

WASHINGTON NATIVE PLANT SOCIETY

Native Plant Stewardship Training:

Rivers and Forests of Whatcom County and Northern Puget Sound
Bellingham, Fall 2017



Coordinator and lead trainer

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Class schedule

Week	Date	Activity or Event	Description
1	Thursday, September 21	Class 1	<i>See Class Outline</i>
	Saturday, September 23	Field Trip 1	Forests & rivers of the Whatcom County lowlands
2	Thursday, September 28	Class 2	<i>See Class Outline</i>
3	Thursday, October 5	Class 3	<i>See Class Outline</i>
	Saturday, October 7	Field Trip 2	Habitat & restoration in the City of Bellingham
4	Thursday, October 12	Class 4	<i>See Class Outline</i>
5	Thursday, October 19	Class 5	<i>See Class Outline</i>
	Saturday, October 21	Field Trip 3	Terrell Creek work party & watershed tour
6	Thursday, October 26	Class 6	<i>See Class Outline</i>

Classes will meet from 6:00 – 8:30 P.M on the dates indicated above. at the Bloedel Beach Pavilion at Bloedel Donovan Park, 2114 Electric Avenue, Bellingham.

(<https://www.cob.org/services/recreation/parks-trails/Pages/bloedel-donovan-park.aspx>)



FIELD TRIPS

Field trips are an integral part of the stewardship training. Field trips are scheduled for the 1st, 3rd, and 5th Saturdays during the course period. Meeting times and places and trip logistics will be announced during class. Many of our field sites will have limited parking, so please plan on carpooling as much as possible. Assembly areas will be places where cars may be dropped and left for a day.

Field trips will be all-day excursions into local ecosystems, complementing and reinforcing topics covered in classroom sessions. Expect 5-7 hours of instruction, observation, and experience, in addition to travel time to and from our assembly area.

Field trips will focus on the following:

- Observing examples of natural plant communities.
- Observing restoration project areas.
- Demonstrations and hands-on experience in planting techniques, invasive species control, and other restoration & management practices.
- Identification of key native and invasive plant species.

Field trips will be rain or shine, and stewards should dress accordingly. Wetland and riparian areas may be quite wet. Regardless of the weather, and footwear should be chosen accordingly. Make sure to bring water, lunch, and snacks for the day.

Carpool etiquette: It's WNPS policy – and just plain good manners! – for field trip passengers to share costs with carpool drivers. The cost-share should include consideration for wear and tear on vehicles as well as covering gas.



Recommended field guide

A field guide is not required for this course, but a good guide is a tremendous tool when learning new plants. Pojar and MacKinnon (below) still seems to be the best overall guide, and earns special praise for its treatments of grasses and sedges, taxonomic groups neglected by many guides.

Pojar, J., and A. MacKinnon. 1994. **Plants of the Pacific Northwest Coast.** Lone Pine Press, Redmond, WA, and Vancouver, BC. 528 pp.

Other helpful guides

The guides below each have a specialized focus. They are all excellent, but lack the breadth of coverage provided by Pojar and MacKinnon. Note the local authorship of three of them!

Guard, B.J. 1995. **Wetland Plants of Oregon and Washington.** Lone Pine Publishing, Redmond, WA, Vancouver, BC. 240 pp.

Lloyd, T.A., and F.H. Chambers. 2014. **Wild Berries of Washington and Oregon.** Lone Pine Publishing. 256 pp. *Koma Kulshan author!*

Turner, M., and E. Kuhlmann. 2014. **Trees and Shrubs of the Pacific Northwest.** Timber Press, Portland, OR. 448 pp. *Koma Kulshan authors!*

Zobrist, Kevin W. 2015. **Native Trees of Western Washington: A Photographic Guide.** Washington State University Press. 160 pp. *Western Washington author!*

CLASS OUTLINE

WEEK 1

I. WELCOME & INTRODUCTION

- Welcome
- A word from our sponsors
- Stewards' minimum commitments.
- Logistics.

Why study native plants? The importance of native plants in Northwest ecosystems.

