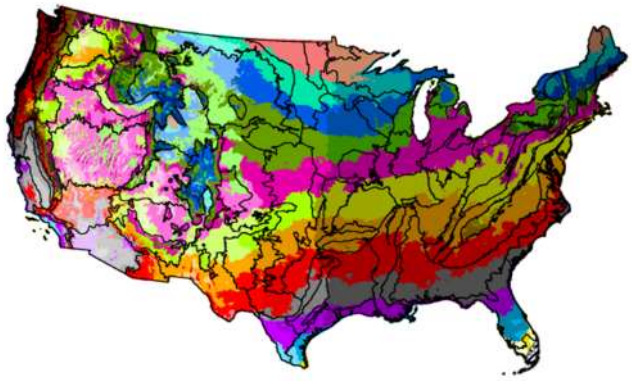


US Forest Service Native Plant Policy and I-90 connectivity restoration

Helen Lau
Cle Elum Ranger District Botanist, Okanogan-Wenatchee National Forest, Restoration Services Team Member, Pacific Northwest Region, U.S. Forest Service

FOREST SERVICE MANUAL
NATIONAL HEADQUARTERS (WO)
WASHINGTON, DC

FSM 2000 – NATIONAL FOREST RESOURCE MANAGEMENT

CHAPTER 2070 – VEGETATION ECOLOGY

Native Plant Material Policy – FSM 2070.3

Ensure genetically appropriate plant materials are given primary consideration:

- Adapted to target site conditions with good establishment, vigor, and reproductive capabilities
- Sufficiently genetically diverse to respond and adapt to changing climates and environment conditions
- Unlikely to cause genetic contamination and undermine local adaptations, community interactions and function of resident native species within the ecosystem.
- Unlikely to become invasive and replace other native species
- Unlikely to be a source of non-native invasive pathogens
- Likely to maintain critical connections with pollinators

Reforestation and Revegetation: USFS Policy, Practices, & Infrastructure

"Right Seed….Right Time…..Right Place"

Reforestation & Revegetation Process









Collection from native stands

Disease resistance screening (if needed)
Seed orchards or seed increase fields
Hardwood stooling beds

Processing

Storage

Nursery production

Seeding or outplanting

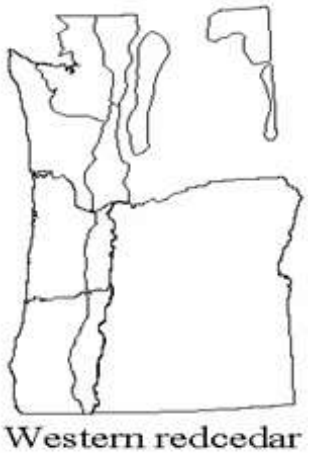
Collection and processing

Deployment

Seed Zones for Forest Trees

- **Have been developed for most major tree species**
  - OR/WA in 1966, revised in 1996/2002
  - CA in 1970
  - Various Forest Service guidelines published 1970s to 1990s
- **Foundational to modern day reforestation and seed procurement programs**

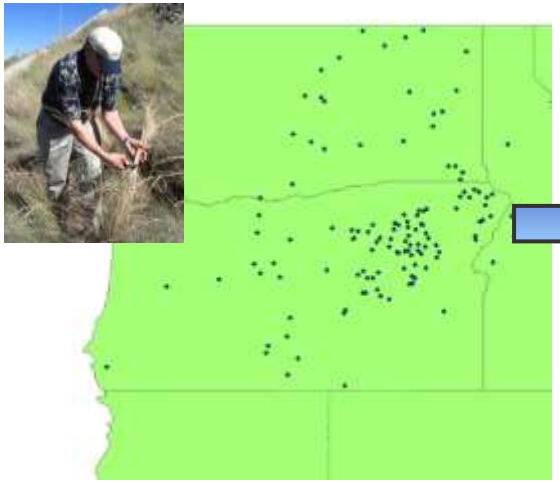
1966



2002

Prairie Junegrass Genecology Study

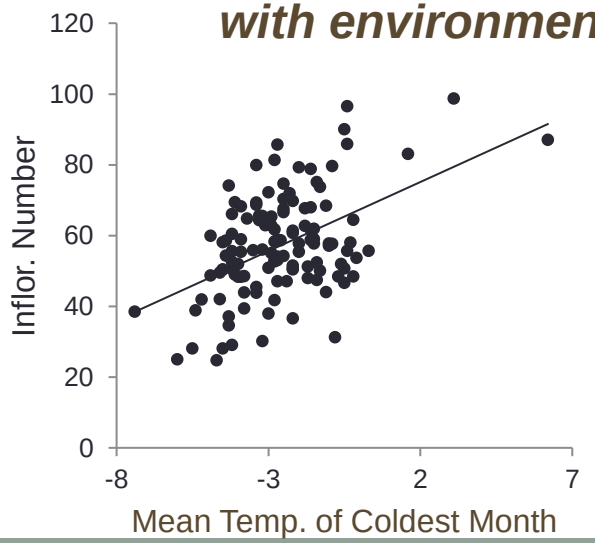
Collect from many well distributed populations



