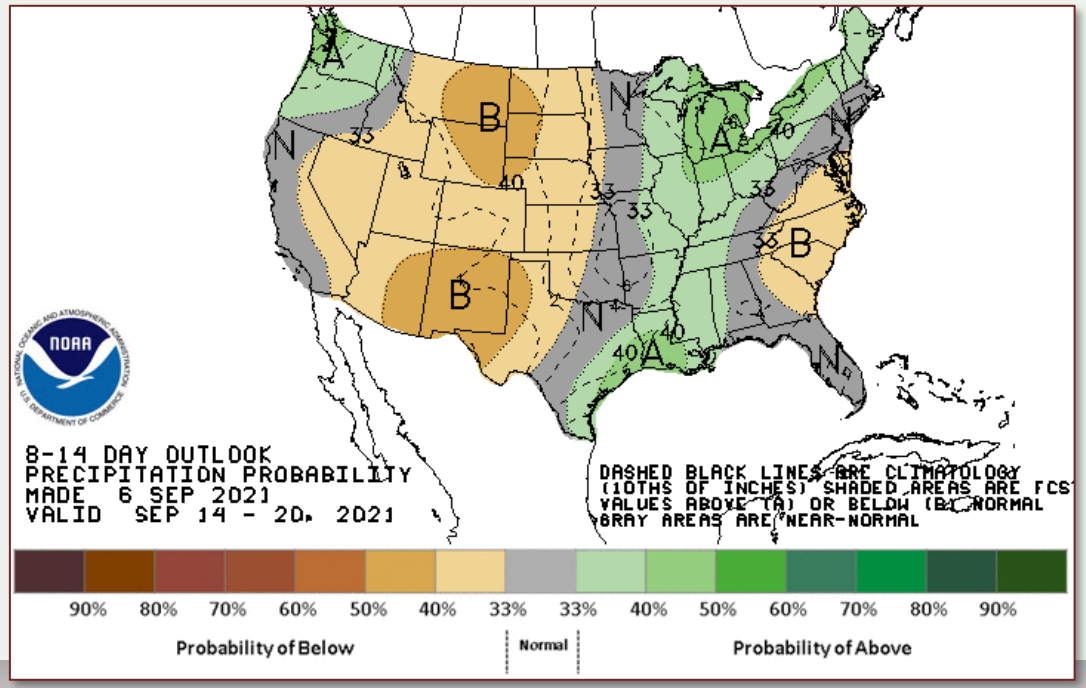


As of Sept 02, all of Oregon is in drought. About **27%** of Oregon is in ***exceptional drought***, **50%** is in **extreme drought**, and **22%** is in severe drought. Only 1% remains in moderate drought.

21 counties have drought declarations, 1 more requested on Aug 19 – Yamhill


Significant Wildland Fire Potential Outlook
September 2021
Hawaii
Alaska
Puerto Rico
Significant Wildland Fire Potential
Above Normal
Below Normal
Normal
Geographic Area Boundary
Predictive Services Area Boundary
State Border
PREDICTIVE SERVICES
NATIONAL INTERAGENCY FIRE CENTER
Boise, Idaho
Map produced by
Predictive Services,
National Interagency Fire Center
Boise, Idaho
Issued July 1, 2021
Next issuance August 1, 2021
Above normal significant wildland fire potential indicates a greater than usual likelihood that significant wildland fires will occur.
Significant wildland fires should be expected at typical times and intervals during normal significant wildland fire potential conditions.
Significant wildland fires are still possible but less likely than usual during forecasted below normal periods.


8-14 DAY OUTLOOK
TEMPERATURE PROBABILITY
MADE 6 SEP 2021
VALID SEP 14 - 20, 2021
DASHED BLACK LINES ARE CLIMATOLOGY
(DEG F) SHADED AREAS ARE FCST
VALUES ABOVE (A) OR BELOW (B) NORMAL
GRAY AREAS ARE NEAR-NORMAL
90% 80% 70% 60% 50% 40% 33% 33% 40% 50% 60% 70% 80% 90%
Probability of Below
Normal
Probability of Above


8-14 DAY OUTLOOK
PRECIPITATION PROBABILITY
MADE 6 SEP 2021
VALID SEP 14 - 20, 2021
DASHED BLACK LINES ARE CLIMATOLOGY
(10THS OF INCHES) SHADED AREAS ARE FCST
VALUES ABOVE (A) OR BELOW (B) NORMAL
GRAY AREAS ARE NEAR-NORMAL
90% 80% 70% 60% 50% 40% 33% 33% 40% 50% 60% 70% 80% 90%
Probability of Below
Normal
Probability of Above


EXTREME
FIRE DANGER
USE CAUTION

Fire statistics to date

September 7, 2021

2021 Year To Date		
	Fires	**Acres**
Lightning	194	166,647
Human (and UI)	803	26,743
Total	**997**	**193,390**
10-Year Average (2011-2020 Year To Date)		
Lightning	239	31,078
Human	567	41,930
Total	806	73,008

