Daniel Kim, The Seattle Times, 2023

UW Grounds Management

Integrated Pest Management for Resilient Landscapes

Marlee Theil, mtheil@uw.edu

UNIVERSITY of WASHINGTON

MY ROLE AT GROUNDS MANAGEMENT

- Integrated Pest Management (IPM) and Sustainability Coordinator
- Develop and implement IPM plans
- Ensure compliance with pesticide legal requirements
- Project management and grant writing
- Passionate about bridging science with management strategies

Salvage Wood Program (phase 2)

AT A GLANCE

Status: Active

The Salvage Wood Program seeks $72,400 to construct an insulated, climate-controlled storage facility for the campus's… Read full summary

Funding received
2023-2024

Grant type
Large

Awarded
$72,400

PROJECT LEAD
Marlee Theil
mtheil@uw.edu

When cherry blossoms will hit peak bloom in the Seattle area in 2025

March 4, 2025 at 6:00 am | *Updated March 4, 2025 at 6:00 am*

Pedestrians walk through illuminated Yoshino cherry blossoms at dusk,... (Erika Schultz / The Seattle Times) **More**

By Terry Wood

Special to The Seattle Times

Marlee Theil has got cherry blossom season down to a science. Literally.

Theil, a University of Washington grad student who is studying in the School of Environmental and Forest Sciences and is part of the UW grounds maintenance team,