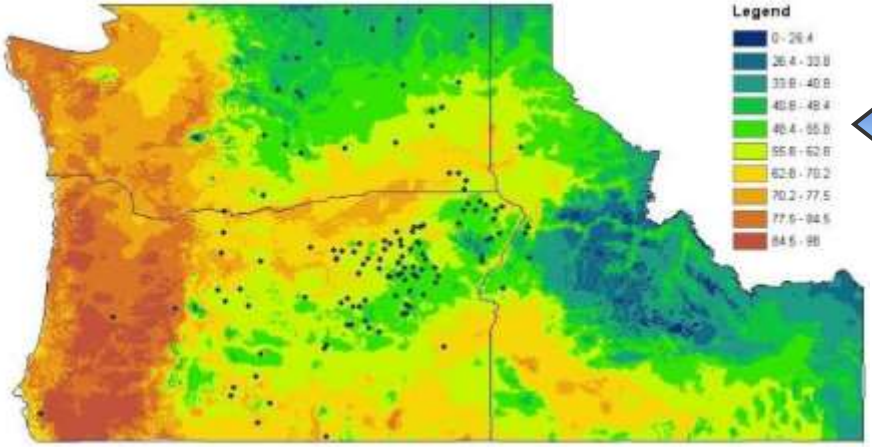
Grow in a common environment

Measure many adaptive traits

Model relationship with environment



Use GIS to map geographic variation

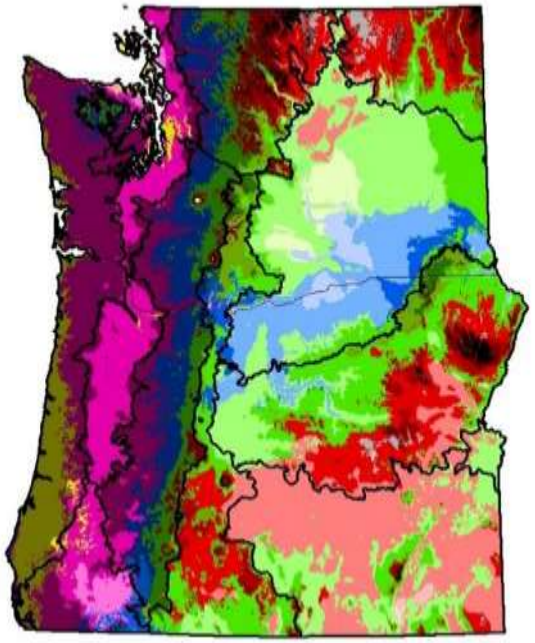


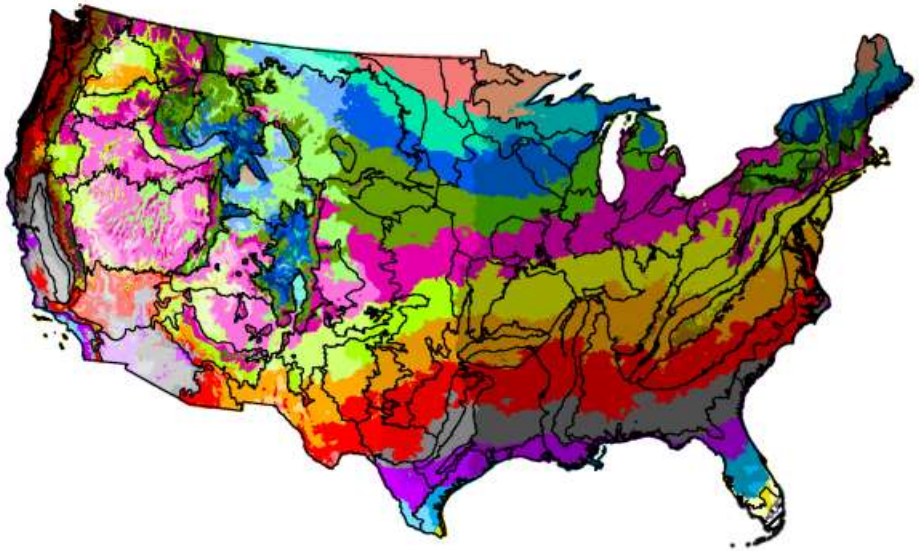
Provisional Seed Zones

When empirical genetic information is lacking

Zones based on:

- Minimum winter temperature
- Aridity (heat: moisture index)
- Omernik Ecoregions (Level III)



