WASHINGTON STATE UNIVERSITY EXTENSION

Ponderosa Pine Needle Compost as a Catalyst for Community Development

Presented By:
Steve McConnell
Regional Extension Specialist, Forestry
Washington State University

ANREP/NACDEP
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Breaking News!!!

Abstract

- A ponderosa pine needle composting research project in Spokane, WA, provided scientific data on a consequential approach to increase ecosystem resiliency in an urban setting and by doing so established an “in” with a huge new client base that had been historically underserved by Forest Extension programs and research.

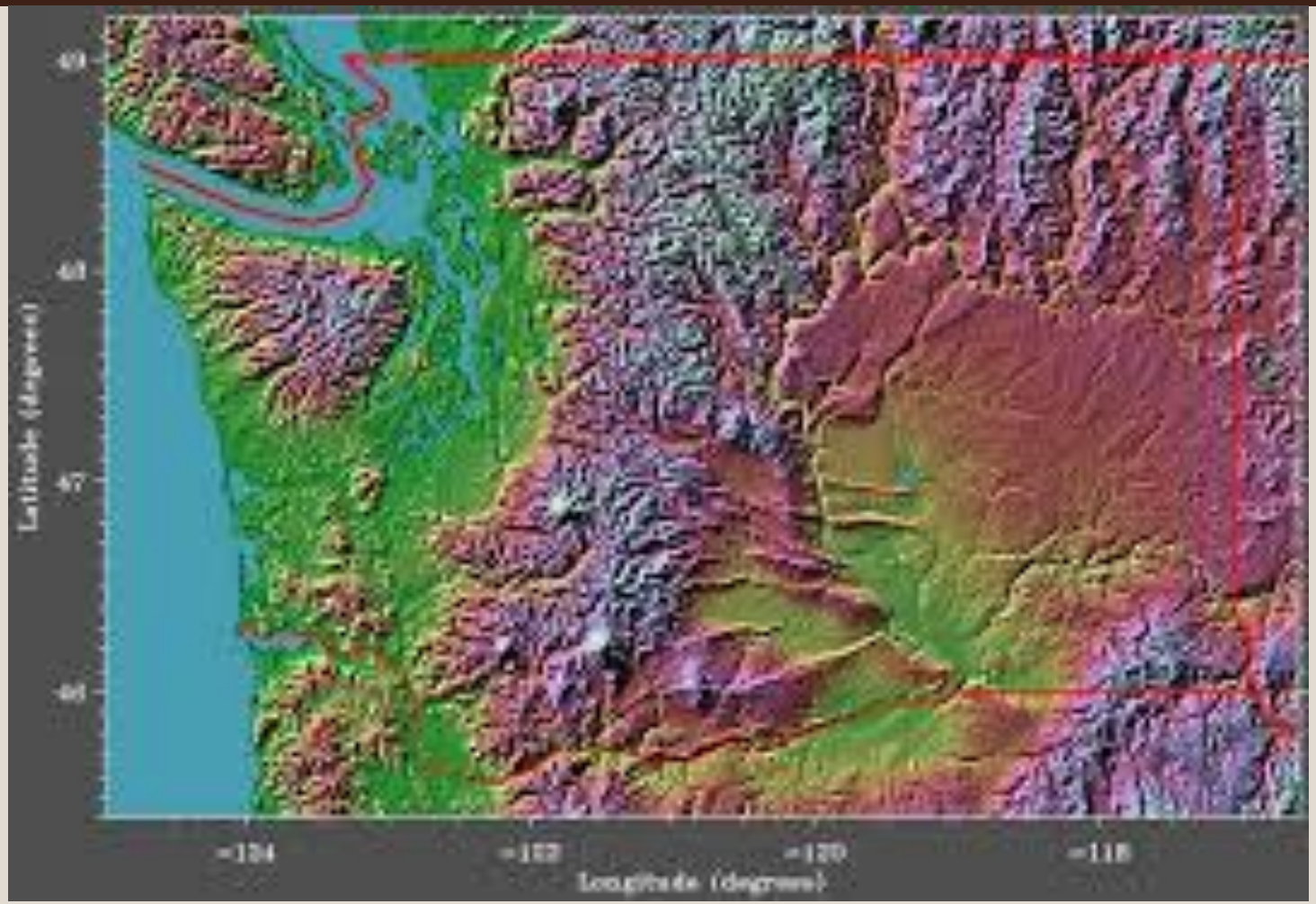
Acknowledgments

- Kathy Callum, Kris Major, Tim Kohlhauff, Anna Kestell, Louise Quirk, Bob Cordes, Eric Choker, Meghan Barrier, Matt Velasco, Ryan Herring, JP, Alex Ratcliff, Jeremy Ratcliff, Jake McConnell, Reed Lindholdt, Jeremy Cowan, Suzanne Tresko, Pat Munts, Ruby McConnell, Dori Babcock, WSU Extension, Pearl McConnell
- Coffee shops all over Spokane
- Tree Care Companies