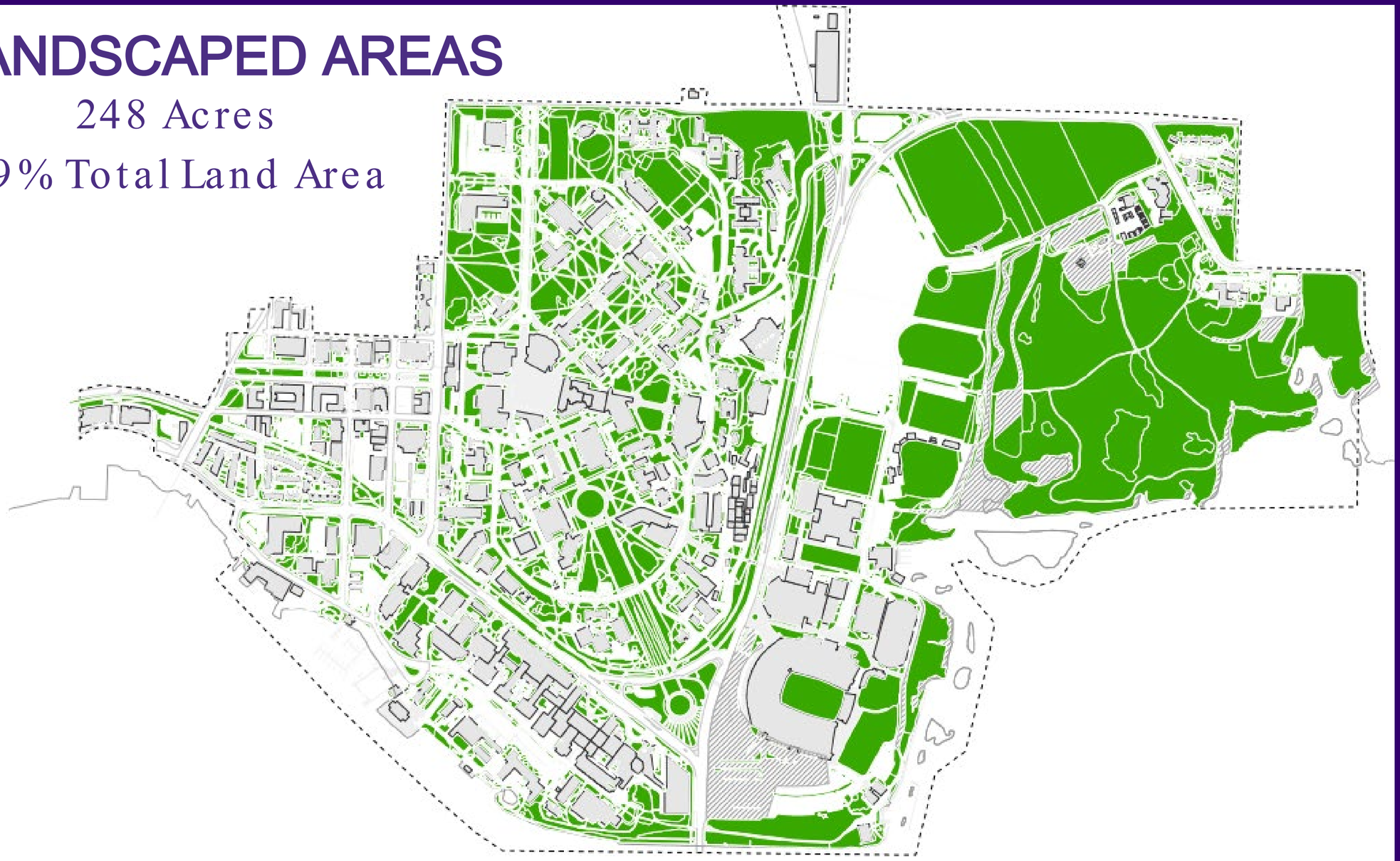
Campus Overview

UNIVERSITY of WASHINGTON

LANDSCAPED AREAS

248 Acres

39% Total Land Area



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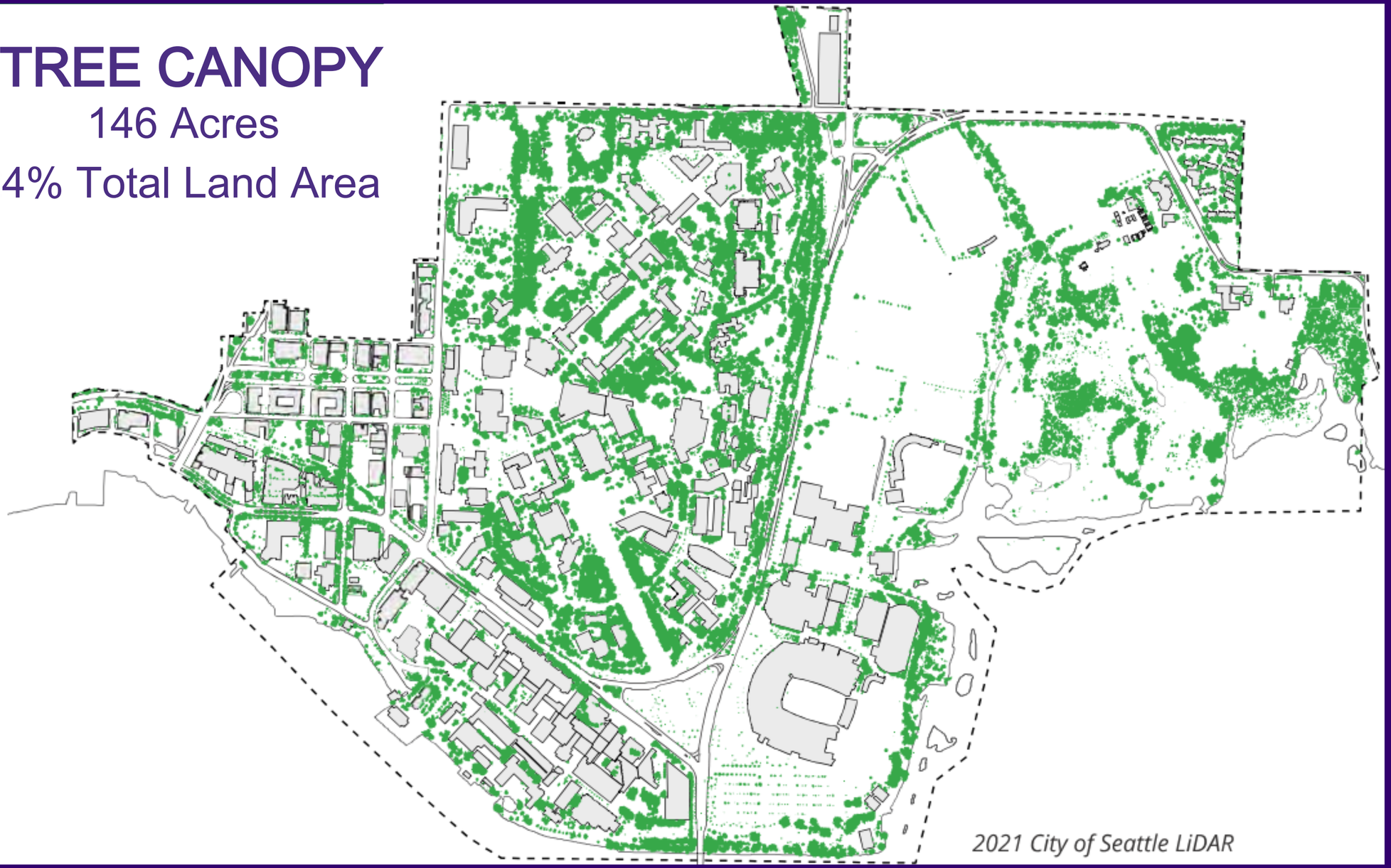
Urban Forest Management Plan,
UW Office of the University Architect, 2016

TREE CANOPY

146 Acres

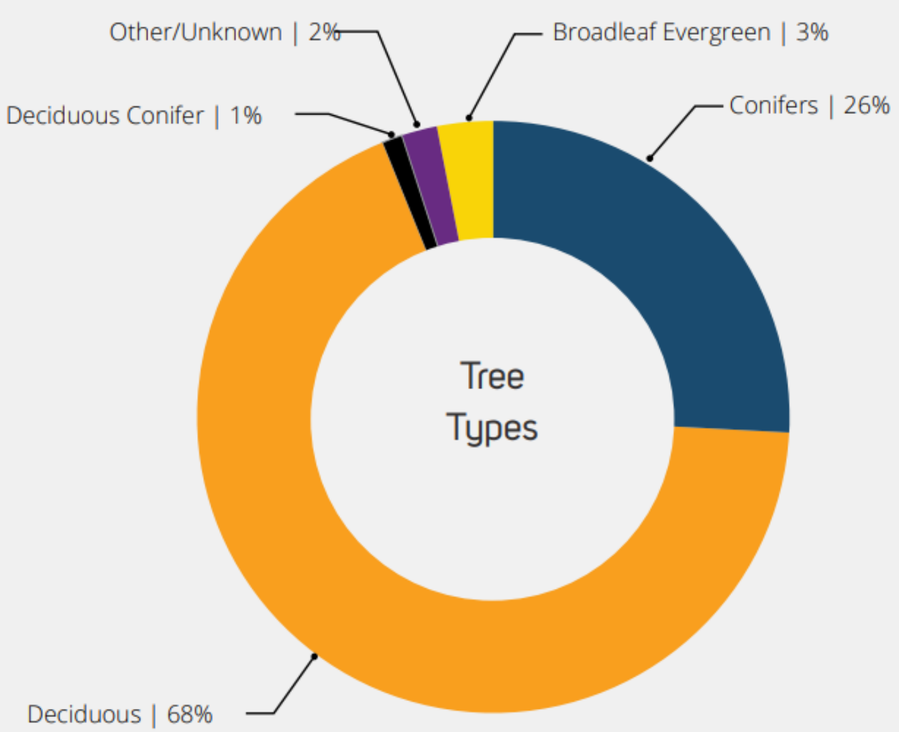
24% Total Land Area



Urban Forest Management Plan,
Campus Architecture & Planning, 2024

TREE DIVERSITY

- 9,000+ trees
- 30% native, 65% non-native
- 500+ species
- $35,000,000+ economic value



