

Sustaining Our Urban Forest



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Importance of forest remnants

- Islands of diversity
- Wildlife corridors
- Cooling sources in heat islands
- Phytoremediation substrates (soil, water, air)
- Recreation and mental health outlets
- Tourism attractions
- Correlates with lower crime rates and increased home values

Citations:

<https://treecanada.ca/resources/canadian-urban-forest-compendium/3-benefits-of-urban-forests/>

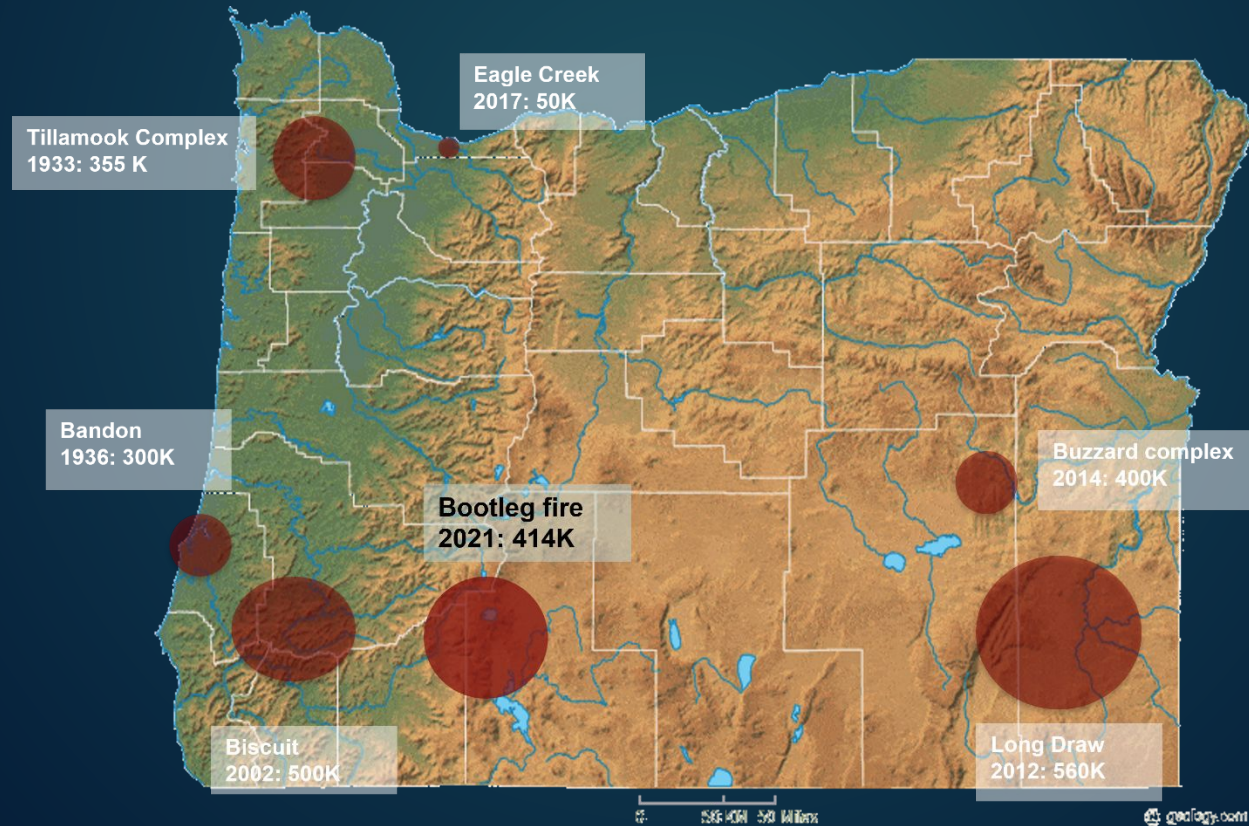
Importance of city codes

- Permit and replacement requirements for tree removal above a specific DBH
- Prohibited removal in ecologically sensitive zones
- Native and coniferous species replacement
- Topping or extensive crown removal restrictions
- Specialist review and approval before removal due to hazard, infestation, other tree mortality, etc.
- Guidance on what to plant where (LO's "*Right Tree Right Place Guide*")

Bad codes can chip away at our habitat, which is hard to win back. Structures are not typically removed to restore habitat.