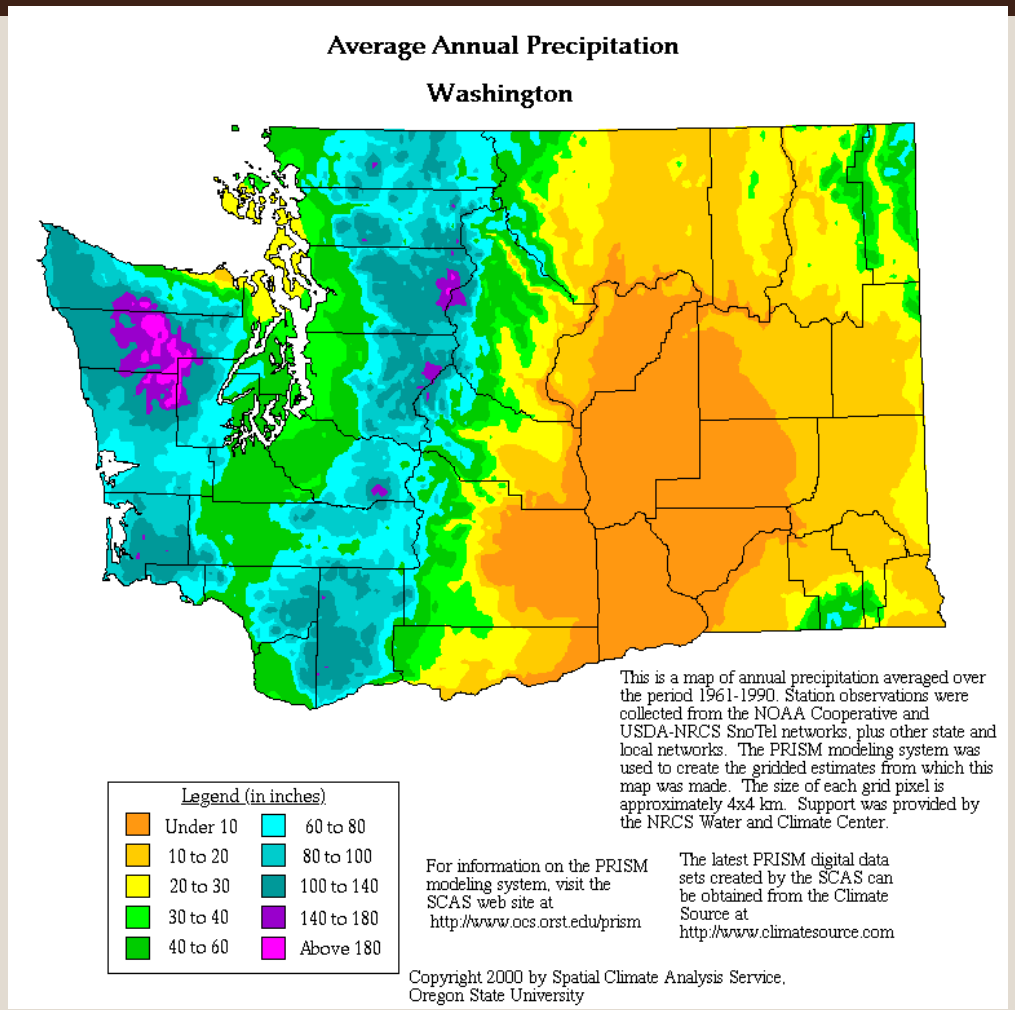
Resilience

- The power or ability to return to the original form, position, etc. after being bent, compressed, or stretched; elasticity
- Ability to recover readily from illness, depression, adversity, or the like; buoyancy

