

Forests, Trees, and Climate Change

Global, Local, and (literally) in your back yard

Lexi Brewer

04/28/2021



Puyallup Watershed Initiative

- Contact info: lbrewer@pwi.org; 253-212-0434

Outline

1. About me
2. About the Forest COI
3. Climate benefits of forests
4. Local benefits of trees
5. Trees, adaptation, and climate resilience
6. Local programs and opportunities

About me



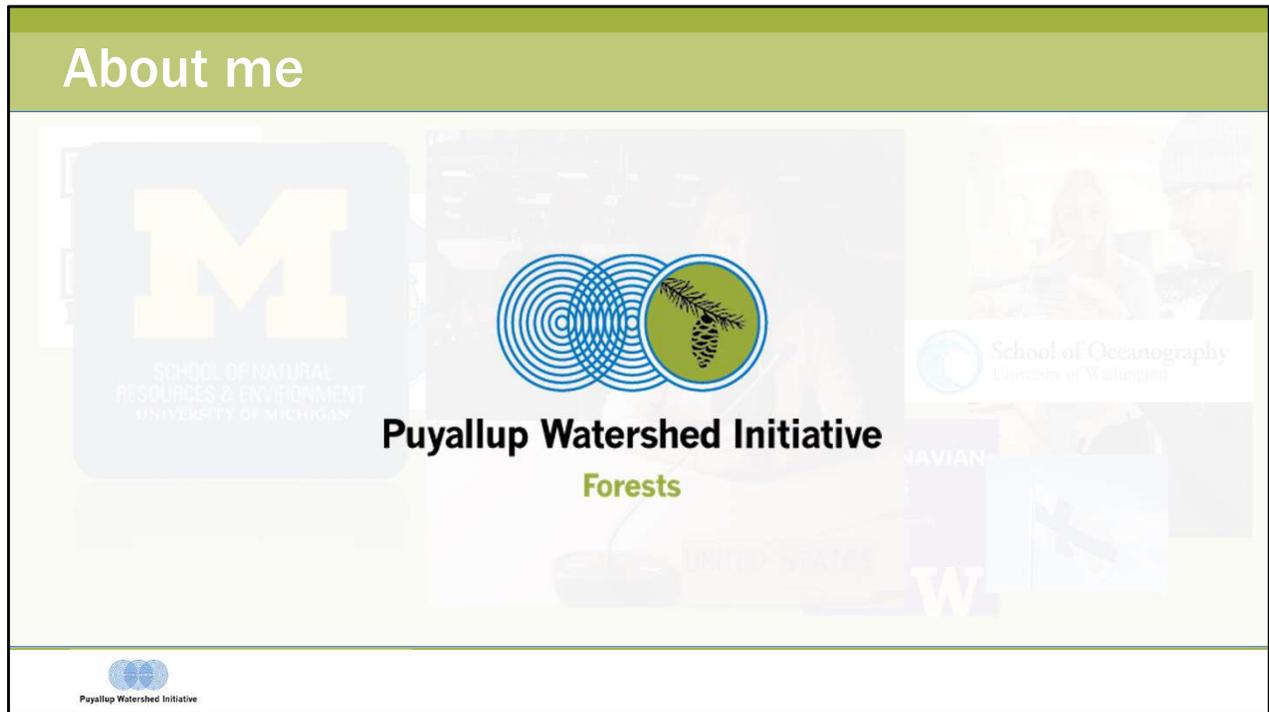
- From Tacoma – Lowell Tiger, Mason Mustang, Stadium Tiger, and love the City
- Diverse set of interests, and background not actually forestry! B.S. UW Oceanography, B.A. Finnish (sitten jos haluaisitte, me voidaan jutella suomeksi).
- Got interested in Climate policy in undergrad.
- Science or policy? A little bit of both, but live more in policy world now.

About me



- Graduate – M.S. Natural Resources and Environment from University of Michigan, focusing on climate policy and adaptation
- UNFCC delegate COP 20 & 21, watched Paris agreement gaveled in

About me



- Chair – Sustainable Tacoma Commission
- Manager, Forests COI at Puyallup Watershed Initiative
- Nonprofit headquartered in Tacoma but that works watershed wide (from commencement bay to the foothills of Mt Rainier)
- Caveat – not an arborist, or a forester, I’m a policy wonk; you may have questions I don’t have answers to, but I probably know someone who can answer them! Sharing today what I’ve learned in my position, and what I’ve found interesting.

How did I end up in this tree program? Collaborative space, need someone to help with that collaboration and connection (and I’ve learned about trees along the way!)

