



**CITY OF
TUMWATER
TREE BOARD
MEETING AGENDA**

**Online via Zoom and In Person at
Tumwater Fire Department
Headquarters, Training Room, 311 Israel
Rd. SW, Tumwater, WA 98501**

**Monday, November 13, 2023
7:00 PM**

1. Call to Order
2. Roll Call
3. Changes to Agenda
4. Approval of Minutes
5. Tree Board Member Reports
6. Coordinator's Report
 - [a.](#) City-owned Urban Forest Inventory Project Update
7. Public Comment
- [8.](#) Intern Street Tree Review Project
- [9.](#) Proposed Non-Regulatory Incentives and Programs
10. Next Meeting Date - 12/11/2023
11. Adjourn

Meeting Information

The public are welcome to attend in person, by telephone or online via Zoom.

Watch Online

https://us02web.zoom.us/webinar/register/WN_K1NGBRNSRw-8YCgj3nwlfg

Listen by Telephone

Call (253) 215-8782, listen for the prompts and enter the Webinar ID 854 3689 8821 and Passcode 210392.

Public Comment

The public is invited to attend the hearing and offer comment. The public may register in advance for this webinar to provide comment: https://us02web.zoom.us/webinar/register/WN_K1NGBRNSRw-8YCgj3nwlfg

After registering, you will receive a confirmation email containing information about joining the webinar.

The public may also submit comments prior to the meeting by sending an email to:

AJonesWood@ci.tumwater.wa.us. Please send the comments by 1:00 p.m. on the date of the meeting.

Comments are submitted directly to the Commission/Board Members and will not be read individually into the record of the meeting.

If you have any questions, please contact Sustainability Coordinator Alyssa Jones Wood at (360) 754-4140 or AJonesWood@ci.tumwater.wa.us.

Post Meeting

Audio of the meeting will be recorded and later available by request, please email CityClerk@ci.tumwater.wa.us

Accommodations

The City of Tumwater takes pride in ensuring that people with disabilities are able to take part in, and benefit from, the range of public programs, services, and activities offered by the City. To request an accommodation or alternate format of communication, please contact the City Clerk by calling (360) 252-5488 or email CityClerk@ci.tumwater.wa.us. For vision or hearing impaired services, please contact the Washington State Relay Services at 7-1-1 or 1-(800)-833-6384. To contact the City's ADA Coordinator directly, call (360) 754-4128 or email ADACoordinator@ci.tumwater.wa.us.

What is the Tree Board?

The Tumwater Tree Board is a citizen advisory board that is appointed by and advisory to the City Council on urban forestry issues, including drafting and revising a comprehensive tree protection plan or ordinance, or any other tree matter. Actions by the Tree Board are not final decisions; they are Board recommendations to the City Council who must ultimately make the final decision. If you have any questions or suggestions on ways the Tree Board can serve you better, please contact the Community Development Department at (360) 754-4180.

TO: Tree Board
FROM: Alyssa Jones Wood, Sustainability Coordinator
DATE: November 13, 2023
SUBJECT: City-owned Urban Forest Inventory Project Update

1) Recommended Action:

For discussion.

2) Background:

The City Council adopted the Urban Forestry Management Plan (UFMP) on March 2, 2021, by Ordinance No. 2020-004. An inventory of City-owned properties is currently underway, being conducted by the City's consultant Davey Resource Group, Inc. City staff will need volunteer assistance in the month of November to update the existing 2018 Street Tree inventory so that Davey Resource Group, Inc may review their inventory and the existing Street Tree inventory to produce a Community and Urban Forest Maintenance Report.

3) Alternatives:

☐ No alternatives are suggested.

TO: Tree Board
FROM: Alyssa Jones Wood, Sustainability Coordinator
DATE: November 13, 2023
SUBJECT: Intern Street Tree Review Project

1) Recommended Action:

For information only.

2) Background:

The City Council adopted the Urban Forestry Management Plan (UFMP) on March 2, 2021, by Ordinance No. 2020-004. Page 24 of the UFMP states “The [Street] tree lists will be updated as new tree species are tested for climate tolerance and urban suitability.” Objective 3.5 Action H also directs staff to “consider the effects of climate change when reviewing the long-term health and suitability of the community and urban forest in the City to manage pests and diseases.”

City staff, consultants, Tree Board, Planning Commission, and community members have been working together to amend multiple sections of the Tumwater Municipal Code as it relates to trees since November 2022. This work is still ongoing. In the Spring Quarter of 2023, the Water Resources & Sustainability Department at the City had the opportunity to host four interns from the Evergreen State College’s Center for Climate Action and Sustainability. One of those interns, Amita Devarajan, chose to research the suitability of trees considering climate impacts. Amita produced a list of useful references and cross-referenced those references with the draft Street Tree list that was being developed at the same time. The list of trees in Attachment B is still in draft form and will be brought to a future joint Planning Commission and Tree Board meeting at a later date as part of the Code Amendment Process for the Street Tree Code and Street Tree Plan.

3) Alternatives:

☐ No proposed alternatives.

4) Attachments:

- A. References
- B. Cross-Referenced Draft Street Tree List
- C. Climate Change Vulnerability of Urban Trees Puget Sound Region, Washington