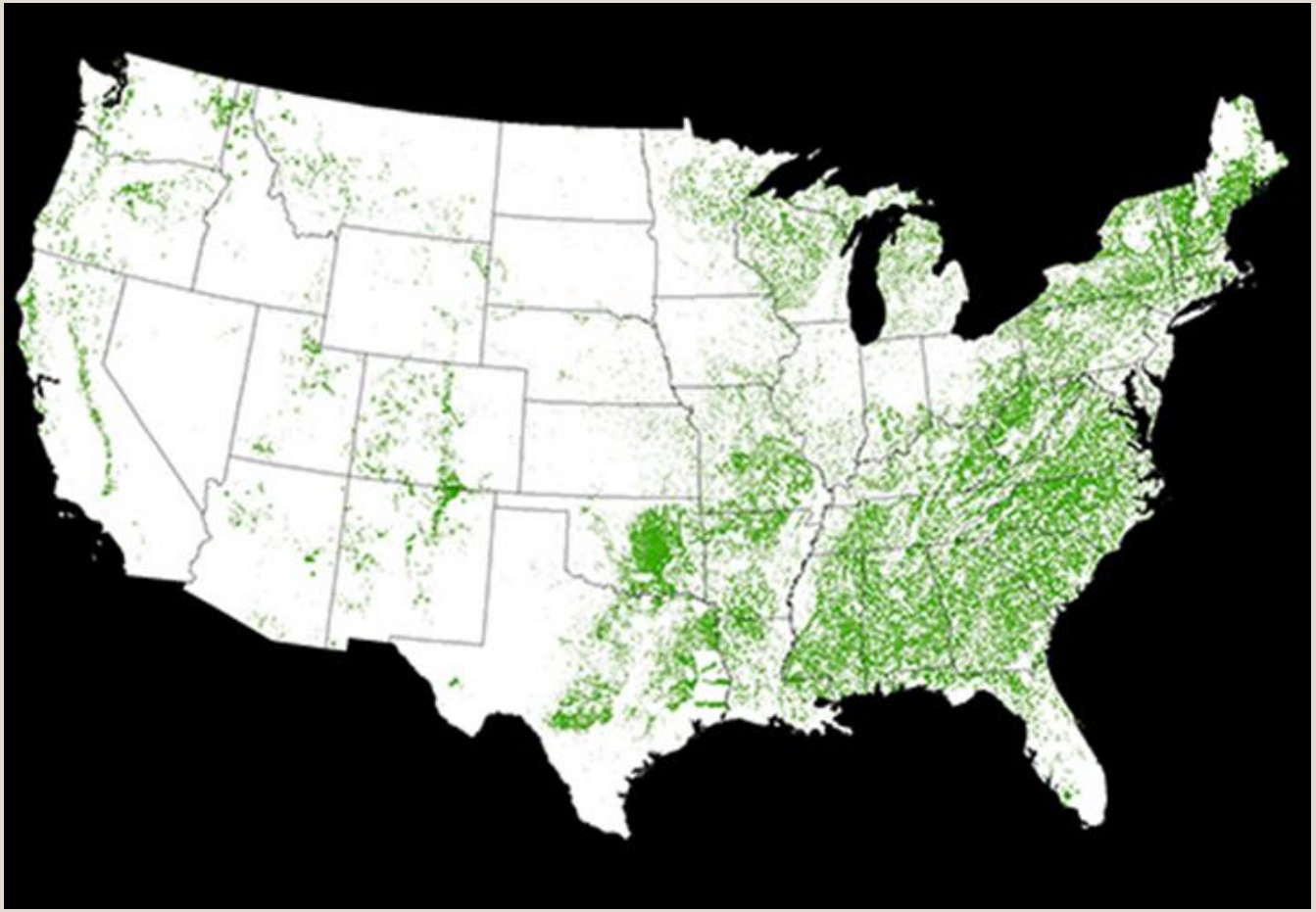
Washington, oh Washington



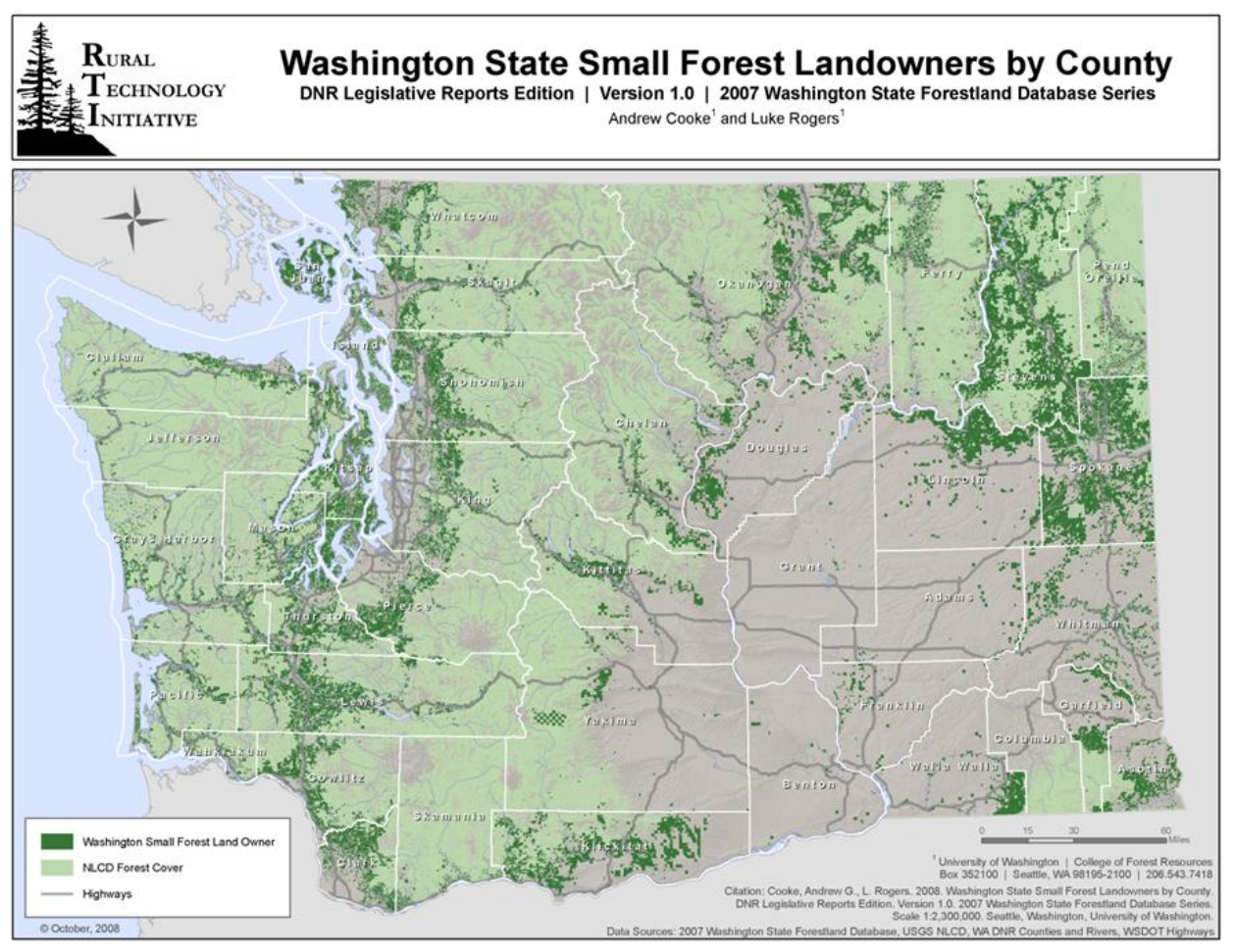
Water and Where it Falls



Small Forest Landowners Nationwide



Small Forest Landowners Statewide



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Forestry Extension Staffing

- Three Extension Foresters, one with two assistants
- Housed in CAHNRS (College of Agriculture, Human and Natural Resource Sciences)
- No Administrative Leadership with a Forestry Background

Other Cooperating Agencies…

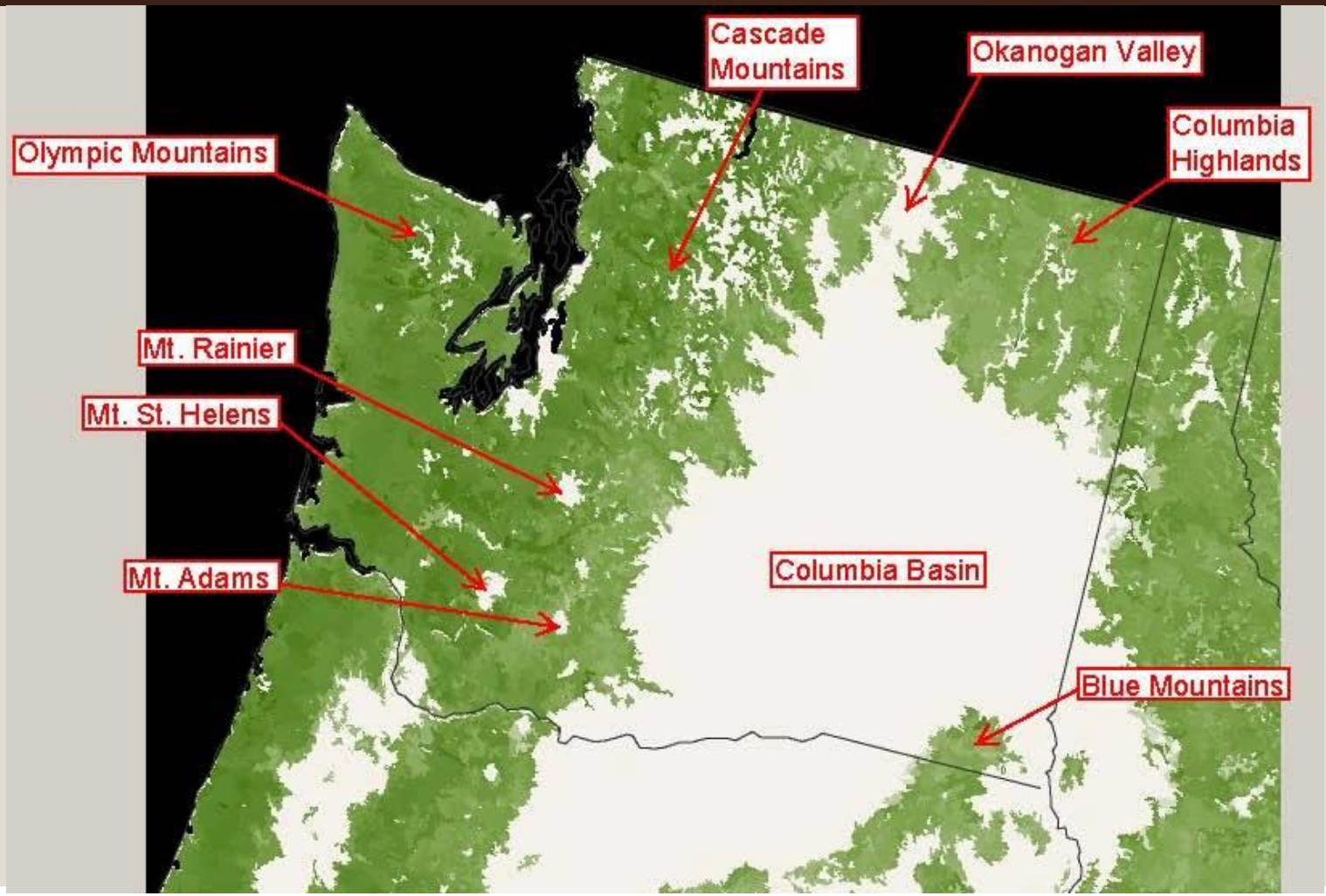
- Conservation Districts
- NRCS
- Department of Natural Resources

Extension Organization and Funding

- Extension Specialists operate as independent entrepreneurs – “build your own program”
- All Extension Agents funded differently
  - One is on “hard” funding
  - One is located amidst wealthy counties, funded primarily by these counties
  - One gets some county funding and WAS funded by federal government, via state and is now learning about resilience and adaptability