Wildfire perspective

Keep Oregon Green wildfire prevention:
<https://keeporegongreen.org/>



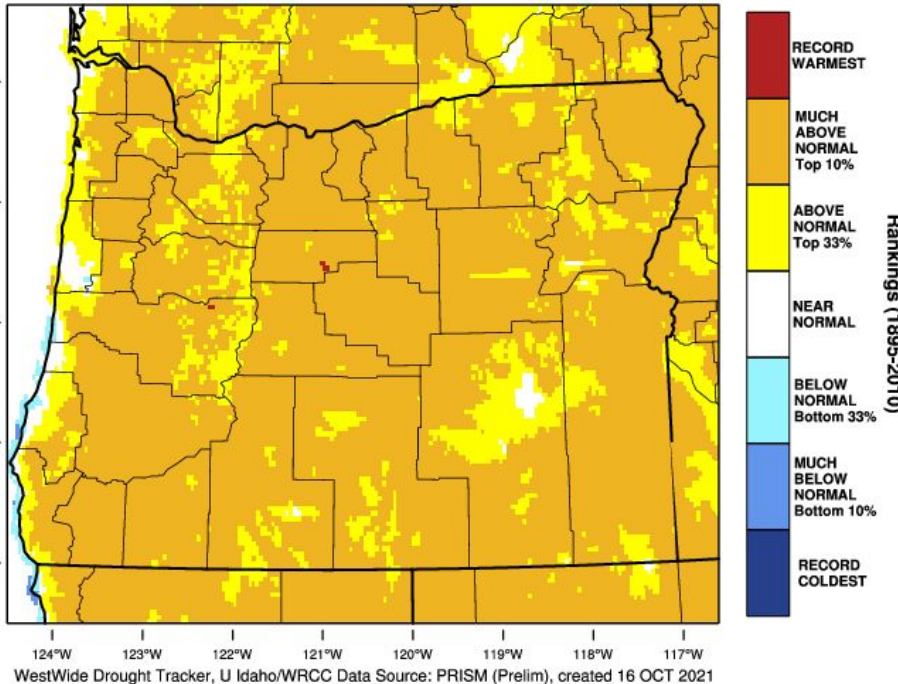
Factors contributing to **both** fire and insect pest risk