References

- Esperon-Rodriguez, M., Rymer, P. D., Power, S. A., Barton, D. N., Cariñanos, P., Dobbs, C., Eleuterio, A. A., Escobedo, F. J., Hauer, R., Hermy, M., Jahani, A., Onyekwelu, J. C., Östberg, J., Pataki, D., Randrup, T. B., Rasmussen, T., Roman, L. A., Russo, A., Shackleton, C., ... Tjoelker, M. G. (2022). Assessing climate risk to support urban forests in a changing climate. *PLANTS, PEOPLE, PLANET*, 4(3), 201–213. <https://doi.org/10.1002/ppp3.10240>
- Janowiak, M. K., Brandt, L. A., Wolf, K. K., Brady, M., Darling, L., Derby Lewis, A., Fahey, R. T., Giesting, K., Hall, E., Henry, M., Hughes, M., Miesbauer, J. W., Marcinkowski, K., Ontl, T., Rutledge, A., Scott, L., & Swanston, C. W. (2021). *Climate adaptation actions for urban forests and human health* (NRS-GTR-203; p. NRS-GTR-203). U.S. Department of Agriculture, Forest Service, Northern Research Station. <https://doi.org/10.2737/NRS-GTR-203>
- Kim, S.-H., Chung, U., Lawler, J. J., & Anderson, R. E. (n.d.). *Assessing the Impacts of Climate Change on Urban Forests in the Puget Sound region: Climate Suitability Analysis for Tree Species*. <https://greenseattle.org/wp-content/uploads/2015/08/Climate-Change-Final-Report.pdf>
- Kwok, J. S. (2020). *An Evaluation of Potential Policy Tools and Frameworks For Urban Tree Canopy Cover Management in North Vancouver*. <https://lfs-mlws-2020.sites.olt.ubc.ca/files/2020/10/Kwok-2020-An-Evaluation-of-Potential-Policy-Tools-and-Frameworks-For-Urban-Tree-Canopy-Cover-Management.pdf>
- Meineke, E. K., Dunn, R. R., Sexton, J. O., & Frank, S. D. (2013). Urban Warming Drives Insect Pest Abundance on Street Trees. *PLOS ONE*, 8(3), e59687. <https://doi.org/10.1371/journal.pone.0059687>

- O'Brien, A. M., Ettinger, A. K., & HilleRisLambers, J. (2012). Conifer growth and reproduction in urban forest fragments: Predictors of future responses to global change? *Urban Ecosystems*, 15(4), 879–891. <https://doi.org/10.1007/s11252-012-0250-7>
- Ordóñez Barona, C. (2015). Adopting public values and climate change adaptation strategies in urban forest management: A review and analysis of the relevant literature. *Journal of Environmental Management*, 164, 215–221. <https://doi.org/10.1016/j.jenvman.2015.09.004>
- Rutledge, A.; Brandt, L.A. (2022). Puget Sound Region: Tree Species Vulnerability Assessment. Summary Report from the Northern Institute of Applied Climate Science (NIACS). U.S. Department of Agriculture, Northern Forests Climate Hub. https://forestadaptation.org/sites/default/files/2022-10/PugetSoundRegion_TreeSpeciesVulnerabilityAssessment_FinalForLayout.pdf
- Salmond, J. A., Tadaki, M., Vardoulakis, S., Arbuthnott, K., Coutts, A., Demuzere, M., Dirks, K. N., Heaviside, C., Lim, S., Macintyre, H., McInnes, R. N., & Wheeler, B. W. (2016). Health and climate related ecosystem services provided by street trees in the urban environment. *Environmental Health*, 15(1), S36. <https://doi.org/10.1186/s12940-016-0103-6>
- Stone, J., Coop, L., & Manter, D. (2008). Predicting effects of climate change on Swiss needle cast disease severity in Pacific Northwest forests. *Canadian Journal of Plant Pathology-Revue Canadienne De Phytopathologie - CAN J PLANT PATHOL*, 30, 169–176. <https://doi.org/10.1080/07060661.2008.10540533>