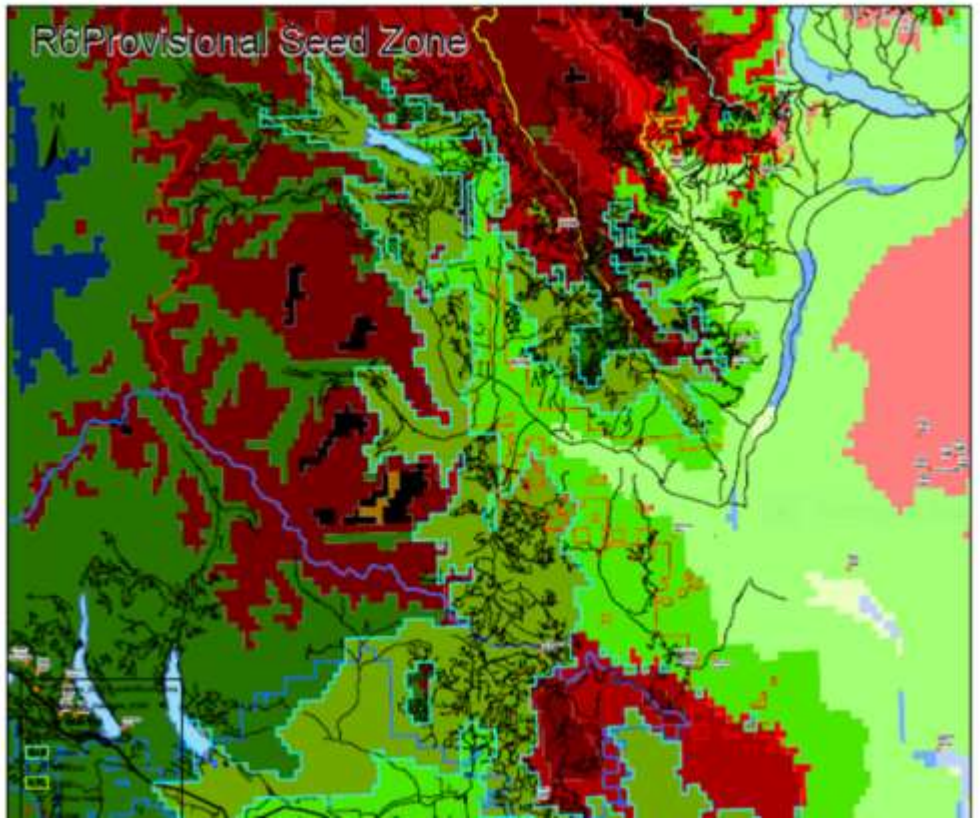


Bower, St. Clair & Erickson
Ecol. App. (2014)

http://www.fs.fed.us/wwetac/threat_map/SeedZones_Intro.html

Provisional Seed Zones

- mean annual temp = (mean max temp+ min temp/2)
- creating aridity index, the higher the drier.



http://www.fs.fed.us/wwetac/threat_map/SeedZones_Intro.html

SEEDZONE MAPPER

A Mapping & Planning Tool for Plant Material Development, Gene Conservation and Restoration

http://www.fs.fed.us/wwetac/threat_map/SeedZones_Intro.html

Data Sources

Download Provisional Seed Zone GIS data:

Dataset	Extent	Download	Map	More Info
Provisional Seed Zones for all Species	CONUS	Shapefile	PDF	PDF

Download Edited Provisional Seed Zone GIS data:

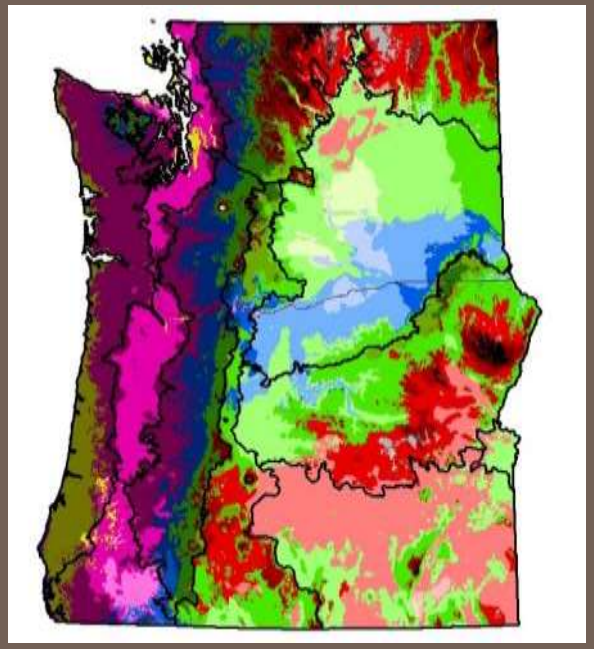
Dataset	Extent	Download	Map	More Info
Edited Provisional Seed Zones	Great Basin	Shapefile	PDF	PDF

Download Empirical (Common Garden Studies) Seed Zone GIS data:

Dataset	Extent	Download	Map	More Info
Blue wildrye (*Elymus glaucus*)	Blue Mountains Ecoregion (Oregon, WA)	Shapefile	PDF	PDF
Mountain Brome (*Bromus carinatus*)	Blue Mountains Ecoregion (Oregon, WA)	Shapefile	PDF	PDF
Prairie junegrass (*Koeleria macrantha*)	Columbia Basin and Great Basin	Shapefile	PDF	PDF
Bluebunch wheatgrass (*Pseudoroegneria spicata*)	Western US	Shapefile	PDF	PDF
Sandberg's bluegrass (*Poa secunda*)	Western US	Shapefile	PDF	PDF
Tapertip onion (*Allium acuminatum*)	Western US	Shapefile	PDF	PDF
Indian ricegrass (*Achnatherum hymenoides*)	Western US	Shapefile	PDF	PDF
Oceanspray (*Holodiscus discolor*)	Western US	Shapefile	PDF	PDF

Viewing & Mapping Platforms

- Webmap browser
- ArcGIS ArcMap



USFS Plant Material Delivery Systems and Supporting Infrastructure

- Conifer Seed Orchards
- Disease Resistance Screening Facilities
- Hardwood Propagation Facilities
- Seed Production Operations (grasses/forbs)
- Seed Extractories
- Nursery Facilities
- Seed Storage

Dorena Genetic Resource Center

- Identify disease resistant parent trees
- Produce seed of resistant families
- Seed storage
- Small-scale seedling production