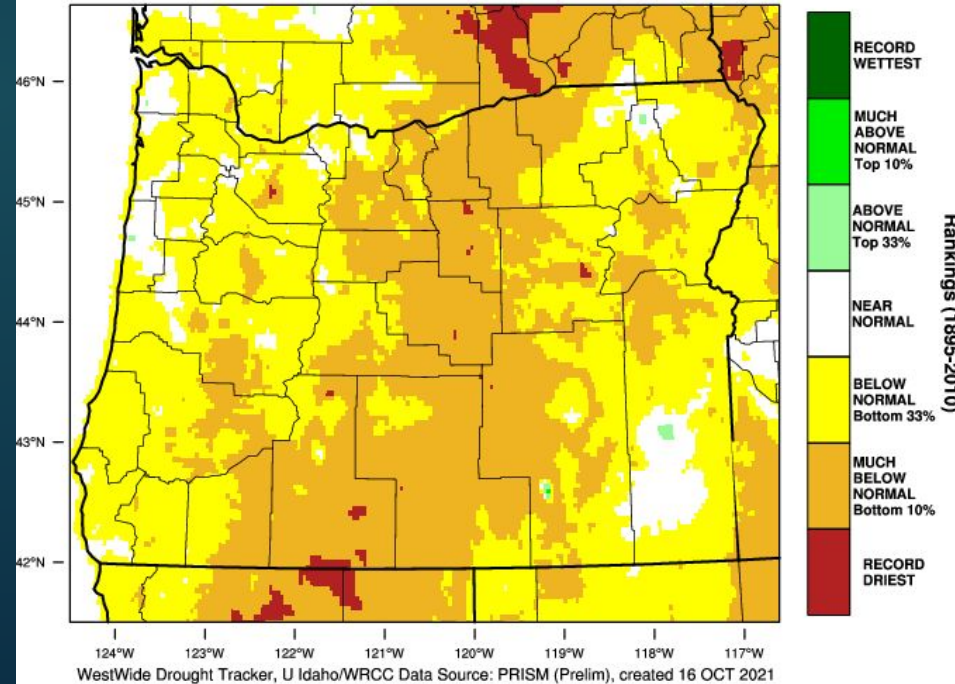
Hot, drought

- High temperatures over long periods
- Low or inconsistent precipitation (including snow)
- Timing of these events is also important

Oregon - Mean Temperature
October-September 2021 Percentile



Oregon - Precipitation
October-September 2021 Percentile



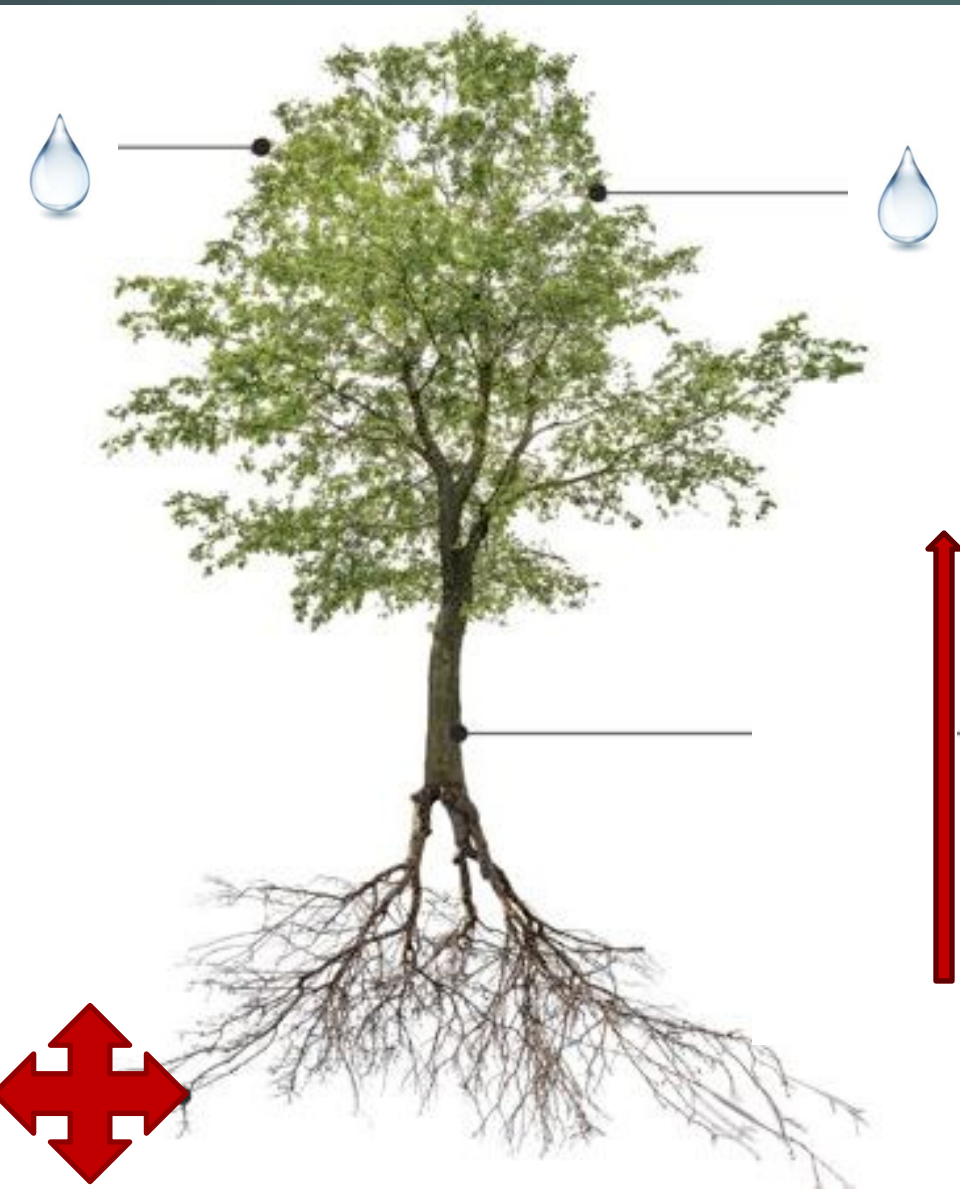
Stay current: <https://tinyurl.com/drought-report>