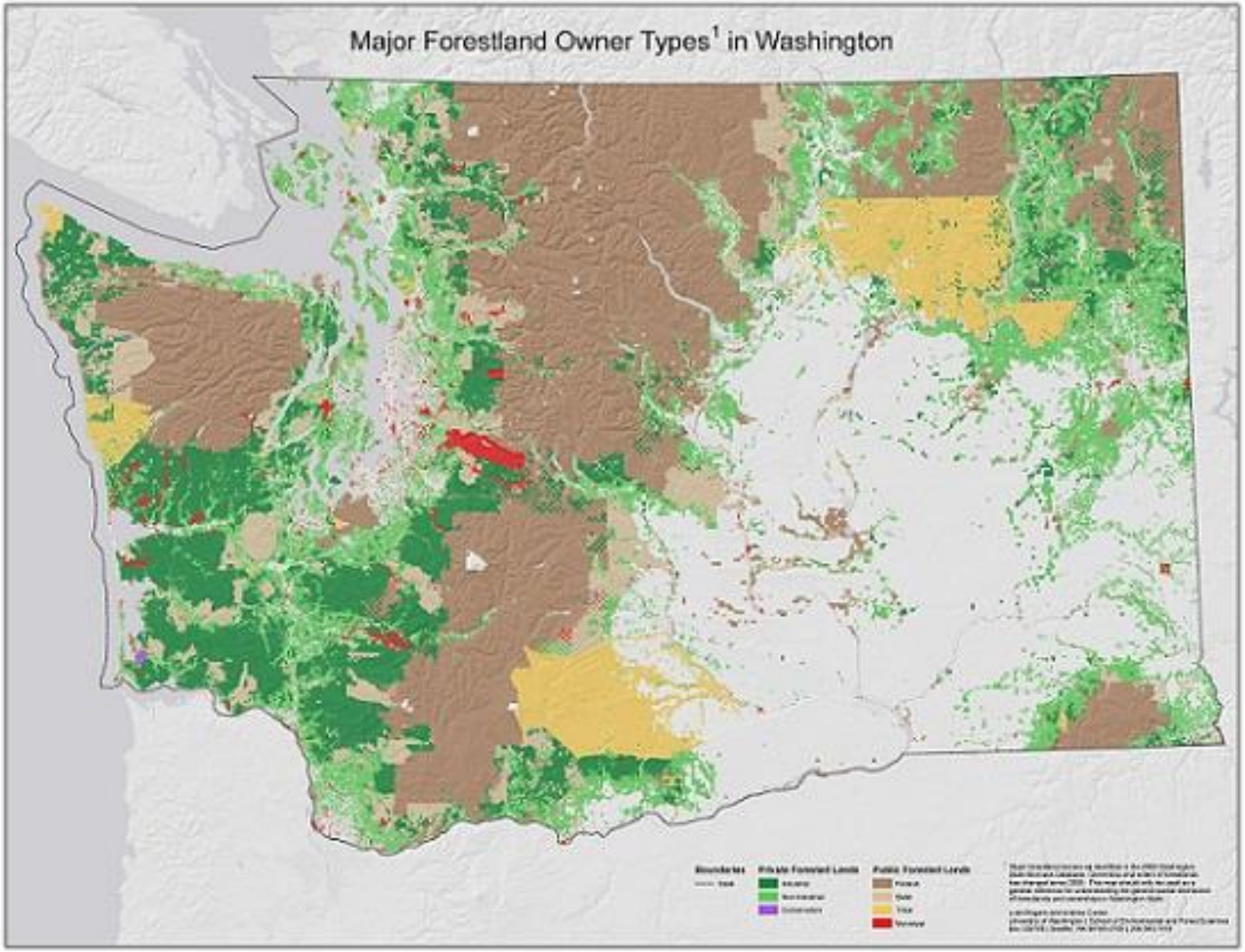
Where are the Forests?

Where are the Forests?



Forest Ownership

• Total land area	42,515,000	100%
• Forested area	22,119,000	52%
• “Government”	14,261,000	64%
• Private	7,858,000	36%
Private Industrial	4,614,000	21%
Non-Industrial Private	3,244,000	15%



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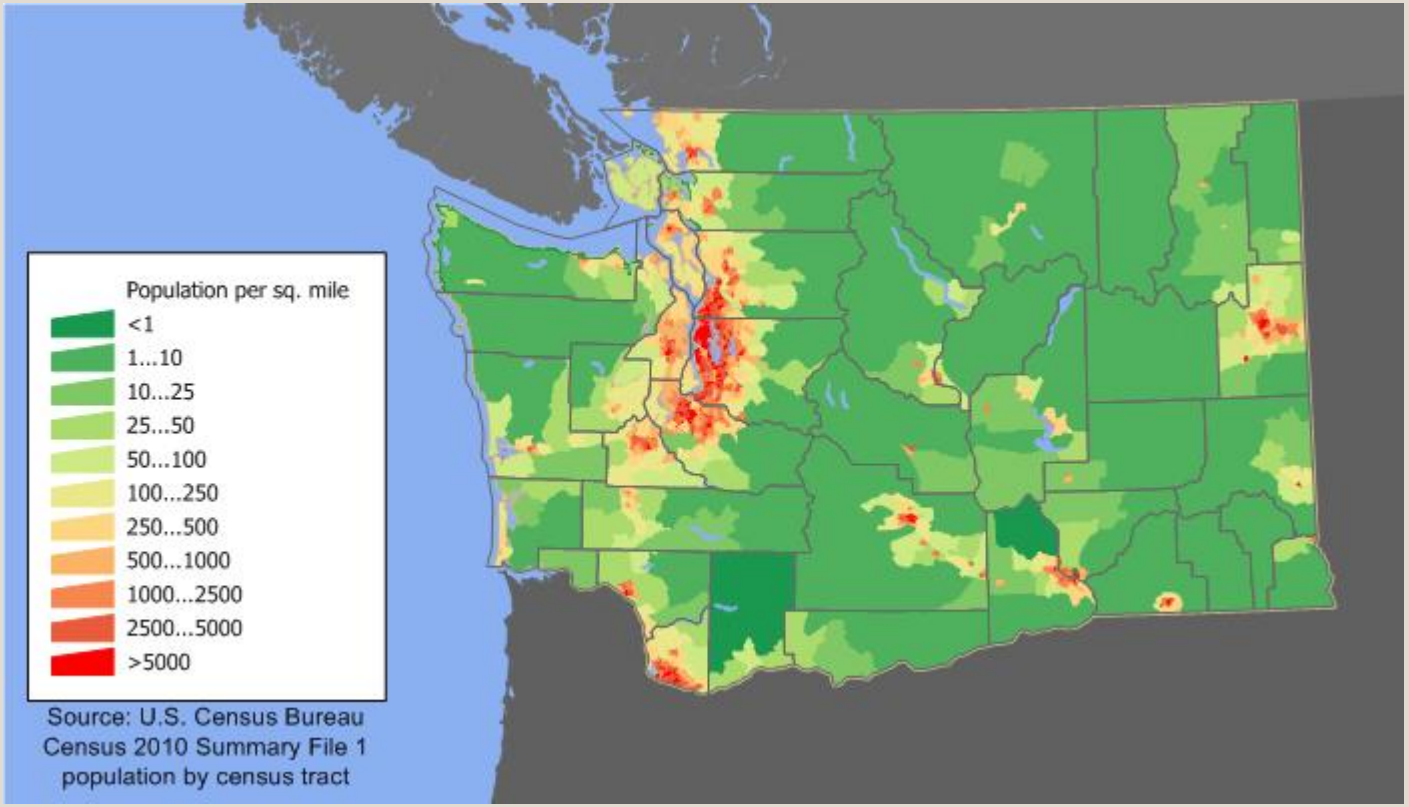
Research Universities in Washington

Forestry Expertise at Universities

- University of Washington – some faculty
  - Graduate program is SAF accredited.
- Washington State University – three faculty members (sociology, economics and forest ecology), none with Extension appointments.
  - Newly re-established forestry program, not yet SAF accredited
- Grays Harbor College, Green River College and Central Washington University

Where are the People?



