

Funding Mechanisms

for the Sustainable Stewardship of Private Forests



January 2020

Authors

Ken Cousins and Kenneth Zummach

Suggested Citation: *Cousins, K., Zummach, K. 2020. Finance Mechanisms for the Sustainable Stewardship of Private Forests. Earth Economics. Tacoma, WA.*

Acknowledgements

Funding provided by The Weyerhaeuser Foundation.

We would also like to thank Earth Economics' Board of Directors for their continued guidance and support: David Cosman, Elizabeth Hendrix, Ingrid Rasch, Molly Seaverns, and Nan McKay.

The authors are responsible for the content of this report.

Any reproduction in full or in part must mention the title and credit Earth Economics as the copyright owner.

Introduction

While timber is one of the more obvious benefits provided by forest ecosystems, healthy forests also clean air, stabilize soils, and provide wildlife habitat, while sequestering and storing carbon. Forests near surface waters also tend to produce richer soils, and critical aquatic and amphibious habitat.

To ensure long-term forest productivity in Washington State—while maintaining the many other benefits provided by forest lands— the Forest Practices Act details several restrictions of private forest management practices. There are many public and private resources to help landowners manage their forests to maximize not only timber, but also general ecosystem health. This report focuses on programs providing some level of economic support to non-industrial private forest landowners.

Private Forests in Pierce County, WA

Pierce County bridges the Puget Sound coast and the central Cascade Mountains, with a rapidly growing population of 870,000 people. Most residents live in the western half of the county—the city of Tacoma is the state’s third largest city. Mount Rainier National Park, to the southeast, has over 2 million visitors per year. The Puyallup-White River watershed is one of the most populated and farmed basins in Western Washington. The county also has one of the highest rates of forest conversion in the state.

Yet private forests are one of Pierce County’s most important natural assets, providing between \$259 million and \$941 million in ecosystem services each year, building and protecting soils, absorbing rain and snow to recharge groundwater, and gradually releasing water for downstream needs while limiting flooding. Forests also provide critical habitat for fish, amphibians, mammals, birds, insects, and invertebrates. Growing trees sequester and store atmospheric carbon, while producing oxygen and improving air quality. The aesthetic beauty of nearby forests also supports higher real estate prices, while offering multiple recreational opportunities, including hunting and fishing, hiking, sightseeing, and wildlife viewing (van Darren et al 2019).

Left Intentionally Blank

Forest Type	Attribute		Acres	USD/Acre/Year		USD/Year	
	Riparian	Urban		Low	High	Low	High
Deciduous Forests			27,827	\$800	\$2,700	\$25,056,600	\$74,904,400
	R		4,033	\$900	\$6,400	\$3,633,300	\$25,829,100
		U	2,642	\$1,330	\$3,200	\$3,515,800	\$8,367,400
Evergreen Forests	R	U	306	\$1,330	\$6,400	\$407,300	\$1,959,800
			128,872	\$900	\$2,800	\$122,328,800	\$362,445,700
	R		31,037	\$1,000	\$6,500	\$31,706,100	\$202,519,800
Mixed Forests		U	7,707	\$1,500	\$3,300	\$11,188,800	\$25,338,700
	R	U	1,078	\$1,500	\$6,500	\$1,565,000	\$7,034,100
			52,408	\$820	\$2,700	\$43,167,700	\$140,815,400
Totals	R		10,982	\$900	\$6,400	\$9,759,400	\$69,704,000
		U	4,515	\$1,700	\$3,800	\$7,613,900	\$16,986,300
	R	U	828	\$1,700	\$7,000	\$1,396,300	\$5,795,600
Totals			271,317	\$12,700	\$50,700	\$259,340,000	\$941,700,000

Much of the forestland within the county is owned by the state or federal government and is thus likely to remain intact. However, a significant portion is privately held. Almost all of these forests are managed for timber, yet privately owned forests are at the greatest risk of being developed to accommodate Pierce County's growing population. Any effort to retain and manage private forests—and the benefits they provide to both landowners and the broader public—must engage and support these landowners.

Economic, Social, and Ecological Benefits

Functional ecosystems produce goods and services such as breathable air, drinkable water, nourishing food, and climate stabilization, almost always at a far lower cost than technological alternatives. Moreover, where conditions allow ecosystems to persist and thrive, such benefits are provided in perpetuity, with limited management and operating costs. As pressures to develop private forests in Pierce County increase, the critical ecosystem services they provide are also at risk. Yet, while these services provide a foundation of quality of life within the county (and beyond), the ability of landowners to benefit from sustainable stewardship of their forests is largely limited to the value of the timber they produce. However, there are still multiple mechanisms to provide financial support for management of non-industrial private forests. Most of these programs center on the ecological benefits produced by responsible stewardship, but many also affect those practices which benefit nearby communities.