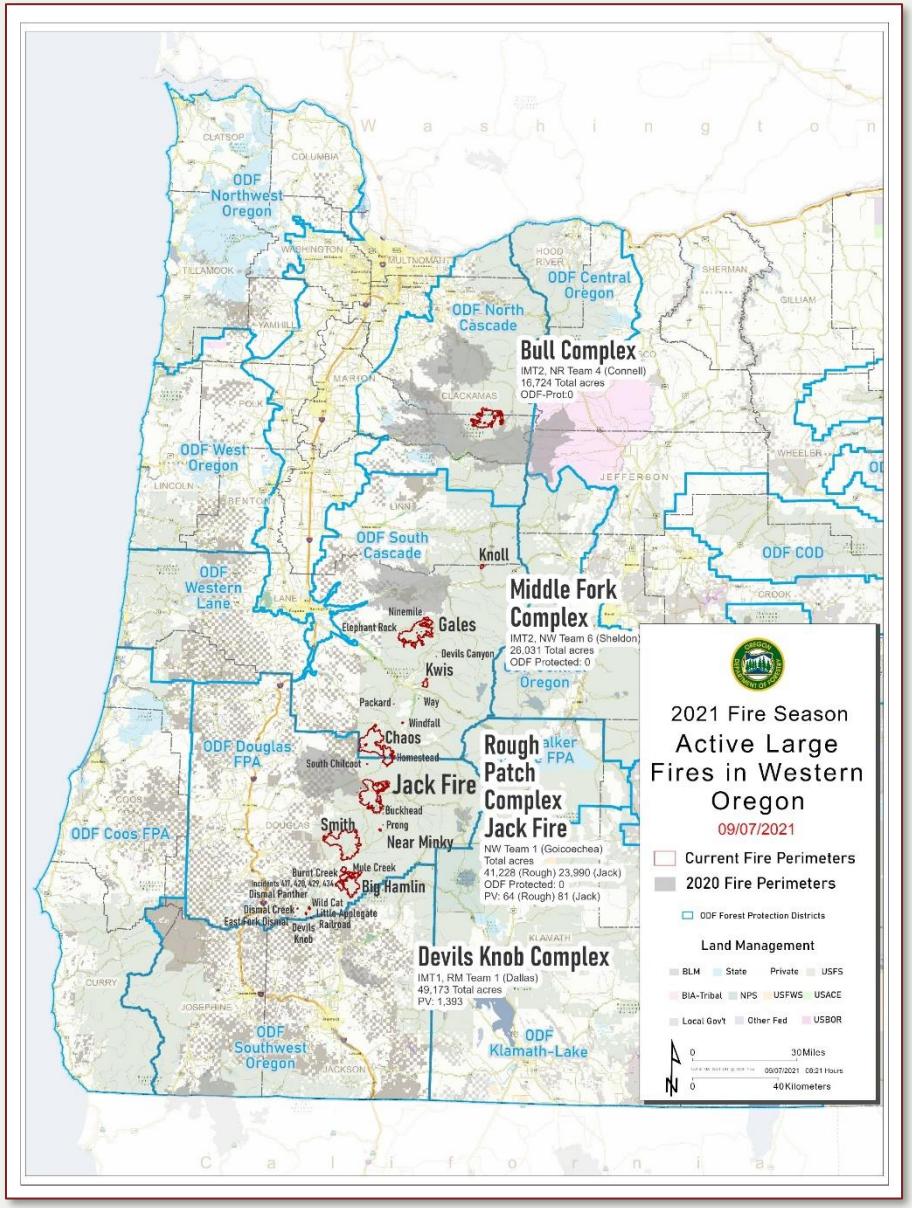
94%

fires kept at 10 acres or less to date in 2021

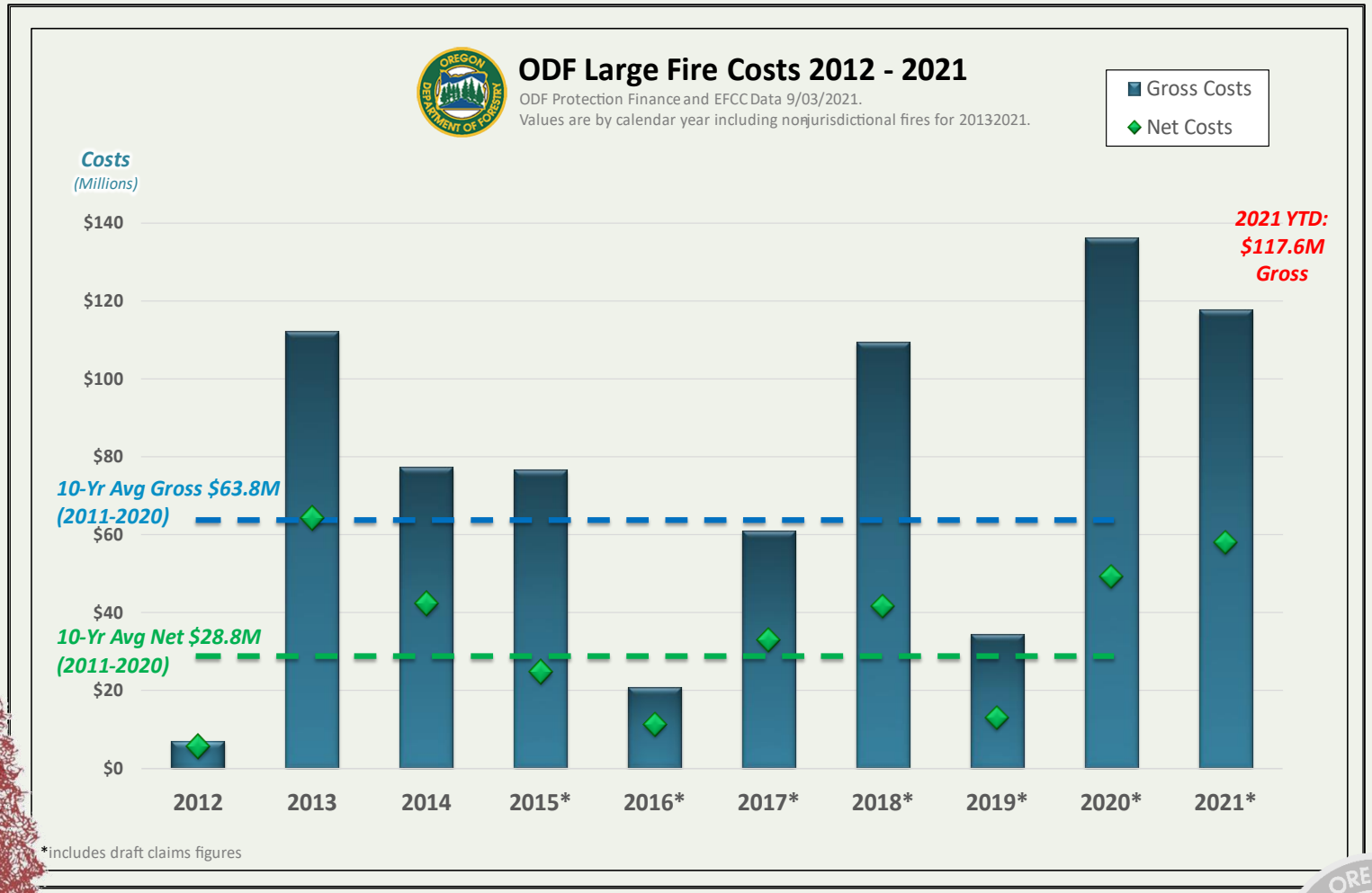
2021 vs 10 Year Average

- ***~1.4x** more human fires*
- ***~2.6x** more total acres burned*

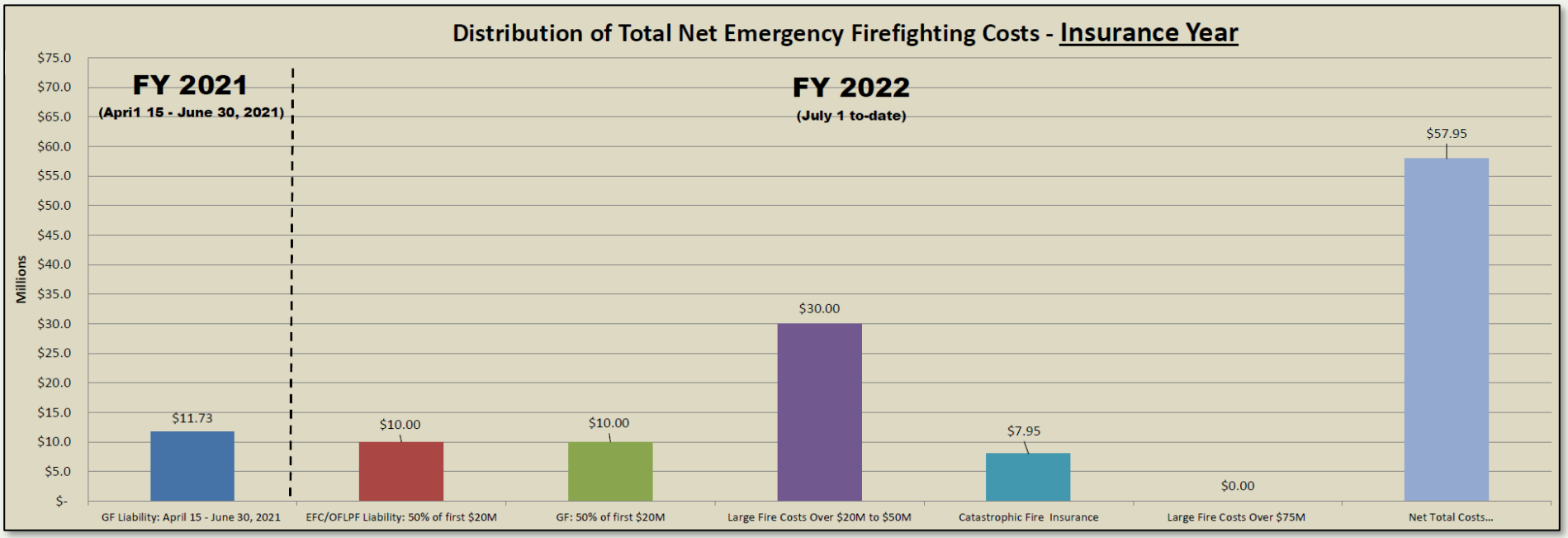
9/07/2021 Western Oregon Active Fires

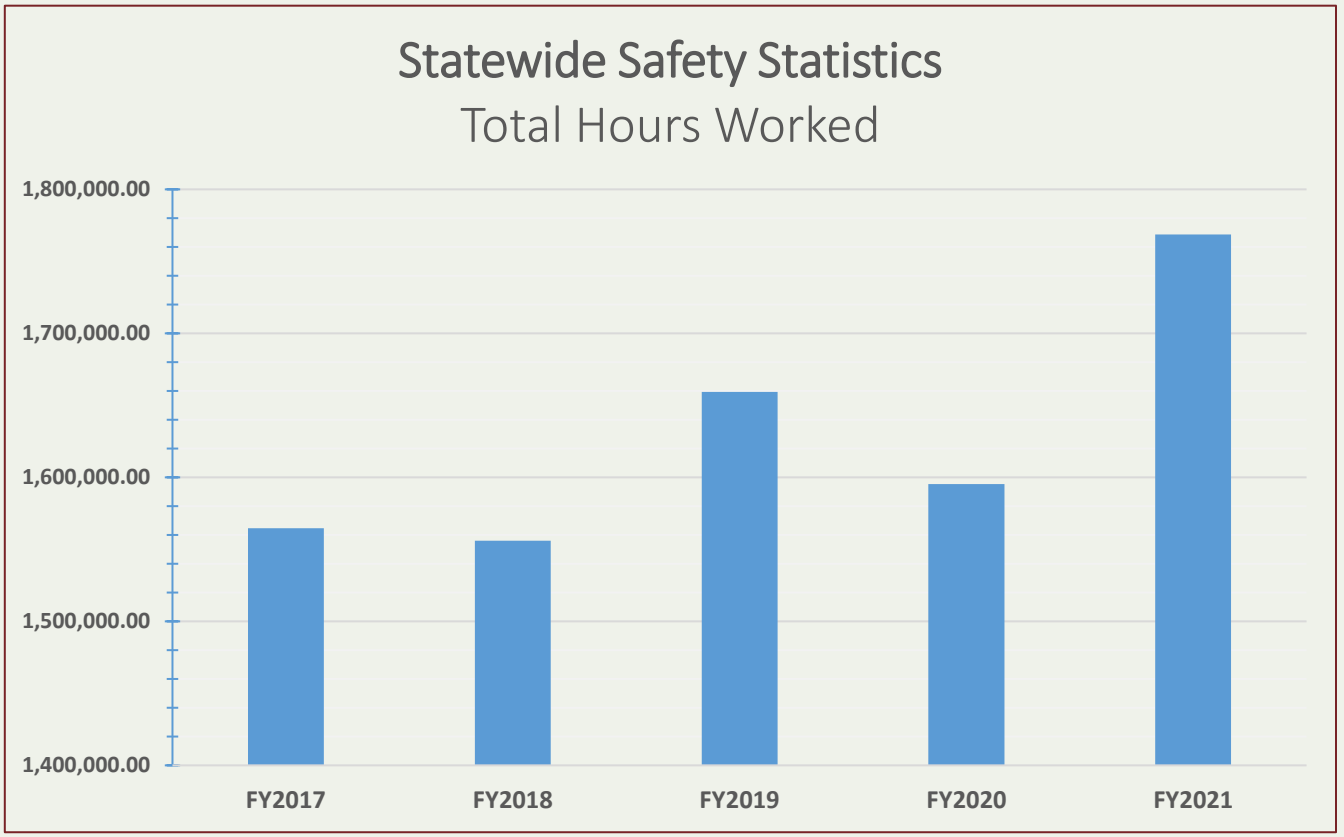


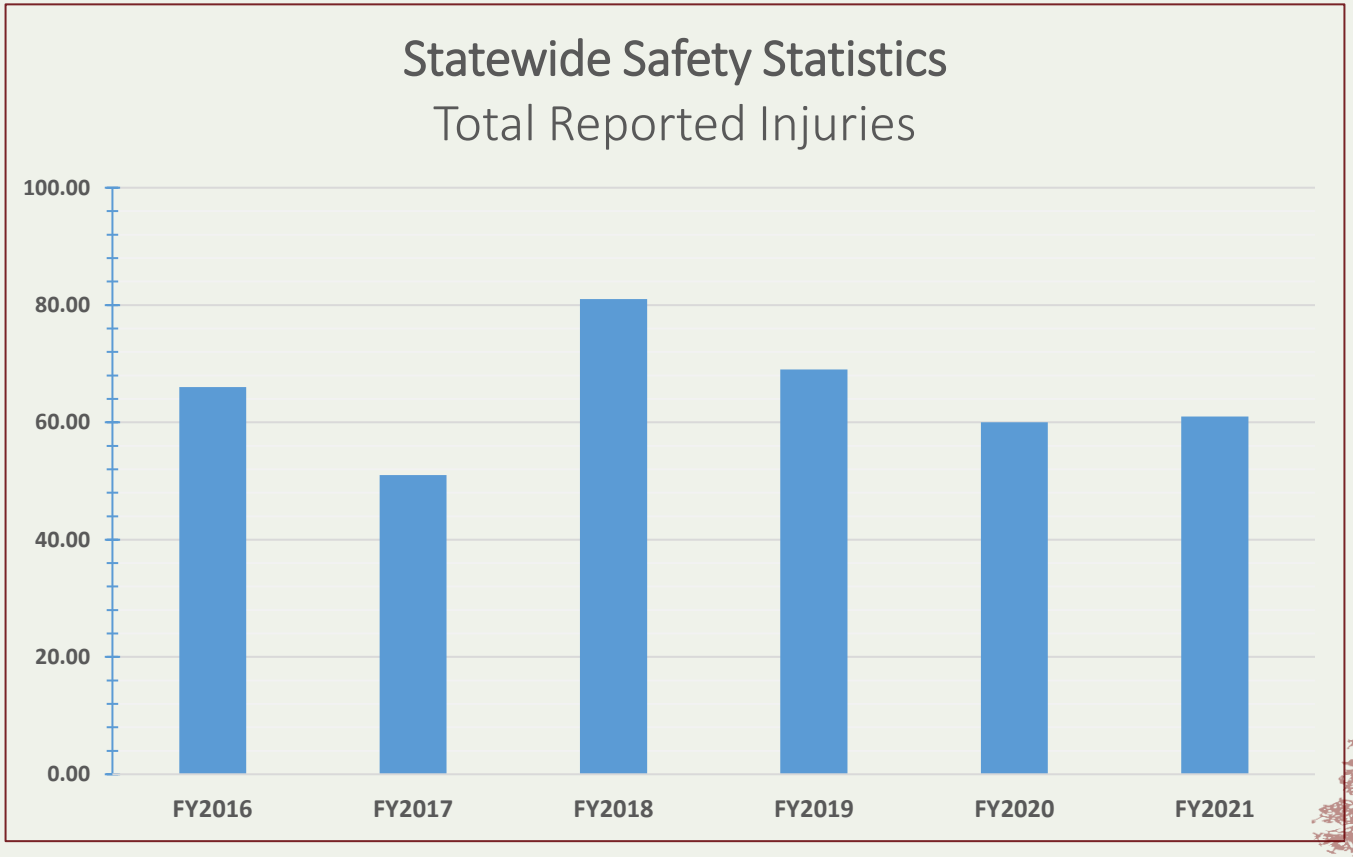
ODF large fire costs, 2012-2021

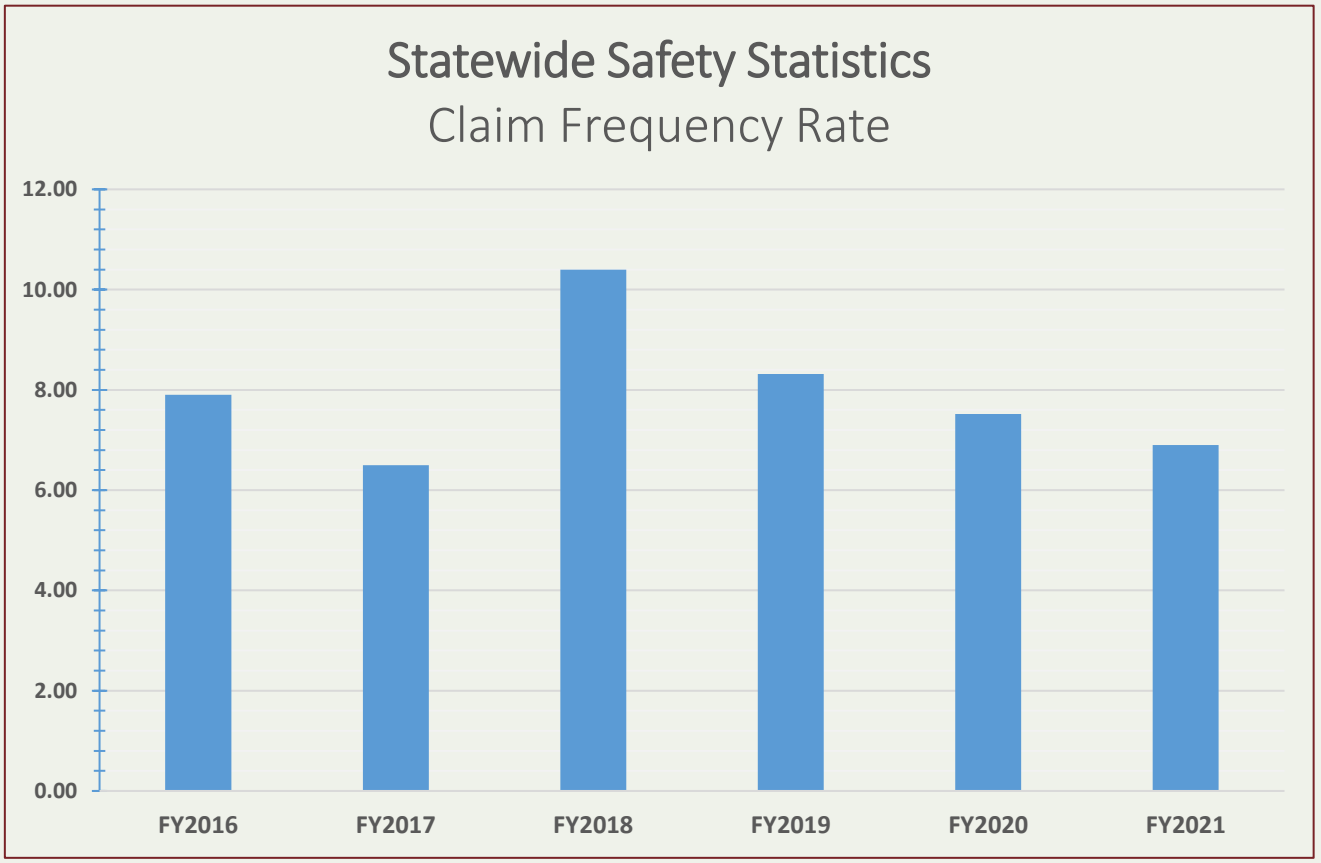


ODF large fire costs, Insurance Year 2012-2021




Statewide Safety Statistics
Total Hours Worked
1,800,000.00
1,700,000.00
1,600,000.00
1,500,000.00
1,400,000.00
FY2017
FY2018
FY2019
FY2020
FY2021


Statewide Safety Statistics
Total Reported Injuries
100.00
80.00
60.00
40.00
20.00
0.00
FY2016
FY2017
FY2018
FY2019
FY2020
FY2021


Statewide Safety Statistics
Claim Frequency Rate