Disease resistance screening

Field validation planting

Seed Orchards

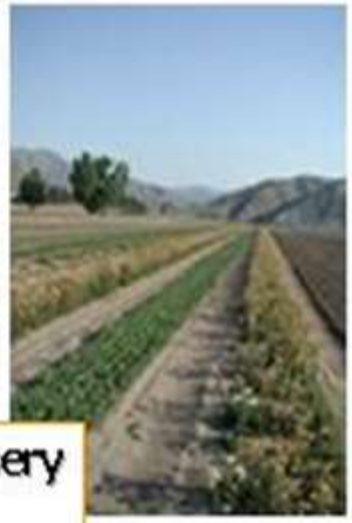
Seed storage

Seedling production

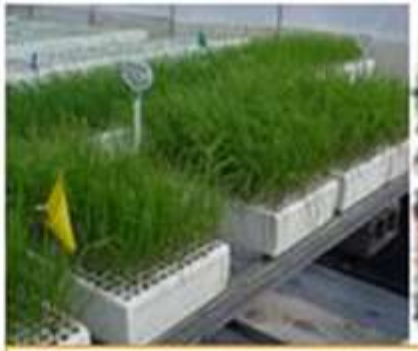
USFS Nurseries

Native Seed & Plant Production

J. Herbert Stone Nursery
(Medford, OR)



Lucky Peak Nursery
(Boise, ID)



Coeur d'Alene Nursery
(Coeur d'Alene, ID)

R6 Bend Seed Extractory

- Extracts, cleans and stores seed (USFS, BLM, BIA, NPS, Fed. Hwy, others). Over 2700 native plant species processed to date

Other services:

- Freezer & granary seed storage
- Seed inventory database
- Seed quality testing & shipping
- Seed need planning and specs for wildland collections
- Training & consultations

Clarno Hardwood Propagation Center

Chris Jensen, Manager

- 6 acre clonebank/cutting orchard, est. 1997
- Clients: USFS, BLM, BIA, USFWS, others
- > 50M cuttings produced annually
- Milkweed seed/seedling

“Workhorse” Species:

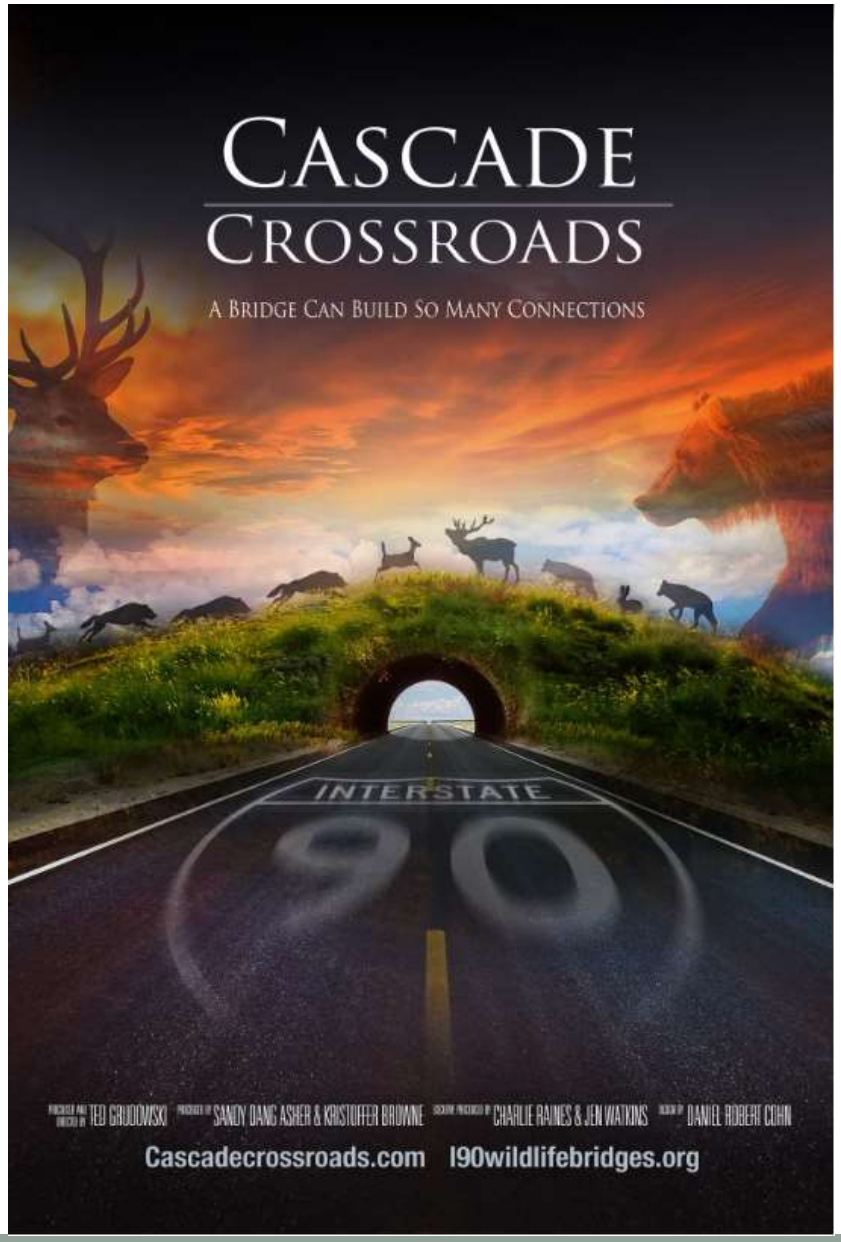
Grasses:

- Blue wildrye
- Bluebunch wheatgrass
- Mountain brome
- Sandberg’s bluegrass
- Great basin wildrye
- Idaho fescue
- Squirreltail
- Prairie junegrass
- Stipa spp.
- Slender hairgrass

Forbs:

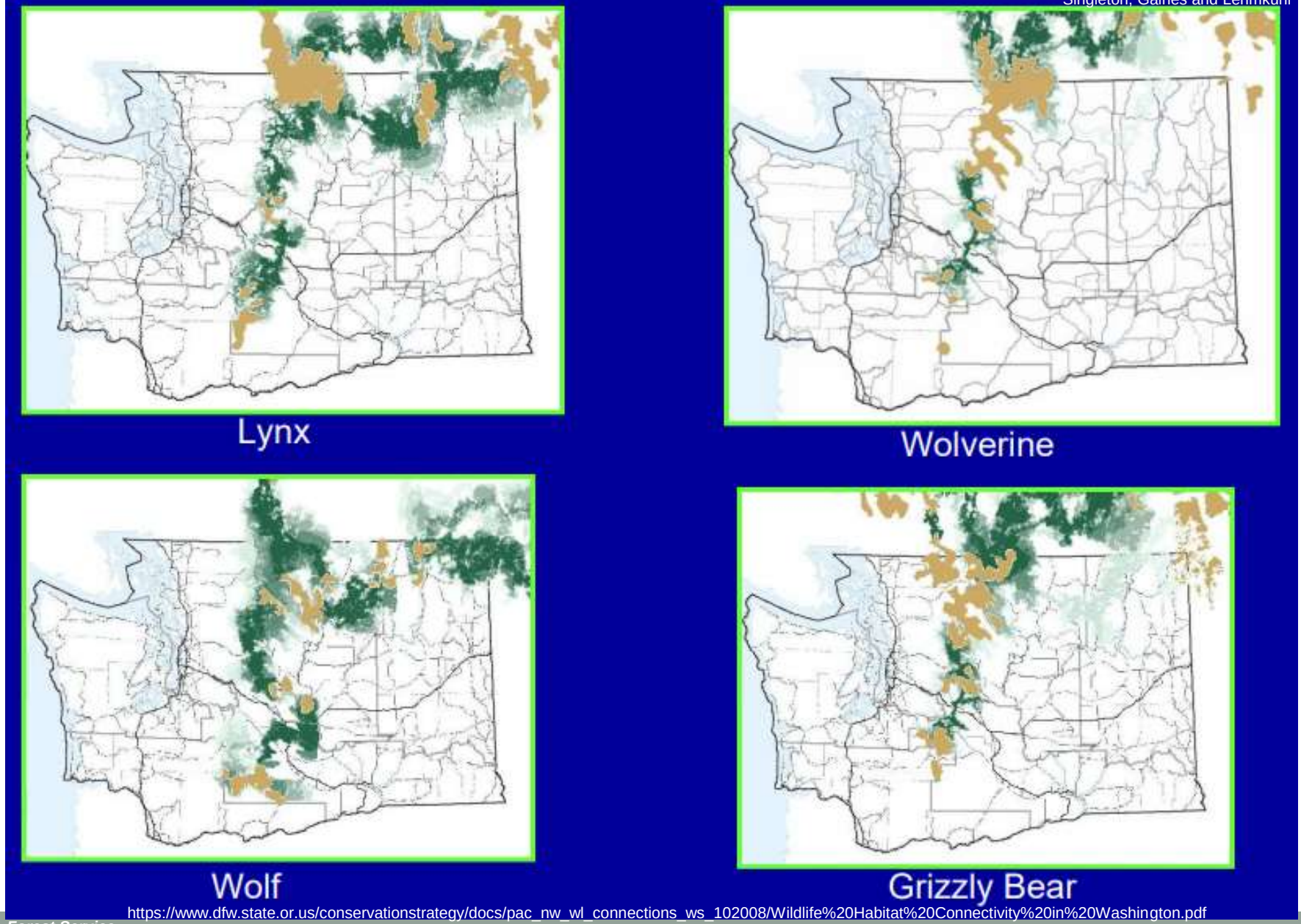
- Yarrow
- Pearly everlasting
- Buckwheat
- Blue flax
- Lupinus spp.
- Penstemon spp.
- Aster spp.

Collaborative Restoration Using Native Plants



Connectivity through the Cascades

Singleton, Gaines and Lehmkuhl



https://www.dfw.state.or.us/conservationstrategy/docs/pac_nw_wl_connections_ws_102008/Wildlife%20Habitat%20Connectivity%20in%20Washington.pdf

(Kelly McAllister and Joanne Schuett-Hanes)

SNOQUALMIE PASS EAST – HYAK TO EASTON

NEED

Ecological Connectivity

Hydrologic Connectivity

Wetland Connectivity

Human Connectivity

Collaborative Restoration Using Native Plants


I-90 Snoqualmie Pass East
Hyak to Easton Project
WSDOT
Phase 1A and B
(Completed)
Completed 2013
Phase 1C
(Under Construction)
Scheduled Completion 2018
Phase 2A
(Under Construction)
Scheduled Completion 2018
Proposed
Phase 4
(Construction 2026-2029)
Proposed
Phase 3
(Construction 2021-2025)
Kachess Lake
Keechelus Lake
Lake Easton

VEGETATION TEAM

- WSDOT Horticulturist-Susan Buis
- FS botanists-Kelly Evans, Helen Lau
- Landscape Architect-Sandy Salisbury
- FS RST-Scott Riley
- FS Geneticist-Matt Horning and Vicki
- WSDOT Assistant Environmental Manager (Biology & Mitigation) - Mark Norman
- WSDOT Environmental Coordinator/Environmental Business Program Coordinator-Mark Reynolds/Michael Wandler/Mark Reynolds