...then there's that 2021 heatwave

- **Highest intensity:** along roads, forest edges, south & west side of trees, coast and other cooler or phenologically delayed areas
- **Impact:** some but not all foliage singed, buds appear unharmed... but we don't know if cavitation or root dieback also occurred
- **Predictions:** growth reduced, defenses reduced, won't know about mortality until next spring



How hot, drought affects trees



- Foliage loss twig branch loss
- Fine root dieback
- Roots migrate in soil zones
- Vascular tissue collapse (cavitation)
- Increased cone crops

Drought symptoms



Drought in/tolerant species



Non-natives (**drought-tolerant exotics are still less resilient than our drought-tolerant natives*)

True fir (even lower elevation species such as grand fir)

Western hemlock

Western redcedar

Douglas-fir

Bigleaf maple

Oak

Pine



Example: W. redcedar dieback



Example: W. redcedar dieback

- Likely marginal site + hot, drought caused
- NO major insect or disease causes
- Symptoms include:

Thinning



Topkill

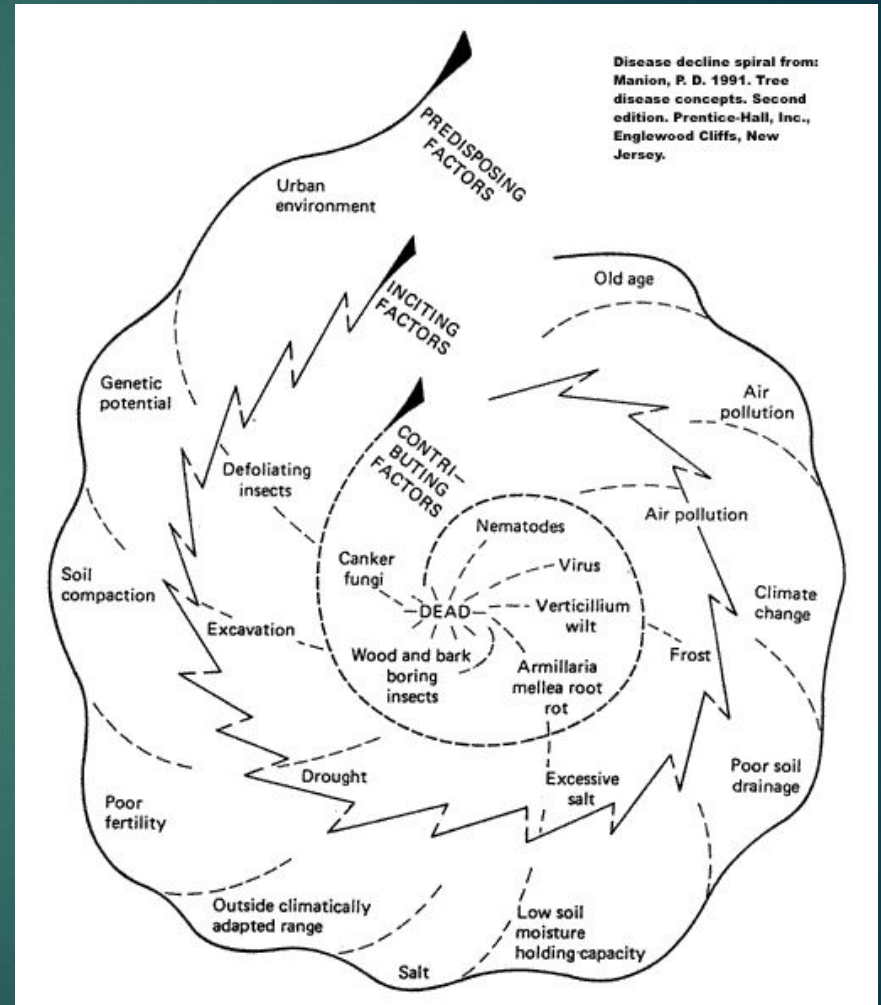


Yellowing



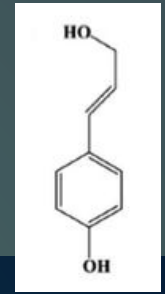
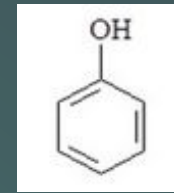
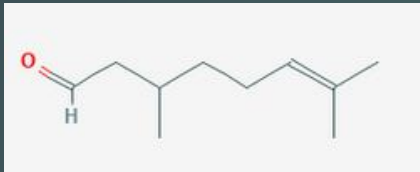
Synergistic effect of multiple stressors

Growth is always primary and defense is secondary, i.e., resources go to rebuilding tissues for growth first **then** to defense mechanisms



Manion spiral

Tree defenses



Healthy trees can kill, resist or tolerate pests using mechanical and chemical defenses