12.00
10.00
8.00
6.00
4.00
2.00
0.00
FY2016
FY2017
FY2018
FY2019
FY2020
FY2021

Oregon's complete and coordinated fire protection system

mgo
CPAs & ADVISORS

OREGON DEPARTMENT OF FORESTRY ASSESSMENT

September 8, 2021

Firm Overview

HIGHLIGHTS

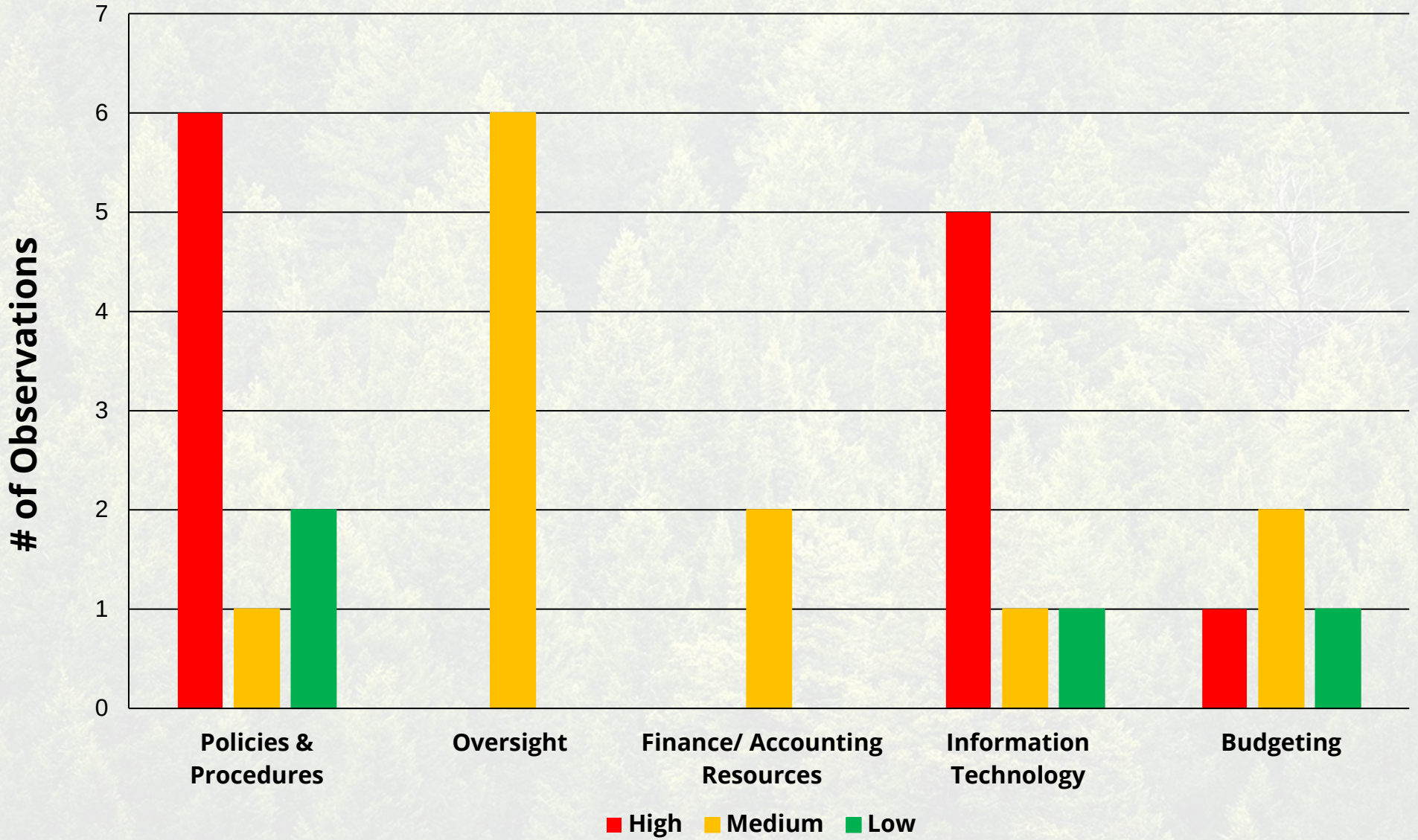
- CPA & advisory services firm
- Over three decades serving government agencies & private enterprises
- National & international footprint
- Over 500 professionals worldwide

Completed Engagement

TASKS AND DELIVERABLES

- Accounts receivable (including invoicing) and payable (including procurement) evaluation and operations
- Federal Emergency Management Agency (FEMA) claims
- Past and current practices and procedures
- Recommendations for future policies/ practices/ procedures
- Final report

SUMMARY OF OBSERVATIONS



QUESTIONS?

Let's Talk.

