R & E Grant Application 13 Biennium

Project #: 13-055

Assessing hatchery-wild hybridization in steelhead

Project Information

R&E Project Request:	$66,454.00
Match Funding:	$103,361.00
Total Project:	$169,815.00
Start Date:	6/1/2014
End Date:	6/30/2015
Project Email:	Marc.Johnson@oregonstate.edu
Project Biennium:	13 Biennium
Organization:	ODFW - Corvallis Research Lab

Applicant Information

Name:	Marc Johnson
Address:	28655 Highway 34 Corvallis, OR 97333
Telephone:	541-757-5152
Email:	Marc.Johnson@oregonstate.edu

Past Recommended or Completed Projects

This applicant has no previous projects that match criteria.

Project Summary

This project is NOT part of ODFW's 25 Year Angling Plan.

Activity Type: Research

Summary: Since 1966, summer steelhead have been produced by ODFW hatcheries in the upper Willamette River to support a recreational harvest program that mitigates for impacts from USACE operated flood control dams. Evidence now suggests that this out-of-basin stock can hybridize with native, ESA-listed winter steelhead, though the extent and location(s) of hybridization remain unclear. We propose to collect steelhead tissue samples and develop genetics-based research to provide accurate estimates of hybrid fractions in major upper Willamette River tributaries. This work will provide information necessary to manage risk from hatchery summer steelhead in the upper Willamette River.

Objectives: This project has four main objectives: 1) field sampling; 2) genetic marker assessment; 3) estimate hybrid fractions within steelhead populations; 4) disseminate results. Each of these objectives is described in detail below.

Objective 1. Field sampling – ODFW staff will non-lethally collect tissue samples from adult winter and summer steelhead. These samples of known adult run timing will serve as the "baseline" for subsequent genetic analyses of "unknown" juvenile samples. About 100 adult samples will be required from each major group of the genetic baseline (see Johnson et al. 2013). ODFW staff will also sample juvenile steelhead in major upper Willamette River tributaries (e.g. McKenzie, South Santiam, North Santiam and Middle Fork Willamette rivers). We will use a stratified random sampling approach, with target juvenile sample sizes of n=100 per subbasin to provide accurate, unbiased estimates of summer steelhead hybridization rates in each subbasin. Juvenile fish will be captured with pole seines, a portable electrofisher, and other methods amenable to site conditions. After tissue has been collected, juvenile fish will be released.

Objective 2. Genetic marker assessment – Adult steelhead of known run type (summer and winter) will be used to verify the diagnostic power of single nucleotide polymorphism (SNP) genetic markers. Preliminary analyses suggest that these markers can provide exceptionally strong diagnostic power for summer and winter steelhead in other Oregon river systems. Diagnostic markers will then be used to estimate hybrid fractions among juvenile steelhead collected from Willamette River tributaries.

Objective 3. Estimate hybrid fractions within steelhead populations – Tissue samples from juvenile steelhead collected throughout the Willamette River basin will be characterized at a suite of SNP genetic markers. Genetic data will then be analyzed to produce spatially-explicit estimates of summer steelhead hybridization rates for each tributary.

Objective 4. Disseminate results – We will develop a report to describe the level of hybridization between hatchery summer steelhead and native winter steelhead observed at various study locations. This report will be provided to ODFW management, the Restoration and Enhancement Board and made available online. We will also present our results at state and regional meetings and conferences.

Fishery Benefits:

The upper Willamette summer steelhead hatchery program produces fish for recreational harvest in the North Santiam, South Santiam, McKenzie, and Middle Fork Willamette rivers. This hatchery program uses a segregated broodstock approach, which aims to minimize genetic interactions with native fish. Our project will provide ODFW managers and the angling public with spatially explicit information regarding the level of genetic risk from this program to native species. ODFW management can then use this information to identify those actions that could minimize genetic risk from upper Willamette summer steelhead, so as to promote the health of native steelhead and trout populations, while providing a popular harvest fishery in the upper Willamette River.

Watershed Benefits:

The first goal of ODFW hatchery management policy is to "foster and sustain opportunities for sport, commercial and tribal fishers consistent with the conservation of naturally produced native fish" (ODFW 2010). Our project will provide information needed to evaluate whether the summer steelhead hatchery program meets this goal, in its entirety, in major watersheds of the upper Willamette River. This information may be used to guide management actions that will provide enhanced angler opportunities with acceptably low risks to native, ESA-listed fish.

Current Situation: The proposed work will not physically alter site conditions. ODFW staff will collect samples using standard methods (e.g. seining, electrofishing, etc.) without producing major disturbances or impacts to non-target species. Genetic analyses will be performed at Dr. Michael R. Miller's research laboratory at University of California, Davis (http://animalscience.ucdavis.edu/faculty/miller/).

Alternatives: Molecular genetic analyses provide an unequivocally powerful tool for research projects such as ours, which aim to estimate hybridization rates between populations. Steelhead can be particularly difficult to observe in large river systems, and our approach provides major advantages over conventional field methods. It is the only available method to positively confirm and quantify genetic interactions between hatchery and wild steelhead in the upper Willamette River.

Designer: Dr. Marc A. Johnson will design this research project in partnership with other research team members.

Methods: Methods for Objective 1 . Field sampling – ODFW staff will (non-lethally) collect tissue samples from adult winter and summer steelhead from the upper Willamette River. These samples of known adult run timing will serve as the "baseline" for subsequent genetic analyses of "unknown" juvenile samples. About 100 samples will be required from each baseline group (i.e. eastern Willamette winter steelhead, western Willamette winter steelhead, hatchery summer steelhead, and resident rainbow trout; see Johnson et al. 2013.) for the genetic baseline. ODFW staff will then collect tissue samples from juvenile steelhead in upper Willamette River subbasins (e.g. Luckiamute, Mary's, McKenzie, South Santiam, North Santiam and Middle Fork Willamette rivers). We will use a stratified random sampling approach, similar to that used to survey Oregon coastal coho (Jacobs and Nickelson 1989), with target juvenile sample sizes of n=100 per subbasin. This sampling design is intended to provide samples for accurate, unbiased estimates of summer steelhead hybridization rates in each Willamette River subbasin. Juvenile fish will be captured with pole seines, a portable electrofisher, and other methods amenable to site conditions, then temporarily anaesthetized with MS-222. A small piece of caudal fin tissue will be collected and stored in a labeled vial, filled with 95% ethanol. Once sampled, juvenile fish will be released.

Methods for Objective 2. Genetic marker assessment – Restriction-site-associated DNA sequencing will be used to identify diagnostic SNPs for steelhead of known run type (i.e. adult summer and winter steelhead), through a method similar to that described by Hale et al. (2013). This work is currently in progress at Dr. Michael Miller's laboratory (UC Davis). Diagnostic markers will then be used to estimate hybrid fractions among juvenile steelhead collected from Willamette River tributaries.

Methods for Objective 3. Estimate hybrid fractions within steelhead populations – DNA will be isolated from fin tissue samples of juvenile steelhead collected throughout the Willamette River basin. We will characterize these samples at a suite of ~100 SNP genetic markers. We will then use the software STRUCTURE (Pritchard et al. 2000) and hybrid classification methods similar to those of Johnson et al. (2013) to produce spatially-explicit estimates of summer steelhead hybrid fractions for each Willamette tributary.

Methods for Objective 4. Disseminate results – We will develop a report to describe the level of hybridization between hatchery summer steelhead and native winter steelhead observed at various study locations. This report will be reviewed by ODFW management, the Restoration and Enhancement Board and at least one third-party agency before dissemination to the general public. After review, the report will be made available online and will be further developed into a manuscript for publication in the peer-reviewed scientific literature. We will also present our findings at a state and/or regional fisheries biology meeting(s), such as the annual Oregon AFS meeting.