Where are the People?

• Spokane	471,221	4
• Stevens	43,531	23
• Pend Oreille	13,001	33
• Ferry	7551	36
• NE Washington	**535,304**	**24**
• Walla Walla	58,781	21
• Asotin	21,623	28
• Asotin	4078	37
• Garfield	2266	39
• SE Washington	86,748	31

Where are the People?

• NE Washington	**535,304**	**24**
• SE Washington	86,748	31
• Total	622,052	

• Spokane Metro Area	471,221
• Walla[2] “Metro Area”	31,731
• Total	502.952

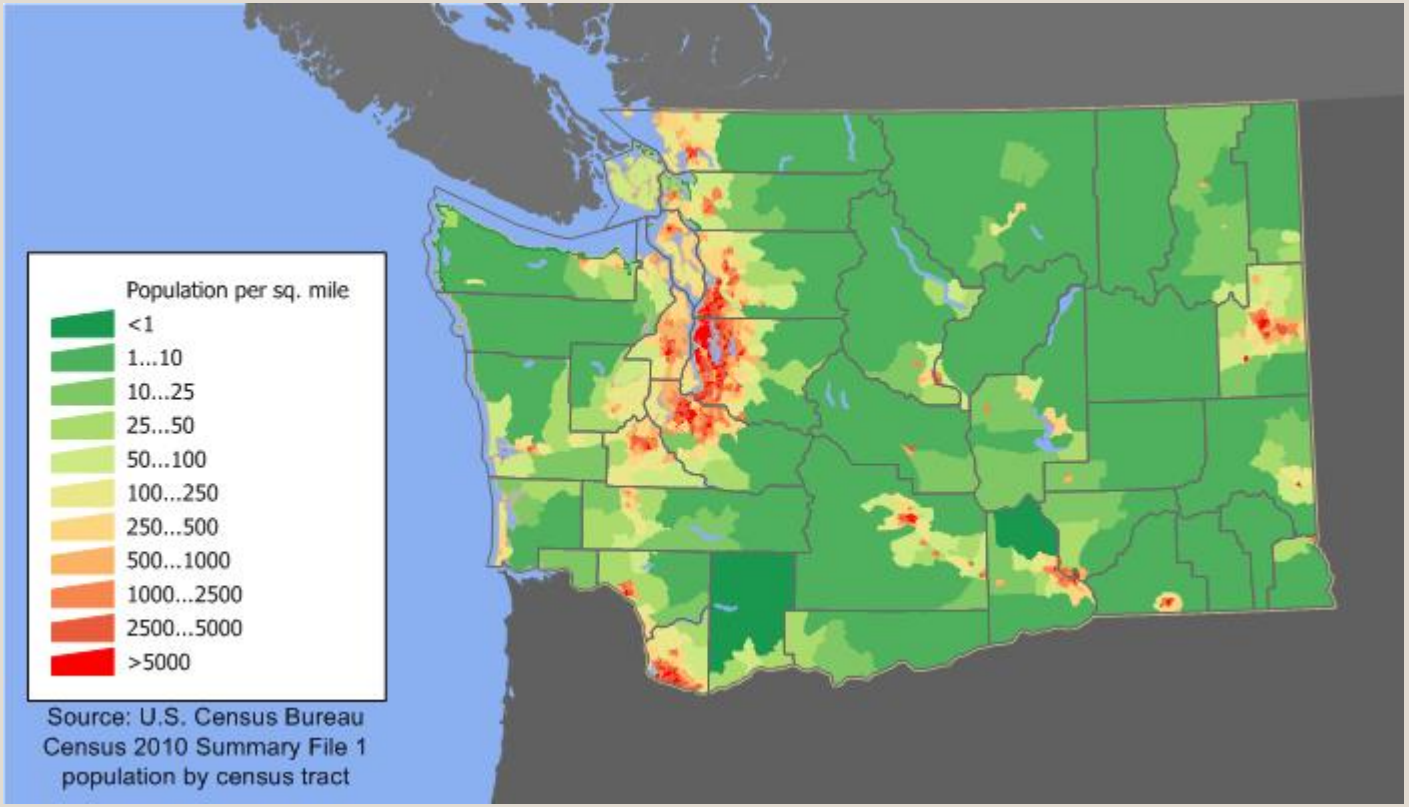
- 80.9% of area residents live in urban setting
- As of 2014 Spokane made list of top 100 metro areas in US with population GT 500,000

Where are the People?

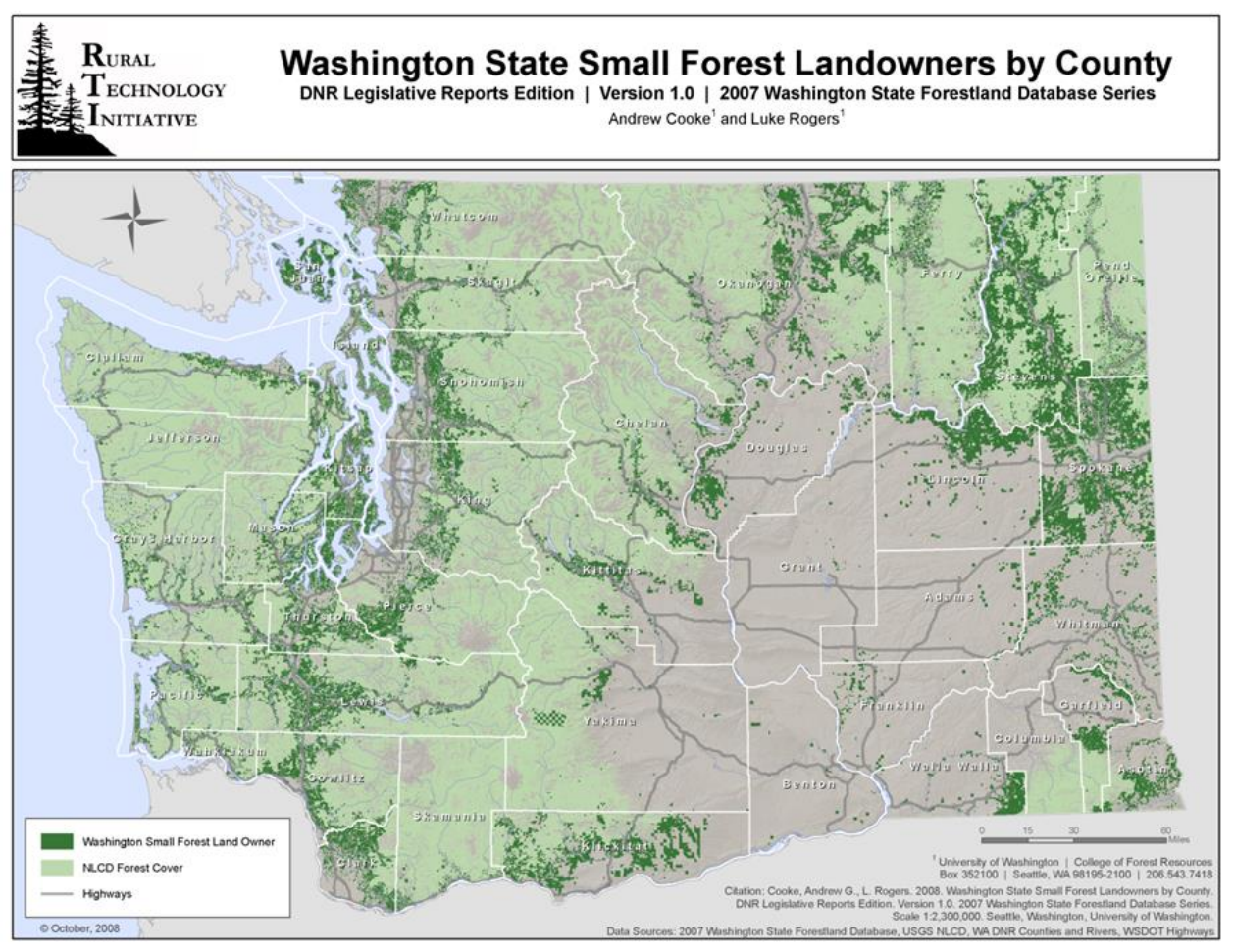
- Washington State 2010 population – 6,744,000
- “My” area 2010 population - 622,052 = 9.2%
- Washington State area = 71,362 mi^2
- “My” area 11,331 mi^2 = 15.9%