Most Common Species

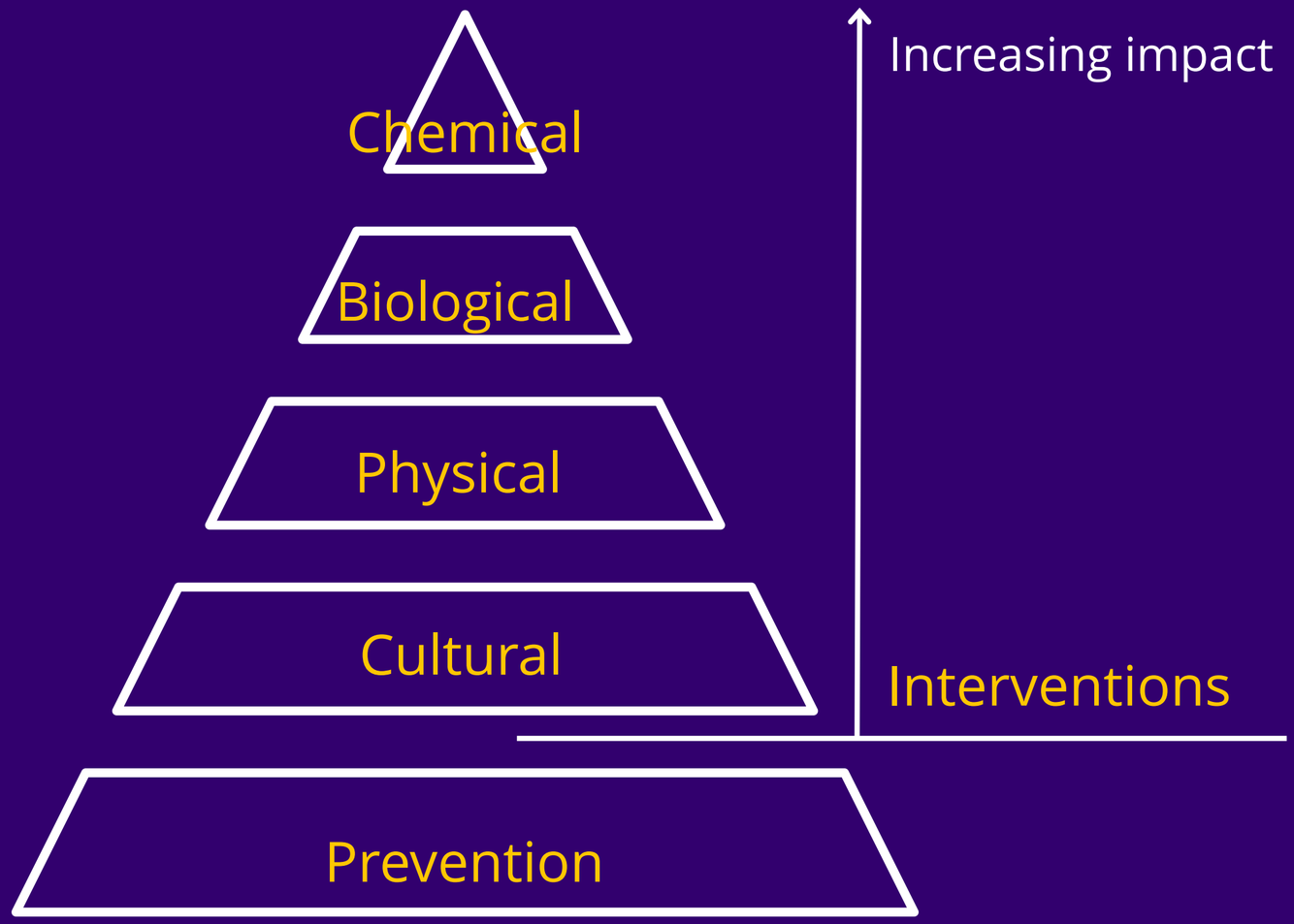
Tree Species	# of Trees
Acer macrophyllum	733
Pseudotsuga menziesii	532
Acer circinatum	479
Quercus rubra	254
Thuja plicata	217
Chamaecyparis lawsoniana	200
Pinus sylvestris	162
Calocedrus decurrens	152
Cedrus deodara	149
Liriodendron tulipifera	145

Urban Forest Management Plan,
Campus Architecture & Planning, 2024

Integrated Pest Management Plan

UNIVERSITY of WASHINGTON

Integrated Pest Management Plan -
an adaptive, sustainable approach for handling pests that safeguards people, plants, and the environment



WHY ARE IPM PLANS IMPORTANT?

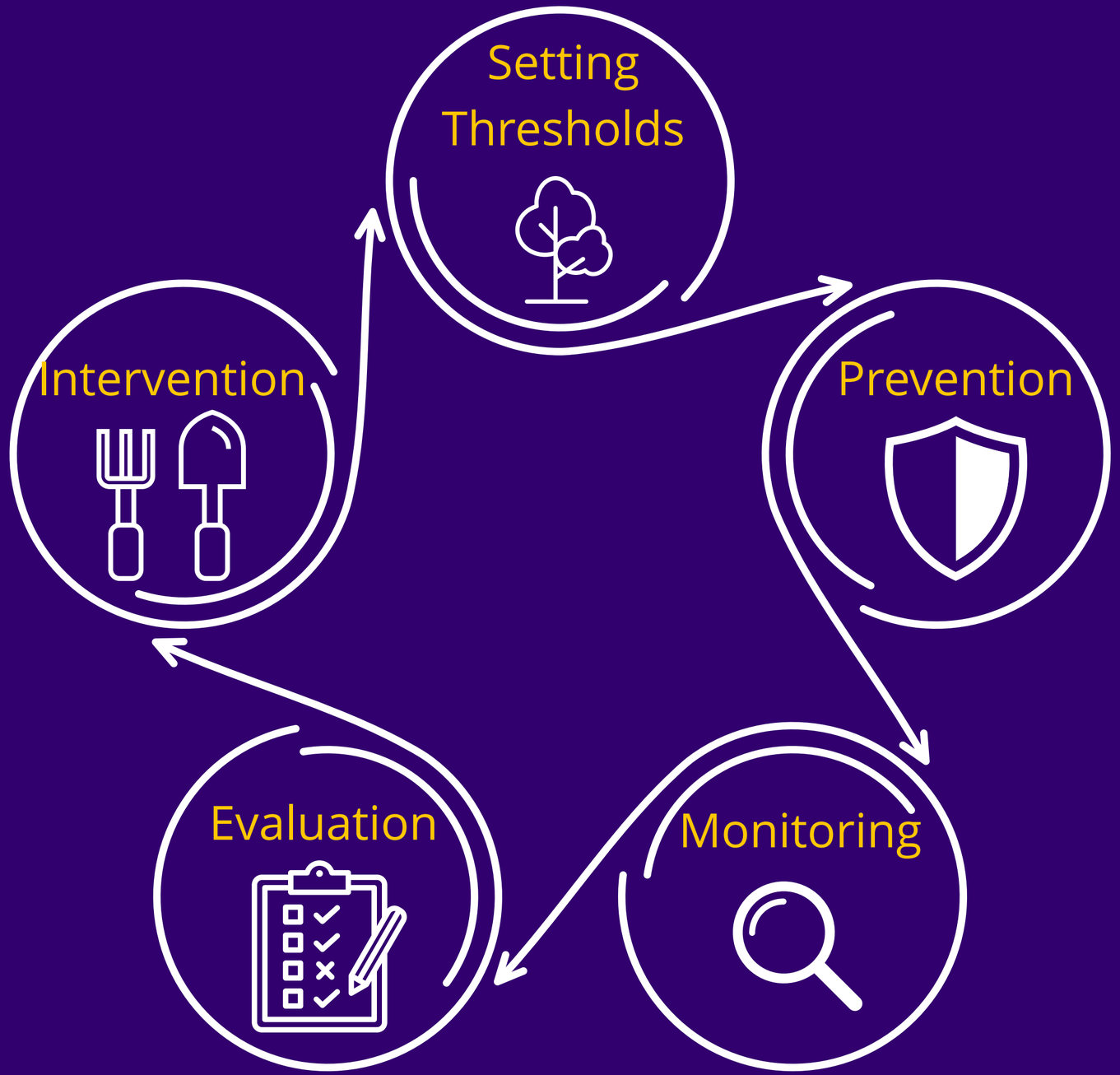
- Guides decisions and documents practices
- Ensures consistent management
- Supports knowledge sharing
- Provides a framework to protect trees
- Keeps landscapes resilient