We are a forum to connect and collaborate to keep trees and forests throughout the Puyallup Watershed.

We work together to keep forestlands forested and make sure all neighborhoods and communities benefit from trees.

- Forest COI has members of nonprofits, local governments, tree farmers – all tree fans welcome!
- Mission

Trees have benefits

- *Invite you to put in the chat some benefits of trees!*

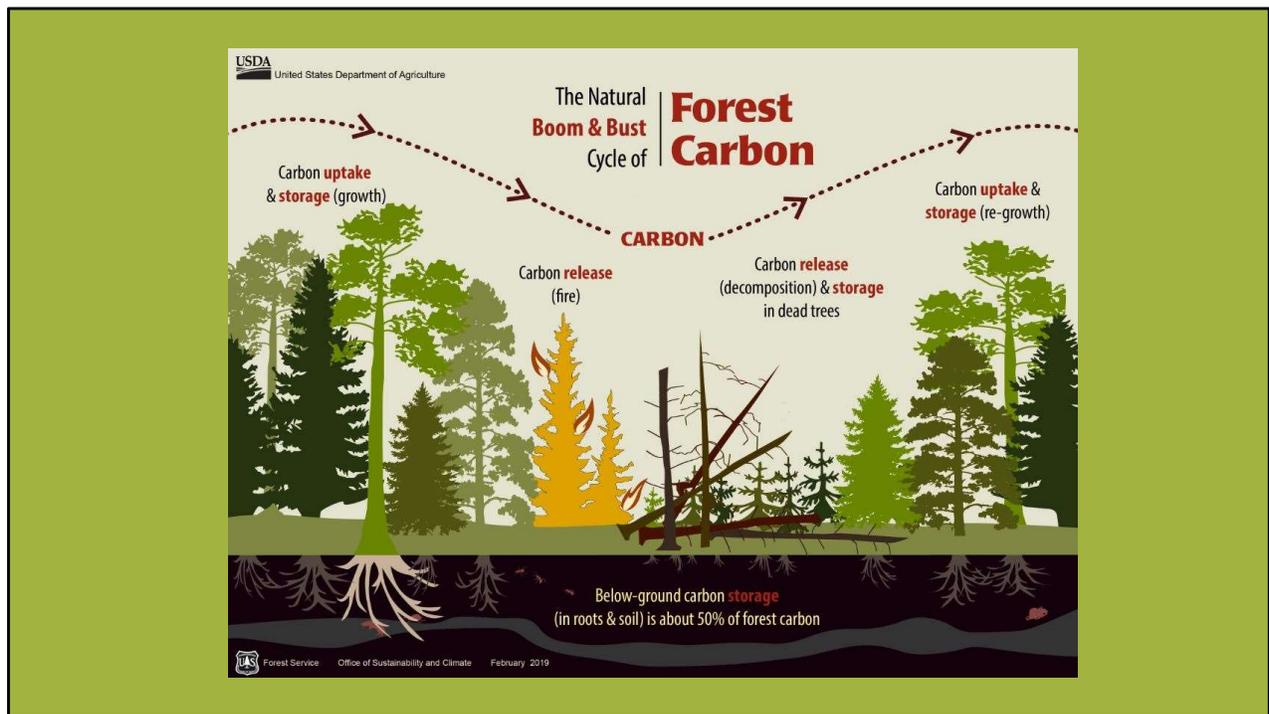


If you're comfortable using chat function, love hearing from folks – love collecting what other people feel are the benefits of trees

Forests and Climate Change



We'll start with the forests, and then we'll move to the trees.



- Forests on the whole are carbon sinks
- Depends on species, but about 50% is carbon, stored in tree as long as it is alive and not decomposing
- Depending on what's going on in a forest, it can be a net emitter, or it can be a sink. Fire will release carbon, or mortality even will release if more dead than alive and decomposing. Stored – also stored in wood products.

Graphic source: <https://www.fs.usda.gov/sites/default/files/Carbon-Graphics-June-2019.pdf>

Forests and Climate Change

The screenshot shows the Science journal article page for "The global tree restoration potential". The page features a dark navigation bar with the Science logo and menu items: Contents, News, Careers, and Journals. Below the navigation bar, the article title "The global tree restoration potential" is displayed in a large font. To the left of the title are social media sharing icons for Facebook, Twitter, LinkedIn, and Email. Below the title, the authors are listed: Jean-Francois Bastin^{1,4}, Yelena Finegold², Claude Garcia^{3,4}, Danilo Mollicone², Marcelo Rezende², Devin Routh¹, and Co... A link to "See all authors and affiliations" is provided. The publication information includes: Science 05 Jul 2019; Vol. 365, Issue 6448, pp. 76-79; DOI: 10.1126/science.aax0848. At the bottom of the article content area, there are links for "Article", "Figures & Data", "Info & Metrics", "eLetters", and a PDF icon. The background of the page is a lush green forest. At the bottom left, there is a logo for the "Payslip Watershed Initiative".