II. NATIVE PLANTS & THEIR HABITATS

The Puget Lowland Ecoregion

Plants and the environment

- Limiting factors
- Competition for resources
- Disturbance & change

III. PUGET SOUND LOWLAND FORESTS

- Ecological functions & biodiversity
- History, trends, and current status
- Forest Structure

Key species of Puget Lowland coniferous forests: ID & ecological characteristics

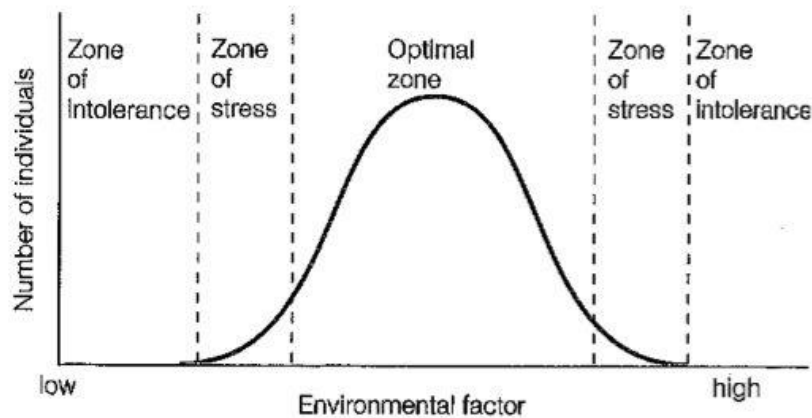
Ecological succession in Puget Lowland forests

Why do conifers dominate Pacific Northwest forests?

IV. INTRODUCTION TO PRIMARY READINGS

Tips for getting the most out of scientific review articles without getting stuck on technical jargon, statistics, etc.

V. LOGISTICS FOR FIELD TRIP 1



Idealized illustration of a plant species tolerance for a hypothetical environmental factor.

[Source: M.G. Barbour and others (1987). *Terrestrial Plant Ecology*. 2nd Edition]

PRIMARY RESOURCES, WEEK 1:

Primary Reading:

Puget Lowland. *On the Class Materials webpage:*

<http://www.wnps.org/nps/komakulshan/stewardship/classroom.html>

Waring, R.H., and J.F. Franklin. 1979. **Evergreen coniferous forests of the Pacific Northwest.** *Science* 204: 1380-1386. <http://andrewsforest.oregonstate.edu/pubs/pdf/pub189.pdf>

Primary Video(s):

Severin, D. 2015. **Something in the Trees: A Message from the Mountains.** Video (00:05:51). <https://www.youtube.com/watch?v=mQen3HGuYUM> *Dr. Jerry Franklin has been the leading light on research and management of Northwest forest ecosystems for more than 40 years, The soundtrack to this short film is unfortunate, but Franklin is a regional treasure.*

Whatcom Land Trust. 2013. **Four Species of Salmon in Maple Creek, North Fork of the Nooksack River.** Video (00:02:37). <https://www.youtube.com/watch?v=kEVFDI0PD-w> *We'll be visiting WLT's Maple Creek Reach Preserve during Saturday's field trip. This short video helps to show why WLT, the Nooksack Salmon Enhancement Association, and others are working there.*

[Kollipara, V. 2015. **Meet the 6 Species of Pacific Salmon.** Video (00:03:32). Salmon Savers. https://www.youtube.com/watch?v=-i2RVBpGc_s *If you have trouble identifying the salmon species in the above video this might help. See how much you can learn from a teenager!]*

WEEK 2

I. PUGET LOWLAND RIPARIAN & STREAM HABITATS

Introduction to riparian & stream habitats

Functions & processes of riparian & stream habitats: *What streams do & how they do it!*

II. WHATCOM CREEK – A ‘PHOENIX RISING’ STORY.

Rae Edwards, City of Bellingham Parks & Recreation Department.

III. STRUCTURE AND COMPOSITION OF PUGET LOWLAND RIPARIAN HABITATS

Key species of Puget Lowland riparian habitats: ID & ecological characteristics.

PRIMARY RESOURCES, WEEK 2:

Primary Reading:

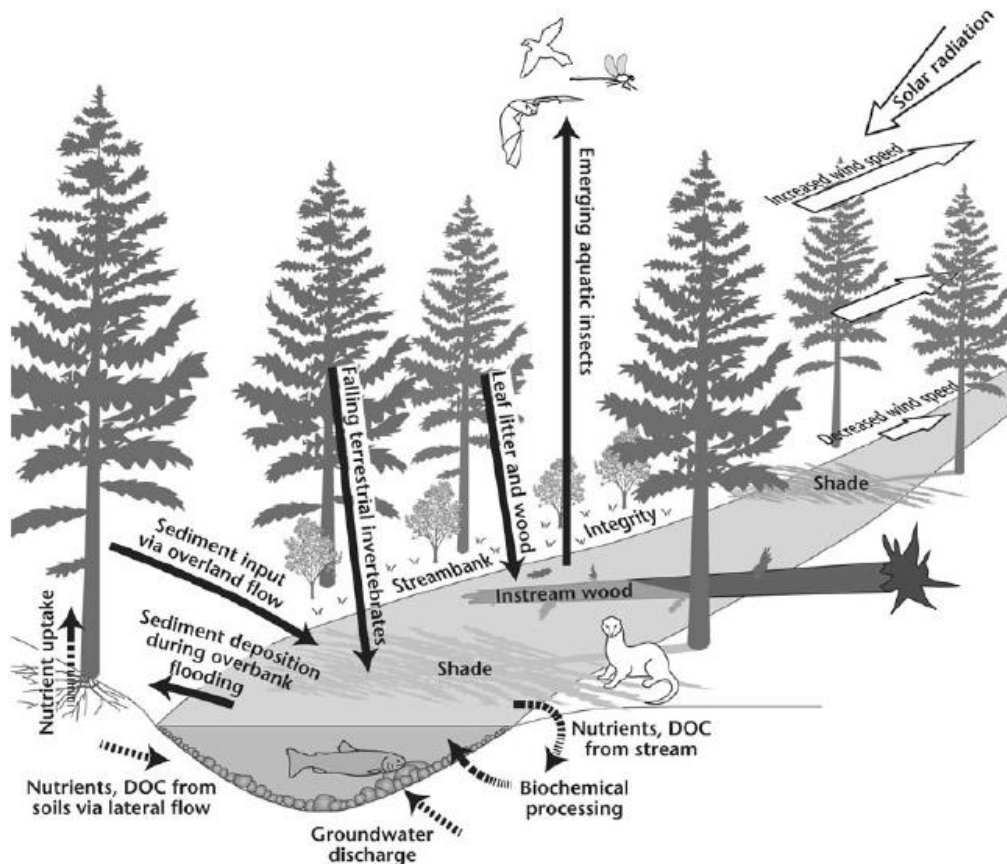
Kocher, S.D. and R. Harris. 2007. **Riparian Vegetation**. Forest Stewardship Series 10, Publication 8240. University of California, Division of Agriculture and Natural Resources. 7 pp. <http://anrcatalog.ucanr.edu/pdf/8240.pdf>

Gregory, S.V., F.J. Swanson, W.A. McKee, and K.W. Cummins. 1991. **An ecosystem perspective of riparian zones: Focus on links between land and water**. Bioscience 41: 540-551. <http://andrewsforest.oregonstate.edu/pubs/pdf/pub954.pdf> OR...

Primary Video(s):

Godwin, D., and L. Ketchum. 2011. **Life on the Edge: Improving Riparian Function**. Video (00:11:51). Oregon State University Extension Service. <https://www.youtube.com/watch?v=3qvjuHFjb2w>

Water Resources Inventory Area 1. 2017. **Restoring the River: Building Salmon Habitat on the Nooksack River**. Video (00:06:16). <https://www.youtube.com/watch?v=T57IpeWcPz0>



Some functions and processes of Pacific Northwest forested riparian and stream ecosystems. [Source: J.S. Richardson, and R.D. Moore (2010): *Stream and Riparian Ecology*. B.C. Ministry of Forests]

WEEK 3

I. PUGET LOWLAND WETLAND HABITATS

Introduction to wetlands:

What is a wetland?

Defining characteristics

Plant adaptations to wetland environments

Status and condition of Puget Lowland wetlands

How wetlands work: Functions and processes of wetlands and the roles of native plants