Citations

Hale, M. C., F. P. Thrower, E. A. Berntson, M. R. Miller, and K. M. Nichols. 2013. Evaluating adaptive divergence between migratory and nonmigratory ecotypes of a salmonid fish, Oncorhynchus mykiss. Genes, Genomes, Genetics 3:1273-1285.

Jacobs, S. E. and T. E. Nickelson. 1998. Use of stratified random sampling to estimate the abundance of Oregon coastal coho salmon. Final report to the U.S. Fish and Wildlife Service. Project number F-145-R-09. Oregon Department of Fish and Wildlife, Corvallis. Available at http://oregonstate.edu/dept/ODFW/spawn/pdf%20files/reports/SRS.PDF (November 2013).

Johnson, M. A., T. A. Friesen, D. J. Teel, and D. M. Van Doornik. 2013. Genetic stock identification and relative natural production of Willamette River steelhead. Final report to the US Army Corps of Engineers, Portland District. Task Order W9127N-10-2-0008-0015. Oregon Department of Fish and Wildlife, Corvallis. Available at http://oregonstate.edu/dept/ODFW/willamettesalmonidrme/hatchery-publications (November 2013).

ODFW (Oregon Department of Fish and Wildlife). 2010. Fish Hatchery Management Policy. Available at http://www.dfw.state.or.us/fish/hatchery/docs/hatchery_mgmt.pdf (November 2013).

Pritchard, J.K., M. Stephens and P. Donnelly. 2000. Inference of population structure using multilocus genotype data. Genetics 155: 945-959.

Inspector: The project report will be reviewed internally by ODFW managers, a third-party agency and the Restoration and Enhancement Board before distribution to the general public.

Funding Elements: As related to project objectives, we request funds from Restoration and Enhancement for some project elements, as described below:

1. Field sampling (R&E funding requested)
We request support for two ODFW Experimental Biology Aides for six months each: field sampling
We request support for one month's salary for one project administrator (Tom Friesen - ODFW): project coordination, contracts and report development

2. Genetic marker assessment (NO R&E FUNDING REQUESTED; all work provided in-kind)
Support for RAD sequencing: match or other

3. Estimate hybrid fractions (R&E funding requested)
We request support for 1 month's salary for technical analyst (Marc Johnson - ODFW): data analysis
Support for genotyping juveniles: match or other

4. Disseminate Results (R&E funding requested)
We request support for 1 month's salary for technical analyst (Marc Johnson - ODFW): report development

Partners: No

Existing Plan: No

Affected Contacted: Yes

Affected Supportive: Yes

Affected Comments: We have contacted ODFW District Biologists, Jeff Ziller and Elise Kelley, about this project. Steelhead tissue samples will be collected from rivers and streams in their districts. They are supportive of this research endeavor.

Project Schedule/Participants/Funding

Activity	Date	Participants
Field sampling	6/1/2014	ODFW Experimental Biology Aides (two - TBD)
Genotyping and analyses	11/1/2014	Dr. Michael R. Miller (UC Davis)
Data analysis and report development	2/1/2015	Dr. Marc A. Johnson (ODFW; Oregon State Univ.)
Administration and report development	6/1/2014	Thomas A. Friesen (ODFW)

Affected Species: Rainbow Trout
Steelhead

Project Permits

Name	Issued By	Secured?	Date Secured	Date Expected
ESA Section 7 Take Authorization	NMFS	No	1/1/0001	5/21/2014
Oregon Scientific Take Permit	ODFW	No	1/1/0001	5/21/2014

Project Monitoring

This project has no monitoring.

Project Maintenance

This project has no maintenance plans.

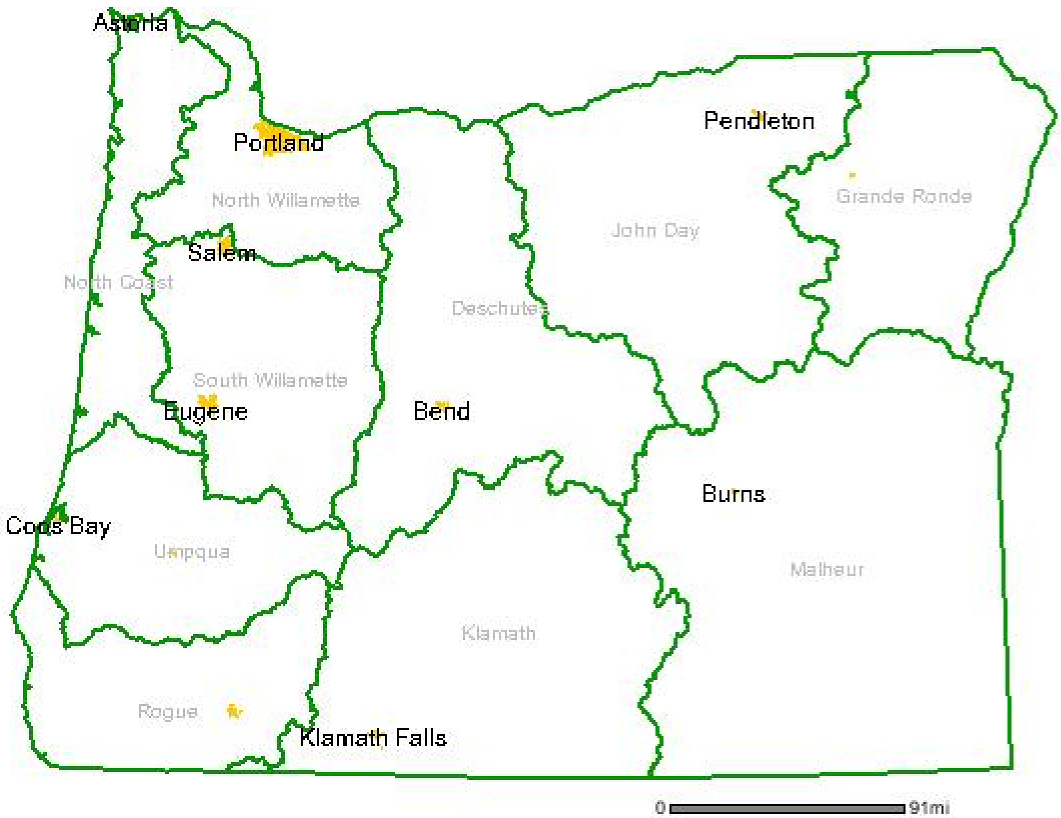
Project Match Funding

Funding Source	Cash	In-Kind	Other	Description	Total	Secured?	Conditions?	Comments
R&E Request	$66,454.00	$0.00	$0.00	ODFW Corvallis Research will provide field sampling equipment (pole seines, electrofisher, scales, etc.)	$66,454.00	No	No	
Miller Lab - UC Davis	$0.00	$103,361.00	$0.00	Genetic lab analyses of steelhead samples	$103,361.00	No	No	All lab work will be performed with in-kind support or match funds to be obtained
				Total Match Funding:	$169,815.00			