Interest in how impactful planting trees can be, offer this example because it can be hard to figure out. Global scale: Does anyone remember a somewhat splashy journal article that hit the news in 2019? It spawned headlines like this... and this....

Article link: <https://science.sciencemag.org/content/365/6448/76>

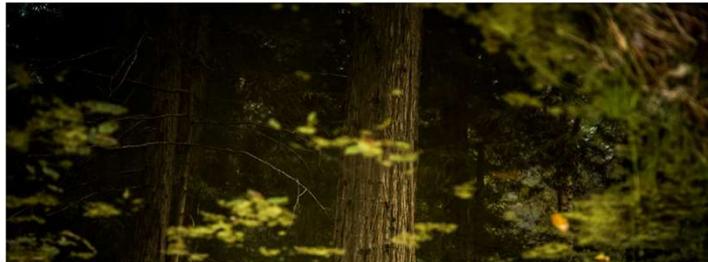
Tree planting 'has mind-blowing potential' to tackle climate crisis

Research shows a trillion trees could store the same amount of carbon dioxide

● Editor's pick: best of 2019. We're favorite stories of the past year
journalism in 2020



Restoring Forests Could Help Put a Brake on Global Warming, Study Finds



Guardian link: <https://www.theguardian.com/environment/2019/jul/04/planting-billions-trees-best-tackle-climate-crisis-scientists-canopy-emissions>

NYT link: <https://www.nytimes.com/2019/07/05/climate/trees-forests-climate-change.html>

Bastin et al, 2019

Study tried to quantify where on earth new trees could be grown (areas not currently being used by humans)

- Used satellite data to assess land cover and land use

1. Planet could support 2.2 billion additional acres of forest (25% more forested area than we have now) – area the size of USA
2. Could store 200 Gt carbon (2/3 of carbon emitted by humans)
3. Tree restoration was the most effective solution to climate change to date.



Findings – sounds great right? All we need to do is plant a lot of trees and we can avert the impacts of climate change? Almost sounds too good to be true?

Response to article: <https://climate.nasa.gov/news/2927/examining-the-viability-of-planting-trees-to-help-mitigate-climate-change/>



SHARE **ERRATUM**

Erratum for the Report: “The global tree restoration potential” by J.-F. Bastin, Y. Finegold, C. Garcia, D. Mollicone, M. Rezende, D. Routh, C. M. Zohner, T. W. Crowther and for the Technical Response “Response to Comments on ‘The global tree restoration potential’” by J.-F. Bastin, Y. Finegold, C. Garcia, N. Gellie, A. Lowe, D. Mollicone, M. Rezende, D. Routh, M. Sacande, B. Sparrow, C. M. Zohner, T. W. Crowther

+ See all authors and affiliations


Payalup Watershed Initiative

It probably is too good to be true. After the article was picked up by lots of news outlets, critical responses from other scientists, and authors issued erratum.

Link to NASA Climate response: <https://climate.nasa.gov/news/2927/examining-the-viability-of-planting-trees-to-help-mitigate-climate-change/>

Link to Erratum: <https://science.sciencemag.org/content/368/6494/eabc8905>

Why isn't this our silver bullet?

1. Planet could support 2.2 billion additional acres of forest (25% more forested area than we have now) – area the size of USA
 - Planting 2.2 billion acres could take 1000-2000 years
 - Generalized, so local constraints missing – e.g. permafrost, nutrient limitations
2. Could store 200 Gt carbon (25% of atmospheric carbon pool)
 - A lot of this land already has plants on it – already storing some carbon
 - Assumes every acre restored to 100% forest cover, low mortality
 - Will take 100+ years for trees planted now to reach maturity
3. Tree restoration was the most effective solution to climate change to date.
 - Authors admit that the most effective solution is ceasing the emission of GHGs.



Takeaway: An oversimplified solution to a really complex problem; offer this example because there is so. Much. Nuance in climate science, and it can be hard to figure out where energy really needs to be.