Funding Mechanisms

In general terms, funding mechanisms are financial tools designed to support public benefits (including natural capital), but may also include incentives or disincentives to influence behaviors that impact those assets. Mechanisms may be public, private, or a mix of both. They may be voluntary or compulsory, implemented by

the private or public sector, exist as a standalone programs or in combination with regulations, or take the form of subsidies and grants, tax exemptions, in-lieu fees, conservation easements, and payments for ecosystem services (e.g., carbon credits). See the Appendix for details on each specific program available to owners of private forestlands in Pierce County.

Subsidies and Grants

Direct payments to compensate or support responsible stewardship of private forests are perhaps the simplest mechanism available to landowners—landowners are given financial support to implement projects or management practices which align with funders’ program goals. Programs to support stewardship of private forests in Pierce County have been designed to incentivize erosion control, habitat retention, protect water quality, mitigate wildfire risk, and remove barriers to migratory fish (e.g., salmon). Eligibility and funding rules may vary by project or practice—some programs compensate landowners for documented expenditures, others require matching financial or in-kind commitments, and others pay costs up-front, following project approval. See specific programs for details.

Program	Environmental Quality Incentive Program (EQIP) / Regional Conservation Partnership
Agency	USDA Natural Resource Conservation Service and Farm Service Agency
Level	Federal
Intention	Assist landowners address practices posing significant threats to soil or water resources
Type	Technical, Financial
Incentive	\$2.4K to \$6K for forest management plans; \$280 to \$338 for woody residue treatment; \$468 to \$6.3K for various riparian buffer plantings; \$1.70/linear foot for road cross-drains; \$1.28/tree to \$850/acre for reforestation; \$125 to \$2.1K for various forest stand improvements and fuel load reductions (e.g., thinning, herbicide treatments).
Eligibility	Forested land
Offerings	Technical assistance, cost-share to implement conservation practices. May be combined with other NRCS Conservation Practices (e.g., Integrated Pest Management)
Economic Impacts	Long-term forest productivity, yields
Ecological Impacts	Improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation, and improved or created wildlife habitat, reduced wildfire risk, increase or maintain carbon storage
Social Impacts	Forest stand improvement may improve visual quality (e.g., retaining attractive and appropriate trees, especially around structures, roads, and home sites)
Sources	www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip See NRCS 2020 for specific incentives. See NRCS 2015 for details on forest-relevant practices.

Program	Family Forest Fish Passage Program (FFFPP)
Agency	Washington Department of Natural Resources
Level	State
Intention	Removing (or improving) stream crossings that block fish from upstream habitat
Type	Technical, Financial
Incentive	Full cost of replacement
Eligibility	Private small forest landowner (<2MBF/year) with road-stream crossings of fish-bearing streams. Applications due on the first day of May.
Offerings	Culverts are evaluated, prioritized (number of salmon or trout species affected, quantity and quality of upstream habitat, upstream/downstream barriers, cost). High priority barriers are replaced based on available funds. Landowners must contribute \$5K (in-kind is allowed) if timber is harvested within three years of funding award.
Economic Impacts	Applicants are relieved of Forest Practices obligations to correct fish barriers.
Ecological Impacts	Restored fish access to upstream habitat.
Social Impacts	Forest stand improvement may improve visual quality (e.g., retaining attractive and appropriate trees, especially around structures, roads, and home sites).
Sources	www.dnr.wa.gov/fffpp See WDNR etal 2016 for additional program details.

Program	Family Forest Fish Passage Program (FFFPP)
Agency	Washington Department of Natural Resources
Level	State
Intention	Removing (or improving) stream crossings that block fish from upstream habitat
Type	Technical, Financial
Incentive	Full cost of replacement
Eligibility	Private small forest landowner (<2MBF/year) with road-stream crossings of fish-bearing streams. Applications due on the first day of May.
Offerings	Culverts are evaluated, prioritized (number of salmon or trout species affected, quantity and quality of upstream habitat, upstream/downstream barriers, cost). High priority barriers are replaced based on available funds. Landowners must contribute \$5K (in-kind is allowed) if timber is harvested within three years of funding award.
Economic Impacts	Applicants are relieved of Forest Practices obligations to correct fish barriers.
Ecological Impacts	Restored fish access to upstream habitat.
Sources	www.dnr.wa.gov/fffpp See WDNR etal 2016 for additional program details.