Project Budget

Item	Item Type	Units	Unit Cost	R&E Funds	Match Funds	Total
UC Davis overhead	Administration	1	$15,393.41	$0.00	$15,393.41	$15,393.41
Dr. Miller summer salary and benefits	Personnel	1	$9,167.59	$0.00	$9,167.59	$9,167.59
Graduate student academic stipend and benefits	Personnel	1	$11,900.00	$0.00	$11,900.00	$11,900.00
Graduate student summer stipend and benefits	Personnel	1	$7,500.00	$0.00	$7,500.00	$7,500.00
ODFW EBA; field sampling	Personnel	4	$3,968.25	$15,873.00	$0.00	$15,873.00
ODFW NRS-3; Data analysis, report development	Personnel	2	$7,985.00	$15,970.00	$0.00	$15,970.00
ODFW PEBA; field sampling	Personnel	4	$4,416.00	$17,664.00	$0.00	$17,664.00
ODFW PEM-D; contracts and report development	Personnel	1	$8,683.00	$8,683.00	$0.00	$8,683.00
Cell phone charges	Supplies/Materials /Services	4	$60.00	$240.00	$0.00	$240.00
Field gear (waders, boots, uniforms, buckets)	Supplies/Materials /Services	1	$2,000.00	$2,000.00	$0.00	$2,000.00
Genetic analysis for hybrid tests - baseline & unk	Supplies/Materials /Services	3000	$15.00	$0.00	$45,000.00	$45,000.00
Genetic analysis for marker selection	Supplies/Materials /Services	192	$75.00	$0.00	$14,400.00	$14,400.00
Office supplies	Supplies/Materials /Services	1	$500.00	$500.00	$0.00	$500.00
Vehicle, state motor pool; lease, fuel, service	Supplies/Materials /Services	4	$1,256.00	$5,024.00	$0.00	$5,024.00
Vials, labels and ethanol for samples	Supplies/Materials /Services	1	$500.00	$500.00	$0.00	$500.00
					Total Budget:	$169,815.00

Project Map



Additional Files

Click a link to view that particular file.

[Johnson et al. 2013](#)

[Letter of Support](#)

[Signature Authorization Page](#)

[The Real Project Map](#)

Signature Authorization Page

I hereby make an application for financial assistance under the terms and conditions of the R&E Program as described in my project application.

I understand that if my project is approved for funding, the following will apply:

- All project sponsors must sign a grant agreement containing the terms and conditions on which funding will be released.
- Project expenses which occur before the grant agreement is signed or after the expiration date will not be paid by the R&E Program.
- Copies of all necessary permits must be submitted to the R&E Program.
- Project sponsors must certify compliance with local, state, and federal regulations and laws.
- Landowner, monitoring and maintenance agreements must be submitted to the R&E Program.
- Regular progress reports may be required, and at the end of each project a Completion Report must be submitted.
- Educational products resulting from projects are public domain.
- All information submitted to either party under this application is subject to the federal Freedom of Information Act.

Project: **Assessing hatchery-wild hybridization in steelhead**

Applicant: [redacted]

Date: 12/10/2013

Regional Manager: [redacted]

Date: Dec 11, 2013

Work Completed for Compliance with the 2008 Willamette Project Biological Opinion, USACE funding: 2012

GENETIC STOCK IDENTIFICATION AND RELATIVE NATURAL PRODUCTION OF WILLAMETTE RIVER STEELHEAD

Prepared for
U. S. ARMY CORPS OF ENGINEERS
PORTAND DISTRICT – WILLAMETTE VALLEY PROJECT
333 S.W. First Ave.
Portland, Oregon 97204

Prepared by
Marc A. Johnson[1], Thomas A. Friesen[1],
David J. Teel[2], and Donald M. Van Doornik[2]

[1]Oregon Department of Fish and Wildlife
Upper Willamette Research, Monitoring, and Evaluation
Corvallis Research Lab
28655 Highway 34
Corvallis, Oregon 97333

[2] NOAA Fisheries, Northwest Fisheries Science Center
Manchester Research Laboratory
P.O. Box 130
Manchester, WA 98353

Task Order Number: W9127N-10-2-0008-0015
August 2013

Abstract

We used genotypic data from 15 microsatellite loci to characterize the stock structure of *Oncorhynchus mykiss* in the upper Willamette River basin. We then used two analytical approaches, implemented in the programs ONCOR and STRUCTURE, to assign (presumably) natural-origin, unmarked fish to their most likely reporting group or hybrid class. We investigated sibling relationships among unknown samples with the program ML RELATE. In the upper Willamette River, *O. mykiss* genetic structure can be characterized by four principal groups: summer steelhead of Skamania stock ancestry, eastern tributaries winter steelhead, western tributaries winter steelhead and resident rainbow trout. We found that about 10% of unmarked juvenile *O. mykiss* sampled at Willamette Falls in 2009-2011 were summer steelhead and that an additional 10% of samples were summer x winter steelhead hybrids. Most *O. mykiss* sampled from the McKenzie River were either summer steelhead or summer x winter steelhead hybrids. Natural production of pure summer steelhead appeared to be very low in the North and South Santiam rivers, though summer steelhead hybrids represented 11.1% and 14.8% of samples. Results from ML RELATE analyses appeared unreliable and inconclusive, and may have been limited by low genetic diversity among summer steelhead samples. We provide several recommendations to better understand and reduce potentially negative interactions between hatchery summer steelhead and native upper Willamette River *O. mykiss* populations. These include reductions in adult steelhead on natural spawning grounds, improved reproductive isolation between hatchery and native populations and additional research to evaluate genetic integrity within and among *O. mykiss* populations.

Table of Contents

Introduction

In the upper Willamette River (UWR) basin, *Oncorhynchus mykiss* is represented by both resident rainbow trout and anadromous steelhead. Native winter steelhead typically return to the Willamette River from the ocean between February and May, then spawn (March-June) in the Molalla, North Santiam, South Santiam, and Calapooia rivers (Figure 1; ODFW and NMFS 2011). Some winter steelhead also spawn in westside tributaries of the Willamette River, such as the Tualatin, Yamhill, and Luckiamute rivers. Winter steelhead are rarely observed in the McKenzie or Middle Fork Willamette rivers and these subbasins are not considered to be critical habitat for the UWR steelhead distinct population segment (DPS) (NMFS 2012; ODFW and NMFS 2011). Much of the historic spawning habitat for UWR winter steelhead became inaccessible to the species in the mid-1960s, with the construction of high-head Willamette Project dams on the North and South Santiam rivers (NMFS 2008).

In 1966, the Oregon Department of Fish and Wildlife (ODFW) initiated a summer steelhead hatchery program to mitigate for winter steelhead habitat losses caused by Willamette Project dams and to provide an enhanced sport fishery in the Willamette River basin. Summer steelhead are not native to the Willamette basin, and Skamania stock steelhead from Washington State were used to found hatchery broodstocks. Adult summer steelhead typically return to the UWR basin between March and October, and spawn timing can overlap with native winter steelhead that typically spawn in March and April (Firman et al. 2004).

Since 1984, all juvenile hatchery summer steelhead released into the Willamette River have been marked by removing the adipose fin to distinguish them from natural origin steelhead. Marked summer steelhead have been observed on spawning grounds (Schroeder et al. 2006), raising concerns about negative ecological interactions and genetic introgression with native winter steelhead in the upper Willamette River Evolutionarily Significant Unit, which are listed as Threatened under the Federal Endangered Species Act (NMFS 1999). These concerns prompted development of Reasonable and Prudent Alternative (RPA) 9.5.2.1 (NMFS 2008), which recommended implementation of a study to "*determine the extent of summer steelhead reproduction in the wild*" by collecting "*tissue samples from juvenile steelhead for genetic analysis to determine if offspring are of winter- or summer-run origin*." In addition, RPA 6.1.9 (Future Summer Steelhead Management Actions) states that, "*The Action Agencies, in cooperation with ODFW, will implement future management actions aimed at reducing the impacts of the summer steelhead hatchery program on ESA-listed species.*" Finally, the Upper Willamette River Conservation and Recovery Plan for Chinook Salmon and Steelhead (ODFW and NOAA 2011) listed interbreeding with summer steelhead as a key threat for winter steelhead in the North and South Santiam rivers (among others) and noted that the impact of genetic introgression and past or current hatchery practices is largely unknown.