Link to NASA Climate response: <https://climate.nasa.gov/news/2927/examining-the-viability-of-planting-trees-to-help-mitigate-climate-change/>

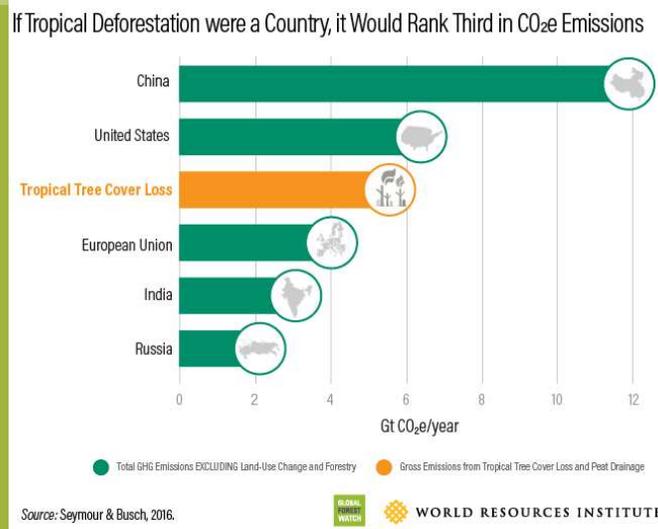
KEY POINT #1

No silver bullet can replace halting emissions, and we are not going to plant our way out of the climate crisis.



- This narrative is still out there,.
- We cannot solve this without addressing emissions.
- Offer this example because it can be hard to know what the actual impact is, scientists themselves haven't figured it out because it is complex and perhaps individual to an ecosystem or even single tree, AND in all the criticism, still emphasized we need both.

We need both natural and energy solutions to stabilize our climate



And, and and!

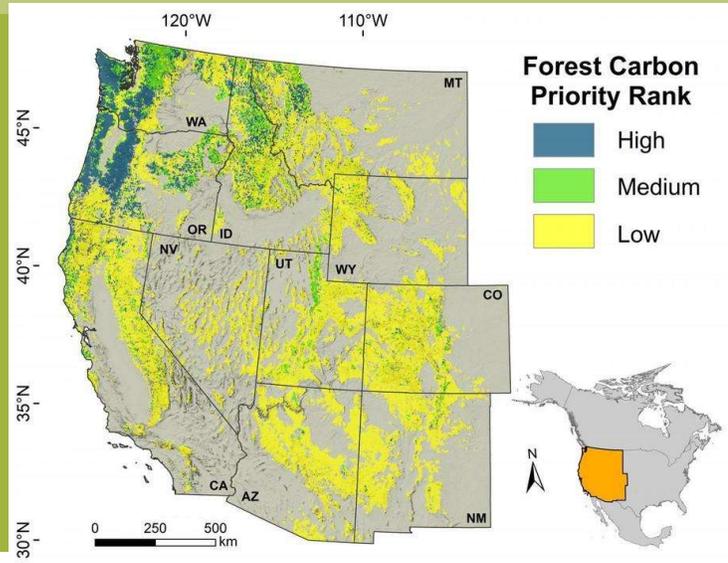
-We need both solutions!

- IPCC statement, need aggressive actions to reduce emissions and pursue natural climate solutions.

Study: <https://www.wri.org/insights/numbers-value-tropical-forests-climate-change-equation>

What about NW Forests?

- 2020, Buotte et al.
- Finds preserving our region's high-value forests equivalent to halting six to eight years of regional emissions.




Payalup Watershed Initiative

- On the global scale, tropical forests sequester more and do it faster.
- BUT our forests are important too.
- Pierce has a lot of that high quality forest!
- particularly for forests in our area, are at enormous threat of conversion. By conversion, not logged and then replaced – biggest threat is development and sprawl.
- This is an area for you – you can push for development code that limits the amount of sprawl into forested areas, or that gives forestlandowners resources to steward their properties so they are easier to maintain and are high quality forests.

Article link: http://opb-imgserve-production.s3-website-us-west-2.amazonaws.com/original/buotte_eap.2039_accepted_1576697573797.pdf

Cross-cut article link: <https://crosscut.com/2020/01/pacific-northwest-forests-fit-trifecta-curbing-climate-change-if-we-stop-logging-them>

So... are carbon credits B.S.? No! Northwest Forests *do* sequester a lot of carbon – and are particularly good carbon sinks.

KEY POINT #2

We need to **PRESERVE** what we have – reforestation is not a substitute.



Once again, key point: We need to **PRESERVE WHAT WE HAVE**, reforestation is not a substitute.