Yakama Nation and UW Grounds Management conducting cultural and restorative burn

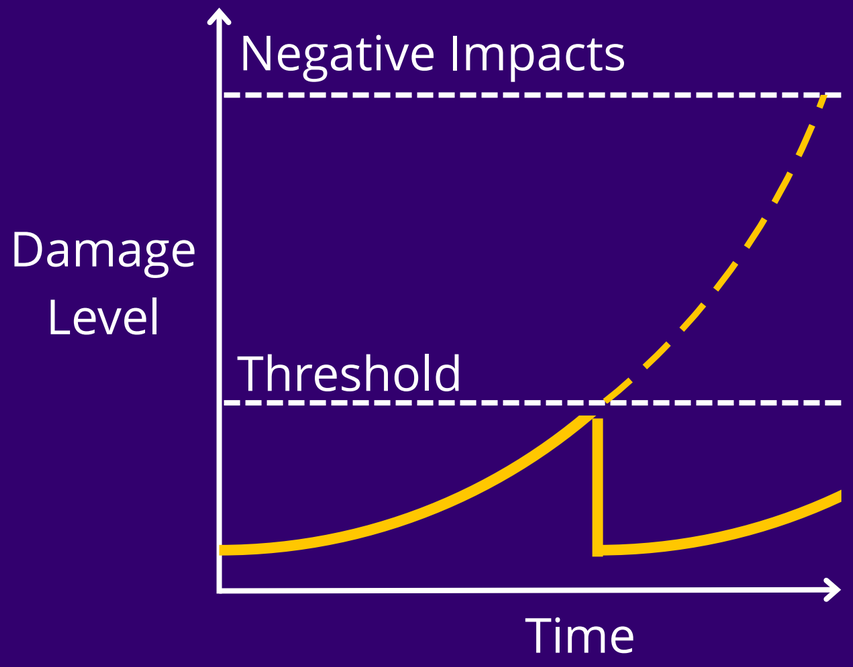
IPM CYCLE

Inspired by:

EPA
United States
Environmental Protection
Agency



IPM CYCLE


Negative Impacts
Damage Level
Threshold
Time


Setting Thresholds
Prevention
Monitoring
Evaluation
Intervention
When pest or damage requires action

IPM CYCLE

- Proper tree Selection
  - Right tree, right place
  - Climate tolerances
  - Strong, natural structure
  - Avoid high-risk species
- Plant diverse stands
- Group plants by needs

Seattle Department of Transportation

Tree Selection Guidance Tool

Tree List
131 Trees

The Seattle Department of Transportation maintains a list of trees common to our area. This dashboard will help you browse this list and help identify to trees that will provide optimal canopy cover based on your site conditions. Large trees, when site conditions allow, could offer benefits such as energy-saving shade and carbon dioxide sequestration. Hover over a tree for more information and important comments by the City Arborist.

Seattle Department of Transportation

TREE CHARACTERISTICS
Click to filter,
click again to unfilter

Drought Tolerence

High	8
Moderate	99
Low Moderate	2
Moderate High	3
Low	19

Size

Large	33
Medium	46

Native

No	125
Yes	3
Unkn	3

Fall Color

Flower

SITE INFORMATION
Filter the list of trees to match the characteristics of your site

Exposure
- [x] Full Sun
- [x] Part Shade
- [x] Part Sun
- [x] Part/Full Sun

Overhead Wires
- (•) No
- ( ) Yes

Planting Strip Width
- ( ) 4 ft
- ( ) 5 ft
- ( ) 6 ft
- (•) 8 ft

Tulip Tree	*Liriodendron tulipifera*	OK Under Wires: No Native: No Drought Tolerance: Moderate Mature Shape: Oval Mature Height: 80 ft Flower: Yellow Exposure: Full Sun
Black Oak	*Quercus velutina*	OK Under Wires: No Native: No Drought Tolerance: Moderate Mature Shape: Oval Mature Height: 70 ft Flower: N/A Exposure: Full Sun
Bloodgood London planetree	*Platanus x acerifolia 'Bloodgood'*	OK Under Wires: No Native: No Drought Tolerance: Moderate Mature Shape: Oval Mature Height: 70 ft Flower: N/A Exposure: Full Sun
Dawn Redwood	*Metasequoia glyptostroboides*	OK Under Wires: No Native: No Drought Tolerance: Moderate Mature Shape: Pyramidal Mature Height: 70 ft Flower: N/A Exposure: Full Sun
Red Oak	*Quercus rubra*	OK Under Wires: No Native: No Drought Tolerance: Moderate Mature Shape: Oval Mature Height: 70 ft Flower: N/A Exposure: Full Sun
Southern Red Oak	*Quercus shumardii*	OK Under Wires: No Native: No Drought Tolerance: Moderate High Mature Shape: Oval Mature Height: 70 ft Flower: N/A Exposure: Full Sun
Bald Cypress	*Taxodium distichum*	OK Under Wires: No Native: No Drought Tolerance: Moderate Mature Shape: Pyramidal Mature Height: 60 ft Flower: N/A Exposure: Full Sun
Bonfire Sugar Maple	*Acer saccharum 'Bonfire'*	OK Under Wires: No Native: No Drought Tolerance: Moderate Mature Shape: Oval Mature Height: 60 ft Flower: N/A Exposure: Full Sun
Chestnut Oak	*Quercus muhlenbergii*	OK Under Wires: No Native: No Drought Tolerance: Moderate Mature Shape: Oval Mature Height: 60 ft Flower: N/A Exposure: Full Sun
English Oak	*Quercus robur*	OK Under Wires: No Native: No Drought Tolerance: Moderate Mature Shape: Oval Mature Height: 60 ft Flower: N/A Exposure: Full Sun