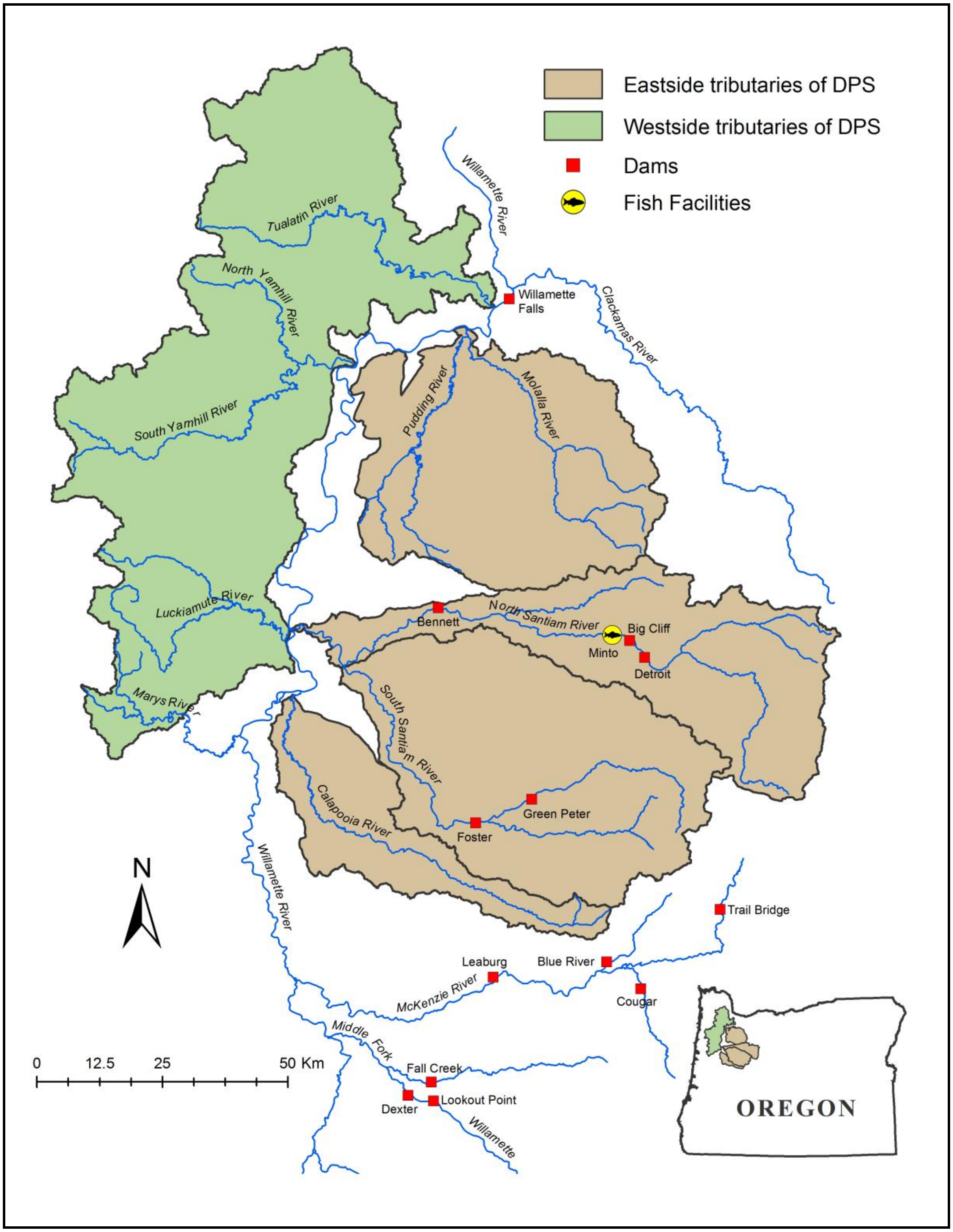


Figure 1. The Willamette River and designated habitats of the upper Willamette River steelhead distinct population segment.

To evaluate the level of natural production by summer steelhead in the upper Willamette River basin, ODFW collected tissue samples from unmarked juvenile *O. mykiss* in 2009-2011. These tissue samples and others that had been collected in previous years were provided to the NOAA Fisheries Manchester Research Laboratory for genetic analyses. Results from those analyses indicated that naturally produced upper Willamette River *O. mykiss* could be described as four genetically distinct groups: 1) Skamania stock summer steelhead (S); 2) eastside tributary Willamette winter steelhead (EW); 3) westside tributary Willamette winter steelhead (WW); and 4) resident rainbow trout (RB) (Figure 2; Van Doornik and Teel 2010). Moreover, significant genetic structure among these groups (Table 1) conferred high accuracy for genetic stock identification (GSI), which was used to assign samples of unknown origin to their mostly likely source population complex (i.e., reporting group; Van Doornik and Teel 2010).

Using GSI, Van Doornik and Teel (2010, 2011, 2012) estimated that 5.4-13.2% of unmarked juvenile steelhead sampled at Willamette Falls (2009-2011) were Skamania summer steelhead. However, samples collected at Willamette Falls could not be used to identify which subbasin(s) supported natural production of summer steelhead. In 2011, ODFW collected samples of unmarked juvenile *O. mykiss* from sites in the McKenzie, North Santiam, South Santiam and various locations of the mainstem Willamette rivers to address this information need. Analyses of these samples suggested that the stock structures of naturally produced *O. mykiss* differed among Willamette River subbasins, explained in part through higher natural production of summer steelhead in the McKenzie River (Van Doornik and Teel 2012).

In this report, we have summarized and expanded upon the work of Van Doornik and Teel (2010, 2011, 2012) by addressing the following research objectives: (1) further explore the genotypic data for evidence of introgression and relatedness among individuals; (2) identify which upper Willamette River subbasins support the natural production of summer steelhead; (3) determine the proportion of natural steelhead production that is represented by summer-run stock within each subbasin; (4) describe differences in the proportion of naturally-produced summer steelhead among subbasins, and (5) summarize the results to date from recent Willamette basin steelhead genetics research.

Our findings provide novel information related to the natural production of non-native summer steelhead in the Willamette River basin and introgression of summer steelhead with native *O. mykiss* populations. We discuss our findings in the context of previous results and provide recommendations for management.