Benefits of Urban Trees

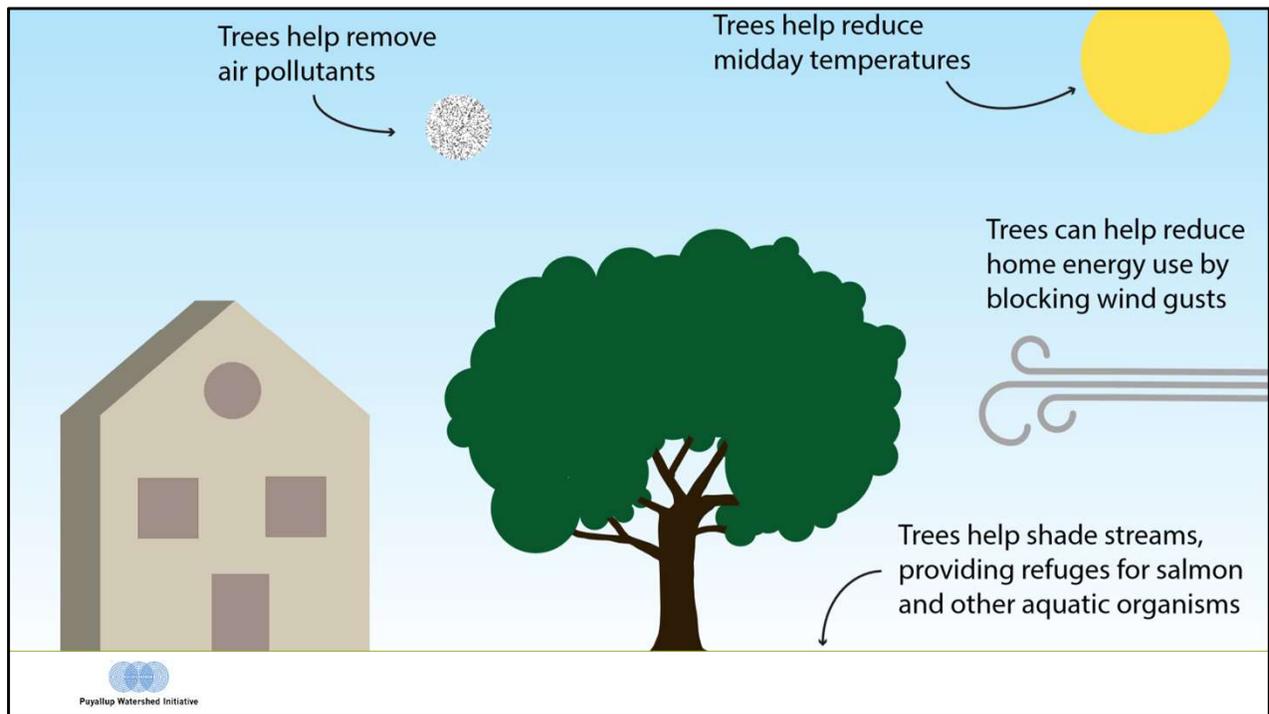
- Air quality
- Stormwater
- Environmental health
- Physical Human health
- Mental health
- *And more!*



Come back to the benefits of trees – read through chat....

Focus on these because most related to climate change, but interesting connections overall – Nature Conservancy Outside Our Doors report a cool resource. E.g. trees and crime.

Outside Our Doors Report Link: <https://www.washingtonnature.org/cities/outsideourdoors>



The distribution of street trees in urban areas is tied to health equity – trees can mitigate the effects of flooding, air pollution, and extreme heat.

- AIR QUALITY: reduce pollution, and needles can absorb pollutants and some particulate matter
- HEAT & ENERGY: A tree right next to your house can help decrease energy bills – a 20% canopy of deciduous trees over a house results in annual cooling savings of up to 18 percent. Diminishes urban heat islands. Shade tree card.
- STORMWATER: Pollution filtration, reduces runoff.

naturewithin.info

Human Dimensions of Urban Forestry and Urban Greening

featuring research on peoples'
perceptions and behaviors
regarding nature in cities

Green Cities: Good Health

human health & well-being research

Projects Director
Kathleen L. Wolf, Ph.D.



What's New?

Nature and Consumer Environments
Research about how the urban forest
influences business district visitors.

Trees and Transportation
Studies on the value of having quality
landscapes in urban roadsides.

Civic Ecology
Studies of human behaviors and benefits when
people are active in the environment.

Policy and Planning
Integrating urban greening science
with community change.