PRE-DECISION WORKSHOP

SEPTEMBER 8TH, 2021

OREGON DEPARTMENT OF FORESTRY

CLIMATE CHANGE AND CARBON PLAN

Welcome

Today we will be providing:

- An update on the draft Climate Change and Carbon Plan

- Overview of the revision process

- A summary of the engagement process

More information, documentation, and the draft plan are available at:

www.oregon.gov/odf/forestbenefits/Pages/climate-change.aspx

A Brief History

In March of 2020, Governor Brown signs Executive Order 20-04.

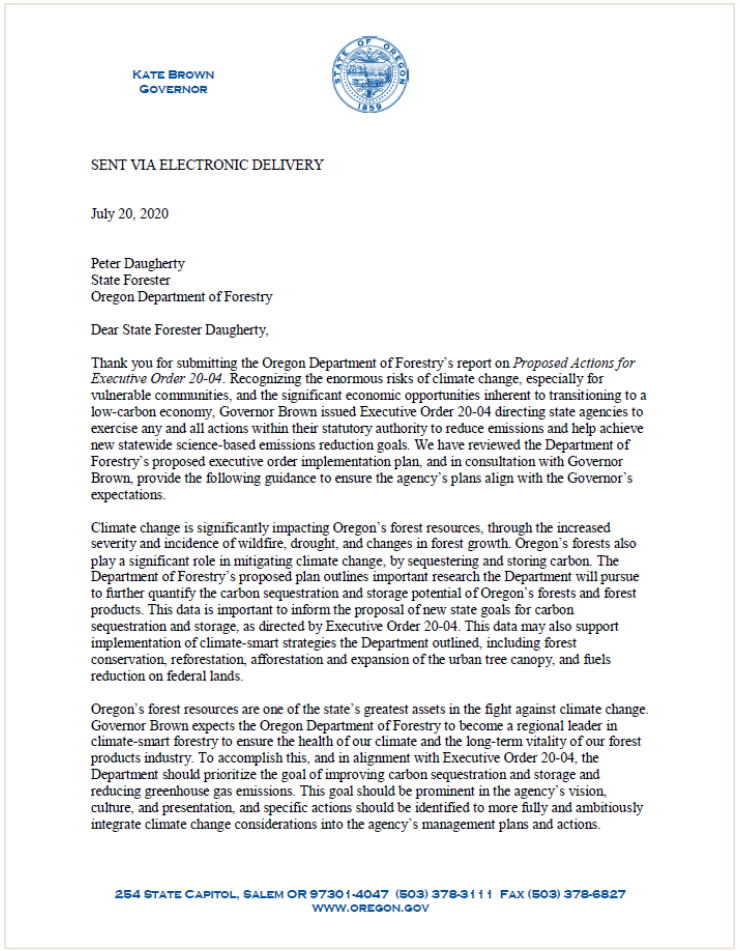
Executive Order 20-04 tasked ODF to put climate change and its impacts front and center in its planning and operations.

Outlines many requirements for state agencies including reports due in May 2020 including the current and anticipated actions within the Department's statutory authorities.

History of how we arrived here

Following the May 2020 report, the Governor's office requested that ODF draft a climate change plan.

This plan will embrace climate-smart forestry and place Oregon forestry as a leader in the region related to addressing climate change.



KATE BROWN
GOVERNOR

SENT VIA ELECTRONIC DELIVERY

July 20, 2020

Peter Daugherty
State Forester
Oregon Department of Forestry

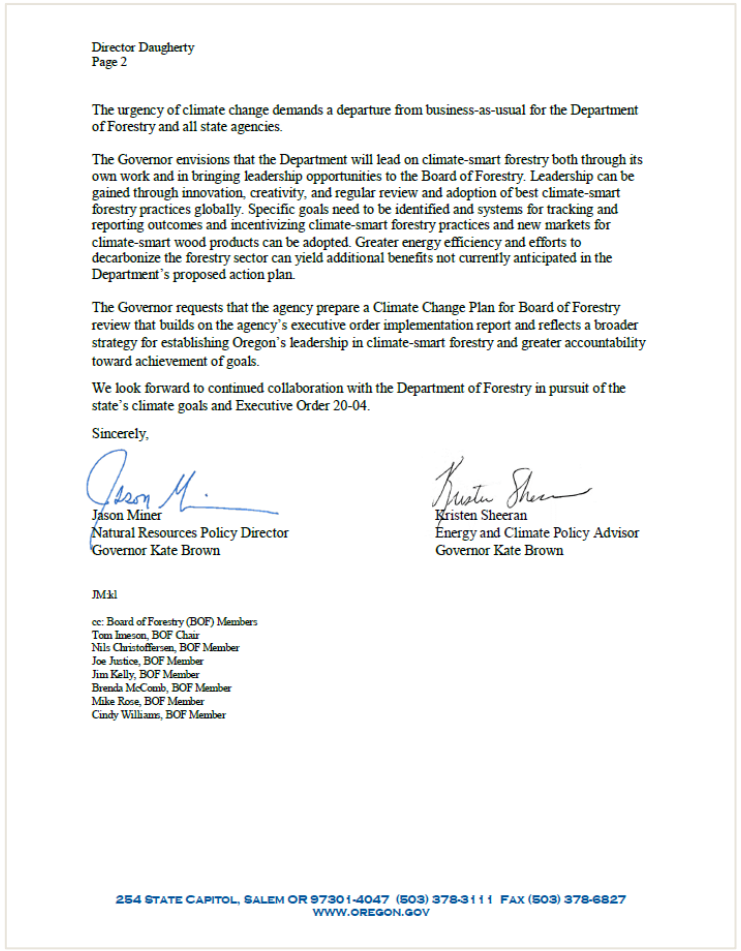
Dear State Forester Daugherty,

Thank you for submitting the Oregon Department of Forestry's report on *Proposed Actions for Executive Order 20-04*. Recognizing the enormous risks of climate change, especially for vulnerable communities, and the significant economic opportunities inherent to transitioning to a low-carbon economy, Governor Brown issued Executive Order 20-04 directing state agencies to exercise any and all actions within their statutory authority to reduce emissions and help achieve new statewide science-based emissions reduction goals. We have reviewed the Department of Forestry's proposed executive order implementation plan, and in consultation with Governor Brown, provide the following guidance to ensure the agency's plans align with the Governor's expectations.

Climate change is significantly impacting Oregon's forest resources, through the increased severity and incidence of wildfire, drought, and changes in forest growth. Oregon's forests also play a significant role in mitigating climate change, by sequestering and storing carbon. The Department of Forestry's proposed plan outlines important research the Department will pursue to further quantify the carbon sequestration and storage potential of Oregon's forests and forest products. This data is important to inform the proposal of new state goals for carbon sequestration and storage, as directed by Executive Order 20-04. This data may also support implementation of climate-smart strategies the Department outlined, including forest conservation, reforestation, afforestation and expansion of the urban tree canopy, and fuels reduction on federal lands.

Oregon's forest resources are one of the state's greatest assets in the fight against climate change. Governor Brown expects the Oregon Department of Forestry to become a regional leader in climate-smart forestry to ensure the health of our climate and the long-term vitality of our forest products industry. To accomplish this, and in alignment with Executive Order 20-04, the Department should prioritize the goal of improving carbon sequestration and storage and reducing greenhouse gas emissions. This goal should be prominent in the agency's vision, culture, and presentation, and specific actions should be identified to more fully and ambitiously integrate climate change considerations into the agency's management plans and actions.

254 STATE CAPITOL, SALEM OR 97301-4047 (503) 378-3111 FAX (503) 378-6827
WWW.OREGON.GOV



Director Daugherty
Page 2

The urgency of climate change demands a departure from business-as-usual for the Department of Forestry and all state agencies.

The Governor envisions that the Department will lead on climate-smart forestry both through its own work and in bringing leadership opportunities to the Board of Forestry. Leadership can be gained through innovation, creativity, and regular review and adoption of best climate-smart forestry practices globally. Specific goals need to be identified and systems for tracking and reporting outcomes and incentivizing climate-smart forestry practices and new markets for climate-smart wood products can be adopted. Greater energy efficiency and efforts to decarbonize the forestry sector can yield additional benefits not currently anticipated in the Department's proposed action plan.

The Governor requests that the agency prepare a Climate Change Plan for Board of Forestry review that builds on the agency's executive order implementation report and reflects a broader strategy for establishing Oregon's leadership in climate-smart forestry and greater accountability toward achievement of goals.

We look forward to continued collaboration with the Department of Forestry in pursuit of the state's climate goals and Executive Order 20-04.

Sincerely,

Jason Miner
Natural Resources Policy Director
Governor Kate Brown

Kristen Sheeran
Energy and Climate Policy Advisor
Governor Kate Brown

JM:kl

cc: Board of Forestry (BOF) Members
Tom Imeson, BOF Chair
Nils Christoffersen, BOF Member
Joe Justice, BOF Member
Jim Kelly, BOF Member
Brenda McComb, BOF Member
Mike Rose, BOF Member
Cindy Williams, BOF Member

254 STATE CAPITOL, SALEM OR 97301-4047 (503) 378-3111 FAX (503) 378-6827
WWW.OREGON.GOV

Tangential Efforts at a Different Scale

With the shift in administrations at the federal level, there has been a series of efforts nationally.

President Biden signed Executive Order 14008 *Tackling the Climate Crisis at Home and Abroad* January 27th, 2021.

- Emphasizes the role of agriculture and forestry in climate mitigation.
- Centers climate-smart agriculture and forestry (CSAF) in the USDA's work.