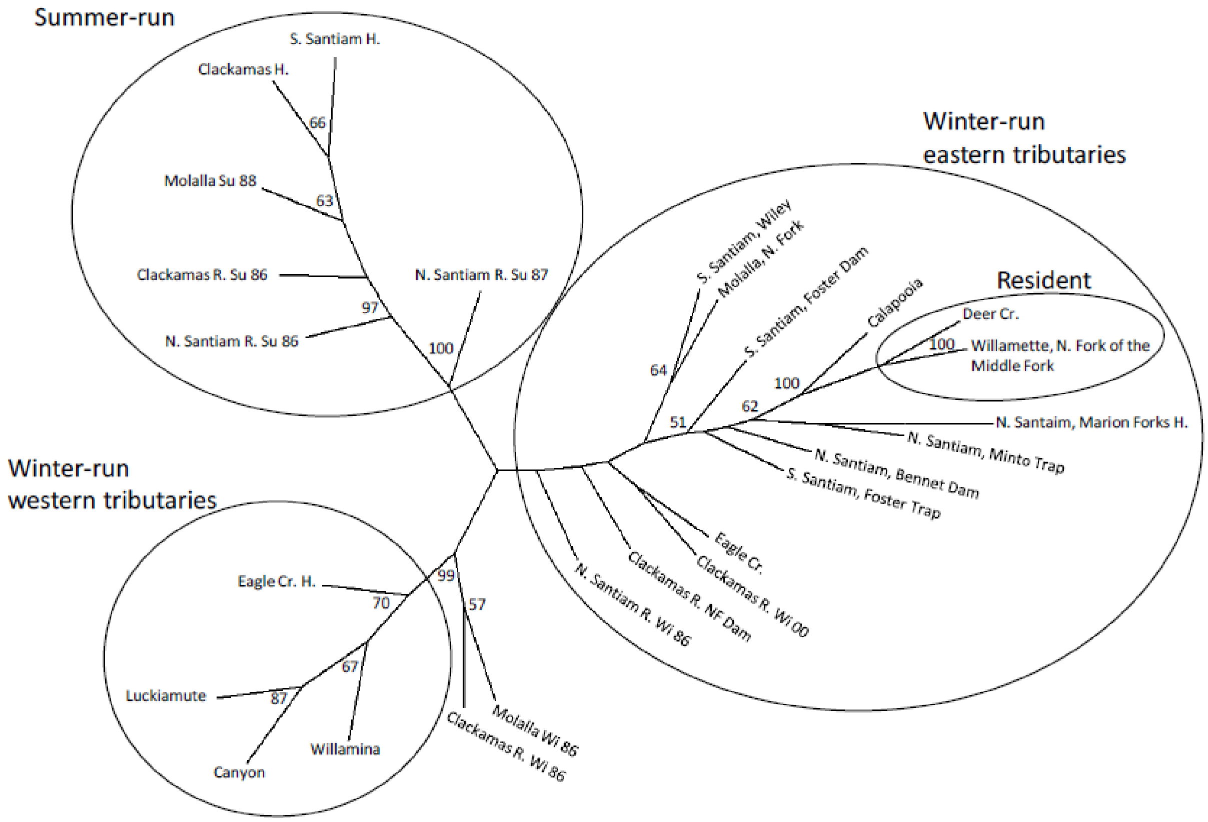


Figure 2. Neighbor-joining dendrogram of Cavalli-Sforza Edwards genetic distances among Willamette River steelhead populations. Bootstrap values (%) greater than 50% are shown. The last two digits of the brood year for the earliest samples are included in the sample names. Major groupings, which also correspond to the reporting groups used for GSI analyses, are circled. Figure is from Van Doornik and Teel (2010).

Table 1. Pairwise θ values (Weir and Cockerham 1984) among major Willamette River *O. mykiss* groups. All values are significant (P <0.01).

	Resident rainbow trout	Summer steelhead	Western winter steelhead
Eastern winter steelhead	0.06727	0.03922	0.03697
Resident rainbow trout	---------	0.10294	0.12737
Summer steelhead	---------	---------	0.04257
Western winter steelhead	---------	---------	---------

Methods

We performed statistical analyses with existing genotypic data for Willamette *O. mykiss* and synthesized results from previous reports. We analyzed data from "known" samples, obtained primarily from adult fish that had been classified in the field (S, EW, WW, RB) from morphology, collection date and location, and mark status. Data from these samples were used to establish baseline allele frequencies for each group and evaluate the accuracy of results from GSI and other analyses. Some of the baseline genetic data used in this study were compiled from Blankenship et al. (2011) and supplemented with additional samples and microsatellite loci. We also analyzed data from "unknown" samples collected from unmarked, naturally produced, adult and juvenile fish. Detailed methods for sample collections, DNA isolation, microsatellite genotyping and GSI analyses are described in Van Doornik and Teel (2010, 2011, 2012).

Genetic introgression and relatedness

Genetic introgression – STRUCTURE analyses

Using the software ONCOR (Kalinowski 2007) to perform GSI, Van Doornik and Teel (2010, 2011, 2012) found that most of the Willamette *O. mykiss* that they examined could be assigned with high probability to one of four reporting groups (S, EW, WW, and RB). Yet some samples assigned with low probability, possibly because they were hybrids. Although ONCOR is widely recognized as a powerful GSI tool, it is not particularly well suited to quantify genetic introgression. However, the methods of Pritchard et al. (2000), implemented in the program STRUCTURE, were developed to detect cryptic genetic structure and estimate the ancestral lineages of individual genomes. This program has been used to describe patterns of hybridization between fall and spring run Chinook salmon (Kinziger et al. 2008) and several trout species (e.g., Boyer et al. 2008; Pritchard et al. 2007; Pritchard et al. 2009; Sanz et al. 2009; Simmons et al. 2009).

In brief, STRUCTURE (Pritchard et al. 2000) employs Bayesian clustering algorithms to allow the user to infer the most likely number of groups (*K*) present within a set of genotypic data and the proportion of each constituent genome (*q*) descended from each of the *K* groups. Threshold values for *q* can then be used to classify individuals as pure or hybrid samples (see Sanz et al. 2009).

A critical first step when performing STRUCTURE analyses is to identify an appropriate value for the parameter *K*, the maximum number of populations present in the data. Samples will be partitioned among too few populations if *K* is set too low, ignoring real population structure, and the model will effectively overfit the data if *K* is set too high. Pritchard et al. (2000) suggested that STRUCTURE analyses should be performed with a range of values for *K*. The optimal value could then be selected through examination of posterior probabilities for the data under models that differed by *K*. However, Evanno et al. (2005) found that the value of posterior probabilities often increased slightly (yet with greater variance) even as *K* exceeded the real number of groups present in the data. They recommended that *K* be selected through examination of an ad hoc statistic, ΔK, which is based on the second order rate of change in posterior probabilities for models with successive values of *K* (Evanno et al. 2005). In hierarchically structured (nested) populations, ΔK will identify the number of groups at the highest level of the hierarchy, and subsequent analyses may be required to resolve population substructure.

We used STRUCTURE to analyze genotypic data for 15 microsatellites from 2,082 Willamette River basin *O. mykiss* samples. Of these samples, 780 were from known groups (e.g., summer steelhead) and were used by Van Doornik and Teel (2010, 2011, 2012) as baseline samples to perform GSI assignments for unknown samples (see Table 2). By including these baseline samples in our analyses, we were able to evaluate the program's ability to partition samples among known groups, while providing the software with additional linkage disequilibrium information to improve accuracy of assignment for unknown samples. We used STRUCTURE to examine the data under models that contained a wide range of *K* values (1-8), with three replicates performed for each value. We performed 100,000 Markov chain Monte Carlo repetitions (initial burn in of 20,000), used an admixture model with sampling locations specified as a prior[1] (Hubisz et al. 2009), inferred α from the data[2], assumed F_{ST} to be different among subpopulations (prior for mean $F_{ST} = 0.01$) and maintained λ constant at one[3]. Detailed parameter descriptions are provided in Pritchard et al. (2000) and the STRUCTURE software

[1] This prior provided information of ancestry for some samples (e.g. adult hatchery summer steelhead) included in our analysis and thereby assisted with clustering of unknown samples

[2] Here, α represents the degree of admixture, which can be set by the user or inferred from the data

[3] Under this parameter setting, the model specifies that allele frequencies are expected to be different among populations, thereby reducing the risk of overestimating *K*

documentation (Pritchard et al. 2010). We used STRUCTURE HARVESTER (Earl and vonHoldt 2012) to examine STRUCTURE output and assessed alternate model likelihoods through an analysis of ΔK (Evanno et al. 2005).

After establishing the most appropriate value for *K*, we used an approach similar to that of Burgarella et al. (2009), whereby individual samples were classified by *q* values into the following general categories:

1) **Pure**: $q > 0.50$ for a single population and $q < 0.20$ for all other populations
2) **Two-way hybrid**: $0.20 < q < 0.80$ for exactly two populations
3) **Three-way hybrid**: $0.20 < q < 0.80$ for exactly three populations

We then evaluated consistency of our results across replicate simulations and calculated the proportion of individuals that assigned to each class for each collection site and year. See Vähä and Primmer (2006) and Sanz et al. (2009) for more information on *q*-value criteria in hybridization studies.