Program	Make a Splash
Agency	City of Tacoma
Level	Municipal
Intention	Protect and restore surface water within Tacoma city limits through erosion prevention, wetland/stream protection; past projects have included afforestation
Type	Financial
Incentive	\$4000 reimbursable award
Eligibility	Must be within City of Tacoma limits, preference for projects with identifiable benefit to local waterways
Offerings	Grant can cover costs in approved project budget including transportation, materials, 20% of labor costs associated with development/ oversight/coordination, no more than 10% can be spent on food.
Economic Impacts	Reimbursement for project costs.
Ecological Impacts	Carbon sequestration and storage, heat island mitigation, air quality, and water quality.
Sources	www.cityoftacoma.org/government/city_departments/environmentalservices/surface_water/make_a_splash_stormwater_project_funding

Program	Sustainability Small Grant
Agency	City of Tacoma
Level	Municipal
Intention	Educate residents, protect and restore the environment—specifically identifies tree planting to expand Tacoma’s tree canopy
Type	Financial
Incentive	\$5000 reimbursable award
Eligibility	Projects within Tacoma City limits, or those approved by Office of Environmental Policy and Sustainability
Offerings	Grant can cover costs in approved project budget including transportation, materials, 20% of labor costs associated with development/oversight/coordination, no more than 10% can be spent on food.
Economic Impacts	Reimbursement for project costs
Ecological Impacts	Carbon sequestration and storage, air quality, heat island mitigation
Social Impacts	Reduced health risks due to air quality or excessive heat
Sources	www.cityoftacoma.org/government/city_departments/environmentalservices/grants_and_sponsorships/sustainability_small_grant

Program	Tree Coupon Program
Agency	City of Tacoma
Level	Municipal
Intention	Increase canopy cover in Tacoma, prioritizing areas of lower cover
Type	Financial, Education
Incentive	Coupon for \$30 off, a tree for up to 3 trees.
Eligibility	Pierce county properties
Offerings	Pierce county resident apply online for tree coupons, which are then mailed along with tree planting education materials.
Economic Impacts	Discounted materials costs
Ecological Impacts	Carbon sequestration and storage, heat island mitigation, air quality
Social Impacts	Reduced health risks due to air quality or excessive heat
Sources	www.cityoftacoma.org/government/city_departments/environmentalservices/urban_forestry/tree_coupon_program

Tax Exemptions

In Washington state, timber harvests are subject to both state excise and Business and Occupation (B&O) taxes, as well as federal income taxes, minus harvesting and marketing costs (where known—otherwise standard allowances can be applied). Subtracting business costs from overall tax liabilities is a common practice, and not necessarily linked to long-term stewardship of forest resources—however, there are several allowances for landowners who follow sustainable management practices. This may affect estate planning and property taxes or may allow to exclude some proportion of grants for stewardship efforts from overall taxable income. See specific programs for details.

Left Intentionally Blank

Program	Forest Land Property Tax Program
Agency	Washington Department of Revenue
Level	State
Intention	Timber grown on these lands is not subject to property tax but is subject to harvest or yield tax.
Type	Tax waiver
Incentive	Removes property tax liability for standing timber
Eligibility	Forest management plans, description of area that does not qualify (e.g., residence, pasture).
Offerings	Property tax exemption
Economic Impacts	Property tax exemption for land with standing timber
Ecological Impacts	Retains forest habitat and associated ecosystem services
Sources	www.co.pierce.wa.us/685/Forest-Land See WDOR 2010 for details on management plan requirements.

Program	Forest Taxation and Estate Planning
Agency	Internal Revenue Service, U.S. Forest Service
Level	Federal
Intention	Active forest management reduces wildfire risk while maintaining or improving timber resources and forest environments
Type	Financial
Incentive	Costs of active management offset taxes on timber income (standing or cut)
Eligibility	Consult a tax expert
Offerings	Sale of standing timber held as investment may be taxed as a capital gain; timber harvests are taxed as income. However, some management costs (e.g., labor, consulting fees, pest control, fire control, road maintenance) may be deducted from taxable income.
Economic Impacts	Reduced tax liability for sustainable forest management
Ecological Impacts	Timber quantity and quality, reduced fire risk, reduced erosion risk
Sources	www.fs.usda.gov/managing-land/private-land/tax