- Vermont 2010 population = 625,960
- Vermont area = 9623 mi^2

Where are the People?



Small Forest Landowners Statewide



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Consequential Attributes of “My” Area

- Most of the population is urban ~ 84%
- Almost everybody lives in an at-risk WUI
- Active forest management (timber harvest) is hugely important to the local economy
- Most SFLO’s objectives are: wildlife, privacy, enjoying a small slice of heaven, recreation… timber harvest is low on their list but harvest occurs as a result of fire ecology of the area

Consequential Attributes of “My” Area

- Recreation and aesthetics are Very Important to urban dwellers – lots of community forests (near nature, near perfect)
- Urban residents very interested in sustainability, community gardens, growing their own food
- Makes for a logical division of emphasis for me of:
  - 1) Working forest, 2) WUI, 3) community forests and 4) urban forests

Near Nature, Near Perfect

Ponderosa Pine Characteristics: Natural Setting

- Drought-tolerant
- Shade-intolerant
- Fire-resistant
  - Thick bark
  - Lower crown self-thins creating distance between surface fuels and crown

Ponderosa Pine Characteristics: Urban Setting

- Need[illegible] fall on lawn
- Need[illegible]
- Need[illegible]
- Ditto
- Need[illegible]

compos[illegible]e

them in

Needles on the lawn…

Needles on the lawn…

Needles on the lawn…

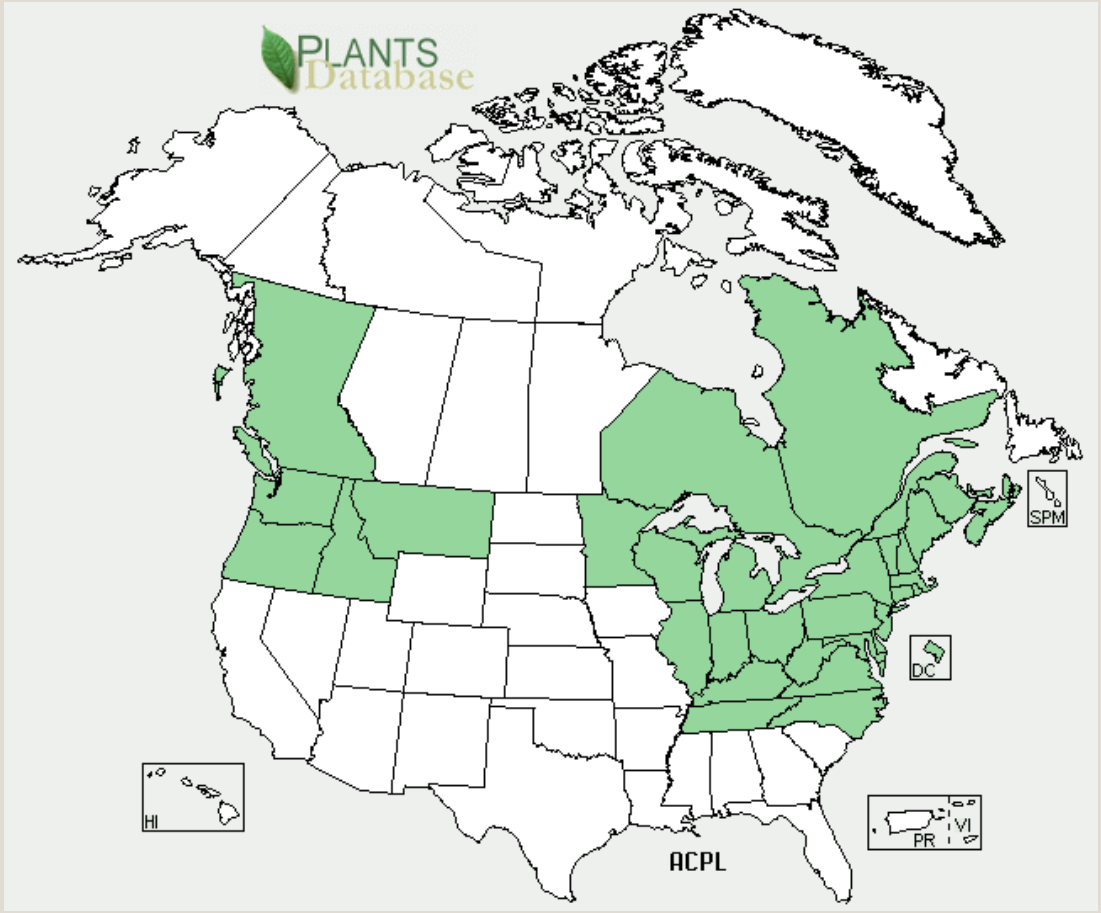
Reflections on ponderosa pine in the city…