Relatedness – ML RELATE analyses

Information on the relatedness among juvenile steelhead could help to characterize the demographics of naturally reproducing summer steelhead in the upper Willamette River. For example, if a high proportion of juvenile summer steelhead were found to be full siblings, we might infer that natural production was the result of a relatively small number of highly successful parents. Inversely, if juvenile summer steelhead were found to have very low pairwise genetic relatedness, we might infer that natural production was supported by a greater number of parents with low reproductive success.

We used the program ML RELATE (Kalinowski et al. 2006) to infer pairwise relationships between all juvenile *O. mykiss* samples identified as summer-run steelhead with the program ONCOR (Van Doornik and Teel 2010, 2011, 2012). We performed 1,000 random genotype simulations for likelihood ratio tests and identified plausible relationships (full-sibling, half-sibling, parent-offspring, unrelated) from a 99% confidence interval (see Kalinowski et al. 2006). We estimated the percentage of sample pairs identified to be plausibly related as full-siblings, half-siblings or (ambiguously) either. We included adult summer steelhead samples collected in 1986-1988 together with juvenile *O. mykiss* samples collected in 2005 and 2009-2011 for our analyses to evaluate the logical accuracy of results, recognizing that sibling relationships between these adult and juvenile samples would be impossible.

Natural production of summer steelhead by subbasin

To identify which upper Willamette River subbasins support the natural production of summer steelhead, we first reviewed GSI results provided by Van Doornik and Teel (2012) that related the percentage of unmarked juvenile samples from the McKenzie, North Santiam, South Santiam and mainstem Willamette rivers that assigned as summer-run steelhead. We then compared those results to our classifications made with STRUCTURE analyses of the same data.

Differences among subbasins for summer steelhead production

We used two-sided Fisher's exact tests to compare the frequencies of summer steelhead present among juvenile samples collected from the McKenzie, North Santiam and South Santiam subbasins in 2011. We performed pairwise tests between the ONCOR class assignment counts for each subbasin and used a Bonferoni corrected critical value of $\alpha = 0.017$ to assess statistical significance (Holm 1979).

We repeated these tests using class assignment counts from STRUCTURE analyses. For this analysis we considered EW, S, WW, RB classes and all hybrid classes that involved S, pooled. That is, counts for SxEW, SxWW, SxRB were pooled for each subbasin and counts of other hybrid classes (e.g., EWxWW) were ignored. This approach ignored few samples and provided a contingency table of acceptable size for pairwise exact tests. As before, we used $\alpha = 0.017$ to assess significance.

Table 2. The number of adult and juvenile *O. mykiss* samples, collected in different years from various locations of the Willamette River basin, genotyped at 15 microsatellite loci and analyzed with the program STRUCTURE (Pritchard et al. 2000). Group is indicated for baseline samples used in the GSI analyses of Van Doornik and Teel (2010, 2011, 2012) and for samples that were classified in the field. Baseline samples are indicated by an asterisk; H = hatchery.

Subbasin or river	Collection location(s)	Group	Life stage	Collection year	*n*
Clackamas	Clackamas H.	Summer-run*	Adult	2006	50
South Santiam	South Santiam H.	Summer-run*	Adult	2007	47
Calapooia	various	Winter-run East tributaries*	Juvenile	1997	38
Clackamas	North Fork Dam	Winter-run East tributaries*	Adult	2005	42
Clackamas	various	Winter-run East tributaries*	Juvenile	2000	80
Eagle Creek	various (wild)	Winter-run East tributaries*	Adult	2000	63
Molalla	North Fork	Winter-run East tributaries*	Juvenile	1996	50
North Santiam	Bennett Dam	Winter-run East tributaries*	Adult	2005	45
North Santiam	various	Winter-run East tributaries*	Juvenile	1998	45
South Santiam	Foster Dam	Winter-run East tributaries*	Adult	2005	49
South Santiam	Wiley Creek	Winter-run East tributaries*	Juvenile	1997	39
Canyon Creek	Canyon Creek	Winter-run West tributaries*	Juvenile	1997	34
Eagle Creek	Eagle Creek H.	Winter-run West tributaries*	Juvenile	2000	62
Luckiamute	various	Winter-run West tributaries*	Juvenile	1997	31
Willamina	various	Winter-run West tributaries*	Juvenile	1997	34
Deer Creek	various	Resident rainbow*	Juvenile	1998	40
Willamette	N. Fork of Middle Fork	Resident rainbow*	Juvenile	1998	31
Clackamas	various	Summer-run	Adult	1986	84
Molalla	various	Summer-run	Adult	1988	46
North Santiam	various	Summer-run	Adult	1986	23
Clackamas	various	Winter-run	Adult	1986	40
Molalla	various	Winter-run	Adult	1986	65
North Santiam	various	Winter-run	Adult	1986	39
North Santiam	various	Summer-run	Adult	1987	16
Willamette	Upper Mainstem	Unknown	Juvenile	2010	6
Willamette	Upper Mainstem	Unknown	Juvenile	2011	30

Table 2 (*continued*).

Subbasin or river	Collection location	Group	Life stage	Collection year	*n*
Willamette	Willamette Falls	Unknown	Juvenile	2009	240
Willamette	Willamette Falls	Unknown	Juvenile	2010	287
Willamette	Willamette Falls	Unknown	Juvenile	2011	56
McKenzie	Leaburg bypass	Unknown	Juvenile	2005	72
McKenzie	Leaburg bypass	Unknown	Juvenile	2011	91
North Santiam	Upper North Santiam	Unknown	Juvenile	2011	36
Santiam	Mouth of Santiam	Unknown	Juvenile	2011	11
South Santiam	Upper South Santiam	Unknown	Juvenile	2011	27
South Santiam	Foster Trap	Unknown	Adult	2009	50
North Santiam	Minto Ponds	Unknown	Adult	2009	11
North Santiam	Bennett Trap	Unknown	Adult	2003	28
North Santiam	Minto Ponds	Unknown	Adult	2010	1
Willamette	Mainstem	Unknown	Adult	2005	1
McKenzie	Mohawk River	Unknown	Adult	2005	1
McKenzie	Leaburg bypass	Unknown	Adult	2011	6
Middle Fork Willamette	Fall Creek	Unknown	Adult	2010	19
Middle Fork Willamette	Fall Creek	Unknown	Adult	2011	16
				Total	2,082

Results

Genetic introgression and relatedness

Genetic introgression – STRUCTURE results

We found that the posterior probability of the data increased sharply as the model parameter *K* was increased from 1 to 3, and continued to increase (albeit at a lesser rate) until reaching a plateau at about $K = 7$ (Figure 3). However, examination of ΔK suggested that only two groups, *K*, were present in our data (Figure 4). We suspected that these ΔK results were strongly influenced by the nested structure of our data[4]. To address this issue, we examined individual STRUCTURE assignments for samples (including baseline samples) under models with different *K* values, as suggested by Evanno et al. (2005).

We found that for $K = 4$, strong partitioning of *q* values could be observed between samples of known life history type, corroborating the four reporting group genetic structure identified by Van Doornik and Teel (2010). Figure 5 presents an excerpt of graphically depicted *q* values for samples of known type and all *q* values for $K = 4$ are provided in the Appendix. When *K* was increased to five, results among replicate runs were inconsistent[5] and no evidence for additional substructure was apparent when the data were modeled with *K* values greater than four.