Program	Forest Health Protection Program (FHPP) Cost Share Offset
Agency	Internal Revenue Service, U.S. Forest Service
Level	Federal
Intention	Expand participation in the FHPP cost-share program (i.e., integrated pest management)
Type	Financial
Incentive	Reduction in taxable income
Eligibility	Consult a tax expert
Offerings	Forest landowners are eligible to exclude part or all of cost sharing (50% - 75% of management costs) received under the FHPP from their income, provided they also meet capital expenditure requirements under Section 126.
Economic Impacts	Reduced tax exposure for timber resources
Sources	www.fs.fed.us/managing-land/private-land/tax/tax-guidelines See IRS 2009 for additional details.

Conservation Easements

In general terms, conservation easements are legally binding contracts that define the allowable land uses for a given property. They typically limit certain land-uses (e.g., development) either permanently or for a defined period. Landowners may deduct the value of these rights from their federally taxable income, provided they are preserving natural habitat of fish, wildlife, or plants. The value of the contribution must be determined by a qualified appraiser, using. This program is available to both individual and corporate taxpayers (including tribal corporations).

Transferable development rights (TDRs) are a form of easement, designed to shift development away from sensitive areas—such as wetlands—to locations with lower ecological impacts. Areas identified for protection are known as "sending" zones, while areas suitable for increased development are "receiving" zones. TDRs to develop a parcel in a "receiving" zone may be traded for the protection of another parcel in a "sending" zone. Pierce County has an active TDR program (see Appendix) that includes allowances for forested sending zones.

Left Intentionally Blank

Program	Forest Legacy Program (FLP)
Agency	U.S. Forest Service, Washington Department of Natural Resources
Level	Federal, State
Intention	Protecting working forests under threat of conversion to non-forest uses (e.g., commercial or residential development)
Type	Financial
Incentive	Conservation easements (federal contribution limited to 75% of project cost)
Eligibility	Parcels at least 75% forested that are under threat of conversion to non-forest uses; ongoing management as working forest
Offerings	Permanent conservation easements (52 tracts in WA since 1994, protecting 69K acres)
Economic Impacts	Working forests
Ecological Impacts	Protect water quality and provide wildlife habitat
Social Impacts	Recreation and other public benefits
Sources	www.fs.fed.us/managing-land/private-land/forest-legacy/program See USFS 2019 for details on eligibility and ranking. See USFS 2017 for additional details.

Program	Forestry Riparian Easement Program (FREP)
Agency	Washington Department of Natural Resources
Level	State
Intention	Protect or increase tree cover in riparian buffers
Type	Financial
Incentive	A minimum of 50% of timber value retained within riparian areas
Eligibility	Privately owned small forests (≥ 20 contiguous acres, or ≥ 80 within the state), harvesting less than 2M board feet per year
Offerings	50-year conservation easements adjacent to streams, wetlands, seeps, or unstable slopes
Economic Impacts	Compensation for reduced harvests in riparian areas
Ecological Impacts	Protect riparian habitat
Sources	www.dnr.wa.gov/programs-and-services/forest-practices/small-forest-landowners/forestry-riparian-easement-program See WDNR 2014 for details.

Program	Manage the Rivers and Habitat Open Space Program (RHOSP)
Agency	Washington Department of Natural Resources
Level	State
Intention	Provide ecological protection and fisheries enhancement while compensating landowners prohibited under state Forests and Fish rules from harvesting timber on riparian land isolated by river channels that have migrated over time.
Type	Financial
Incentive	Permanent conservation easement
Eligibility	Forestland habitat critical for state-listed threatened or endangered species; or forestlands within unconfined Channel Migration Zones (i.e., islands within shifting river channels).
Offerings	Qualifying landowners can apply to donate or sell a permanent conservation easement on their land and/or timber in designated forest land that exists along migrating stream channels (16 easements covering 1,043 acres since 2002)
Economic Impacts	Economic benefit to landowner, maintains small forest lands
Ecological Impacts	Habitat extent and quality (including landscape continuity), species diversity
Sources	www.dnr.wa.gov/programs-and-services/forest-practices/small-forest-landowners/rivers-and-habitat-open-space