Leaf chemicals
repel, kill or
reduce insect
growth



Wood contains
mechanical and
chemical barriers to
digestion



Pitch and resins are
mechanical barriers and
have repellent, toxic and
anti-microbial chemicals

Natural enemies

- Predators and parasitoids provide important control for pests
- Heavily impacted by pesticides and loss of refugia



Insect pest precursors



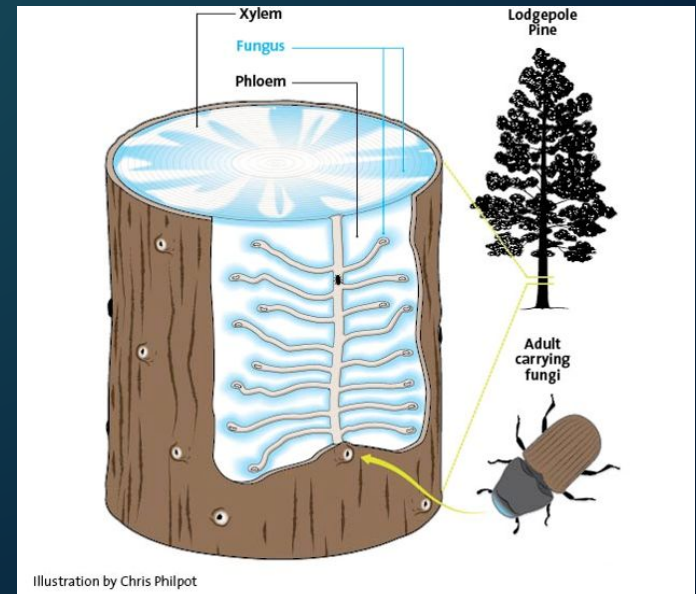
- Stressed conditions (drought, fire, storms)
- Lack of natural controls (invasive species, pesticide drift, mild winters)
- Cyclical biology

Encourage tree resilience

- Plant the right species (and cultivar) in the right place
- Opt for site-appropriate natives
- Provide adequate spacing, reduce competition including invasives
- Plan for climate change especially on marginal sites
- Irrigate via consistent, long and deep soaks
- Avoid fertilizing if not irrigating
- Remove struggling trees
- Prevent mechanical damage from construction and roads
- Remove *current* infestations (hard to stay ahead of outbreaks this way or sanitize a site)
- Encourage natural enemies - provide refugia, reduce drift and broad-spectrum insecticides

Bark beetles

- Opportunistic, some eruptive
- Chemical signaling (*power in numbers!*)
- Feeds on phloem (*not wood*) causing girdling
- Introduces fungi that clog vascular tissues



Bark beetles ♥ droughted trees

- Stressed trees easy to detect
- Low moisture = decreased sap

Resulting in blind attacks, loss of mechanical barrier and repellent/antimicrobial chemicals