CLIMATE CHANGE VULNERABILITY OF URBAN TREES

PUGET SOUND REGION, WASHINGTON

NIACS
Northern Institute of Applied Climate Science

URBAN ADAPTABILITY:

- \+ High: *Species may perform better than modeled*
- • Medium
- – Low: *Species may perform worse than modeled*

ZONE SUITABILITY:

- ✔ Suitable
- ✘ Not Suitable

VULNERABILITY:

- ▼ Low: *Suitable zone, high adaptability*
- ● Low-moderate: *Suitable zone, medium adaptability*
- ⊖ Moderate: *Suitable zone, low adaptability or zone not suitable, high adaptability*
- ○ Moderate- high: *Zone not suitable, medium adaptability*
- △ High: *Zone not suitable, low adaptability*

COMMON NAME	ADAPT	HEAT ONLY ZONE SUIT	HEAT ONLY ZONE VULN	HEAT & HARDINESS ZONE SUIT	HEAT & HARDINESS ZONE VULN
Aleppo pine	•	✔	●	✔	●
Alleghany serviceberry	+	✔	▼	✔	▼
American basswood	•	✔	●	✘	○
American beech	•	✔	●	✔	●
American elm	•	✔	●	✔	●
American hornbeam	+	✔	▼	✔	▼
American smoke tree	•	✔	●	✘	○
American sycamore	•	✔	●	✔	●
American witch-hazel	•	✔	●	✘	○
Amur maackia*	+	✔	▼	✘	⊖
Apricot	•	✔	●	✘	○
Arizona cypress	•	✔	●	✔	●
Austrian pine	•	✔	●	✘	○
Bald cypress	+	✔	▼	✔	▼
Big leaf maple	•	✔	●	✔	●
Birch bark cherry	•	✔	●	✘	○
Black cherry	–	✔	⊖	✔	⊖

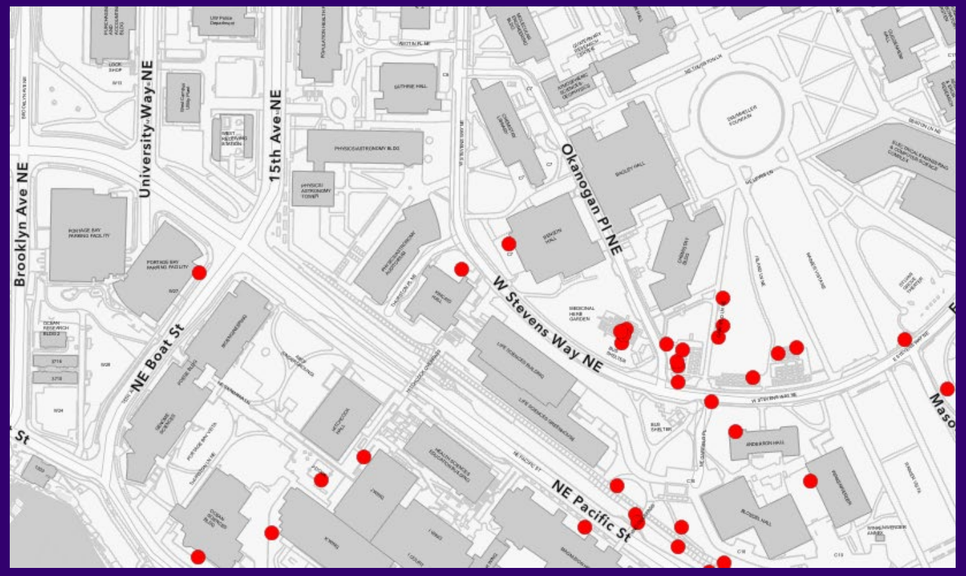
COMMON NAME	ADAPT	HEAT ONLY ZONE SUIT	HEAT ONLY ZONE VULN	HEAT & HARDINESS ZONE SUIT	HEAT & HARDINESS ZONE VULN
Corkscrew willow	•	N/A	N/A	✔	●
Cornelian cherry	•	✔	●	✘	○
Crabapple	•	✔	●	✘	○
Crepe myrtle	+	✔	▼	✔	▼
Dawn redwood	•	✔	●	✘	○
Douglas fir	•	✔	⊖	✘	△
Downy serviceberry	+	✔	▼	✔	▼
Eastern hemlock	–	✔	⊖	✘	△
Eastern red cedar	+	✔	▼	✔	▼
Eastern redbud	•	✔	●	✘	○
Eastern white pine	–	✔	⊖	✘	△
Edible apple	•	✔	●	✘	○
Emerald sunshine elm	+	N/A	N/A	✘	⊖
Empress tree*	+	✔	▼	✔	▼
English elm	•	✔	●	✘	○
English laurel*	•	✔	●	✔	●
English oak	•	✔	●	✘	○