Scientific Name/Common Name	Planted Adaptability				Heat only		Heat & Hardiness		Carbon Benefit	Natural Areas?
	Urban Adaptability	Planted Adapt Score	Positive Modification Factors	Planted Negative Modification Factors	Zone Suitability	Vulnerability	Zone Suitability	Vulnerability		
Abies grandis / Grand Fir	medium	4.14	NUP	AIP	suitable	low-moderate	not suitable	moderate-high	low-moderate	yes
Acer buegerianum / Trident Maple	medium	4.21	RRC	FLO LPS	suitable	low-moderate	suitable	low-moderate	low	
Acer circinatum / Vine Maple	high	5.0	TEM	--	suitable	low-moderate	suitable	low-moderate	--	yes
Acer freemanii / Free man maple (Autumn Blaze® Maple)	high	4.91	TEM ESP LPS NUP	--	suitable	low	not suitable	moderate	--	
Acer griseum / Paperbark Maple	low	3.28	--	DRO TEM AIP NUP	suitable	moderate	not suitable	high	low	
Acer miyabei / Miyabe's Maple (Morton/State Street Maple)	high	5.1	SAL	AIP	suitable	low	not suitable	moderate	--	
Acer nigrum / Black Maple (Green Column Black Sugar Maple)	medium	3.69	TEM	INS AIP SAL NUP	suitable	low-moderate	not suitable	moderate-high	high	
Acer palmatum / Japanese Maple	medium	3.92	NUP	DRO AIP LPS	suitable	low-moderate	not suitable	moderate-high	low	
Acer saccharum / Sugar Maple (Bonfire®, Commemoration®, Legacy®, Green Mountain®)	medium	4.4	NUP MAR COL	INS FLO AIP RRC SAL	suitable	moderate	not suitable	moderate-high	moderate-high	
Acer tataricum / Tatarian Maple (ssp. Ginnala® Amur Maple)	medium	3.92	DRO	AIP INPO	suitable	low-moderate	not suitable	moderate-high	low-moderate	
Acer triflorum / Three-Flower Maple	medium	3.56	--	DRO AIP	suitable	low-moderate	not suitable	moderate-high	--	
Acer truncatum / Shantung Maple (Acer truncatum x A. platanoides 'Keithsform' / Norwegian Sunset® Maple)	high	5.41	DRO TEM LPS RRC NUP	INS	suitable	low	not suitable	moderate	low	
Aesculus hippocastanum / Horsechestnut (Baumannii® / Fruitless Horsechestnut, Aesculus x carnea 'Briotii' / Red Horsechestnut)	medium	4.2	TEM	INPO	not suitable	low-moderate	suitable	moderate-high	high	
Serviceberry (Amelanchier x grandiflora 'Robin Hill', Lustre Allegheny®, Amelanchier x hybrida / Cumulus Serviceberry, Amelanchier x grandiflora 'Autumn Brilliance', Amelanchier x grandiflora 'Princess Diana')	high	4.66	LPS	DRO AIP	suitable	low	suitable	low	low	
Arbutus unedo / Strawberry Tree (Marina® Strawberry Tree)	high	4.57	LPS	--	suitable	low	suitable	low	low	
Betula nigra / River Birch (BNMTF® / Dura-Heat®, Cully® / Heritage®)	medium	3.65	TEM LPS NUP	DISE DRO PLE	suitable	low-moderate	suitable	low-moderate	high	
Carpinus betulus / European Hornbeam (Columnaris®, Fastigiata® / Pyramidal)	medium	4.42	--	SAL	suitable	low-moderate	suitable	low-moderate	low	
Carpinus caroliniana / American hornbeam (CCSU® / Palisade®, Uxbridge® / Rising Fire®, 'J.N. Upright'® / Firespire®, JFS-KW6® / Native Flame®)	high	4.75	FLO TEM NUP COL	DRO AIP	suitable	low	suitable	low	low	
Cercidiphyllum japonicum / Katsura Tree (Pendulum® / Weeping Katsura)	low	3.31	DISE NUP	DRO WIN AIP RRC	suitable	moderate	not suitable	high	low-moderate	
Chamaecyparis obtusa / Hinoki Cypress (Confucius®, Gracilis® / Dwarf)	low	3.41	TEM	FLO AIP MAR	suitable	moderate	not suitable	high	moderate	
Chionanthus retusus / Chinese Fringetree	high	4.77	LPS RRC	--	suitable	low	suitable	low	--	
Cornus florida / Flowering Dogwood	medium	3.84	TEM NUP	DRO FLO AIP RRC LPS	suitable	low-moderate	suitable	low-moderate	low	
Cornus kousa / Kousa Dogwood (Satomi®, 'Chinensis')	high	4.63	NUP	DRO AIP	suitable	low	not suitable	moderate	low	
Crataegus crus-galli / Cockspur Hawthorn (Thornless Cockspur Hawthorn)	medium	4.47	DRO TEM LPS RRC NUP	INS AIP DISE FLO	suitable	low-moderate	not suitable	moderate-high	low	
Crataegus aevigata / English hawthorn / Midland Hawthorn (Crimson Cloud®, Crataegus x lavalii / Lavalie Hawthorne)	medium	3.81	DRO NUP	INS FLO INPO	suitable	low-moderate	not suitable	moderate-high	low	
Eucommia ulmoides / Hardy Rubber Tree	high	4.69	DRO	FLO	suitable	low	suitable	moderate	moderate-high	
Fagus sylvatica / Green Beech (Asplenifolia® / Fernleaf Beech)	medium	3.8	NUP	DRO RRC LPS	suitable	low-moderate	not suitable	moderate	moderate	
Fraxinus americana / White Ash (Autumn Purple Ash)	low	3.22	NUP	INS AIP RRC	suitable	moderate	suitable	moderate	high	
Fraxinus excelsior / European Ash (Golden Desert® / Golden Desert Ash)	medium	3.83	FLO	INS LPS	suitable	low-moderate	not suitable	moderate-high	high	
Fraxinus latifolia / Oregon Ash	medium	4.15	--	--	suitable	low-moderate	not suitable	moderate-high	moderate-high	yes
Fraxinus pennsylvanica / Green Ash (Summit®, Patmore®)	medium	3.9	FLO LPS NUP	INS MAR	suitable	low-moderate	suitable	low-moderate	moderate	
Ginkgo biloba / Maidenhair tree (Emperor®, The President®, Presidential Gold®, Autumn Gold®, Halka Ginkgo Biloba, Golden Colonade®, Maygar, Saratoga, Shangri-La)	high	5.97	DRO TEM LPS RRC NUP	FLO	suitable	low	not suitable	moderate	moderate	