Program	Transfer of Development Rights (TDR)
Agency	Pierce County Planning and Public Works
Level	County
Intention	Pierce County Transfer of Development Rights Program (TDR) is a market-based program that shifts development rights from ecologically sensitive and resource rich lands to lands more suitable for development. This shift preserves ecologically sensitive and resource rich lands while redirecting growth to urban areas. TDRs allow landowners to transfer the right to develop one parcel of land to a different parcel of land.
Type	Financial
Incentive	Varies depending on assessed “TDR credits” (calculator at: www.co.pierce.wa.us/DocumentCenter/View/41544)
Eligibility	Site has a land use designation of Forest Lands (FL)
Offerings	Permanent conservation easements
Economic Impacts	Economic benefit to landowner, maintains small forest lands
Ecological Impacts	Habitat extent and quality (including landscape continuity), species diversity
Sources	www.co.pierce.wa.us/TDR

In-Lieu Fees

In-lieu programs allow developers offset or reduce permitting and compliance costs following investments in the sustainable management of other at-risk ecosystems. This may include payment to owners of forested wetlands where harvesting is prohibited, as a means of protecting aquatic habitat and water quality. In-lieu programs are a distant relative of TDRs, in that stewardship of high-value locations is funded by those who wish to offset unavoidable impacts other locations, without outright transfer of development rights. Pierce County has an active in-lieu fee program to mitigate the net impact of development in rapidly urbanizing areas of the county.

Program	Pierce County In-Lieu Fee (ILF) Program
Agency	Pierce County Planning and Public Works
Level	County
Intention	Pierce County Transfer of Development Rights Program (TDR) is a market-based program that shifts development rights from ecologically sensitive and resource rich lands to lands more suitable for development. This shift preserves ecologically sensitive and resource rich lands while redirecting growth to urban areas. TDRs allow landowners to transfer the right to develop one parcel of land to a different parcel of land.
Type	Financial
Incentive	Varies depending on assessed “TDR credits” (calculator at: www.co.pierce.wa.us/DocumentCenter/View/41544)
Eligibility	Site has a land use designation of Forest Lands (FL)
Offerings	Permanent conservation easements
Economic Impacts	Economic benefit to landowner, maintains small forest lands
Ecological Impacts	Habitat extent and quality (including landscape continuity), species diversity
Sources	www.co.pierce.wa.us/TDR

Payments for Ecosystem Services

A characteristic common to ecosystem services is that they are rarely traded in markets. This has made it challenging to directly compensate landowners for responsible stewardship. However, in recent decades, several policy experiments to remedy this imbalance have emerged. Perhaps the most widespread of these are “emissions offsets” programs—also known as carbon trading schemes. The most ambitious of these (i.e., those applying higher prices to carbon emissions) focus on the current and future “social cost of carbon,” or the effect that ongoing emissions can be expected to have on public health, safety, and wellbeing. California’s Air Resources Board manages one of the more successful of these, and several organizations have emerged to help landowners participate. While the cost to establish and monitor forested offsets may be relatively high for smaller landowners, there are experiments to lower such costs. Contact Forest Carbon Works for further details.

Left Intentionally Blank

Program	Forest Offset Protocol
Agency	Forest Carbon Works (credits via the California Air Resources Board)
Level	State
Intention	Carbon sequestration and storage from reforestation, improved forest management (increased rotational period, thinning/brush management), avoided conversion to other land uses
Type	Financial
Incentive	Compensation for increased biomass due to a range of factors (e.g., reforestation, deferred harvests), or assurances that biomass storage would be perpetual (e.g., easements)
Eligibility	Only management units that can be legally harvested are eligible (i.e., no areas where harvests are prohibited by regulation). Current forest condition must be higher than neighboring properties; growth and harvest scenarios must incorporate regulatory limits and be cost-effective over a 100-year period. Forest Carbon Works has developed techniques to lower costs for smallholders, including pseudo-aggregation (multiple landowners certifying at the same time), and lower-cost inventory tools.
Offerings	Contact Forest Carbon Works for details.
Economic Impacts	Emissions offsets for industry become income streams for forest landowners
Ecological Impacts	Protect or increase carbon stored as forest biomass
Sources	www.forestcarbonworks.org ww3.arb.ca.gov/cc/capandtrade/offsets/issuance/issuance.htm

Left Intentionally Blank

Conclusion

Mechanism	Examples	Benefits		
		Social	Ecological	Economic
Subsidies and Grants	Environmental Quality Incentive Program	•	•	•
	Family Forest Fish Passage Program		•	•
	Make a Splash		•	•
	Sustainability Small Grant	•	•	•
	Tree Coupon Program	•	•	•
Tax Exemptions	Forest Land Property Tax Program		•	•
	Forest Taxation and Estate Planning		•	•
	Forest Health Protection Program		•	•
Conservation Easements	Forest Legacy Program	•	•	•
	Forestry Riparian Easement Program		•	•
	Manage the Rivers and Habitat Open Space Program		•	•
	Pierce County Transferable Development Rights	•	•	•
In-Lieu Fees	Pierce County In-Lieu Fee Program		•	•
Payment for Ecosystem Services	California Forest Offset Protocol		•	•