STRUCTURE results were highly consistent among replicate simulations with $K = 4$; the difference between individual sample *q* values was a mean 0.003 between runs and exceeded 0.05 for only 25 of 2,082 samples. For 21 of these, differences between replicate *q* value estimates had no influence on sample classification. We used the consensus classification for the four ambiguous samples (samples 412, 1452, 1810 and 2081), provided in the Appendix.

By parsing results for replicate models with $K = 4$ by collection year and location, we found that STRUCTURE identified a mean 10.5% of the juvenile *O. mykiss* sampled at Willamette Falls (2009-2011) as "pure" summer steelhead. An additional mean 10.6% of juveniles sampled at this location appeared to be the offspring of summer steelhead that hybridized with a native *O. mykiss*, most frequently eastern tributary winter steelhead (Table 3).

Although sample sizes were small, we found no evidence for pure juvenile summer steelhead in the North, South or lower mainstem Santiam rivers. However, hybrids of summer

[4] Willamette *O. mykiss* population structure is nested as: {*O. mykiss*{native Willamette{Eastern tributaries{resident rainbow trout}}}}

[5] Results from one $K = 5$ run suggested that some EW samples from the Clackamas comprised a distinct group, whereas in another $K = 5$ run all EW samples formed a single group but WW samples parsed into two groups.

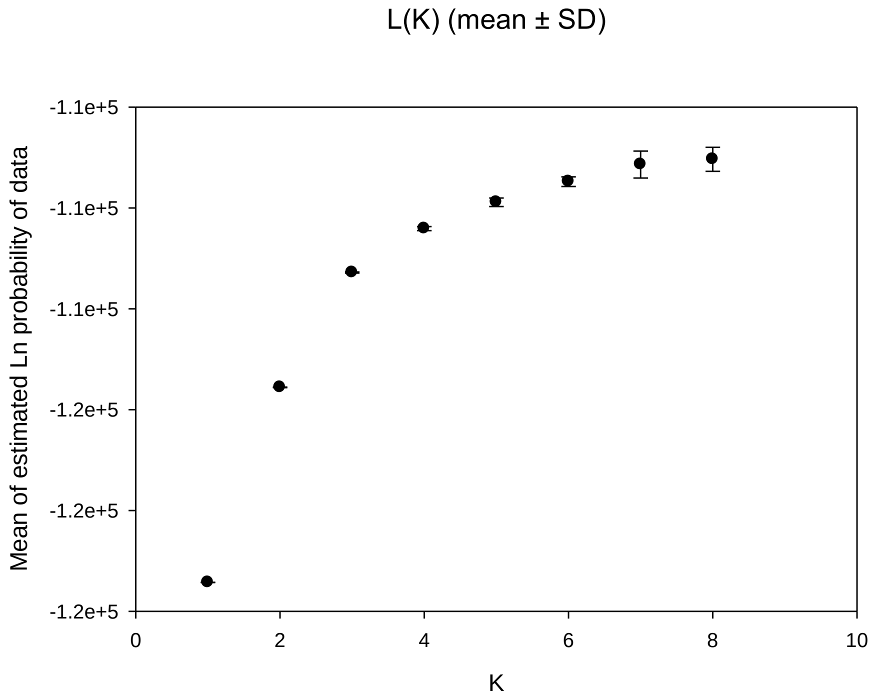


Figure 3. Posterior probabilities of Willamette *O. mykiss* genotypic data in function of model values for *K*, the maximum number of groups assumed to occur within the data (Pritchard et al. 2000). Data are mean values ± SD over 3 replicates.

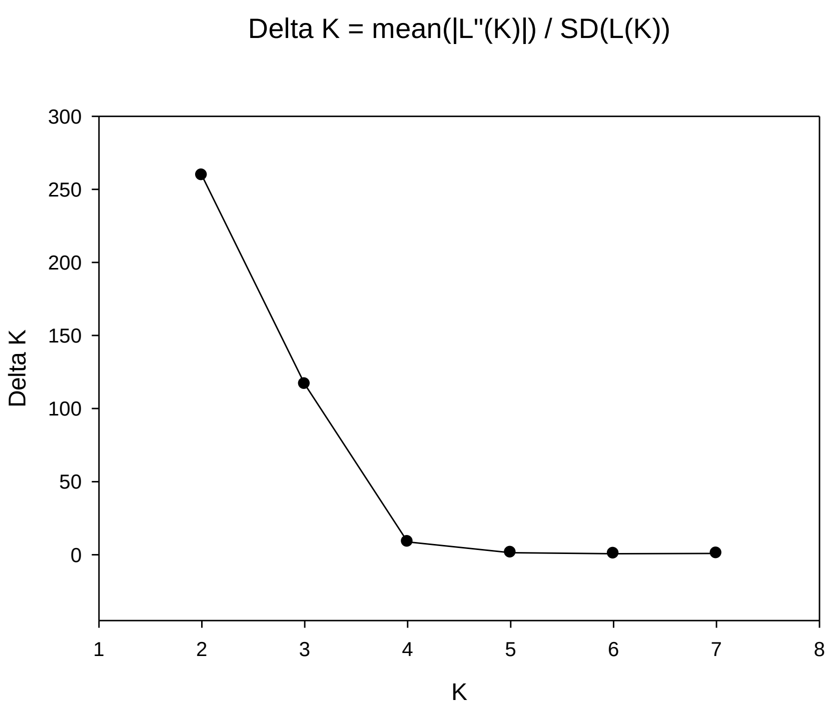


Figure 4. Magnitude of ΔK as a function of K (mean ΔK ± SD over 3 replicates) for STRUCTURE (Pritchard et al. 2000) analyses of Willamette *O. mykiss* microsatellite data.