Bark beetle signs and symptoms



Thin pitch streams or pitch tubes



Brown frass

Bark beetle signs and symptoms



Distinct gallery pattern on inner bark and sometimes phloem



Tiny exit holes

Bark beetle signs and symptoms



Stained wood



Red crown (top 1/3 or full)

Bark beetle process



Frass and
sometimes pitch
on entry



Gallery creation,
vector fungi



Exit holes, red
crown

Woodborers vs. Bark beetles



Borer holes in wood

Borer

Bark beetle

Woodborer exit holes usually much larger



Bark beetle

Borer

Frass is white not brown

Woodboring beetles

- Mostly attacks dead or dying trees
- Insignificant outbreak potential
- Usually large or flashy but can also be very small



Common issues: arborvitae

- Arborvitae is a western redcedar variety
- Prefers shade and moisture
- Not great for sun-exposed and trafficked areas



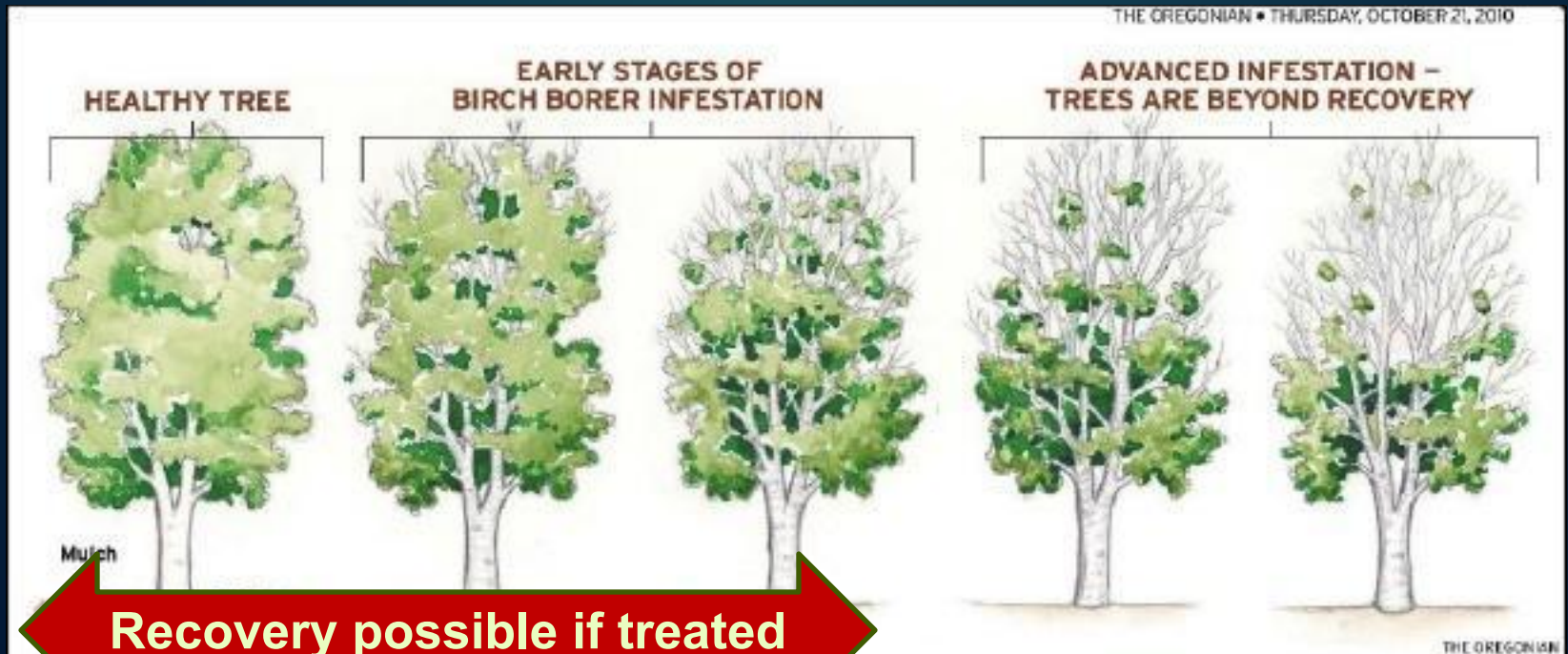
Common issues: grand fir

- Large trees reach an unsustainable moisture and heat threshold during droughts



Common issues: birch

- Birch species vary in susceptibility, opt for native paper and water birch
- Cluster in moist, cool locations and add mulch