Types of wetlands: Structure and composition of Puget Lowland wetland habitats

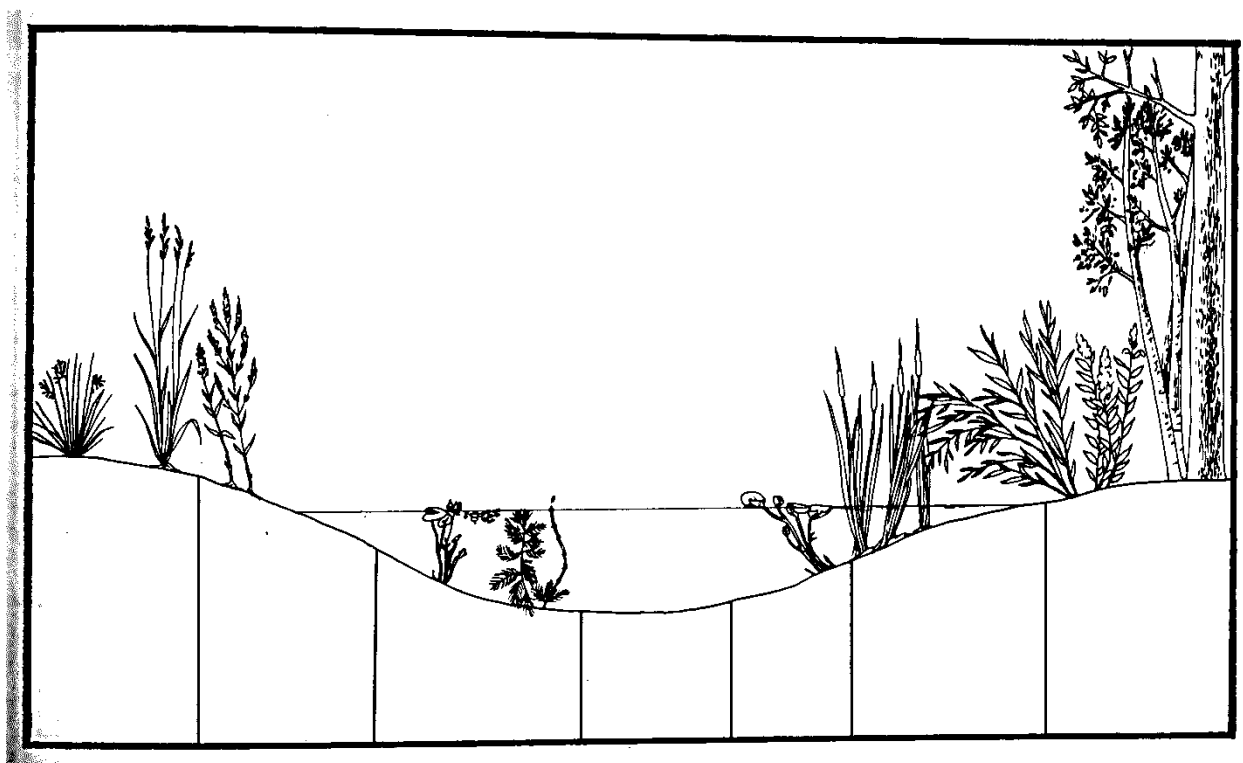
Species ID: Puget Lowland wetland habitats

II. HYDROPHYTIC VEGETATION OF RIPARIAN & WETLAND HABITATS

Wetland indicator status – an imperfect integration of knowledge about moisture & flooding tolerances of vascular plants.

Wetland indicator values of common native plants

III. LOGISTICS FOR FIELD TRIP 2: *Habitat & restoration in the City of Bellingham*



Idealized view of freshwater wetlands.

[Source: F. Weinmann and others (1984): *Wetland Plants of the Pacific Northwest*]

PRIMARY RESOURCES, WEEK 3:

Primary Reading:

Puget Lowland Freshwater Wetlands. *On the Class Materials*

webpage: <http://www.wnps.org/nps/komakulshan/stewardship/classroom.html>

Washington Department of Ecology. **Functions and Values of Wetlands.** [Webpage] <http://www.ecy.wa.gov/programs/sea/wetlands/functions.html>. *The links at the bottom of the page might be of additional interest to you, but are not part of the required reading.*

Lichvar, R.W., N.C. Melvin, M.L. Butterwick, and W.N. Kirchner. 2012. **National Wetland Plant List Indicator Rating Definitions.** U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory. 14 pp.

<http://www.fws.gov/wetlands/documents/National-Wetland-Plant-List-Indicator-Rating-Definitions.pdf>

If you are at all unsure about the wetland indicator ratings, this [optional] paper will help! The meat of this paper is only 6 pages. Ignore the plant examples; most of the species they use as examples don't occur in Washington. We'll discuss our own examples.

Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. **The National Wetland Plant List: 2014 Update of Wetland Ratings. Western Mountains, Valleys, and Coast 2014 Regional Wetland Plant List.** U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory. 50 pp.

http://rsgisias.crrel.usace.army.mil/nwpl_static/data/DOC/lists_2014/Regions/pdf/reg_WMVC_2014v1.pdf

The list is not to read, but is a resource you'll need to be able to use. The list is organized by the scientific (Latin) names of the species.

Primary Video(s):

University of Washington Bothell/Cascadia Community College. 2012. **With Nature in Mind: The Wetlands at UW Bothell/Cascadia Community College.** Video (00:07:32).