Urban Forestry and Human Benefits
More resources, studies and links . . .

Sponsors



Amazing resource in this region – if you can catch a talk by Dr. Wolf, do.

Urban Trees: Human Health

City residents who live next to green space have **lower levels of illness and disease** than other people of similar income levels.

Example: Urban Forests & Newborns

- 10% increase in canopy cover within 50 m of a house resulted in a **lower number of low weight births** (*Hystad et al, 2014*)

Example: Trees and asthma rates

- Study from NYC shows that street trees associated with lower asthma rates.

Example: Trees and hospital stays

- Study showed that being able to see trees while recovering from surgery shortened recovery time. (*Ulrich, R.S.,1999*).



Links to articles: http://depts.washington.edu/hhwb/Thm_Risk.html
<http://www.majorfoundation.org/pdfs/Effects%20of%20Gardens%20on%20Health%20Outcomes.pdf>

Urban Trees: Mental Health

Exposure to nearby nature can reduce stress and improve mental health outcomes.

Example: Life issues and green space

- Residents with nearby trees were more effective in coping with major life issues than those with homes surrounded by concrete. (*Kuo, 2001*)

Example: Trees and burnout

- Nature experiences can restore from mental fatigue due to work or studies, and improve work performance and satisfaction.

Example: Outdoors and lessening symptoms

- Outdoor activities can help alleviate the symptoms of Alzheimers, dementia, stress, and depression.



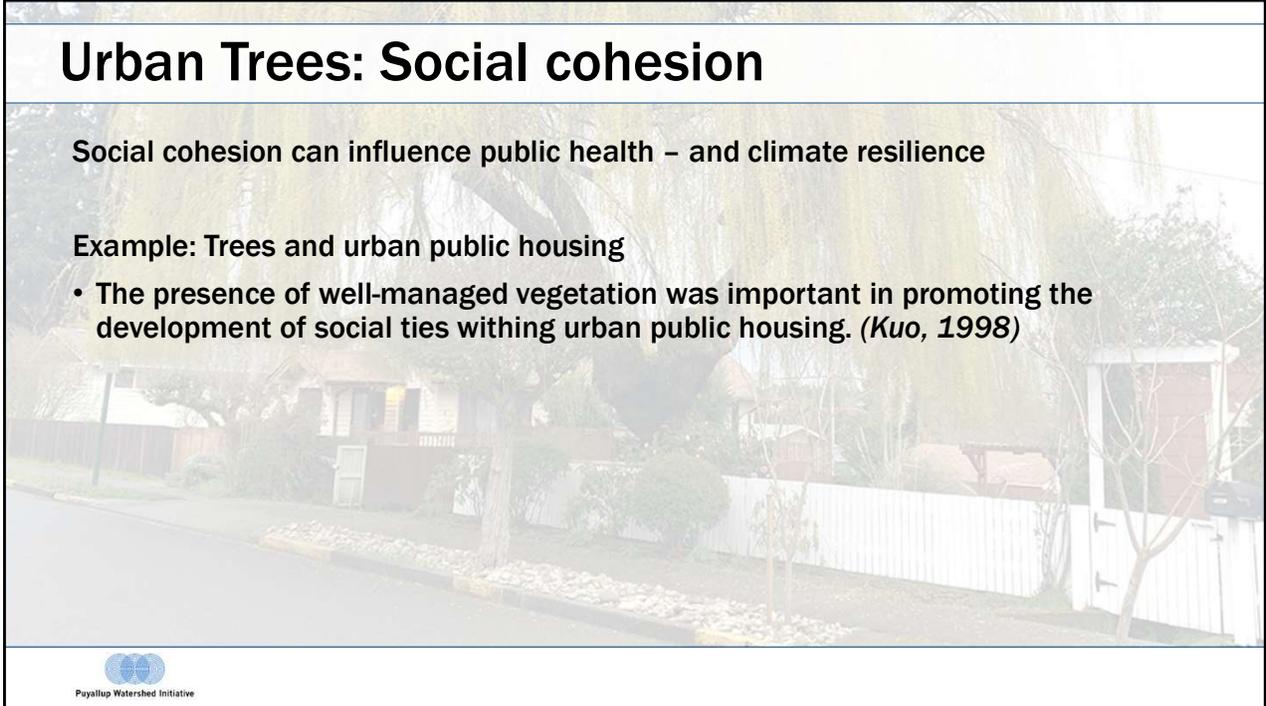
http://depts.washington.edu/hhwb/Thm_Mental.html