Cleditsia triacanthos / Honeylocust (Christie®/Halka®, Shademaster®, Skyline®)	medium	4.26	DRO TEM RRC NUP	--	suitable	low	not suitable	moderate-high	moderate	
Gymnocladus dioicus / Kentucky Coffeetree (Espresso®, True North®)	high	4.6	DRO LPS NUP	AIP	suitable	low	suitable	moderate	moderate	
Koeleruteria paniculata / Goldenrain Tree	high	4.71	DRO TEM LPS RRC NUP	INPO	suitable	low	suitable	low	moderate	
Lagerstroemia indica x fauriei / Hybrid, Lagerstroemia indica x fauriei 'Muskogee', Lagerstroemia indica x fauriei 'Natchez', Lagerstroemia indica x fauriei 'Tuscarora')	high	4.71	DRO TEM LPS RRC NUP	FLO AIP	suitable	low	suitable	low	low	
Magnolia grandiflora / Southern Magnolia (Victoria® / Victoria Evergreen Magnolia)	medium	3.97	NUP	RRC	suitable	low-moderate	suitable	low-moderate	moderate-high	
Magnolia kobus / Kobus Magnolia (Wada's Memory®, Magnolia x loebneri / Loebner Magnolia)	medium	3.61	--	--	N/A	N/A	not suitable	moderate-high	--	
(Tschonoskii®, 'Donald Wyman', 'Adirondack', 'Red Barron', 'Golden Raindrops', 'JFS KW214MX' P.A.F. / Ivory Spear®, 'Lancelot', Malus spp. / Hybrid Crabapple)	medium	4.01	DRO ICE TEM LPS RRC NUP	DISE INS BRO FLO WIN AIP SWP SAL COL ESP PLE MAR	suitable	low-moderate	not suitable	moderate-high	moderate	
Nyssa sylvatica / Tupelo (David Odom® / Afterburner®, 'Haymanred' / Red Rage®, 'JFS-PN Legacy' / Gum Drop®, 'Sheri's Cloud', 'Wildfire')	high	4.72	RRC	AIP	suitable	low	suitable	low	high	
Ostrya virginiana / Ironwood / American Hophornbeam	high	5.41	DRO TEM LPS RRC NUP	FLO AIP	suitable	low	suitable	low	low-moderate	
Oxydendron arboreum / Sourwood	high	4.6			suitable	low	suitable	low	low	
Parrotia persica / Persian Parrotia (Vanessa®, 'Inge' / Ruby Vase®)	high	5.47	DRO TEM LPS RRC NUP INS DRO ICE WIN TEM	SAL	suitable	low	not suitable	moderate	low	
Pistacia chinensis / Chinese Pistachio	high	4.86	AIP SWP ESP LPS RRC NUP	DISE BRO FLO PLE MAR INPO	suitable	low	suitable	low	low	
Prunus sargentii / Sargent Cherry (Columnaris®)	medium	3.8	DRO TEM RRC LPS	WN AIP	suitable	low-moderate	not suitable	moderate-high	moderate-high	
Prunus serrulata / Japanese Cherry (Amanogawa® / Amanogawa Flowering Cherry, Prunus x yedoensis 'Akebono')	medium	4.31	TEM LPS NUP	--	suitable	low-moderate	not suitable	moderate-high	low	
Pseudotsuga menziesii / Douglas-fir	medium	3.5	NUP	FLO TEM LPS ESP SAL INS DISE	suitable	moderate-high	not suitable	high	low-moderate	yes
Quercus alba / White oak	low	3.34	TEM NUP SAL DRO	FLO AIP ESP LPS RRC DISE PLE	suitable	moderate	suitable	moderate	high	
Quercus bicolor / Swamp White Oak	high	5.15	TEM RRC NUP SAL LPS TEM FLO	AIP	suitable	low	not suitable	moderate	moderate-high	
Quercus coccinea / Scarlet Oak	medium	3.82	TEM LPS	AIP ESP FLO DISE	suitable	low-moderate	suitable	low-moderate	high	
Quercus garryana / Oregon Oak	medium	3.85	--	--	suitable	low-moderate	suitable	low-moderate	moderate	yes
Quercus imbricaria / Shingle Oak	high	4.5	DRO NUP	AIP ESP DISE	suitable	low	not suitable	moderate	low-moderate	
Quercus robur / English Oak (Fastigiata® / Skyrocket Oak)	medium	4.22	DRO TEM		suitable	low-moderate	not suitable	moderate-high	moderate	
Quercus rubra / Red Oak	medium	4.05	TEM LPS NUP	DISE FLO RRC ESP	suitable	low-moderate	not suitable	moderate-high	high	
Quercus shumardii / Shumard Oak	medium	3.99	DRO FLO TEM LPS RRC NUP	DISE PLE ESP	suitable	low-moderate	suitable	low-moderate	moderate	
Sorbus alnifolia / Korean Mountain Ash	medium	3.65	NUP	AIP	suitable	low-moderate	not suitable	moderate-high	--	
Stewartia pseudocamellia / Japanese Stewartia	low	3.2	--	DRO AIP	suitable	moderate	not suitable	high	low	
Styrax japonicus / Japanese Snowbell (Emerald Pagoda®, 'JFS-E' / Snow Charm®, 'Pink Chimes')	medium	4.19	DISE INS AIP COL LPS RRC	ICE TEM SAL ESP NUP PLE MAR	suitable	low-moderate	not suitable	moderate-high	low	
Syringa pekinensis / Chinese Tree Lilac (Morton® / China Snow Tree Lilac, 'DTR 124' / Summer Charm®, WFH2® / Great Wall®, 'Zhang Zhiming' / Beijing Gold)	high	4.67	LPS NUP	FLO TEM	suitable	low	not suitable	moderate	moderate	
Syringa reticulata / Japanese Tree Lilac (Ivory Silk®)	high	4.55	LPS RRC NUP ESP PLE	AIP FLO INPO DISE	suitable	low	not suitable	moderate		
Taxodium distichum / Bald Cypress (Mickelson® / Shaumee Brave®)	high	4.9	FLO RRC NUP	AIP	suitable	low	suitable	low	moderate	
Thuja plicata / Western red cedar	high	5	FLO WIN LPS	AIP	suitable	low	not suitable	moderate	low	yes
Tilia cordata / Littleleaf Linden (Chancellor®, 'Greenspire', 'Halka' / Summer Sprite®)	high	5.18	LPS NUP PLE ESP AIP	INS SAL WIN	suitable	low	not suitable	moderate	high	
Tilia tomentosa / Silver Linden (Sterling®)	medium	4.15	TEM NUP	AIP	suitable	low-moderate	not suitable	moderate-high	low-moderate	
Ulmus parvifolia / Chinese Elm (Emer II® / Allee Elm, Ulmus x 'Frontier' / Frontier Elm)	high	5.5	DRO TEM ESP LPS RRC NUP	INPO	suitable	low	suitable	low	high	
Ulmus propinqua 'JFS-Bierbach' / Emerald Sunshine® Elm	high	5.2	TEM ESP NUP RRC	--	N/A	N/A	not suitable	moderate	--	

Item 8.

zeikova serrata / japanese zeikova (‘Halka’ / Halka Zeikova, ‘Green Vase’, JFS- KWI’/City Sprite®, ‘Schmidtlow’/ Wireless®, ‘Village Green’)	high	4.87	TEM LPS RRC NUP SAL DRO	--	suitable	low	not suitable	moderate	moderate	
--	------	------	----------------------------	----	----------	-----	--------------	----------	----------	--