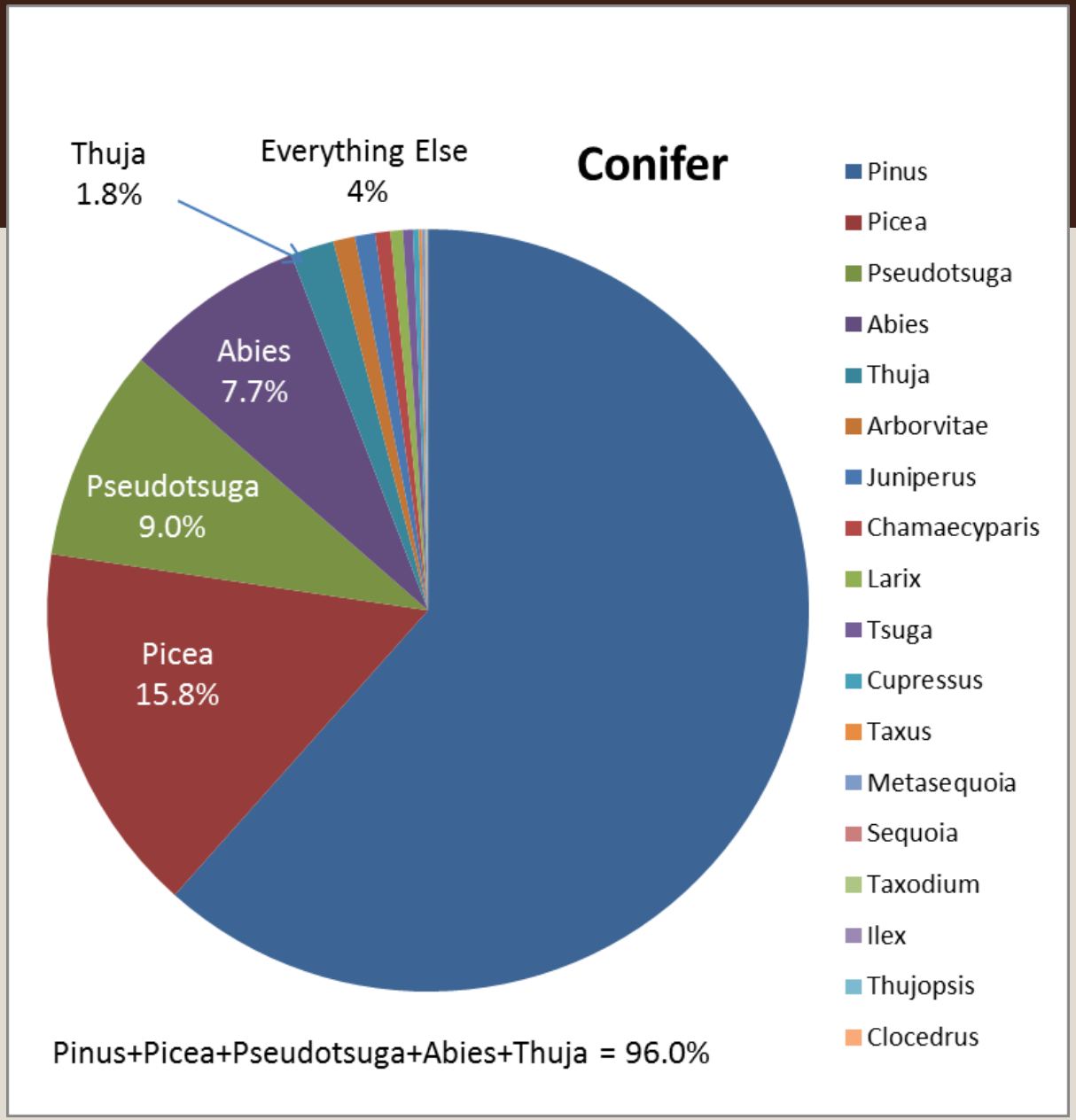
- Spokane is one of the few cities in the country which has both a “needle exchange program” for heroin users, and a “needle disposal program” for ponderosa victims.
- Named Official tree of the City of Spokane in 2014

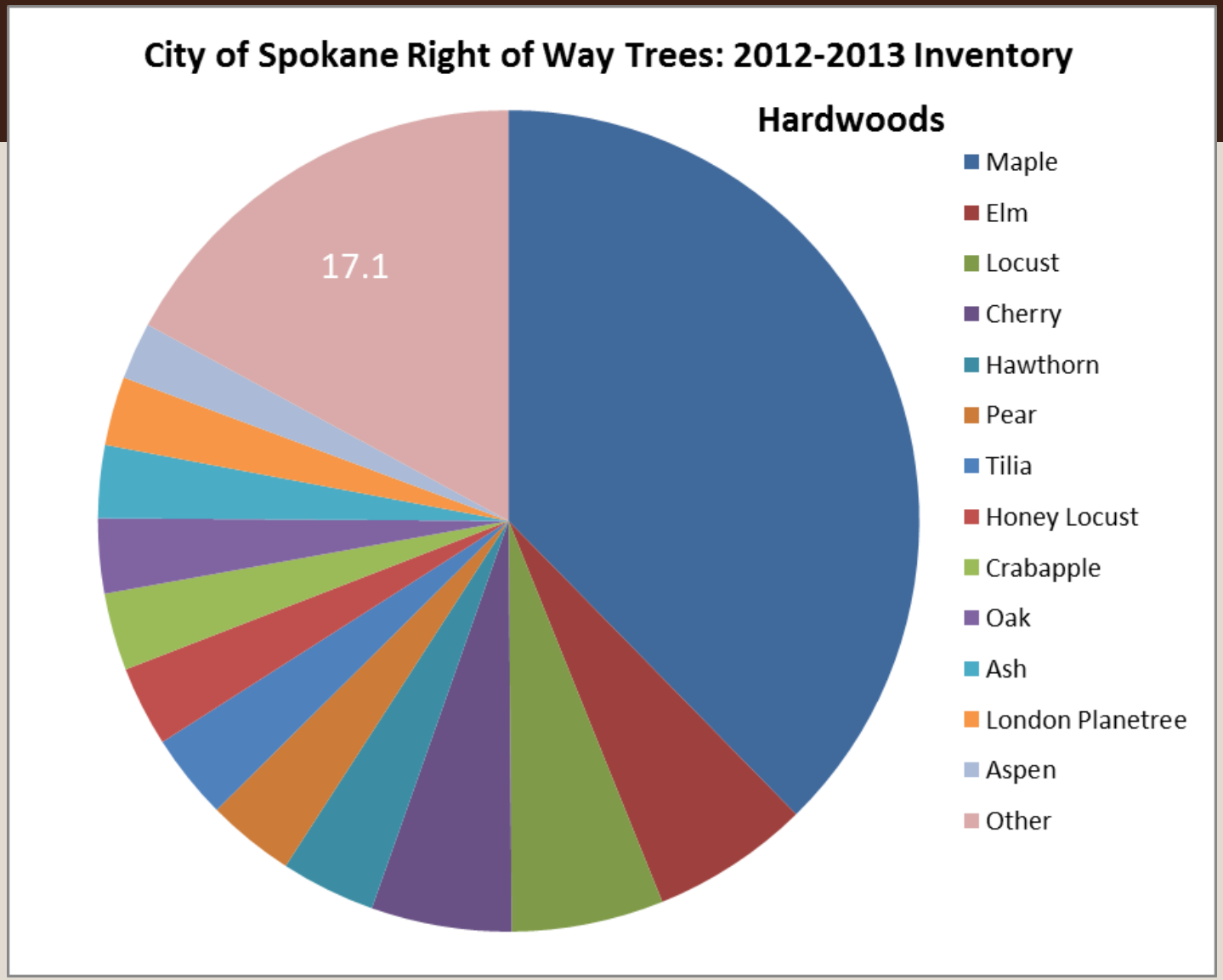
Pine needle moment of Zen…

Ponderosa pine distribution

Norway Maple Distribution in North America




Conifer
Thuja
1.8%
Everything Else
4%
Abies
7.7%
Pseudotsuga
9.0%
Picea
15.8%
Pinus
Picea
Pseudotsuga
Abies
Thuja
Arborvitae
Juniperus
Chamaecyparis
Larix
Tsuga
Cupressus
Taxus
Metasequoia
Sequoia
Taxodium
Ilex
Thujopsis
Clocedrus
Pinus+Picea+Pseudotsuga+Abies+Thuja = 96.0%


City of Spokane Right of Way Trees: 2012-2013 Inventory
Hardwoods
17.1
Maple
Elm
Locust
Cherry
Hawthorn
Pear
Tilia
Honey Locust
Crabapple
Oak
Ash
London Planetree
Aspen
Other

Why Compost?