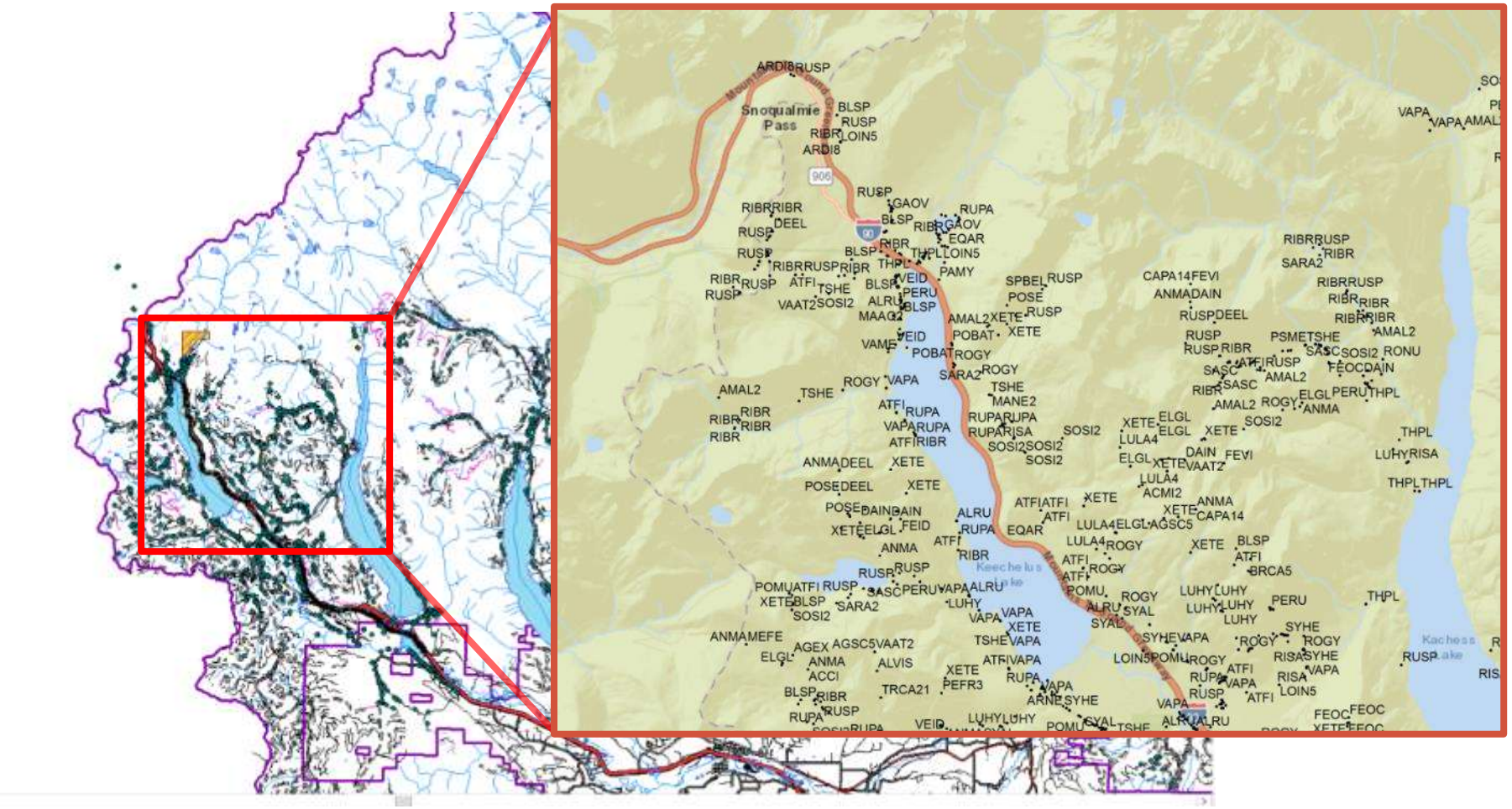
MILESTONE

1	I-90 Snoqualmie Pass East Hyak to Keechelus Dam Roadside Revegetation & Wetland Mitigation Milestones								Begin container plant prop		Target Year to plant	Contingency planting	contain er plant prop			Target Year to plant	Contingency planting		
2	last updated Jan 23, 2016 (HL)			tan indicated a completed	blue indicate a task to be					Phase 1B					Phase 1C/2A				
3	Phase	Contract ID	Tasks	Lead	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Notes: should be dated for clarity and removed from subsequent updates when redundant or no longer applicable
11	1B	MA2	Implementation of TOD AA I-90 Snoqualmie Pass East-Hyak to Keechelus Dam, roadside restoration 1B]	Scott							May completed	Expire 12/31							USFS job code created July 06, 2015. Agreement signed May 08, 2015, ...
12	1B	MA2	Implementation of TOD for Keechelus stockpile site plants and restoration work / Fines restoration work in 1B	Kelly/Bill/Helen/Matt/Julie								Winter							May or may not use contract. Potential WSDOT fines work in house. Plant from MA1-TOD AA and AB (Derby Canyon Natives and CDA). Planting may in contract implemented for TOD AA (Wildlands Inc.) -Helen 1/8/2016
13	1C	MA2	Implementation of TOD AA I-90 Hyak to Keechelus Dam, roadside restoration 1C]	Kelly/Helen/Scott										Expire 2018. Begin working on Planting					
14	1B/1C/2A	MA1/MA2	Monthly Expense Reports	Kelly		Completed	Completed	Completed	Completed	Completed	Completed	On going							
15	1B/1C/2A	MA1/MA2	TOD Quarterly Reports(TOD AA, AB, AC)	Kelly		Completed	Completed	Completed	Completed	Completed	Completed	On going							
16	1B/1C/2A	MA1/MA2	COR Certification	Helen/Kelly			Completed			April Completed		Due for winter	Due for winter						Contract Officer Representative (COR) recertification needs to occur every...
17	Seed Collection & Increase																		
18	1B	TOD AA 2.1	Grass & Shrub Seed Collection Locations Identified and Mapped	Kelly & Helen		Completed May-Nov	Completed May-Nov	Completed May-Sept	Completed May-Sept	Completed May-Sept									The seed collection contract ended in 2012. Seed is now only collected by staff
19	1B	TOD AA 2.1	Emergent Seed Collection Locations Identified and Mapped	Susan		Completed May-Nov	Completed May-Nov	Completed May-Sept											
20	1B	TOD AA 2.5	Issue Native Seed Task Order Contract #AG-05H7-D-09-0011	Kelly			Contract Issued (POCU, DEEL, ELGL)	Seed Delivered Mar											Delivered seed for I-90 project (ELGL - 1520 lbs, POCU 330 lbs, DEEL 200... a contract modification from an existing FS contract which predated the W... project
21	1B	TOD AA 2.5	Issue Seed Increase Task Order Contract TO **AG-05GG-D-11-0008 (sowing and seed)	Kelly	Contract Issued May: DAIN, BRMA, AGSCS, FEDC, VAAT, AGEX, ACMI		Contract Revised June DAIN, BRMA, AGSCS, FEDC, VAAT	Quantities adjusted Dec. Modified, remove ACSC, AGD	Contract end	Full amount BRMA, AGEX, ACMI Seed Paid. [illegible]	Monitor other up	LULA continue grow out. Modify contract							DAIN, FEVI, VAAT, FEDC all failed in the grow out fields. -Helen Lau 1/6/20...
22	1B	TOD AA 2.5	Issue seed collection Task Order for grasses, forbs and shrubs #AG-05GG-D11-0003	Helen & Kelly			Contract Issued June DAIN, BRMA, AGSCS, FEDC, VAAT, AGEX, ACMI	Completed Aug											In addition, Kelly, Helen and both botany technicians will continue to locate populations (FEB 2012).