Trees not found in research

Scientific Name/Common Name	Natural Areas?	further research on climate vulnerability:
Abies pinsapo/ Spanish Fir		
Acer campestre / Hedge Maple (‘Evelyn’/Queen Elizabeth®)		
Acer glabrum/ Rocky Mt. Maple		
Acer grandidentatum ‘Schmidt’/ Rocky Mt. Glow® Maple		
Acer henryi/ Henry maple		
Azara microphylla/ Boxleaf azara		
Calocedrus decurrens/ Incense Cedar	Yes	
Carpinus japonica/ Japanese Hornbeam		
Cedrus deodara/ Deodar cedar		
Chitalpa tashkentensis ‘Pink Dawn’/ Chitalpa		
Chrysolepis chrysophylla/ Golden Chinkapin		
Cornus ‘Aurora’/ Aurora® Dogwood		
Cornus ‘Eddie’s White Wonder’/ Eddie’s White Wonder Dogwood		
Cornus ‘Rutcan’/ (Constellation® Dogwood Cornus, Celestial® Dogwood)		
Cornus alternifolia/ Pagoda Dogwood		
Cornus controversa ‘June Snow’/ Giant Dogwood		
Cornus elwinortonii (‘KN30-8’ / Venus® Dogwood, ‘KN4-43’ /Starlight® Dogwood)		
Cornus kousa x nuttallii ‘KN-43’/ Starlight Dogwood		
Cornus kousa x nuttallii ‘KN-43’/ Starlight Dogwood	Yes	
Cupressus bakeri / Baker Cypress	Yes	
Davidia involucrata/ Dove Tree		

Frangula purshiana/ Cascara	Yes	
Halesia monticola/ Mountain Silverbell		
Halesia tetraptera/ Carolina Silverbell		
Magnolia denudata/ Yulan Magnolia		
Magnolia x 'Elizabeth'/ Elizabeth Magnolia		
Magnolia x 'Galaxy'/ Galaxy Magnolia		
Magnolia x soulangeana 'Rustica Rubra'/ Rustica Rubra Saucer Magnolia		
Pinus contorta var. contorta/ Shore pine	Yes	
Pinus densiflora 'Umbraculifera'/ Dwarf Japanese Red Pine		
Pinus flexilis 'Vanderwolf's Pyramid'/ Limber Pine		
Pinus heldreichii/ Bosnian Pine		
Platanus x acerifolia / London Planetree ('Bloodgood', Columbia, 'Morton Circle' / Exclamation®)		
Pterostyrax hispida/ Fragrant Epaulette Tree		
Quercus hypoleucoides/ Silverleaf Oak		
Quercus ilex/ Holly Oak		
Quercus macrocarpa/ Bur Oak		
Quercus muehlenbergii/ Chinkapin Oak		
Quercus velutina/ Black Oak		
Sophora japonica / Japanese Pagodatree ('Regent')		
Sorbus americana 'Dwarf-crown' / Red Cascade Mountain Ash		
Sorbus x hybridia/ Oakleaf Royal Mt. Ash		

Stewartia monodelpha/ Orange Bark Stewartia		
Styrax obassia/ Fragrant Styrax		
Umbellularia californica/ Oregon Myrtle		

Legend

	Trait Code:			
Urban Adaptability	Modification Factor	Description (if positive)	Description (if negative)	Vulnerability
low: Species may perform worse than modeled	AIP: Air pollution	Tolerant of air pollution	Intolerant of air pollution	low: Suitable zone, high adaptability
medium	BRO: Browse	Resistant to browsing	Susceptible to browsing	low-moderate: Suitable zone, medium adaptability
high: Species may perform better than modeled	COL: Competition-light	Tolerant of shade or limited light conditions	Intolerant of shade or limited light conditions	moderate: Suitable zone, low adaptability or zone not suitable, high adaptability
	DISE: Disease	Disease-resistant	Has a high number and/or severity of known pathogens that attack the species	moderate-high: Zone not suitable, medium adaptability
	DRO: Drought	Drought-tolerant	Susceptible to drought	high: Zone not suitable, low adaptability
	ESP: Edaphic specificity	Wide range of soil tolerance	Narrow range of soil requirements	
	EHS: Environmental habitat specificity	Wide range of slopes/aspects/topographic positions	Small range of slopes/aspects/topographic positions	
	FLO: Flood	Flood-tolerant	Flood-intolerant	
	ICE: Ice	N/A	Susceptible to breakage from ice storms	
	INS: Insect pests	Pest-resistant	Has a high number and/or severity of insects that may attack the species	
	INPL: Invasive plants	N/A	Strong negative effects or invasive plants on the species, either through competition for nutrients or as a pathogen	
	INPO: Invasive potential	N/A	Species has the potential to become invasive and is thus disfavored for planting	
	LPS: Land-use and planting site specificity	Can be planted on a wide variety of sites	Can be planted only in a narrow range of sites or as a specimen	
	MAR: Maintenance required	Little pruning, watering, or cleanup required	Requires considerable pruning, watering, or cleanup of debris	
	NUP: Nursery propagation	Easily propagated in nursery and widely available	Not easily propagated/not usually available	
	PLE: Planting establishment	Easily transplanted and requires little care to establish	Difficult to transplant or requires considerable care to establish	
	RRC: Restricted rooting conditions	Can tolerate restricted rooting conditions	Intolerant of restricted rooting conditions	
	SWP: Soil and water pollution	Tolerant of soil and/or water pollution	Intolerant of soil and/or water pollution	
	TEM: Temperature gradients	Wide range of temperature tolerances	Narrow range of temperature requirements	
	WIN: Wind	N/A	Susceptible to breakage from wind storms	

CLIMATE CHANGE VULNERABILITY OF URBAN TREES

PUGET SOUND REGION, WASHINGTON



This list was developed to aid Puget Sound Region community forestry practitioners in selecting trees to reduce climate change vulnerability of their urban forests. It is meant to be a complement to other tree selection resources. Other factors may also need to be considered, such as aesthetics, local site conditions, wildlife value, or nursery availability. It is also important to note that some species may have climate benefits but may not be suitable for planting for other reasons, such as having invasive potential or susceptibility to pests or pathogens.

Vulnerability: Trees can be vulnerable to a variety of climate-related stressors such as intense heat, drought, flooding, and changing pest and disease patterns.