While there are several funding mechanisms available to the owners of private forestlands, few allow landowners to generate a substantial stream of income while retaining the full rights of fee-simple ownership. Most either compensate for focused, time-limited projects (e.g., culvert replacement), offset the costs of forest management and tax liability, or require landowners to cede some land use rights, either temporarily or permanently. Others which may offer a more consistent income stream (e.g., carbon offsets), often focus on “above the line” activities—practices beyond those required by regulation are generally ineligible for compensation (e.g., harvest limits in riparian buffers). More informal income streams (e.g., allowing access to hunters or fishers, in exchange for payment) and expanded experiments into payments for ecosystem services may provide some relief to the private owners of forestlands in Pierce County (and beyond).

References

Air Resources Board, 2015. Compliance Offset Protocol: U.S. Forest Projects (Protocol). California Environmental Protection Agency, Sacramento, CA. url: ww3.arb.ca.gov/cc/capandtrade/protocols/usforest/forestprotocol2015.pdf

Barbane, Z., 2017. Forest Carbon Offset Projects. url: www.pinshot.org/doc/602

Bonlender, B., Drewel, B., Devernoy, G., 2013. Regional transfer of development rights in Puget Sound: A Regional Alliance of Puget Sound Counties, Cities, the Puget Sound Regional Council, Forterra and Department of Commerce (Report to U.S. EPA). Washington Department of Commerce, Puget Sound Regional Council, Forterra. url: www.eopugetsound.org/articles/report-regional-transfer-development-rights-puget-sound

Bratton, N., Swenson, S., Carroll, T., Aten, H., 2009. A Resource Guide to Designing Transfer of Development Rights Programs in Washington State. Cascade Land Conservancy, Seattle, WA. url: www.skagitcounty.net/PlanningAndPermitTDR/Documents/CTEDPublicationsView.pdf

California Air Resources Board, 2019. Compliance Offset Protocol U.S. Forest Offset Projects. CA.gov. URL ww3.arb.ca.gov/cc/capandtrade/protocols/usforest/usforestprojects_2015.htm.

California Environmental Policy Agency, 2013. California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms, California Code of Regulations. url: ww3.arb.ca.gov/cc/capandtrade/c-t-reg-reader-2013.pdf

Carr, L., Batker, D., Milan, F., Mary Sue, G., n.d. The Carbon River Valley Conservation Project: A Lifeline to Mount Rainier National Park (Draft). APEX, Seattle, WA. url: www.southsoundchapterwnps.org/CARBONRI_reduce.pdf

Climate Bonds Initiative, 2017. Green Bonds and Forestry. url: www.pinshot.org/doc/602

Cox, L., 2015. Family Forest Fish Passage Program. Washington Department of Natural Resources. url: www.dnr.wa.gov/fffpp.

Driscoll, M., 2017. Transfer of development rights preserves Pierce County farmland, and increases Tacoma urban density. Tacoma News Tribune. url: www.thenewstribune.com/news/local/news-columns-blogs/matt-driscoll/article147934764.html

Earth Economics, 2009. WRIA 9 Funding Mechanisms Report: Generating Payments for Ecosystem Services. Prepared for the WRIA 9 Watershed Ecosystem Forum.

Erickson, A., Rinehart, J., 2005. Private Forest Landownership in Washington State (Discussion Paper), Saving Washington's Working Forest Land Base. University of Washington, Northwest Environmental Forum, Seattle, WA. url: digital.lib.washington.edu/researchworks/bitstream/handle/1773/2233/tp1.pdf

Forest Practices Board, 2001. Forest Practices Board Manual. url: www.dnr.wa.gov/about/boards-and-councils/forest-practices-board/rules-and-guidelines/forest-practices-board-manual

Greene, J.L., Siegel, W.C., Hoover, W.L., Koontz, M., 2013. Forest landowners' guide to the Federal income tax. Agriculture Handbook 731. Washington, DC: U.S. Forest Service. 152 p. 731, 1–152. url: www.srs.fs.usda.gov/pubs/42921

Internal Revenue Service, 2009. Internal Revenue Bulletin: 2009-32. url: www.irs.gov/irb/2009-32_IRB.