23	1B	TOD AA 2.2, 3.2	Seed Collection (upland)	Kelly and Helen	Completed	Completed May-Nov	Completed May-Nov	Completed May-Nov											
24	1B	TOD AA 2.2, 3.2	Seeds Cleaned (upland) - send to Bend Seed Ext.	Kelly	Completed	Completed	Completed Nov	Completed Fall	Completed Fall	Completed winter									
25	1B	TOD AA 2.2, 3.2	Seed Collection (emergents)	Susan	Completed	Completed May-Nov	Completed Nov	Completed Oct-Nov											See 2010 collection report and seed inventory
26	1B	TOD AA 2.2	Seeds Cleaned (emergents) - send to Bend Seed Ext.	Susan	Completed	Completed	Completed Dec	Winter	Completed Fall										
27	1B	TOD AA 2.4	Inspection of bagged seed before sowing	Susan					Completed Fall										Who is doing this?

MONSTER MASTER

1	TERRESTRIAL GRAMINOIDS														
2	Species			Foundation											
3											Certified Seed Lab Exam Costs				
4	Scientific Name	Common Name	Plant Code[1]	Genetic Transfer Model[2]	Needs Mapping	Needs Collection	# of sites mapped	# of parent plants	Uncleaned weight (oz)[3]	Cleaned weight (oz)	Cleaning Costs	Purity	Germination	TZ	Shipping Costs ($25-$50)	Primary
57																
58	SHRUBS															
59	Species			Foundation												
60											Certified Seed Lab Exam Costs					
61	Scientific Name	Common Name	Plant Code[1]	Genetic Transfer Model[2]	Needs Mapping	Needs Collection	# of sites mapped	# of parent plants	Uncleaned weight (oz)[3]	Cleaned weight (oz)[4]	Cleaning Costs	Purity	Germination	TZ	Shipping Costs ($25-$50)	Primary
62																
63	*Acer circinatum*	vine maple	ACCI	C	Complete	Year before planting	5	48	8.00					62.00		Seed
64	*Acer glabrum*	Rocky Mountain maple	ACGL	C	Yes	Year before planting	2	1	0.10					62.00		Seed
65	*Amelanchier alnifolia*	serviceberry	AMAL2	C	Yes	Yes	0	0	0.00		90.00			62.00		Seed/Cuttings
66	*Arctostaphylos nevadensis*	pinemat manzanita	ARNE	G/C	Yes	Yes	3	171	12.60	4.34	90.00			62.00		Cuttings
67	*Ceanothus velutinus*	snowbrush	CEVE	C	Yes	Yes	2	0	0.00					62.00		Seed/Cuttings
68	*Cornus sericea ssp. sericea*	redosier dogwood	COSES	C	Yes	Yes	3	36	7.10	1.47				62.00		Cuttings
69	*Corylus cornuta*	beaked hazelnut	COCO6	C	Yes	Yes	0	0	0.00					62.00		Cuttings
70	*Gaultheria ovatifolia*	western tea-berry	GAOV	C	Yes	Yes	0	0	0.00					62.00		Seed
71	*Gaultheria shallon*	salal	GASH	C	Yes	Yes	0	0	0.00					62.00		Seed*
72	*Holodiscus discolor*	oceanspray	HODI	G	Yes	Yes	9	59	9.90					62.00		Seed
73	*Lonicera ciliosa*	orange honeysuckle	LOCI3											62.00		
74	*Lonicera involucrata*	twinberry honeysuckle	LOIN5											62.00		
75	*Mahonia aquifolium*	tall Oregon grape	MAAQ2	C	Yes	Yes	0	0	0.00					62.00		Seed
76	*Mahonia nervosa*	Cascade Oregon grape	MANE2	C	Yes	Yes	0	0	0.00					62.00		Seed
77	*Menziesia ferruginea*	false azalea	MEFE	C	Yes	Yes	0	0	0.00					62.00		?
78	*Paxistima myrsinites*	Oregon boxleaf	PAMY	C	Yes	Yes	0	0	0.00					62.00		Cuttings
79	*Physocarpus capitatus*	Pacific Ninebark	PHCA11	C	Yes	Yes	0	0	0.00					62.00		Cuttings
80	*Ribes bracteosum*	stink Currant	RIBR	C	Yes	Yes	0	0	0.00					62.00		?
81	*Ribes lacustre*	prickly Currant	RILA	C	Yes	Yes	0	0	0.00					62.00		Seed