Climate vulnerability is a function of the impacts of

climate change on a species and its adaptive capacity. Species with projected negative impacts of climate change on their habitat suitability and low adaptive capacity will have high vulnerability. Those with projected positive or neutral climate change impacts on their habitat suitability and high adaptive capacity will have low vulnerability. The following factors were used to determine climate vulnerability:

Urban adaptability: Adaptability scores were generated for each species based on literature describing its tolerance to climate-related disturbances such as drought, flooding, pests, and disease, as well as its growth requirements such as shade tolerance, soil needs, and ease of nursery propagation. Scores were assigned to species using published methods for assessing vulnerability of trees planted in developed sites¹. A positive score indicates that a species is tolerant to a wide range of disturbances and can be planted on a variety of sites. A negative score indicates a species is highly susceptible to disturbances and/or is limited to specific planting sites.

Hardiness and heat zone suitability: Tree species heat and hardiness zone tolerances were recorded from government, university, and arboretum websites. Species tolerance ranges were compared to current and projected heat and hardiness zones for Seattle, Washington using downscaled climate models under low emissions (RCP 4.5) and high emissions (RCP 8.5) scenarios for changes in greenhouse gases². For this particular assessment, we include heat zone suitability alone, as well as heat and hardiness zone suitability. Suitability was determined by the current and projected zones for the Seattle region through the end of the 21st century. For some species, only the hardiness zone ranges were available, and heat zone suitability was not determined (marked N/A). The assessed tree species had the same suitability and vulnerability under both low and high emissions scenarios because all species were suitable under the projected heat zones through the end of the century, and the projected hardiness zone is the same under both low and high emissions scenarios.

Current and projected USDA Hardiness Zones and AHS Heat Zones for Seattle, Washington. Hardiness zone is determined by the average lowest temperature over a 30 year period. Heat zones are determined by the number of days above 86°F.

Time Period	Hardiness Zone Range		Heat Zone Range	
1980–2010	8-9		2	
	Low Emissions	High Emissions	Low Emissions	High Emissions
2010–2039	8-9	9	2	3
2040–2069	9	9	3	4
2070–2099	9	9	3	6

SOURCES: ¹Adaptability scores were assigned using methods developed by Brandt et al. 2021 <https://www.frontiersin.org/articles/10.3389/fevo.2021.721831/full> ²Future heat and hardiness zone information were provided from: <https://usfs.maps.arcgis.com/apps/MapSeries/index.html?appid=96088b1c086a4b39b3a75d0fd97a4c40>

Funds for this project were provided by the USDA Forest Service Urban and Community Forestry Program, administered through the State of Washington Department of Natural Resources Urban and Community Forestry Program.



www.forestadaptation.org

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

*Invasive species

COMMON NAME	HEAT ONLY			HEAT & HARDINESS	
	ADAPT	ZONE SUIT	VULN	ZONE SUIT	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	-	✓	⊖	✓	⊖
Black locust*	•	✓	●	✗	○
Black maple	•	✓	●	✗	○
Black poplar	•	N/A	N/A	✓	●
Black walnut	-	✓	⊖	✓	⊖
Boxelder	•	✓	●	✓	●
Callery pear*	•	✓	●	✓	●
Cherry plum	•	✓	●	✓	●
Chinese chestnut	•	✓	●	✗	○
Chinese elm	+	✓	▼	✓	▼
Chinese fringetree	+	✓	▼	✓	▼
Chinese juniper	+	✓	▼	✓	▼
Chinese pistachio	+	✓	▼	✓	▼
Chinese tree lilac	+	✓	▼	✗	⊖
Coast live oak	•	✓	●	✓	●
Coast redwood	-	✓	⊖	✓	⊖
Cockspur hawthorn	•	✓	●	✗	○
Colorado spruce	•	✓	●	✗	○
Common chokecherry	•	✓	●	✗	○
Common fig	-	✓	⊖	✓	⊖
Common hackberry	+	✓	▼	✓	▼
Common hawthorn*	•	✓	●	✗	○
Common hazel/European filbert	•	✓	●	✗	○
Common hibiscus	+	✓	▼	✗	⊖
Common holly*	•	✓	●	✓	●
Common laburnum	•	✓	⊖	✗	△
Common lilac	•	✓	●	✗	○
Common pear	•	✓	●	✓	●
Common plum	•	✓	●	✓	●

COMMON NAME	HEAT ONLY			HEAT & HARDINESS	
	ADAPT	ZONE SUIT	VULN	ZONE SUIT	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 sushine elm	+	N/A	N/A	✗	⊖
Empress tree*	+	✓	▼	✓	▼
English elm	•	✓	●	✗	○
English laurel*	•	✓	●	✓	●
English oak	•	✓	●	✗	○
English walnut	•	✓	●	✗	○
European ash	•	✓	●	✗	○
European hornbeam	•	✓	●	✓	●
European larch	•	✓	●	✗	○
European olive	•	✓	●	✓	●
Flowering dogwood	•	✓	●	✓	●
Foothill pine	-	N/A	N/A	✓	⊖
Freeman maple	+	✓	▼	✗	⊖
Giant sequoia	•	✓	⊖	✗	△
Ginkgo	+	✓	▼	✗	⊖
Glossy privet	+	✓	▼	✓	▼
Golden raintree*	+	✓	▼	✓	▼
Grand fir	•	✓	●	✗	○
Gray birch	-	✓	⊖	✗	△
Green ash	•	✓	●	✓	●
Green beech	•	✓	●	✗	○
Hardy rubber tree	+	✓	▼	✗	⊖
Higan cherry	•	✓	●	✗	○
Hinoki cypress	-	✓	⊖	✗	△
Honey locust*	•	✓	●	✗	○
Horse chestnut*	•	✓	●	✗	○
Ironwood	+	✓	▼	✓	▼
Italian stone pine	•	✓	●	✓	●
Jack pine	-	✓	⊖	✗	△
Japanese cherry	•	✓	●	✗	○
Japanese maple	•	✓	●	✗	○
Japanese snowbell	•	✓	●	✗	○
Japanese stewartia	-	✓	⊖	✗	△