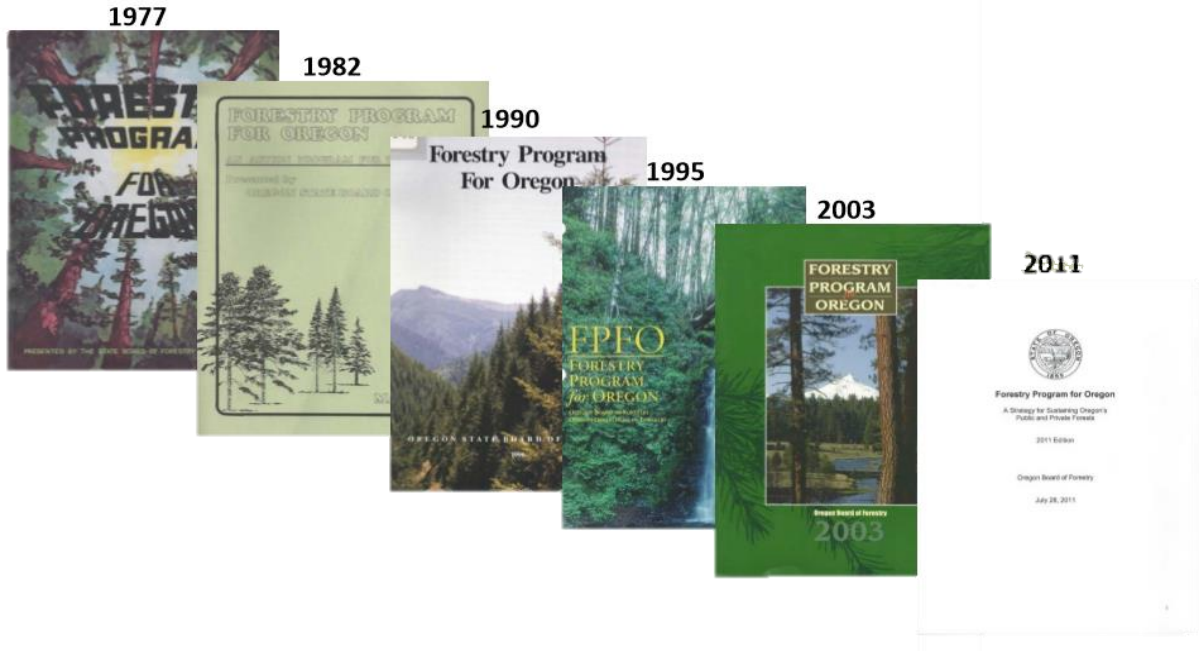
Growing Climate Solutions Act S.B. 1251

- Passed in Senate (92-8), currently in House

Current ODF Policy

The Forestry Program for Oregon describes the Board's mission, values, vision, goals, objectives, and indicators of sustainable forest management.

- Mission establishes the purpose of the Board
- Values identify guiding forestry philosophies
- Vision describes conditions the Board wants to establish, on a 20-year horizon
- Goals identify what the Board wants to achieve over the next eight years
- Objectives are near term actions to focus efforts
- Indicators serve to reflect change and progress in goal achievement



Climate Change and Carbon Plan Intent

As presented by the Governor's office, the Department's plan will position it as a regional leader in climate-smart forestry.

The plan will build on the work the department identified in the May 2020 report to EO 20-04.

Puts in place expectations and accountability for the Board and the Department in implementing climate-smart forestry and addressing climate change.

Purpose, Vision, Principles

Purpose:

- Make Oregon forestry a leader in climate change mitigation and adaptation.

- The department will be a leader in promoting climate-smart forest policies and actions that achieve our vison by operationalizing goals, implementing actions, and measuring progress to achieving climate goals.

Purpose, Vision, Principles

Vision:

- Oregon's Board of Forestry and Department of Forestry are national leaders in climate-smart and socially equitable forest policies that promote climate health, resilient forests and watersheds, community wellbeing, and a viable forest products industry.

Purpose, Vision, Principles

Principles:

- Climate change is a serious threat.
  - We have less than a decade to alter behaviors if we want to avoid catastrophic impacts. We must be innovative, creative, and proactive in working towards solutions, not simply react to the results of climate change.
- Black, Indigenous, and People of Color (BIPOC), natural resource dependent communities, and those growing up in intergenerational poverty have been and continue to be among the most climate-impacted communities.
  - Forest policies will be shaped through the lens of social justice and equity. Actions will prioritize benefits to historically and currently underserved communities as they adapt to a changing climate.
- Oregon's forest sector offers opportunities for significant sequestration and storage both in the forest and harvested wood products.
  - As well as opportunities to promote clean water and air, while preserving forest resilience in the form of flood control, biodiversity, thermal refugia, etc.
- As changing climates affect forests, incorporation of the best available science and practices will be key to adaptive management and planning across ownership type, size, and goals.

Need for plan

Climate change is threatening Oregon's forest and forest products industry, through increased severity and incidence of wildfire, drought, and greater susceptibility to insects and diseases. Climate change is an existential problem that differentially affects vulnerable populations, including people of color and lower income Oregonians. Without substantial behavior changes and mitigation efforts to limit global warming to less than 1.5°C (2.7°F) by 2030, the region and the world is very likely to experience high levels of ecosystem degradation and species extinctions.

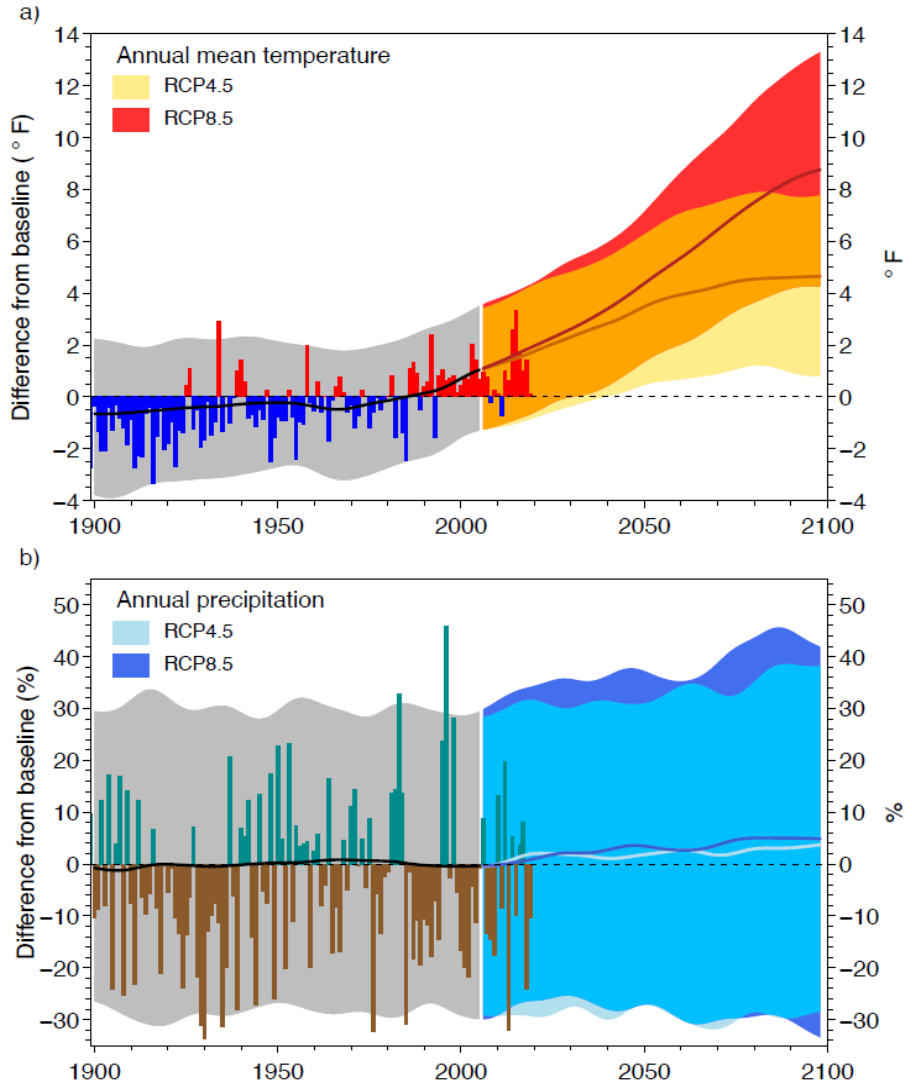


Figure 1. Observed, simulated, and projected changes in Oregon's mean annual (a) temperature and (b) precipitation relative to 1970–1999 (baseline) under RCP 4.5 and RCP 8.5 future scenarios. Colored bars are observed values (1900–2019) from the National Centers for Environmental Information. The thicker solid lines are the mean values of simulations from 35 climate models for the 1900–2005 period, which were based on observed climate forcings (black line), and the 2006–2099 period for the two future scenarios (orange [RCP 4.5] and red [RCP 8.5] lines in the top panel, light blue [RCP 4.5] and darker blue [RCP 8.5] lines in the bottom panel). Shading indicates the range in annual temperatures or precipitation from all models. The mean and range were smoothed to emphasize long-term variability. (OCCRI 2021)

Need for plan -- IPCC

"It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred."

"Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since AR5."

Opportunities

Oregon's forests have amongst the highest sequestration potential on the planet.

Landowners and managers can capitalize on increasing sequestration.

Harvested wood products can store a substantial amount of carbon.

- The forest sector can work with other sectors to increase the utilization of HWP (built environment) and decrease emissions (energy and transportation).

Integration of climate change into Department planning processes will inform the work of the agency.

Barriers

Identified environmental, structural, and capacity limitations.

Includes issues include, but are not limited to:

- Statutory authorities
- Public perceptions
- Staffing capacity
- Biological constraints

What is Climate-Smart Forestry

Climate-smart forestry is anchored in sustainable forest management and evolved from climate-smart agriculture concepts in the early 2010s.

At its core, climate-smart forestry has three main areas:

- Forest **adaptation**,
- Climate **mitigation**, and
- **Social dimensions** of community and economy

Climate-Smart Forestry *is sustainable adaptive forest management and governance to protect and enhance the potential of forests to adapt to, and mitigate climate change. The aim is to sustain ecosystem integrity and functions and to ensure the continuous delivery of ecosystem goods and services, while minimising the impact of climate-induced changes on mountain forests on well-being and nature's contribution to people.*

Adaptation measures of forests that maintain or improve their ability to grow under current and projected climatic conditions and increase their resistance and resilience. The adaptive capacity to changes in climate and to the timing and size of climate-induced disturbances (e.g., fire, extreme storm events, pests and diseases) can be enhanced by promoting genetic, compositional, structural, and functional diversity at both stand and landscape scales. This includes facilitating natural regeneration and planting of native as well as non-native tree species, genetic variants and individuals that are considered to be adapted to future conditions. Increased connectivity assists the migration of forest species.

Mitigation of climate change by forests is a combination of carbon sequestration by trees, carbon storage by forest ecosystems, especially soils, and forest derived products, such as structural timber, and by carbon substitution - directly by replacing fossil fuels with bioenergy and indirectly through use of wood to substitute for higher carbon footprint materials.

The ***social dimension*** of forestry holds many aspects, from the involvement of stakeholders from local communities, and their conflicts over land use or for the access to skills and technology, to global forest governance challenges. Climate change may jeopardize forest ecosystem functioning and brings social and economic consequences for people, which may modify priorities of ecosystem services at various scales. Assessment for ecosystem services could be a tool making this process more efficient with respect to indicators relevant for governance regime and actors involved.

In summary, **Climate-Smart Forestry** should enable both forests and society to transform, adapt to and mitigate climate-induced changes.