PHENOLOGY/MAPPING



SEED COLLECTION METHODOLOGIES

- Seeds verses vegetative propagules
- 5 Populations
- 50 Parents
- Collecting at multiple time periods
  - When ripe or seed coat is soft
- Collect equal amounts per population
- Location considerations: pristine vs disturbed

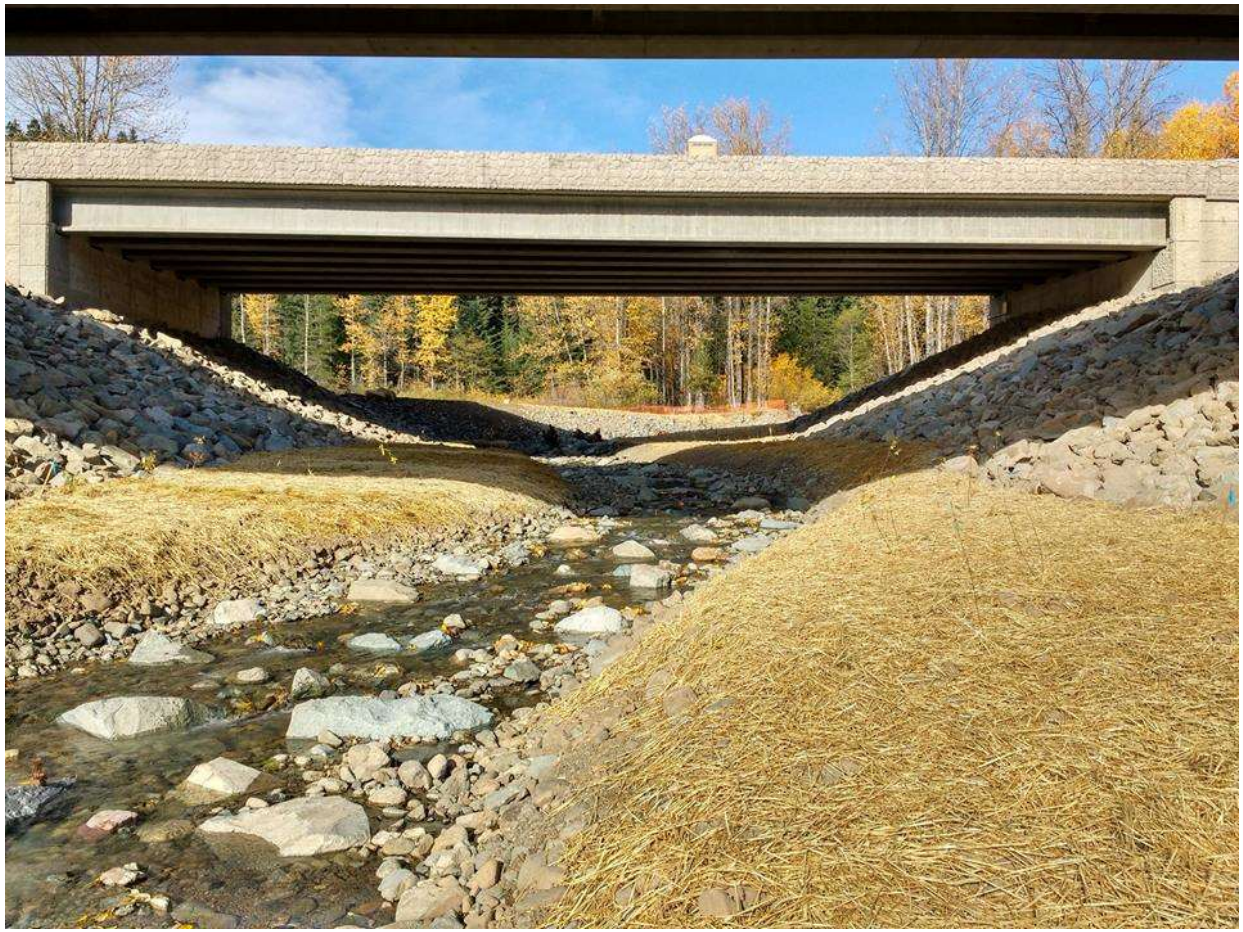
SNOQUALMIE PASS EAST – HYAK TO EASTON

PURPOSE AND NEED – GOLD CREEK BRIDGE

SNOQUALMIE PASS EAST – HYAK TO EASTON
PURPOSE AND NEED-GOLD CREEK BRIDGE

RESORT CREEK

RESORT CREEK




Restoration!

STAMPEDE STOCKPILE

TOWNSAND CREEK

Thank you!

Helen.lau@usda.gov