Johnson, R.L., Alig, R., Kline, J., Moulton, R., Rickenbach, M., 1999. Management of Non-industrial Private Forest Lands: Survey Results from Western Oregon and Washington Owners (Research Contribution No. 28). Oregon State University, Forest Research Laboratory, Corvallis, OR.

Natural Resources Conservation Service, 1997. SW Washington Non-Industrial Private Forest Lands Conservation Partnership - Regional Conservation Partnership Program (Overview). Washington Department of Natural Resources, Olympia, WA. url: www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=nrcseprd1372246&ext=pdf

Natural Resources Conservation Service, 2015. Conservation Practice Standard - Forest Stand Improvement. U.S. Department of Agriculture. url: www.nrcs.usda.gov/wps/portal/nrcs/detail/?cid=nrcs144p2_027208

Natural Resources Conservation Service, 2019. Regional Conservation Partnership Program. U.S. Department of Agriculture. url: www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/rcpp/.

Natural Resources Conservation Service, n.d. Unlocking Carbon Markets for Forest Owners in the Pacific Northwest. url: www.nrcs.usda.gov/wps/portal/nrcs/detail/or/programs/farmbill/rcpp/?cid=nrcseprd346420.

Natural Resources Conservation Service, n.d. Washington Payment Schedules. U.S. Department of Agriculture. url: www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/?cid=nrcseprd1328418.

Nisqually Land Trust, 2017. Public Use of Nisqually Land Trust Lands. url: nisquallylandtrust.org/public-use-nisqually-land-trust-lands/.

Partridge, C., Boese, J., Bernath, S., 2011. 2010 Forest Carbon Workgroup: Final Report (Final Report No. 11-10–006). Water Quality Program, Washington Department of Ecology, Olympia, WA. url: digital.library.unt.edu/ark:/67531/metadc226781/

Peterson, D.L., Innes, J.L., O'Brian, K., 2004. Climate Change, Carbon, and Forestry in Northwestern North America: Proceedings of a Workshop, November 14-15, 2001 - Orcas Island, Washington (General Technical Report No. PNW-GTR-614). U.S. Forest Service, Seattle, WA. url: www.fs.usda.gov/treesearch/pubs/6596

Pierce County Development Center, 2019. Purchase and Transfer of Development Rights Program - Eligible Sending Site Criteria. Pierce County Planning and Public Works, Tacoma, WA. url: www.piercecountywa.gov/DocumentCenter/View/4525/TDR-Eligible-Sending-Site-Criteria?bidId=

Pierce County Planning and Public Works, 2013. Forest Practices in Pierce County: Frequently Asked Questions. Pierce County Planning and Public Works, Tacoma, WA. url: www.co.pierce.wa.us/DocumentCenter/View/70576/FAQ-Forest-Practices-in-Pierce-County

Pierce County Planning and Public Works, n.d. In-Lieu Fee Program. url: www.piercecountywa.org/1847/In-Lieu-Fee-Program.

Pierce County, 2019. Title 18A Development Regulations – Zoning. Code Publishing. url: www.codepublishing.com/WA/PierceCounty/html/PierceCounty18A/PierceCounty18A.html.

Pinchot Institute for Conservation, 2017. Carbon Forestry Workshop. url: www.pinchot.org/doc/602

Pomerenk, D., 2014. Forestry Riparian Easement Program. Washington Department of Natural Resources. url: www.dnr.wa.gov/programs-and-services/forest-practices/small-forest-landowners/forestry-riparian-easement-program.

Puget Sound Regional Council, 2018. Regional Open Space Conservation Plan. url: www.psrc.org/open-space.

Puyallup River Watershed Council, 2013. Forest Management in the Puyallup Watershed. url: www.co.pierce.wa.us/AgendaCenter/ViewFile/Item/340?fileID=384

Rural Technology Initiative, 2007. Future of Washington's Forests and Forestry Industries (Final Report No. 5). University of Washington, Seattle, WA. url: www.ruraltech.org/projects/fwaf/

Sagor, E., 2006. Nonindustrial private forest landowners and sources of assistance, in: Jakes, Pamela, Ed. Forestry Cooperatives: What Today's Resource Professionals Need to Know. Proceedings of a Satellite Conference; 2003 November 18. Gen. Tech. Rep. NC-266. St. Paul, MN: U.S. Forest Service, North Central Forest Experiment Station. pp. 3-11. url: www.fs.usda.gov/treearch/pubs/19066

Small Forest Landowner Office, 2015. Rivers and Habitat Open Space Program. Washington Department of Natural Resources. URL www.dnr.wa.gov/programs-and-services/forest-practices/small-forest-landowners/rivers-and-habitat-open-space.