Bowditch et. al. 2020 https://doi.org/10.1016/j.ecoser.2020.101113

Adaptation

Require active measures and seeks to build resilience to the effects of climate change:

- Different tree species or genetics,
- Changes to the structure of the forest stand and landscape, and
- Utilizing a mix of management approaches

Adaptation means that forest managers are looking at future climate rather than relying historic norms and practices.

Requires bold steps to ensure that forests remain forests and do not shift to an alternative vegetation type due to climate induced mortality events, increasing insect and disease pressure, and increasing destructive wildfire season.

Mitigation

Leaving trees in place until sequestration is maximized, followed by harvest will likely provide the greatest mitigation benefit.

Wood products can continue carbon storage in lower-embodied-carbon wood products (e.g., mass timber) and displace high-carbon cost materials (e.g., cement, steel, non-wood flooring) and fuels.

- However, more work supporting and advancing long-lived wood products, development, and utilization needs to be done to ensure that the harvested fiber is sequestered long-term.

Reducing the emissions from the harvest and manufacturing of wood products will need to be addressed.

Additional methods and technologies will need to be explored to meet these mitigation needs.

Social and Economic Dimension

Utilization of the state's forests for harvest of traditional foods, recreation, tourism, and wood fiber all support a diverse set of communities.

- Climate-smart forestry will require careful coordination and communication to ensure all voices are heard and incorporated.
- Natural resource dependent, disproportionally climate impacted, and traditionally underserved communities are important parts of Oregon's culture and economy and are at great risk from climate change impacts.
- Ensuring they are included in the planning and decision-making process and are not left behind as the forest sector works to adjust and transition to a changing environment and landscape is key.

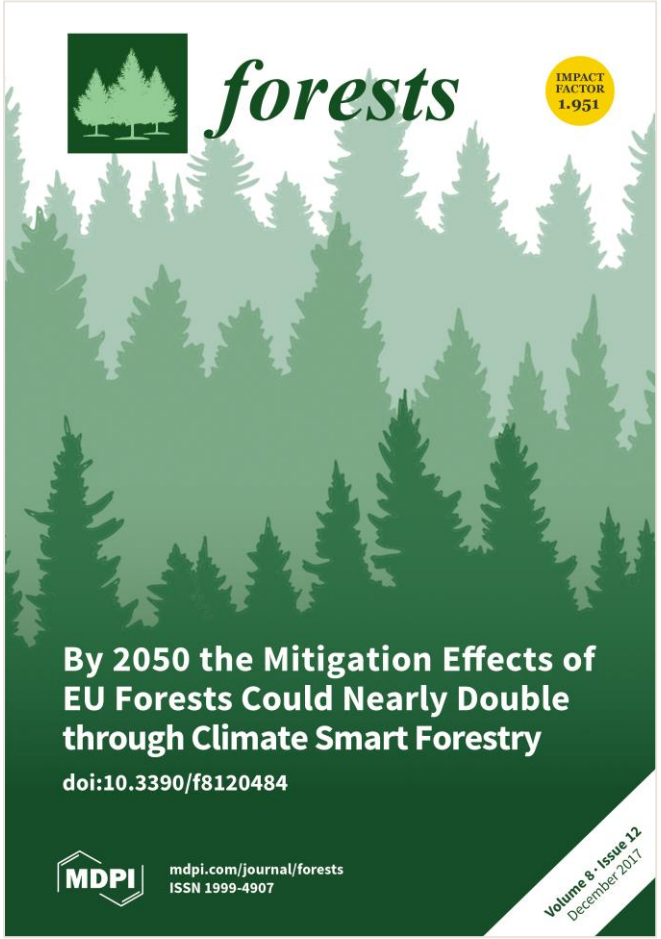
The cultural significance of forests (wildland, community, and urban) and forest products, timber and beyond, is highly important.

Forestry Climate Action Goals

1. Climate-Smart Forestry in Silviculture
2. Fire Management, Response and Fire / Smoke Adapted Communities
3. State Forests Management
4. Forestlands Climate Resilience and Ecological Function Restoration
5. Urban and Community Forests
6. Reforestation and Afforestation
7. Maintain and Conserve Forests
8. Research and Monitoring

Climate-Smart Forestry in Silviculture

Goal: Establish a just and equitable transition to climate-informed silviculture and climate-smart forestry that optimizes climate mitigation and adaptation, while maintaining a sustainable flow of wood products to ensure long-term resource benefits and viability of the forest products industry and flow of long-lived forest products.



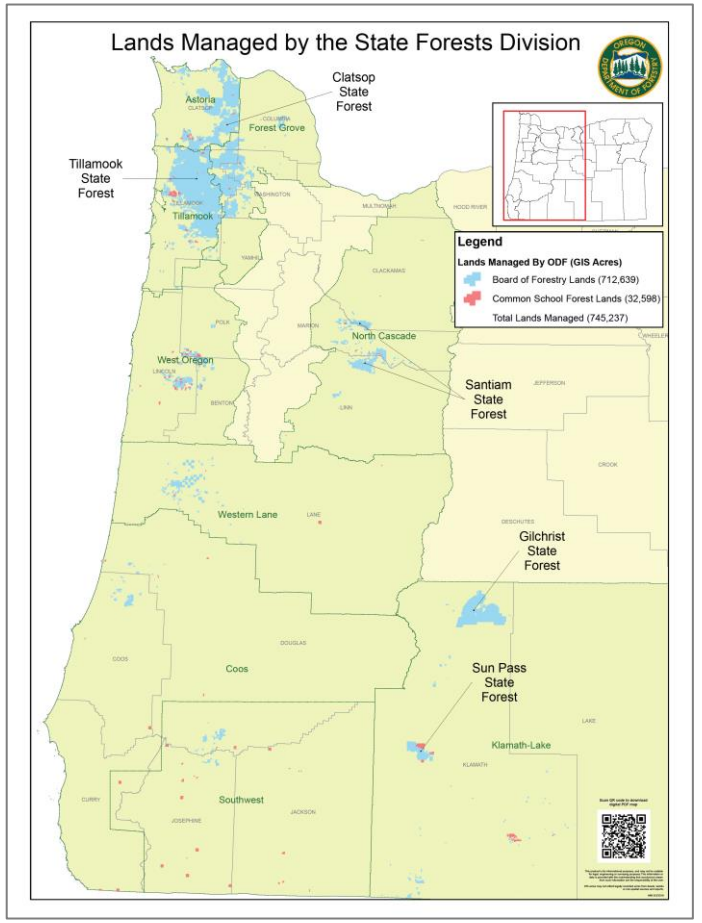
Fire Management, Response and Fire / Smoke Adapted Communities

Goal: Modernize Oregon's complete and coordinated wildfire protection system to respond to the increased severity of wildfire.

Promote fire and smoke adapted communities in the wildland-urban interface, to mitigate the impacts of climate-induced increases in wildfire severity.

State Forests Management

Goal: Lead by example and demonstrate climate-smart forest management on State Forests to achieve adaptation, mitigation, and the achievement of forest resource goals.



Forestlands Climate Resilience and Ecological Function Restoration

Goal: Accelerate the pace, scale, and quality of forest restoration to increase the resilience to increased wildfire severity and incidence. Support implementation of the recommendations of the Governor's Council on Wildfire Response.

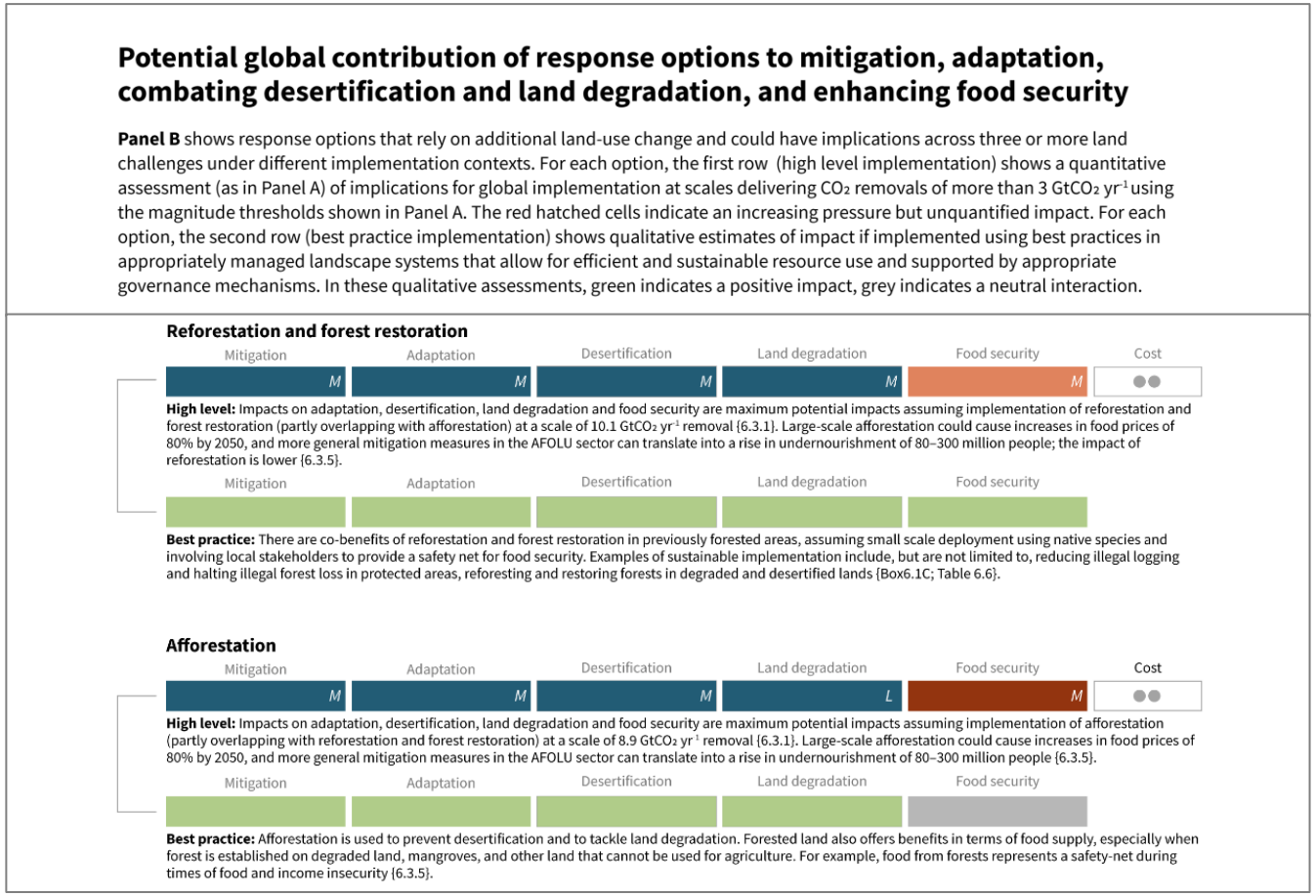
MEMORANDUM OF UNDERSTANDING
On
SHARED STEWARDSHIP
Between the
STATE OF OREGON
OREGON DEPARTMENT OF FORESTRY
And the
U.S. DEPARTMENT OF AGRICULTURE
USDA FOREST SERVICE, PACIFIC NORTHWEST REGION

Urban and Community Forests

GOAL: Increase the extent and resilience of urban and community forests to maximize the climate mitigation and health benefits of urban forests canopy.