Urban Trees: Social cohesion

Social cohesion can influence public health – and climate resilience

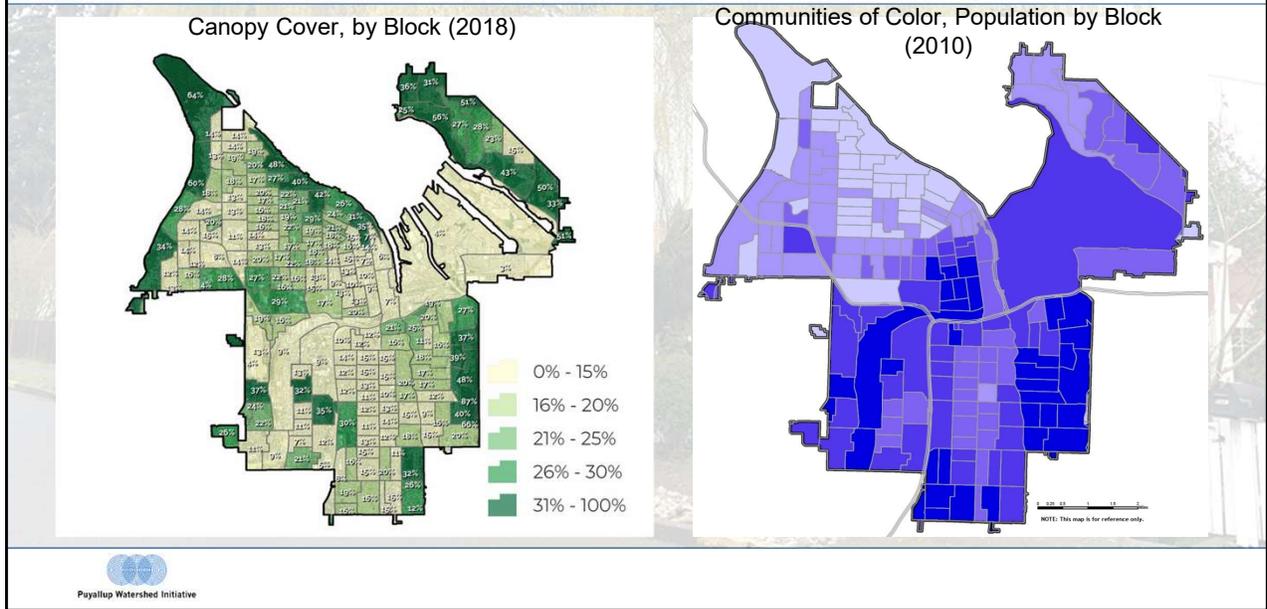
Example: Trees and urban public housing

- The presence of well-managed vegetation was important in promoting the development of social ties withing urban public housing. (*Kuo, 1998*)



http://depts.washington.edu/hhwb/Thm_Community.html

Equitable Access



Trees not equitably distributed. Not an accident, legacies of redlining and environmental racism made this pattern, present in most major cities today. BIPOC communities less likely to have access to these benefits.

More reading: Tacoma Urban Forest Management Plan Research Summary: <https://ss-usa.s3.amazonaws.com/c/308468772/media/18215df90cb0d1ad010922147355010/Phase%201%20Research%20Summary%20-%20Tacoma%20Urban%20Forest%20Management%20Plan%2011-12-19.pdf>

Benefits of Trees and Resilience

- Trees can help mitigate some of the common impacts of climate change we will feel in our region
 - Poor air quality
 - Heat
 - Extreme weather events
- Trees also improve health and social conditions that can make populations less vulnerable.
 - An event that may be a nuisance for someone else may be catastrophic for you.
- Access to these benefits is NOT equitably distributed

Tacoma Canopy Cover: Regional Rock Bottom at 20%

30% Canopy Cover Goal... What would it take?



Image from Mike Carey, City of Tacoma Urban Forester
- Size of tree matters in achieving canopy cover (and benefits!)

KEY POINT #3

Big, mature trees in urban areas provide more benefits than young trees.



Stealing from Mike Carey: Trees are good, More healthy trees are better, Bigger healthy trees are best

KEY POINT #2

We need to PRESERVE what we have – ~~reforestation~~ *removing mature trees and planting new ones* is not a substitute.



Also ties in to Key Point 2 – change for urban setting.

Local Programs

- **Pierce Conservation District, City Forest Credits**
 - PCD does restoration
 - Carbon sequestration of restoration verified by City Forest Credits
 - Credits sold by carbon broker, South Pole, to businesses that want to invest in offset projects.
 - <https://pierced.org/543/City-Forest-Credits>



New program, first CD in country to offer carbon credit program focused on URBAN environments. First project Clark's Creek, will be more in the future.