Sprague, E., Price, W., Parrish, J., Olenzak, T., 2011. Sustainable Forestry Revolving Loan Fund (Prospectus). Pinchot Institute for Conservation, The Nature Conservancy of Pennsylvania.

Stewart, S., 2015. The Forest Legacy Program: 25 Years of Keeping Working Forests Working. U.S. Forest Service. url: www.fs.usda.gov/features/forest-legacy-program-25-years-keeping-working-forests-working.

Swedeon, P., 2016. Lessons from Exploring the use of California's Carbon Market to Leverage Forest Conservation in Washington State: The Nisqually Land Trust Case. Washington Environmental Council. url: wecprotects.org/wp-content/uploads/2016/11/Nisqually-Lessons-Learned_full.pdf

U.S. EPA, 2017. Financing Options for Nontraditional Eligibilities in the CWSRF. url: www.epa.gov/cwsrf/financing-options-nontraditional-eligibilities-cwsrf

U.S. Forest Service, 2017. Forest Legacy Program Implementation Guidelines (No. FS-1088). Washington, DC. url: www.fs.usda.gov/sites/default/files/fs_media/fs_document/15541-forest-service-legacy-program-508.pdf

U.S. Forest Service, 2019. Forest Health Protection: Evaluation Monitoring Program - Proposal Instructions and Guidelines. Washington, DC.

U.S. Forest Service, 2019. Forest Legacy Program: Project Scoring Guidance. Washington, DC. url: www.fs.usda.gov/sites/default/files/fy-2019-flp-project-scoring-guidance-508c.pdf

Van Deren, M., Armistead, C., Kerr, N., Soares, J., 2019. The Costs of Sprawl: The Potential Impacts of Development in Pierce County, Washington. Earth Economics, Tacoma, WA.

Van Deren, M., Cousins, K., Kerr, N., Soares, J., 2018. The Public Benefits of Private Forests: An Ecosystem Services Valuation of Private Forest Lands in Pierce County, Washington. Earth Economics, Tacoma, WA.

Wang, L., 2012. Federal Income Tax on Timber: A Quick Guide for Woodland Owners (No. FS-1007). U.S. Forest Service, Washington DC. url: www.fs.fed.us/spf/coop/library/timbertax2012.pdf

Wang, L., 2018. Timber Tax Filing for the 2017 Tax Year. url: www.forestrywebinars.net/webinars/timber-tax-filing-for-the-2017-tax-year

Washington Department of Ecology, 2006. Wetland Mitigation in Washington State - Part 2: Developing Mitigation Plans. url: fortress.wa.gov/ecy/publications/summarypages/0606011b.html.

Washington Department of Fish and Wildlife, Washington Recreation and Conservation Office, Washington Department of Natural Resources, 2016. Family Forest Fish Passage Program: Program Guidelines. Olympia, WA. url: www.dnr.wa.gov/publications/fp_sflo_ffppguidelines.pdf

Washington Department of Health, 2019. Drinking Water State Revolving Fund (DWSRF). url: www.doh.wa.gov/communityandenvironment/drinkingwater/watersystemassistance/drinkingwaterstaterevolvingfunddw_srf.

Washington Department of Natural Resources, 2017. Forest Practices Illustrated: A Simplified Guide to Forest Practices Rules in Washington State. Olympia, WA. url: www.dnr.wa.gov/forest-practices-illustrated

Washington Department of Natural Resources, 2019. Ecosystem Services Markets. Olympia, WA.

Washington Department of Natural Resources, Natural Resources Conservation Service, Washington Department of Revenue, U.S. Forest Service, 2017. Washington State Integrated Forest Management Plan Guidelines and Template. Olympia, WA. url: www.dnr.wa.gov/publications/fp_sflo_fs_intfmgmtgdlns.pdf?h63bvt

Washington Department of Revenue, December 15. Guidelines for Timber Management Plans (No. FS0024). Olympia, WA. url: dor.wa.gov/sites/default/files/legacy/Docs/Pubs/ForestTax/ForestSum.pdf

Washington Forest Protection Association, 2017. Forest Facts and Figures. url: www.wfpa.org/news-resources/forest-facts-figures/