<https://www.youtube.com/watch?v=1jyQLJDHSE>

UW/360. 2013. **Bothell Wetlands.** Video (00:03:40). UWTV, University of Washington.

https://www.youtube.com/watch?v=8jf2-MJJU_4

WEEK 4

I. URBAN & LOWLAND STREAMS, SALMON RESILIENCE, & THE CLIMATE CONNECTION. *Annaliese Burns. Habitat and Restoration Manager, City of Bellingham, Public Works Department.*

II. RESTORATION

What we mean by 'restoration.'

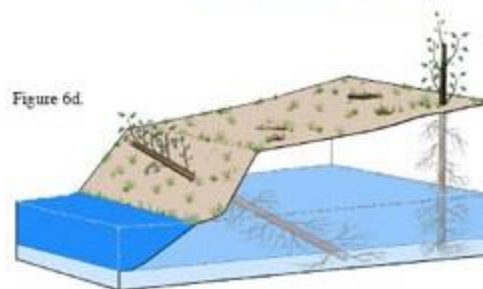
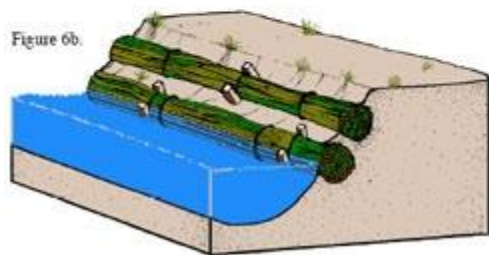
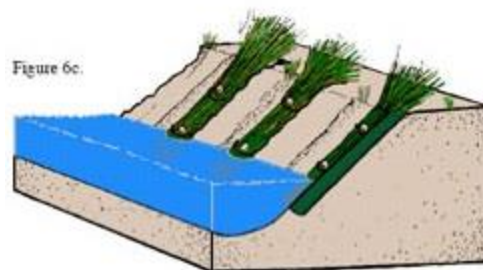
Restoration in practice: Restoration projects large and small

Elements of restoration planting

PRIMARY RESOURCES, WEEK 4

Primary reading:

Hoag, J. C., and T.D. Landis. 2002. **Plant materials for riparian revegetation.** Pp. 33-43 in R.K. Dumroese, L.E. Riley, and T.D. Landis, technical coordinators. National Proceedings: Forest and Conservation Nursery Associations: 1999, 2000, and 2001. Proceedings RMRS-P-24. U.S. Forest Service, Rocky Mountain Research Station, Ogden, UT.
http://www.fs.fed.us/rm/pubs/rmrs_p024/rmrs_p024_033_043.pdf



[Figure 2 in the Hoag and Landis article is obscure in the black-and-white scan. These sharper versions are from: Luna, T., R.K. Dumroese, and T.D. Landis. No date. **Collecting Dormant Hardwood Cuttings for Western Riparian Restoration Projects.** U.S. Forest Service.
<http://www.fs.fed.us/t-d/pubs/htmlpubs/htm06242334/page01.htm>]

Primary Video(s):

City of Bellingham Department of Public Works. 2016. **A Community Creek: The Padden Creek Daylighting Project.** Video (00:06:42).

<https://www.cob.org/services/environment/restoration/Pages/padden-creek-daylighting.aspx>

King County. 2017. **Lower White River Countyline project update.** Video (00:02:21). King County Department of Natural Resources and Parks, Land and Water Division.

<https://www.youtube.com/watch?v=TFqM1p5-TYg&feature=youtu.be>

The Countyline Levee Setback Project is King County's largest flood risk reduction project to date. The project reconnects the lower White River to 121 acres of its historical floodplain, providing greater flood protection to the City of Pacific and improved habitat for imperiled salmon runs.

River Partners. 2015. **Abbott Lake, Drumheller Slough, and Bear River restoration projects.** Video (00:03:25). <https://vimeo.com/144195073>

This video shows how quickly floodplain vegetation can develop into complex plant communities after planting. The projects shown are large floodplain restoration plantings using agricultural methods (furrowing, row planting), which can be the most economical way to revegetate large acreages on gentle terrain. These methods allow restorationists to get large acreages revegetated as quickly and as economically as possible. Although these kinds of projects look like plantations for awhile, this appearance diminishes over the lifetime of the plant community, as natural processes of plant death, reproduction, and the random establishment of new seedlings take over.