Common issues: Douglas-fir

- Only moderate drought-tolerance
- Avoid rocky soils, sun-exposed or edge habitat
- If leaving downed large-diameter logs use MCH repellent in the first year or two



Common issues: pine

- Avoid non-native Scots and Mugo
- Dispose of fresh slash quickly in spring and summer



Bees in forests???

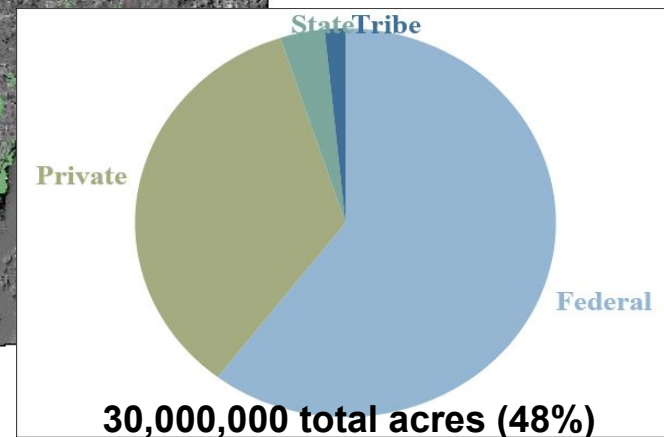
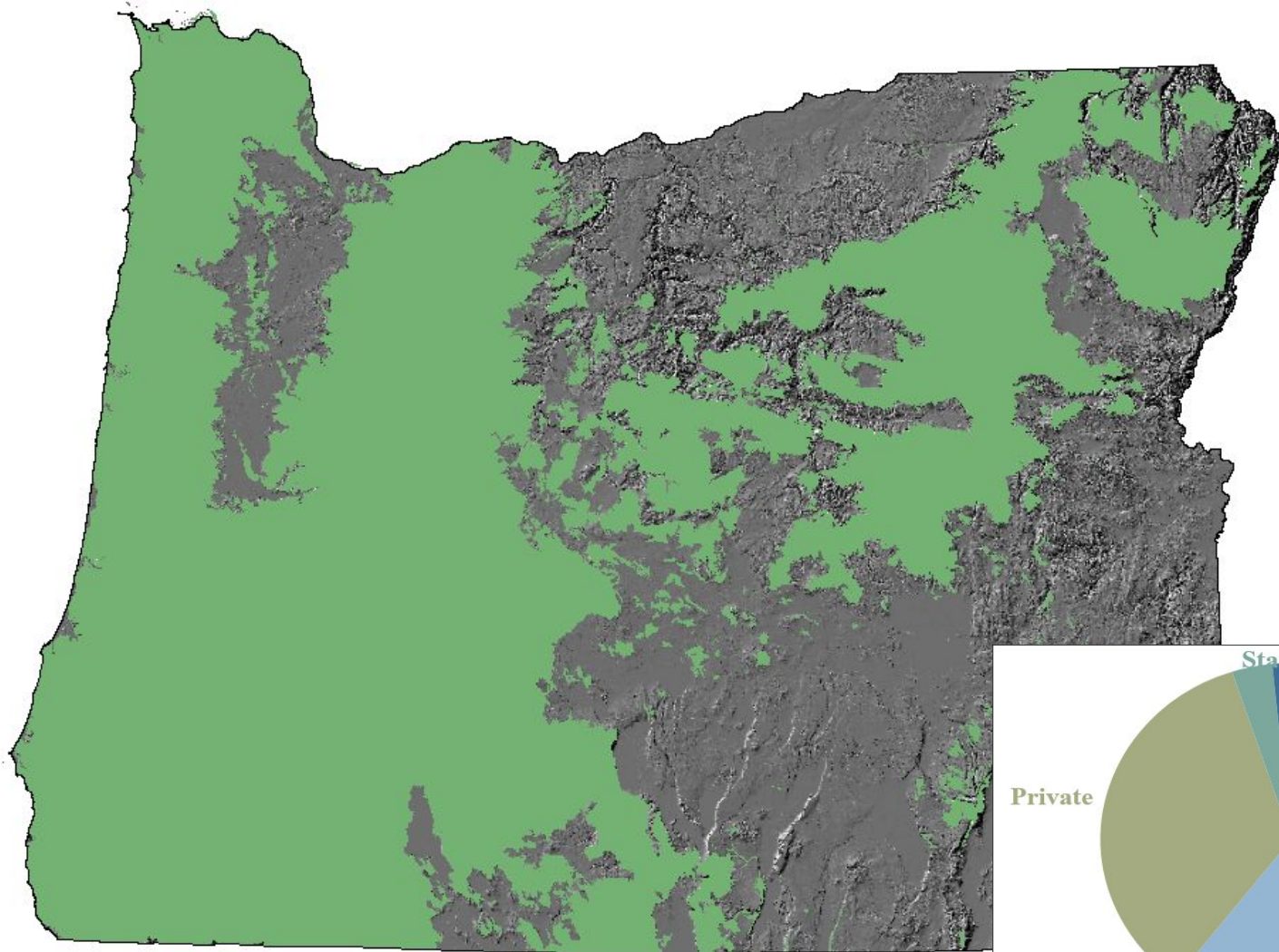
Forests provide (overlooked) habitat for native bees:

- 1) Forage plants**
- 2) Bare soil for ground nests and hibernation**
- 3) Woody debris, stems and stumps for nests**

Oregon has over
600 species of diverse bees!!!



Oregon has a lot of forest habitat!



Forest forage plants

Rhododendron, salal, Oregon grape, currant, salmonberry, madrone, ceanothus, etc.



Bees also visit maples for nectar and pollen and sometimes various conifers for resins!



Forest nests

Nesting (or hibernating) in the ground



Nesting in pithy stems and wood cavities



Enhance habitat

- Group plants with similar flower shapes to provide a strong signal
- Create a larger swatch of plants rather than dispersed patches
- Plant native flowering plants and shrubs to create constant flowering windows
- Create habitat (flowers or nesting sites) in forgotten areas such as along roadsides, embankments, fence lines, etc.
- Leave some areas with exposed soil (bees will not dig through debris)
- Leave or create some woody nesting materials (pithy stems, wood with holes)
- Remove aggressive or invasive plants that outcompete and reduce forage plant diversity



Get involved!

Drought damage survey:

<https://tinyurl.com/forestdroughtsurvey>


Oregon Bee Atlas:

<https://extension.oregonstate.edu/bee-atlas>

Drought Impacts on Forestry

Introduction
What effects of drought on forests and trees do you see? The Oregon Department of Forestry is working with the National Drought Mitigation Center and with the National Integrated Drought Information System on this survey, a way to record your observations of how drought is affecting the forests and trees around you. View observations from this survey on [this map](#).

Where are you?*
Position the marker on the map for your location using one of three methods: 1) Click on the round compass icon and allow access to your location. 2) Enter an address or the name of a place in the search window. 3) Drag the map until the marker points to the correct location. Use the plus or minus if you want to zoom in or out after you have placed the marker. Scrolling will move the marker.



Find address or place

Bartram Geographics Powered by Esri

No geometry captured yet.



Resources

Forest Health

Resources

Forest Health Program is a joint product of ODF and the USFS Region 6
Oregon Invasive Species Online Hotline
Oregon Forest Pest Database
Forest Insect and Disease Leaflets (FIDL)
Grants and Incentives

Partners

Oregon Invasive Species Council

Contact

Forest Health Program
Private Forests Division
3000 State Street
Salem, OR 97310
Phone: 503-845-7007
Email: fhp@odf.or.gov

ODF Forest Health

<http://tinyurl.com/odf-foresthealth>

Foresters

<https://www.oregon.gov/odf/Working/Pages/FindAForester.aspx>

<https://directory.forestry.oregonstate.edu/forestry-and-natural-resources-extension>