IPM CYCLE

King County

NOXIOUS WEEDS

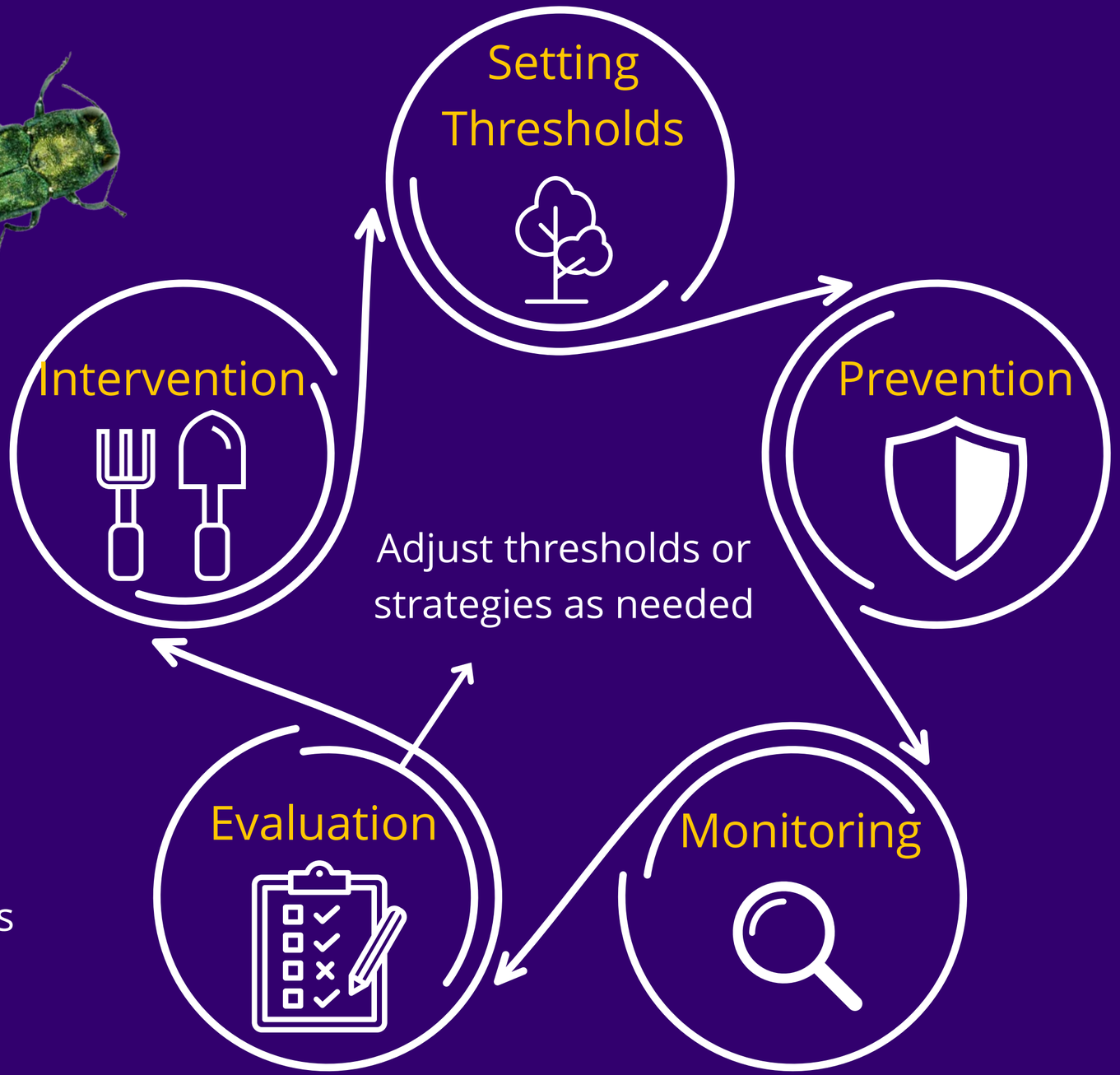
Plant Disease ArcGIS Map



IPM CYCLE

Emerald Ash Borer IPM

- Stop planting; limit maintenance
- Annual training
- Tree inventory
- Financial planning
- Monitoring
- Considering treating priority trees

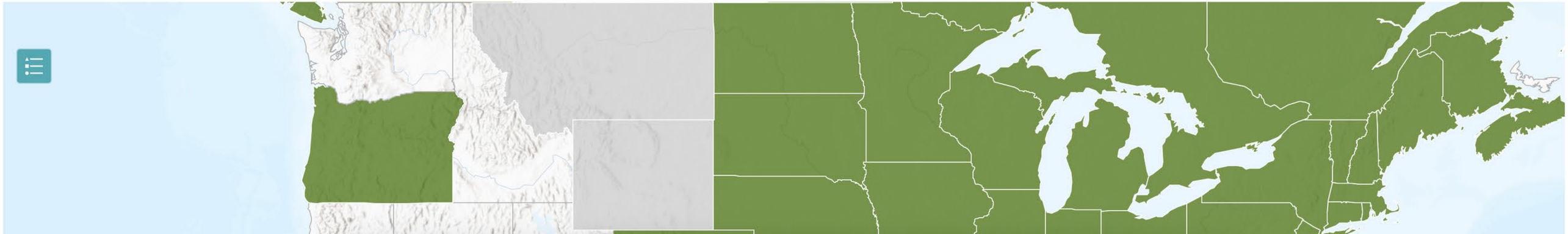


Emerald Ash Borer Information Network

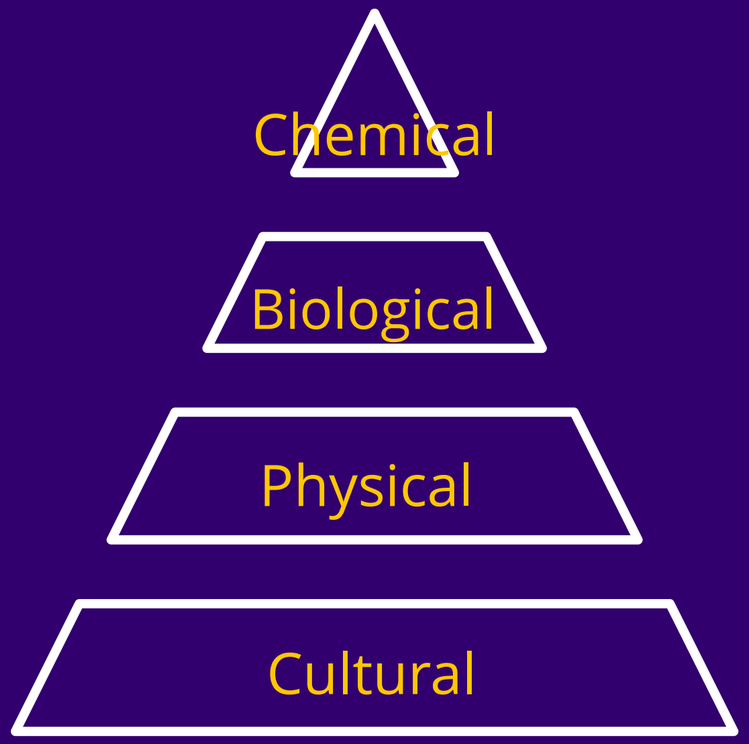
EAB Network

About | Homeowners | EAB U | Detection | Newsletter | Resources | FAQs | Sign In

Welcome to the Emerald Ash Borer Information Network



IPM CYCLE


Chemical
Biological
Physical
Cultural


Setting Thresholds
Prevention
Monitoring
Evaluation
Intervention
Targeted action when necessary

Cultural Interventions -

lowest impact strategies; “cultivating” a site to make the growing environment less favorable to pests

- Water first, then mulch
- Mulch: arborist chips
  - Mid-to-late winter
  - 3-6" in depth (permanent)
  - 3-4 ft radius; ideally to dripline
  - Keep 2-3" gap at trunk

treegator® Slow Release Watering Bags — Made in the USA

Free wood chips!