Also a good resource: Carbon Friendly Forestry Conference, City Forest Credits has presented last few years. <https://wecprotects.org/our-work/areas-of-work/evergreen-forests/carbon-conference/carbon-friendly-forestry-conference-2020/>

Free or reduced cost trees

- City of Tacoma:
 - Grit City Trees:
https://www.cityoftacoma.org/government/city_departments/environmentalservices/urban_forestry/grit_city_trees
- Pierce Conservation District:
 - Urban Tree Sale: <https://pierced.org/409/Urban-Tree-Sale>
 - OPENS MAY 1ST
- County-wide:
 - Tree Coupon Program:
https://www.cityoftacoma.org/government/city_departments/environmentalservices/urban_forestry/tree_coupon_program
 - Opens Fall 2021.

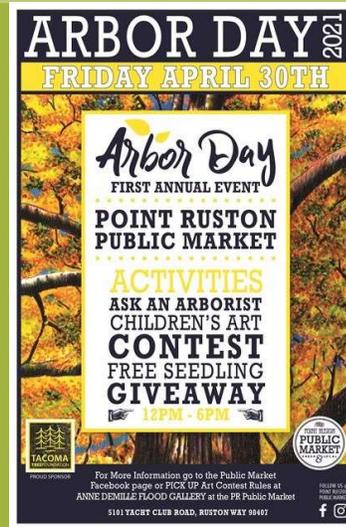
Educational Opportunities and Stewardship

- Tacoma Tree Foundation:

- Tree Stewards Program
- Webinars
- Tree Giveaways
- www.tacomatreefoundation.org

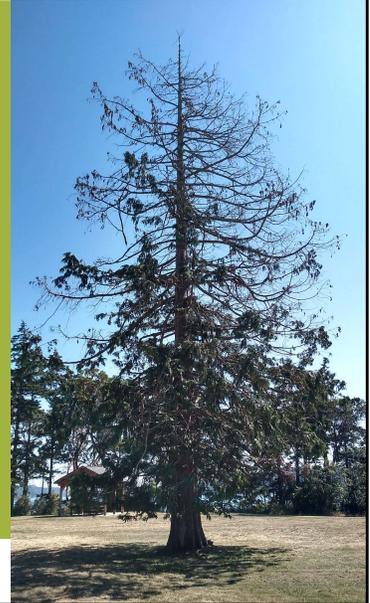
- Earth Day South Sound:

- Stewardship events
- <https://earthdaysouthsound.org/>



Forest Health Watch: Redcedar Decline

- WSU Extension Forest Health Watch
 - <https://foresthealth.org/redcedar/>
 - Log instances of declining trees on iNaturalist



Come hang out with us at the Forest COI!

- Next meeting, Friday May 21 10:00am – 12:00pm
- lbrewer@pwi.org



All are welcome! We'll hear an update on last year's tree coupon program and an overview of programs and efforts going on this year.

What can you do?

1. Stick up for trees! Pierce County, City, State level policy needs voices that say “hey, existing trees need help”

- Budget decisions
- Planning efforts
- Policy – we need tree codes!

2. Maintain your trees

- Hire a certified arborist to do work, don't let anyone top your tree

3. Plant a tree

- The City, or nonprofits like TTF can help you find a species that will work for your spot.



TTF=Tacoma Tree Foundation

Find a certified arborist! <https://www.treesaregood.org/findanarborist>

Don't top your tree: <https://www.plantamnesty.org/wp-content/uploads/Warning-Topping-is-Hazardous.pdf>

Discussion Question

- You found \$150,000 in funding for municipal, county, or nonprofit tree programs. Where do you spend it and why?
- Some options to start out:
 - Small nonprofit education program, \$20,000 each
 - Technical forester to help small forest land owners, \$90,000
 - Single site habitat restoration, \$15,000
 - Low-income hazard tree program, \$60,000
 - Tree maintenance crew, \$1,000,000
 - Expand tree coupon program, \$20,000
 - Tree Management Planning effort, \$150,000
 - Design and printing of educational materials, \$10,000
 - Tree advocacy training, \$25,000
 - *Other? Throw it out and name a price!*

Note – there are no right answers! *All* of these things are needed, and one isn't necessarily more effective or impactful than any other. This is where inaction starts in our region – **we need funds, and to get funds, we need advocacy!**