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

*Invasive species

COMMON NAME	ADAPT	HEAT ONLY			HEAT & HARDINESS	
		ZONE	ZONE	ZONE	ZONE	ZONE
		SUIT	SUIT	SUIT	SUIT	SUIT
		VULN	VULN	VULN	VULN	VULN
Japanese tree lilac	+	✓	▼	✗	⊖	
Japanese white pine	•	✓	●	✓	●	
Japanese zelkova	+	✓	▼	✗	⊖	
Katsura tree	-	✓	⊖	✗	△	
Kentucky coffeetree	+	✓	▼	✗	⊖	
Kobus magnolia	•	N/A	N/A	✗	○	
Korean mountain ash	•	✓	●	✗	○	
Kousa dogwood	+	✓	▼	✗	⊖	
Large leaf linden	•	✓	●	✗	○	
Lawson's cypress	•	✓	●	✗	○	
Littleleaf linden	+	✓	▼	✗	⊖	
Live oak	+	✓	▼	✓	▼	
Mediterranean cypress	+	✓	▼	✓	▼	
Midland hawthorn	•	✓	●	✗	○	
Miyabe's maple	+	✓	▼	✗	⊖	
Mountain hemlock	•	N/A	N/A	✗	○	
Narrow-leafed ash	•	✓	●	✗	○	
Noble fir	•	✓	●	✗	○	
Nootka cypress	-	✓	⊖	✗	△	
Northern catalpa	•	✓	●	✗	○	
Northern white cedar	+	✓	▼	✗	⊖	
Norway maple*	+	✓	▼	✗	⊖	
Norway spruce	•	✓	●	✗	○	
Oregon ash	•	✓	●	✗	○	
Oregon oak	•	✓	●	✓	●	
Pacific dogwood	•	✓	●	✗	○	
Pacific madrone	•	✓	●	✓	●	
Paper birch	•	✓	●	✗	○	
Paperbark maple	-	✓	⊖	✗	△	
Peach	•	✓	●	✓	●	
Persian parrotia	+	✓	▼	✗	⊖	
Persian silk tree	-	✓	⊖	✓	⊖	
Pin oak	•	✓	●	✗	○	
Ponderosa pine	-	✓	⊖	✗	△	
Quaking aspen	•	✓	●	✗	○	
Red alder	-	✓	⊖	✗	△	
Red maple	+	✓	▼	✓	▼	
Red oak	•	✓	●	✗	○	
River birch	•	✓	●	✓	●	
Rowan	•	✓	●	✗	○	
Russian olive*	+	✓	▼	✗	⊖	
Sargent cherry	•	✓	●	✗	○	
Sawara cypress	•	✓	●	✗	○	
Sawtooth oak*	+	✓	▼	✓	▼	
Scarlet oak	•	✓	●	✓	●	

COMMON NAME	ADAPT	HEAT ONLY			HEAT & HARDINESS	
		ZONE	ZONE	ZONE	ZONE	ZONE
		SUIT	SUIT	SUIT	SUIT	SUIT
		VULN	VULN	VULN	VULN	VULN
Scots pine	•	✓	●	✗	○	
Serbian spruce	•	✓	●	✗	○	
Shantung maple	+	✓	▼	✗	⊖	
Shingle oak	+	✓	▼	✗	⊖	
Shumard oak	•	✓	●	✓	●	
Siberian elm*	•	✓	●	✓	●	
Silver birch	-	✓	⊖	✗	△	
Silver linden	•	✓	●	✗	○	
Silver maple	•	✓	●	✓	●	
Smoke tree	+	✓	▼	✗	⊖	
Sour cherry	•	✓	●	✗	○	
Sourwood	+	✓	▼	✓	▼	
Southern catalpa	•	✓	●	✓	●	
Southern magnolia	•	✓	●	✓	●	
Strawberry tree	+	✓	▼	✓	▼	
Sugar maple	•	✓	●	✗	○	
Swamp birch	+	✓	▼	✗	⊖	
Swamp white oak	+	✓	▼	✗	⊖	
Sweet cherry	•	✓	●	✗	○	
Sweet chestnut	-	✓	⊖	✗	△	
Sweet mountain pine	•	✓	●	✗	○	
Sweetgum	-	✓	▼	✓	⊖	
Sycamore maple*	•	✓	●	✗	○	
Tatarian maple	•	✓	●	✗	○	
Tree of heaven*	+	✓	▼	✗	⊖	
Trident maple	•	✓	●	✓	●	
Tulip tree	-	✓	⊖	✗	△	
Tupelo	+	✓	▼	✓	▼	
Turkish filbert	•	✓	●	✗	○	
Vine maple	+	✓	●	✓	●	
Washington hawthorn	•	✓	●	✗	○	
Wax-leaf privet	•	✓	●	✓	●	
Weeping higan cherry	•	✓	●	✗	○	
Western hemlock	-	✓	●	✗	○	
Western red cedar	+	✓	▼	✗	⊖	
White ash	-	✓	⊖	✓	⊖	
White fir	•	✓	●	✗	○	
White mulberry*	•	✓	●	✗	○	
White oak	-	✓	⊖	✓	⊖	
White poplar	•	✓	●	✓	●	
White spruce	•	✓	●	✗	○	
Willow oak	+	✓	▼	✓	▼	
Windmill palm	+	✓	▼	✓	▼	
Yellow buckeye	•	✓	●	✗	○	
Yellowwood	•	✓	●	✗	○	

TO: Tree Board
FROM: Alyssa Jones Wood, Sustainability Coordinator
DATE: November 13, 2023
SUBJECT: Proposed Non-Regulatory Incentives and Programs

1) Recommended Action:

Discussion item for the Tree Board, then a recommendation for inclusion in the 2025/2026 budget request.

2) Background:

The City Council adopted the Urban Forestry Management Plan (UFMP) on March 2, 2021, by Ordinance No. 2020-004. Actions 1.1 D and 2.1 D in the UFMP direct staff to explore non-regulatory programs and incentives to engage the community to plant more trees, retain trees, and replant or reforest both public and private property. On March 13, 2023, staff presented a memorandum of examples of non-regulatory incentives and programs mainly from the Cascadia bioregion. The Tree Board requested that staff bring back specific recommendations from that memorandum at a future meeting. This item contains those recommendations.