Tree People — Seattle Tree Service

CHIPDROP

Cultural Interventions -
lowest impact strategies; “cultivating” a site to make the growing environment less favorable to pests

- Construction protection
  - 8-12" in depth (temporary)
  - No excavation within dripline
  - Avoid soil compaction during wet conditions

UW Tree Protection Greensheet

Prior to Mobilization of Equipment or Supplies

Tree Protection

1st to show, last to go

!! ALERT !!

- Damage to protected trees can result in replacement costs equaling the assessed value of the tree
- Protect yourself with documentation from the Project Arborist

TREE PROTECTION
DO NOT MOVE FENCE

THE ASSESSED VALUE OF PROTECTED TREES ON THIS PROJECT

$56,700

NO MATERIAL WITHIN TREE PROTECTION ZONE

WRITTEN PERMISSION IS REQUIRED TO ENTER THE TREE PROTECTION AREA

Tree Protection Area (TPA)

- Install Tree Protection signs on fencing
- Project Arborist must be onsite or give written permission to move the Tree Protection fence
- Paint the corners of the TPA fencing for accurate replacement

Landscape Protection

- Protect landscape from equipment travel or pedestrian desired routes
- Check overhead clearance for free branch conflicts with equipment
- Protect irrigation by marking heads and underground lines

Inspired by:

FEMA

ROOTS

- If the root can be preserved, keep the roots covered and moist until they can be reburied
- If working outside TPA, cut any roots less than 2 inches in diameter with sharp pruners
- If working inside the TPA, follow the direction of the consulting Arborist

INSIDE THE TPA

- Hand work only - No heavy equipment - Do not compact Soil - Water/mulch according to the Arborist Plan

Removing Tree Protection- Alert the UW Arborist 2 weeks prior to removal

Tree Protection removal is the most vulnerable time for trees

Protect the tree as if the fence were present. Nothing should be in the area of the Tree Protection zone. Keep equipment and materials out of the area. Do not drive equipment over the roots. Install temporary tree protection as a reminder when not working in the area or replace the original fence if feasible.

Biological Interventions -

Using living organisms to control pests; harnessing natural relationships between pests and their enemies

Dutch Elm Disease Vaccine

DutchTrig®

Daniel Kim, The Seattle Times, 2023

Successful Insect Bio -Control Agents in Action

UNIVERSITY of WASHINGTON

BEECH TREE & APHIDS

Copper Beech

Fagus sylvatica

Woolly Beech Aphid

Phyllaphis fagi

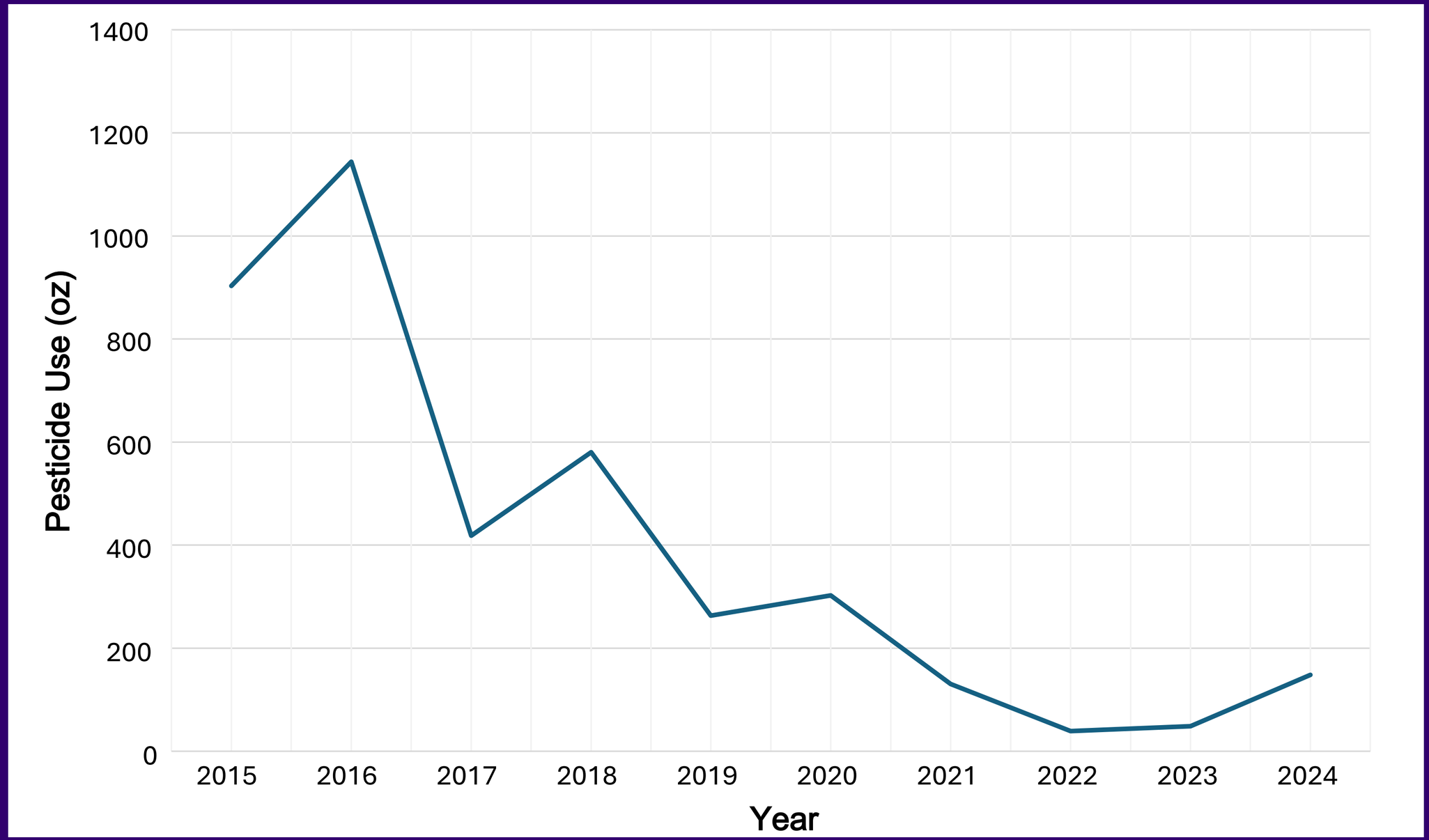
CHEMICAL CONTROL OF APHIDS

Soil Drench of Criterion
(imidacloprid)