Reforestation and Afforestation

Goal: Facilitate and encourage the reforestation of areas burned by wildfire and afforestation of low-productivity lands that are understocked or not in forest use.



Potential global contribution of response options to mitigation, adaptation, combating desertification and land degradation, and enhancing food security

Panel B shows response options that rely on additional land-use change and could have implications across three or more land challenges under different implementation contexts. For each option, the first row (high level implementation) shows a quantitative assessment (as in Panel A) of implications for global implementation at scales delivering CO_2 removals of more than 3 $GtCO_2\ yr^{-1}$ using the magnitude thresholds shown in Panel A. The red hatched cells indicate an increasing pressure but unquantified impact. For each option, the second row (best practice implementation) shows qualitative estimates of impact if implemented using best practices in appropriately managed landscape systems that allow for efficient and sustainable resource use and supported by appropriate governance mechanisms. In these qualitative assessments, green indicates a positive impact, grey indicates a neutral interaction.

Reforestation and forest restoration

Mitigation: M | Adaptation: M | Desertification: M | Land degradation: M | Food security: M | Cost: ●●

High level: Impacts on adaptation, desertification, land degradation and food security are maximum potential impacts assuming implementation of reforestation and forest restoration (partly overlapping with afforestation) at a scale of 10.1 $GtCO_2\ yr^{-1}$ removal {6.3.1}. Large-scale afforestation could cause increases in food prices of 80% by 2050, and more general mitigation measures in the AFOLU sector can translate into a rise in undernourishment of 80–300 million people; the impact of reforestation is lower {6.3.5}.

Mitigation | Adaptation | Desertification | Land degradation | Food security

Best practice: There are co-benefits of reforestation and forest restoration in previously forested areas, assuming small scale deployment using native species and involving local stakeholders to provide a safety net for food security. Examples of sustainable implementation include, but are not limited to, reducing illegal logging and halting illegal forest loss in protected areas, reforesting and restoring forests in degraded and desertified lands {Box6.1C; Table 6.6}.

Afforestation

Mitigation: M | Adaptation: M | Desertification: M | Land degradation: L | Food security: M | Cost: ●●

High level: Impacts on adaptation, desertification, land degradation and food security are maximum potential impacts assuming implementation of afforestation (partly overlapping with reforestation and forest restoration) at a scale of 8.9 $GtCO_2\ yr^{-1}$ removal {6.3.1}. Large-scale afforestation could cause increases in food prices of 80% by 2050, and more general mitigation measures in the AFOLU sector can translate into a rise in undernourishment of 80–300 million people {6.3.5}.

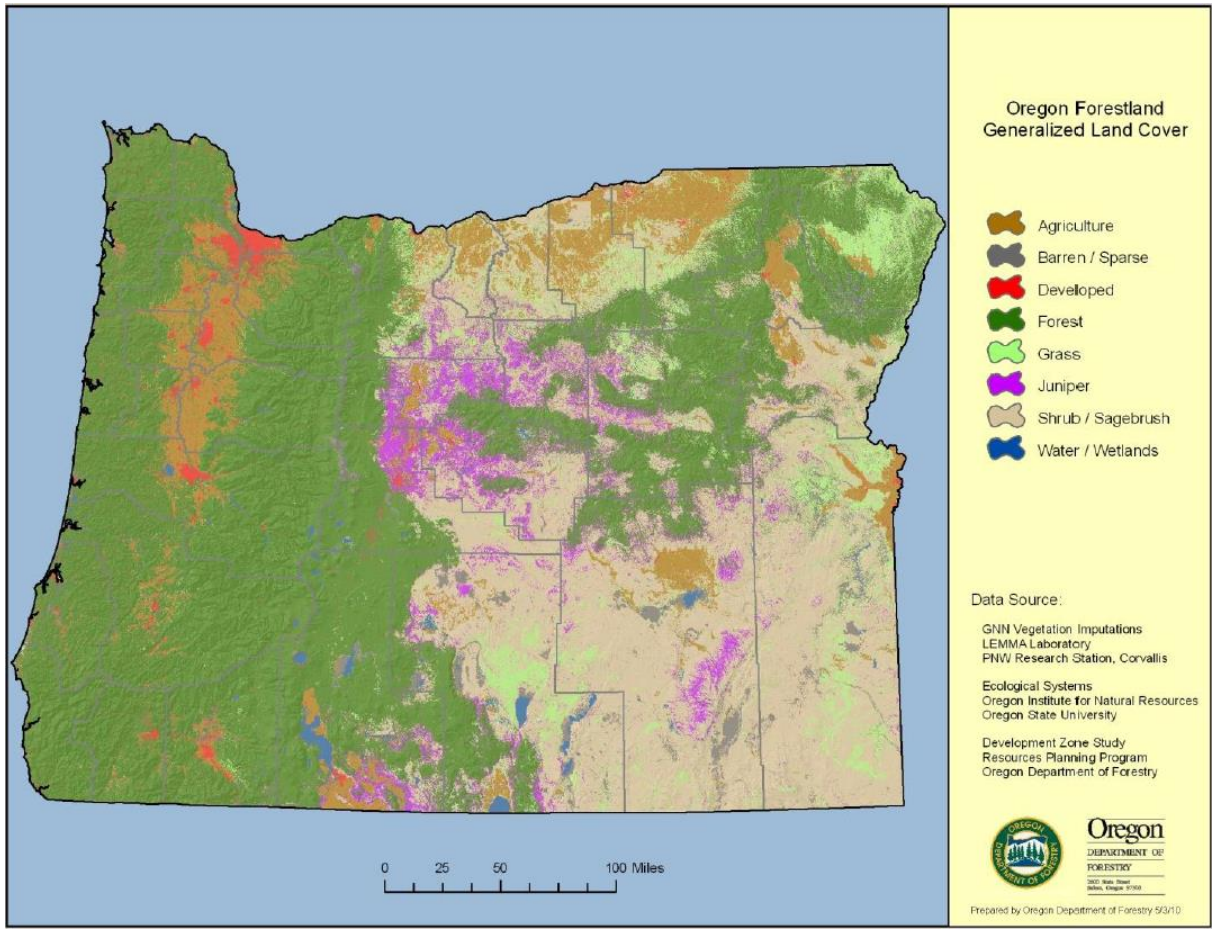
Mitigation | Adaptation | Desertification | Land degradation | Food security

Best practice: Afforestation is used to prevent desertification and to tackle land degradation. Forested land also offers benefits in terms of food supply, especially when forest is established on degraded land, mangroves, and other land that cannot be used for agriculture. For example, food from forests represents a safety-net during times of food and income insecurity {6.3.5}.

IPCC, 2019: Summary for Policymakers. In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. In press.

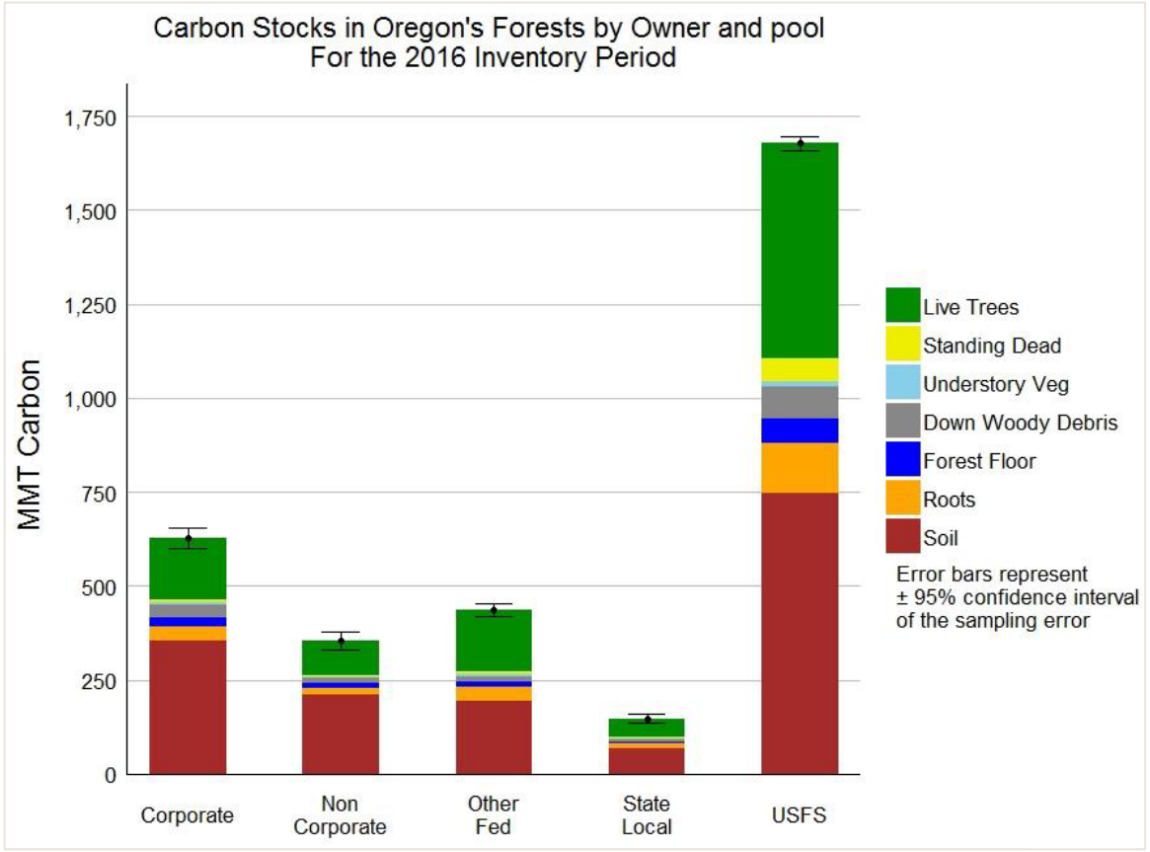
Maintain and Conserve Forests

Goal: Support a strong, but flexible, Land Use Planning System as a cornerstone of maintaining Oregon's forests on private lands.