Columbia Land Trust. 2015. **A River Reborn.** Video (00:07:02). Columbia Land Trust, Portland, OR. <http://www.columbialandtrust.org/a-river-reborn-video/>

WEEK 5

I. NEARSHORE HABITATS OF NORTHERN PUGET SOUND

Types of nearshore habitats

History & current status

II. IDENTIFICATION & MANAGEMENT OF INVASIVE SPECIES

Definitions: *A weed by any other name?*

State noxious weed law in brief

Invasive species & their management

The 10 Worst Weeds of Whatcom County (maybe): Habitats, impacts, & control methods

III. LOGISTICS FOR FIELD TRIP 3: *The Terrell Creek Watershed*

PRIMARY RESOURCES, WEEK 5:

Primary reading:

Puget Sound Nearshore Habitats. *On the Class Materials*

webpage: <http://www.wnps.org/nps/komakulshan/stewardship/classroom.html>

Primary Video(s):

King County Noxious Weed Control Program. **Introduction to knotweed.** Video (00:03:41).

King County Noxious Weed Control Program, King County, WA.

<http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/weed-identification/invasive-knotweeds/knotweed-control-video.aspx>

You may also wish to view the knotweed control videos on the same page.

Mustin, H. 2014. **Mount Si Holly Removal.** Video (00:02:31).

<https://www.youtube.com/watch?v=UvZjPWU5gUs> *We will all need to work as energetically as this gentleman to meet the challenges of invasive species in our ecosystems. No problem! (I hope he got all the roots!)*

Xenobiota Xposures. 2005. **English Ivy - Managing an invasive alien species.** Video (00:08:43).

<http://www.co.thurston.wa.us/tcweeds/Weedlistdetail/Ivyvideo.htm>

WEEK 6

I. CLIMATE CHANGE AND PUGET LOWLAND ECOSYSTEMS

Effects on forests

Effects on stream ecosystems

Effects on nearshore environments

How to make a difference: *What can we do, and where do we do it?*

II. DETAILS

What do we do now? Partner organizations and volunteer opportunities

How did we do? Course evaluation.

III. THE DREADED TAKE-HOME FINAL EXAM (DTHFE)

Tips & instructions

Due date: *The DTHFE is due no later than noon on Monday, November 6th, 2017.*

IV. CLOSING

PRIMARY RESOURCES, WEEK 6:

Primary Reading:

Bernton, H. 2017. **Expect to see more, bigger fires in forests west of the Cascades.** *Seattle Times*, September 10, 2017. <http://www.seattletimes.com/seattle-news/environment/pacific-northwest-forests-west-of-the-cascades-will-see-more-fires-bigger-fires-with-climate-change/>

Seavy, N.E., T. Gardali, G. H. Golet, F. T. Griggs, C. A. Howell, T. R. Kelsey, S. Small, J. H. Viers, J. F. Weigand. 2009. **Why climate change makes riparian restoration more important than ever: Recommendations for Practice and Research.** *Ecological Restoration* 27:330-338. http://www.remarkableriparian.org/pdfs/pubs/Climate_Change_Riparian_Restoration.pdf

The Nature Conservancy and University of Washington Climate Impacts Group. 2016. **Climate Change Impacts on Puget Sound Floodplains.** 6 pp. https://cig.uw.edu/wp-content/uploads/sites/2/2014/11/TNC_Floodplains_3_25_16_bothlogos.pdf

The Nature Conservancy, University of Washington Climate Impacts Group, and Skagit Climate Science Consortium. 2016. **Adapting to Change: Climate Impacts and Innovation in Puget Sound.** 23 pp. https://cig.uw.edu/wp-content/uploads/sites/2/2014/11/Adapting-to-Change-booklet_final.pdf *Please don't be put off by the length of this well-produced booklet. It's filled with photos and illustrations; the actual written content is fairly brief.*

Primary Video(s):

Littell, J. 2012. **Climate Impacts on the Pacific Northwest.** Video (00:14:54). TEDx Talks (independently organized TED event). The Evergreen State College. <https://www.youtube.com/watch?v=pE7N30pEFuA> *Jeremy Littell is a research scientist in the University of Washington's Climate Impacts Group, and lead author or co-author of numerous scientific journal articles, including McKenzie, D., and J.S. Littell. 2017. Climate change and the eco-hydrology of fire: Will area burned increase in a warming western USA? Ecological Applications 27:26-36; and Littell, J.S., and others (2010): Forest ecosystems, disturbance, and climatic change in Washington State, USA. Climatic Change 102: 129-158.*

Tharp, J. 2012. **Cascading Effects: Climate Change in the Pacific Northwest.** Montana State University, Bozeman, MT. Video (00:14:13). <https://vimeo.com/51577352>



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