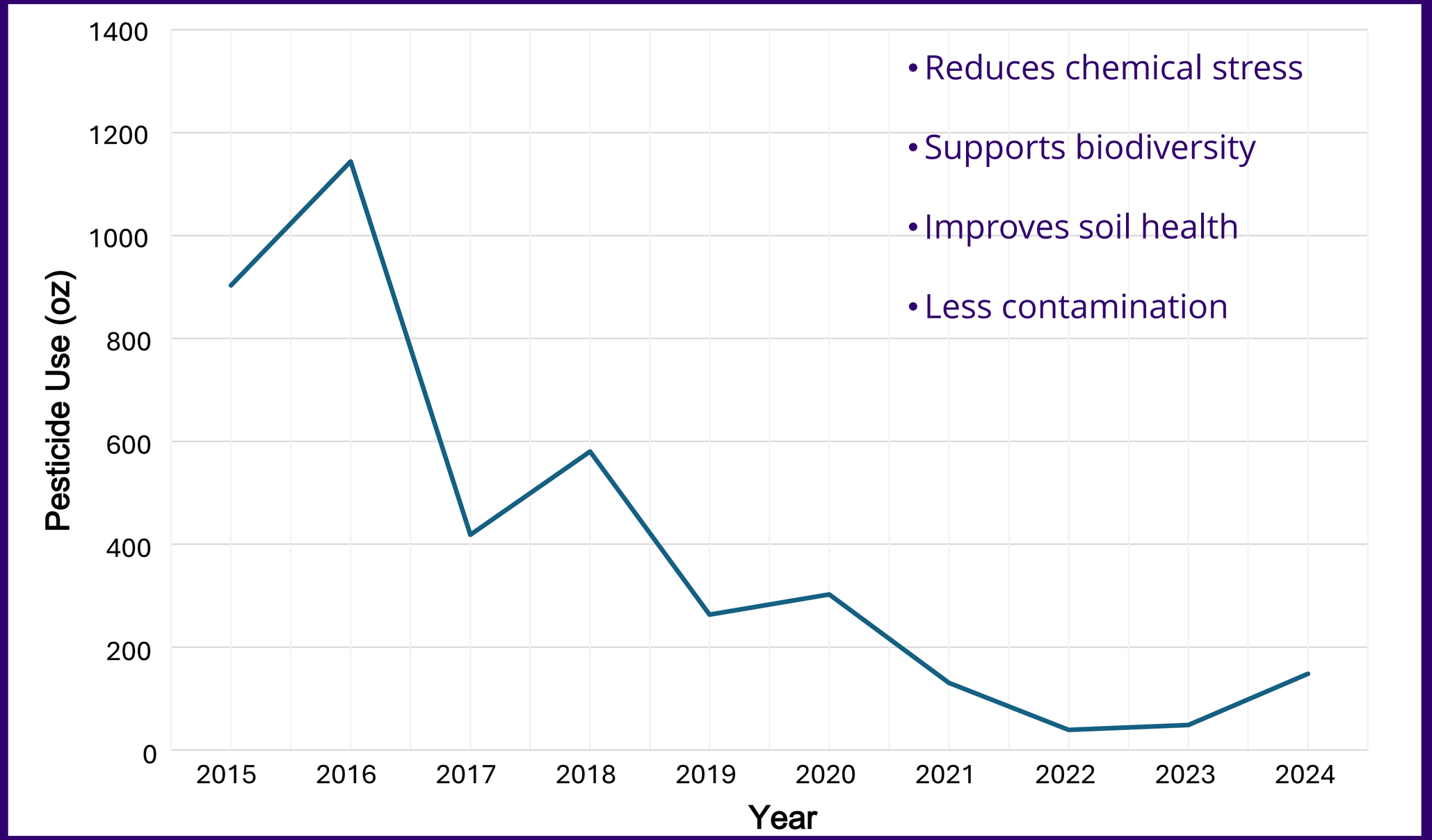
CHEMICAL CONTROL OF APHIDS

Soil Drench or Criterion
(imidacloprid)

UW Grounds Management Pesticide Use 2015 - 2024



UW Grounds Management Pesticide Use 2015 - 2024



BIOLOGICAL CONTROL OF APHIDS

Green Lacewing

Chrysoperla rufilabris

Aphid-Parasitic Wasp

Aphidus colemani

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BIOLOGICAL CONTROL OF APHIDS

SEATTLE TREE CARE

Thank you! Questions?

Marlee Theil, mtheil@uw.edu

UNIVERSITY of WASHINGTON

RESOURCES

- UW Urban Forest Management Plan, Office of the University Architect, 2016
https://facilities.uw.edu/files/media/2016-urban-forest-management-plan.pdf

- UW Urban Forest Management Plan, Campus Architecture and Planning, 2024
https://facilities.uw.edu/files/media/ufmp-2024-compressed-for-mobile-30mb.pdf

- Integrated Pest Management (IPM) Principles, United States Environmental Protection Agency
https://www.epa.gov/safepestcontrol/integrated-pest-management-ipm-principles

- Seattle Department of Transportation, Tree Selection Guidance Tool
https://public.tableau.com/app/profile/city.of.seattle.transportation/viz/SDOTTreeSelector/Dashboard

- Puget Sound Region: Tree Species Vulnerability Assessment
  - Research:
    - Rutledge, A.; Brandt, L.A. 2022. Puget Sound Region: Tree Species Vulnerability Assessment. Summary Report from the Northern Institute of Applied Climate Science (NIACS). White Paper. Houghton, MI: U.S. Department of Agriculture, Northern Forests Climate Hub.
  - Handout:
    - https://forestadaptation.org/sites/default/files/2022-03/PugetSound_species_handout_1x1Portrait_%5BUpdated%202.25.22%5D.pdf

RESOURCES

- King County Noxious Weeds Control Program

https://kingcounty.gov/en/dept/dnrp/nature-recreation/environment-ecology-conservation/noxious-weeds/about-us

- Emerald Ash Borer Information Network

https://www.emeraldashborer.info

- Federal Emergency Management Agency Environmental Considerations Greensheet

https://www.deq.nc.gov/waste-management/dwm/sw/field-operations/dds/fema-environmental-green-sheet/download