3) Alternatives:

- ☐ Schedule further discussion at the Tree Board's December 11, 2023, meeting
-

4) Attachments:

- A. Memorandum on Tree Planting & Retention Incentives

MEMORANDUM



Date: November 13, 2023

To: Tree Board

From: Alyssa Jones Wood, Sustainability Coordinator

Proposed Non-Regulatory Incentives and Programs

Recommended Action

Discussion item for the Tree Board then a recommendation for inclusion in the 2025/2026 Budget Request.

Fiscal Impact

The recommended programs below would cost \$58,455 per year and additional staff time. A grant from the U.S. Forest Service recently awarded to the City of Tumwater can pay for half of these costs, or \$29,227.50 per year. Grant funding for any of the recommended programs below is contingent upon matching funds being allocated by the City Council for the 2025/2026 and 2027/2028 budgets.

Background

The Urban Forestry Management Plan (UFMP) was adopted by the Tumwater City Council on March 2, 2021, by Ordinance No. 2020-004. The UFMP includes a myriad of goals, objectives, and actions intended to guide the City's management of the Urban Forest. This memo makes recommendations related to two actions within the UFMP:

- Objective 1.1, Action D: Explore non-regulatory programs and incentives to engage the community, plant more trees, and reforest property owned by the City.
- Objective 2.1, Action D: Explore non-regulatory programs and incentives to engage the community and allow for the retention, planting, and replanting of more trees.

On March 13, 2023, City staff brought a memorandum on tree planting and retention incentives to the Tree Board outlining various examples of non-regulatory incentives and programs. The Tree Board requested that staff bring back their recommendations for programs based on the examples provided. This memorandum focuses on those recommended programs.

In May 2023, City staff submitted a grant proposal to the U.S. Forest Service for their Inflation Reduction Act Urban and Community Forest grant opportunity. This proposal included funding for the proposed

programs within this memorandum. The U.S. Forest Service notified the City that this grant was awarded on September 14, 2023. The City is awaiting a grant agreement from the U.S. Forest Service's pass-through partner, the River Network. Any work on the proposed programs would occur after a grant agreement is executed and after the City Council provides approval of the needed matching funds.

Recommendations

Public Property

The City of Tumwater has planted and maintains trees in right-of-way along multiple corridors and roadways in the City. In addition, new development is required to install street trees in accordance with the Tumwater Municipal Code. For those street trees planted by developments, the adjacent property owner or HOA is responsible for the maintenance of those trees. Together, there are more than 3,000 street trees in Tumwater. City staff currently does not have the capacity to maintain/trim more street trees than we currently maintain.

Throughout the 2023 Street Tree Code community engagement process, staff heard repeated concerns regarding the financial burden of street tree maintenance on adjacent property owners, especially if those property owners had limited disposable income. Keeping street trees properly maintained is key to ensuring safe transportation for all on sidewalks and roads.

Staff recommends that the City develop a subsidized street tree trimming program to assist low- and moderate-income Tumwater residents struggling to adequately maintain existing street trees. Income thresholds for this program and other LMI qualifying programs included in this memo will be developed at a later date after stakeholder outreach. To do this, the City would solicit and hire an outside contract ISA Certified Arborist to perform maintenance and trimming on properties selected for the program. Staff estimates that this could cost \$32,000 per year (160 hours per year). The US Forest Service grant could cover 50 percent or \$16,000 of this program each year for four years of the grant.

Private Property

Staff recommends two programs to address private properties: one for retaining existing trees and one for planting more trees.

Planting More Trees

Staff recommends the City and Tree Board continue the annual Arbor Day Tree Giveaway and add one more annual giveaway that is data-driven. Staff recommends that this additional giveaway prioritize and target participation from private property owners/renters of the City in census block groups with a Tree Equity Score of 84 or less, census tracts Environmental Health Disparity score of 8 or higher, or

areas identified in the City of Tumwater Tree Inventory as priority planting areas. Staff suggests that 60 percent of whatever funding is allocated for this program be retained for addresses that fall into the categories above. To effectively reach those residents and property owners in the target areas, the City would carry out a targeted annual mailing and/or door hanger outreach campaign to encourage participation. The property owner participating in this program would be responsible for the trees once they leave the in-person planting workshop.

To participate residents would need to:

1. Apply to the program;
2. Attend a pre-recorded tree care webinar or the annual in-person planting and care workshop;
3. Be responsible for bringing the trees, watering bags, compost, and mulch home from the in-person planting and care workshop¹; and
4. Sign a Tree Care Pledge.

On any given year, staff would review applications to ensure that 60 percent of the trees would be distributed to the target areas.

Staff recommends that the giveaway include trees (species selected by the Tree Board), watering bags, compost, and mulch. These trees would be intended to be planted on private residential property within City limits, and not in right-of-way. Staff recommends that renters of single-family homes, ADUs, and multifamily housing with 4 units or less could participate with written permission from property owners.

Staff recommends that this program be established and provide up to 100 trees per year. Staff estimates that this would cost \$26,455 per year, inclusive of the trees, watering bags, compost, mulch, and outreach. The US Forest Service grant could cover 50 percent or \$13,227 of this program each year for four years of the grant.

Retaining Existing Trees

Recent community engagement in Tumwater has suggested to staff that homeowners often remove trees because they fear the potential financial impacts of what a tree or limbs falling could create. Oftentimes, this fear can be alleviated by a Tree Health Assessment done by an ISA Certified Arborist, but that comes with its own financial burden.

¹ If participants are physically unable to transport and/or plant the tree, assistance can be provided but is limited.

The U.S. Forest Service grant award will provide the City with 50 percent of the funding needed to hire a full-time Urban Forester. Staff recommends that if the matching funds are approved by the City Council in the 2025/2026 budget, that part of the Urban Forester’s job duties include providing a limited number of Tree Health Assessments for low- and moderate-income Tumwater property owners. The intention of these Assessments is to provide information needed for decision making which ideally leads to retaining existing, healthy trees.