Research and Monitoring

Goal: Maintain a research and monitoring program to track the status and trends of ecological, economic, and social indicators and the effects of climate change and to track progress related to this plan.



Supporting actions

Supporting actions are linked to multiple goals.

Depending on the action, impacts can and will extend to several goals, they are not limited to a one to one goal relationship.

These supporting actions will be incorporated into agency planning, which includes documents and processes like the Forest Management Plan, Implementation Plans, and Annual Operating Plans, among others.

- Many of these other plans and processes lay out in short time segments (e.g., biennium) what the Department's work will be.

Supporting Actions

Examples include:

- Incorporating climate change in FPA rule development and revision
- Incentivizing climate-smart forestry
- Providing recognition of climate mitigation and adaptation measures
- Developing an internal carbon pricing process
- Restoration of low/under performing forests (e.g., Swiss needle cast)
- Increase resilience efforts including a prescribed fire program
- Afforestation and reforestation in the municipal and community environment
- Investigate further decarbonization of forest activities and harvest
- Encourage Low Carbon Impact Materials in Oregon
- Track agency carbon footprint and work to reduce it
- Among others

Next Steps

Utilizing the conversation that take place today:

- Ensure alignment with the Board and the Department's direction in the plan
- Consideration of comments received

Final iteration of the drafting process.

Presentation of the final draft of the plan to the Board in November.

Questions and Resources

Danny Norlander

Forest Carbon and Forest Health Policy Analyst

Danny.norlander@Oregon.gov

503-945-7395

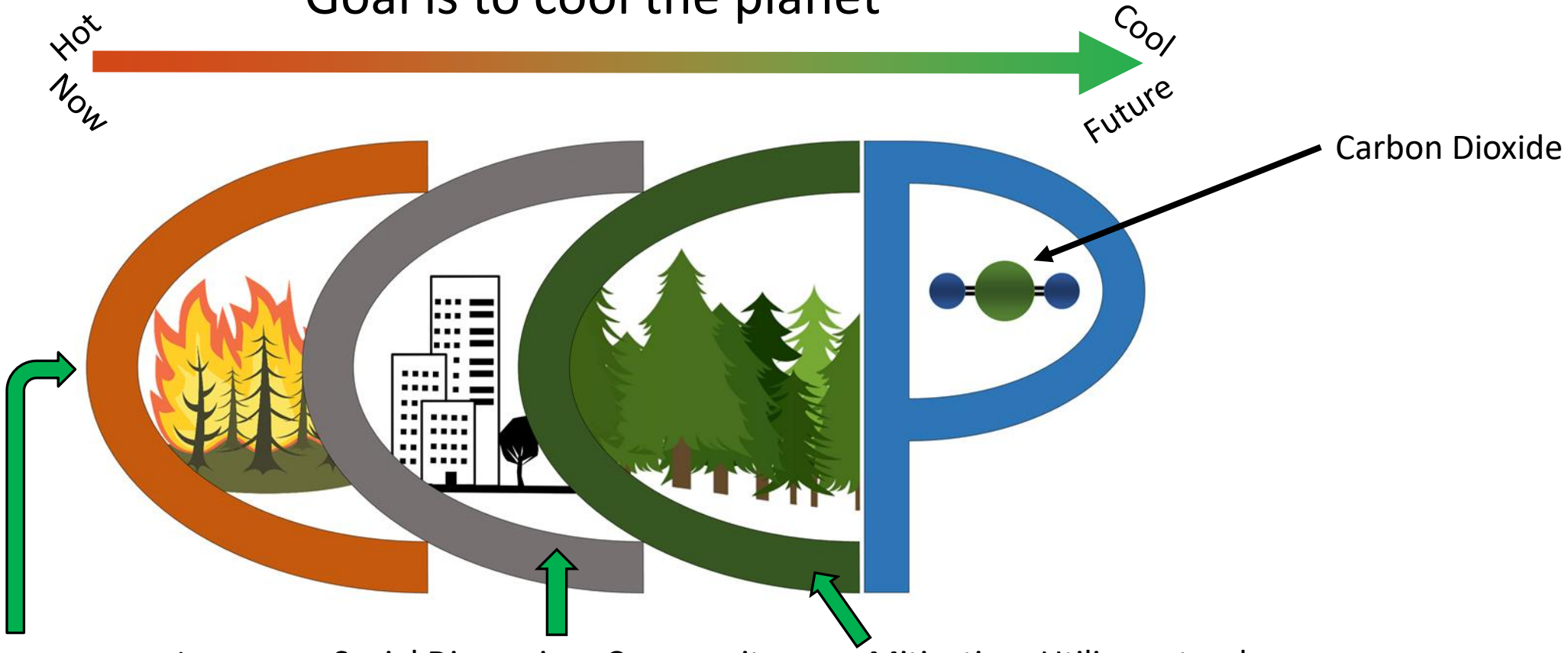
ODF Climate Change Page: www.oregon.gov/odf/ForestBenefits/Pages/Climate-Change.aspx

Board of Forestry Page: www.oregon.gov/odf/board/Pages/default.aspx

Governor Brown's Climate Policy Office: www.oregon.gov/gov/policy/Pages/energy_climatechange.aspx

OGWC website: www.keeporegoncool.org/about-the-commission

Goal is to cool the planet



Adaptation: response to the impacts of climate change on Oregon's forests

Social Dimension: Community and economy supported by climate adapted forests

Mitigation: Utilize natural climate solutions to reduce GHG in the atmosphere through sequestration

PRE-DECISION WORKSHOP

SEPTEMBER 8TH, 2021

ENGAGEMENT

OREGON DEPARTMENT OF FORESTRY

CLIMATE CHANGE AND CARBON PLAN

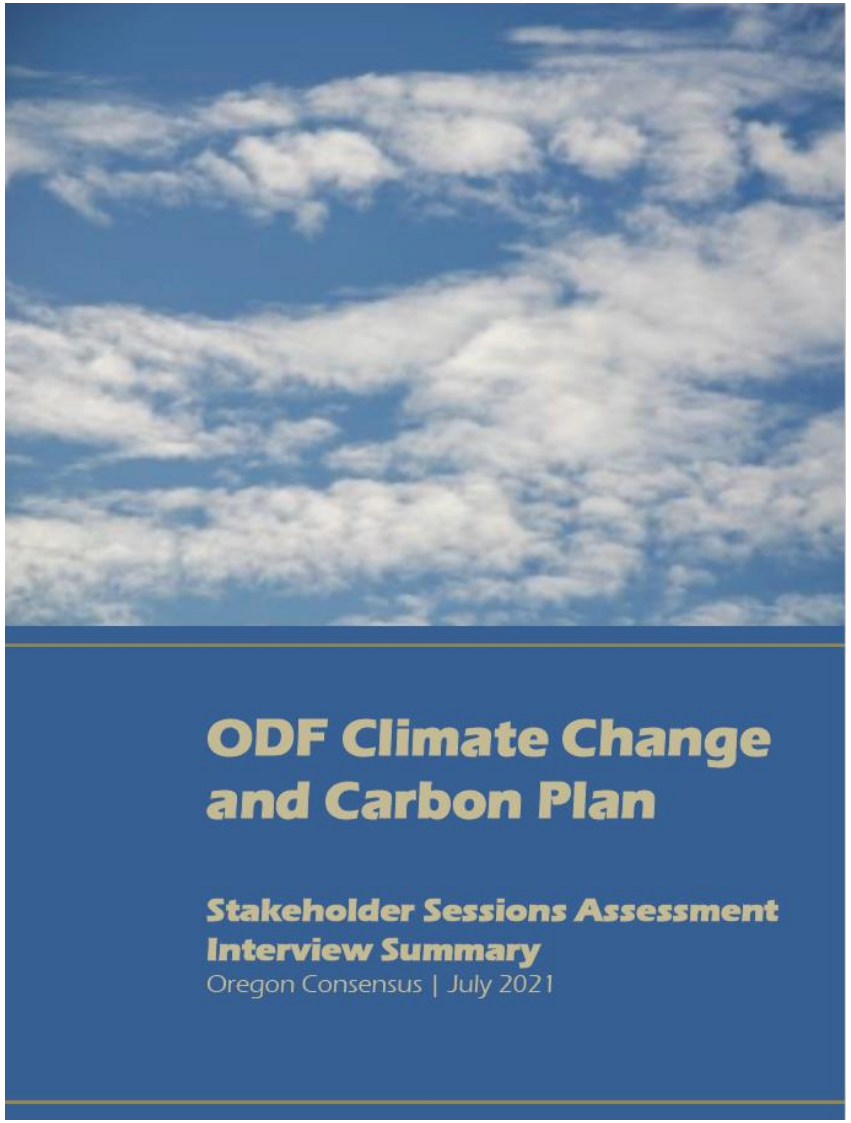
Beginning: Late July 2020 to ~~September 2020~~…January 2021

Started with Pulling information from previous input streams:

- Previous Board meetings
- Previous comments
- Legislative processes
- State government enterprise-wide guidance

Initial work inner-Departmental

- Executive Team
- State Forester
- Board conversations



Middle: January 2021 to July 2021

Worked with a third party to conduct small group assessments

Presented to:

- General audience
- Cultural Resource Cluster
- FTLAC

Incorporation with the Oregon Global Warming Commission

- Directed within EO 20-04

Incorporated the feedback that the different processes provided

End: August 2021 to November 2021

Today's pre-decision workshop

Will incorporate feedback from:

- Board members
- Executive team
- Public comments, written and verbal

Return to Board with final draft for approval in November

Changes That Have Been Made

Incorporation of barriers section

Refinement of language

- More clarity on intent
- Stronger definition of Climate-Smart Forestry
- Ensure that there is appropriate language

Include who are impacted in the forestry realm

Incorporation of more tangible and achievable outcomes

Questions and Resources

Danny Norlander

Forest Carbon and Forest Health Policy Analyst

Danny.norlander@Oregon.gov

503-945-7395

ODF Climate Change Page: www.oregon.gov/odf/ForestBenefits/Pages/Climate-Change.aspx

Board of Forestry Page: www.oregon.gov/odf/board/Pages/default.aspx

Governor Brown's Climate Policy Office: www.oregon.gov/gov/policy/Pages/energy_climatechange.aspx

OGWC website: www.keeporegoncool.org/about-the-commission