- Increase soil moisture-holding capacity
- Add “tilth” to soil
- Add nutrients to soil
- Positive way to utilize unwanted biomass and keep it on site instead of shipping it elsewhere

The rap on ponderosa pine needles

- Won’t compost, ever, period. Really, don’t even try.
- If it does compost, pH will be low (acidic) and will kill most anything you might want to grow in your lawn or garden.

Composting Ponderosa Pine Needles

- Three treatments
  - Current year needles – INTACT
  - Current year needles – SHREDDED
  - Last year needles – SHREDDED and left in a pile for a year
- Four replicates of each treatment
- Randomized

Composting Ponderosa Pine Needles

- Project designed to fit with objectives and resources of a backyard gardener homeowner
- Used Geobins, available for purchase at WSU Extension Office
- Tried to minimize pile turning and water additions
- Used only locally available materials
- Did not adhere to a rigid schedule for pile turning

Used the Klickitat County Compost Calculator

- http://www.klickitatcounty.org/solidwaste/fileshtml/organics/compostcalc.htm
- Tried to get a carbon/nitrogen ratio of about 40:1
- This is high but we wanted to try to move as much carbon (pine needles) as we could

Composting Ponderosa Pine Needles

First installment – July 2 to 4, 2015

- 122 pounds ponderosa pine needles
- 110 pounds coffee grounds
- 23 pounds dry hardwood leaves
- 67 pounds fresh cut grass

One down, 102 degrees and temps are rising..

Needles!

Coffee!

Lawn Clippings!

Supplies

Shredder, not so much…

Shredder!

Mixing and watering

Emptying into the bin

Smoke!


SPOKANE COUNTY
EXTENSION EDUCATION
CENTER
222 N. HAVANA
4x4


489-5900

Frost!

Data Collected

- Measured temperature (degrees Fahrenheit) in each bin twice a day at 7 AM and 7 PM
- First few days measured only in center
- Noticed variability by location so subsequently measured from 4 locations – “peace sign” design
- Later measured at two different depths: 1) all in, and 2) 8 inches up
- Measured subsidence to nearest 1/8” at 4 locations on bin


222 N. HAVANA


MADE IN U.S.A.
1
2
3
4
5
6
7
8
9
10
WESTCOTT
RULER

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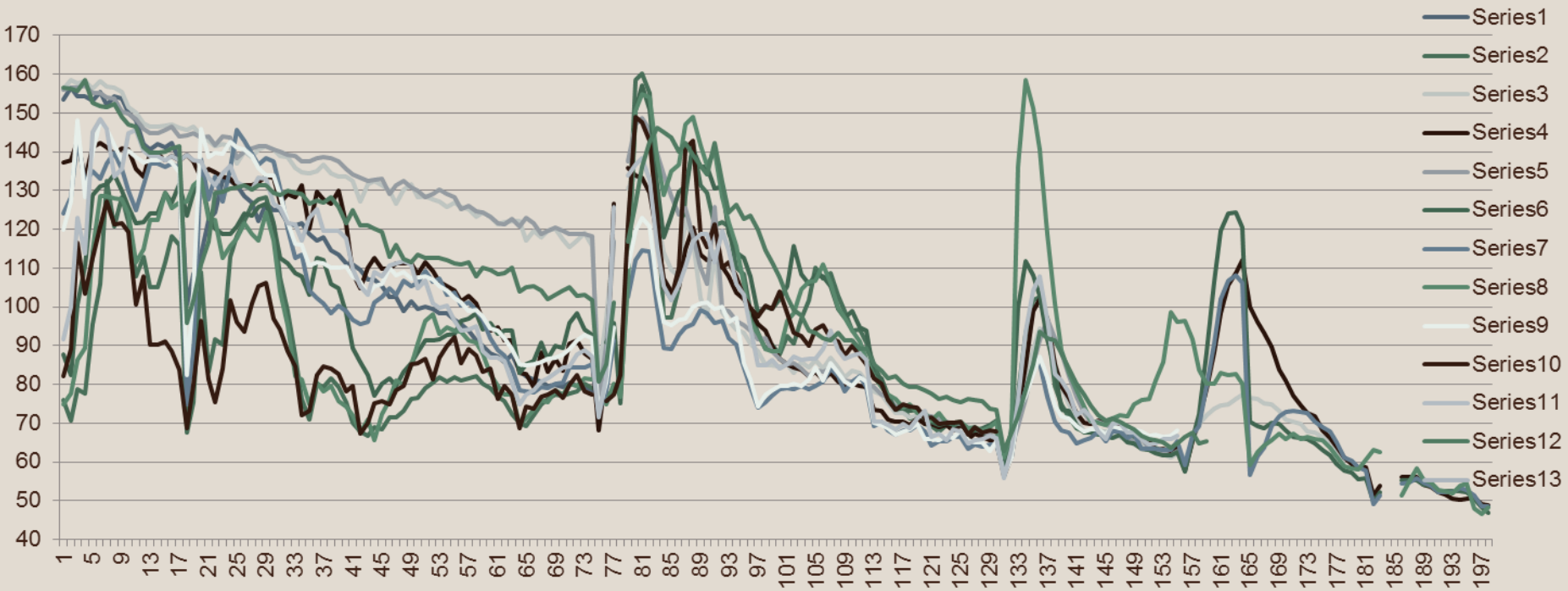
Day 1 to project end, 4 (5) pile turnings



Results

- Ponderosa pine needles make great compost
- Shredding needles is key
- Old, shredded treatment was the best
- Shredders are a problem - if powerful enough, too powerful. Ideal is a hand-crank, backyard shredder. I need an inventor on the team!!
- pH's within acceptable range for lawns/gardens – acidity is NOT a problem

Next Steps

- Repeat work
  - Use a better (more appropriate) shredder
  - Use a better system for tracking pH
  - Try to expedite process, can it go faster?
- Upscale? I've had a lot of interest in trying to do this on a larger scale. Would need funding for all the resources needed.

Results

- Project appealed to a broad range of forest dwellers
  - Small Forest Landowners
  - Wildland Urban Interface
  - Community Forest
  - Urban

Results

- Great interest and lots of help from Master Gardener's and Master Composter/Recyclers
- Lots of interest from WUI residents and SFLO's – have been asked to present results at numerous venues

Results

- Provided an “in” to a different audience than just SFLO’s
- Led to acceptance by urban foresters, conservation groups, permaculture enthusiasts, community forest “friends of groups”

Connection Examples

- Invited to present at WFFA annual meeting
- Invited to “Sowing Seeds” event in Colville, WA
- Led to closer connections to City of Spokane Urban Forestry Department. Will be doing “Wood, Water, Wildlife and Waffles” events with City and Audubon Society
- Got LOTS more traction with my efforts to encourage landowners to leave snags in city for wildlife

A Tall Stump is a Short Snag

The Spokane Edible Tree Project

Questions?