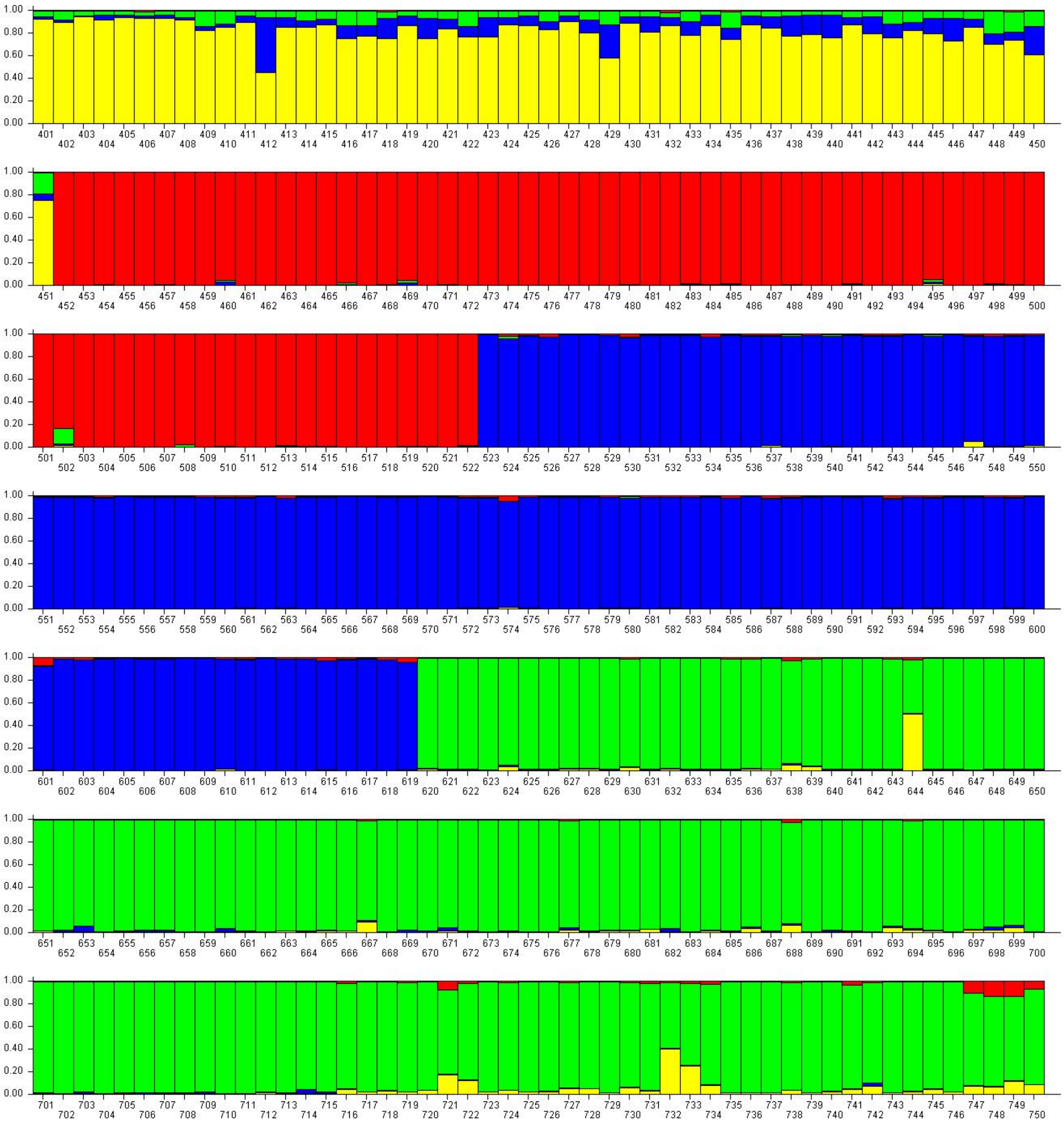


Figure 5. Graphical representation of *q* values, the proportions of the genome assigning to each of *K* = 4 groups, for 350 Willamette River *O. mykiss* samples analyzed with the program STRUCTURE (Pritchard et al. 2000). Each numbered bar represents an individual fish. Colors represent the proportions of the genome that assign to each of the four groups. These 350 samples were from “known” groups and were used by Van Doornik and Teel (2010, 2011, 2012) as GSI baseline data for Willamette eastern tributaries winter steelhead (samples 401-451), resident rainbow trout (samples 452-522), summer steelhead (523-619) and western tributaries winter steelhead (620-750). Note that distinct delineations can be seen among groups (yellow = EW, red = RB, blue = S and green = WW) and that samples 412, 644 and 732 are likely hybrids.

and eastern tributaries winter (SxEW) steelhead comprised 9.1-14.8% of juveniles sampled from these locations. In the McKenzie River, most juvenile samples (73.0%) were pure summer steelhead and several summer hybrid classes were present. Pure summer steelhead comprised 10.0% of juvenile samples from the mainstem Willamette River, and two samples from the mainstem were summer steelhead hybrids. Juvenile *O. mykiss* STRUCTURE results are summarized in Table 3.

Most juvenile samples from all locations, except the McKenzie River, had low *q* values (< 0.10) for the summer steelhead (S) group (Figure 6). Moreover, samples classified as S hybrids from the North and South Santiam rivers tended to have summer steelhead *q* values less than 0.30. In contrast, most juvenile samples from the McKenzie had high summer steelhead *q* values (> 0.80) and most summer steelhead hybrids from that subbasin presented summer steelhead *q* values greater than 0.40 (Figure 6).

In addition to juvenile samples, we analyzed 133 genotypes from unmarked adult *O. mykiss*, sampled at various locations of the Willamette River. Many of these samples were classified in the field as winter steelhead, rainbow trout, etc., based on phenotype and date of collection. Overall, our STRUCTURE analyses suggested that pure summer steelhead were among adult samples from the North Santiam and McKenzie rivers, but not the South Santiam or Middle Fork Willamette rivers (Table 4).

Although most South Santiam River adult steelhead samples appeared to be pure EW steelhead, five fish (10%) appeared to be SxEW hybrids. Similarly, most samples collected from the Middle Fork Willamette River were pure EW steelhead (92%), although a single fish appeared to be a EWxRB hybrid. Adult samples collected in 2009 and 2010 at the Minto Ponds Collection Facility on the North Santiam River included no pure summer steelhead, but 2 of 12 samples were classified as SxEW hybrids. Most of the adult samples collected at the Bennett fish trap on the North Santiam River and at the Leaburg fish trap on the McKenzie River appeared to be either summer steelhead or SxEW hybrids (Table 4). We emphasize that these adult samples were collected opportunistically, in some cases because they exhibited peculiar run timing (e.g. November arrival), and should not be considered representative of local *O. mykiss* stock structures. Adult *O. mykiss* STRUCTURE results are summarized in Table 4.

Relatedness – ML RELATE results

We used the program ML RELATE to infer all plausible pairwise relationships for 367 samples; 196 juvenile samples (collected in 2005, 2009-2011) and 171 adult samples (collected in 1986-1988), all of which assigned as summer steelhead through ONCOR analyses. Of the 67,162 possible pairwise relationships, ML RELATE identified 35 as strictly full-sibling pairs, 788 as strictly half-sibling pairs and 691 as either full- or half-sibling pairs ($P < 0.01$). However, 4 of 35 (11.4%) full-sibling relationships identified by ML RELATE were not logically possible; as they paired samples that had been collected decades apart (adults identified as full siblings of

Table 3. Genetic composition of juvenile *O. mykiss* sampled from various locations of the upper Willamette River, as determined by STRUCTURE (Pritchard et al. 2000) analyses of genotypic data for 15 microsatellite loci. Individual samples were classified as summer steelhead (S), eastside tributary Willamette winter steelhead (EW), resident rainbow trout (RB), westside tributary Willamette winter steelhead (WW) or hybrids of these groups. Data are presented as counts and percent of total counts for each location.

Year	Location	*n*	S	EW	RB	WW	SxWW	SxEW	SxRB	WWxEW	WWxRB	EWxRB	3x Hybrid
2009	Willamette Falls	240	19	126	1	34	1	23	1	31	0	1	3
2010	Willamette Falls	287	39	144	1	37	4	29	0	25	0	3	5
2011	Willamette Falls	56	3	29	0	13	1	3	0	5	0	0	2
	Percent of Total		10.5	51.3	0.3	14.4	1.0	9.4	0.2	10.5	0.0	0.7	1.7
2005	McKenzie R., Leaburg	72	56	1	0	0	1	11	1	1	0	0	1
2011	McKenzie R., Leaburg	91	63	2	4	0	1	11	6	0	0	2	2
	Percent of Total		73.0	1.8	2.5	0.0	1.2	13.5	4.3	0.6	0.0	1.2	1.8
2010	Mainstem Willamette R.	30	3	10	10	0	1	1	0	0	0	5	0
	Percent of Total		10.0	33.3	33.3	0.0	3.3	3.3	0.0	0.0	0.0	16.7	0.0
2011	N. Santiam R.	36	0	25	0	1	0	4	0	4	0	1	1
	Percent of Total		0.0	69.4	0.0	2.8	0.0	11.1	0.0	11.1	0.0	2.8	2.8
2011	Santiam R., Mouth	11	0	6	2	0	0	1	0	1	0	0	1
	Percent of Total		0.0	54.5	18.2	0.0	0.0	9.1	0.0	9.1	0.0	0.0	9.1
2011	S. Santiam R.	27	0	20	0	1	0	4	0	2	0	0	0
	Percent of Total		0.0	74.1	0.0	3.7	0.0	14.8	0.0	7.4	0.0	0.0	0.0

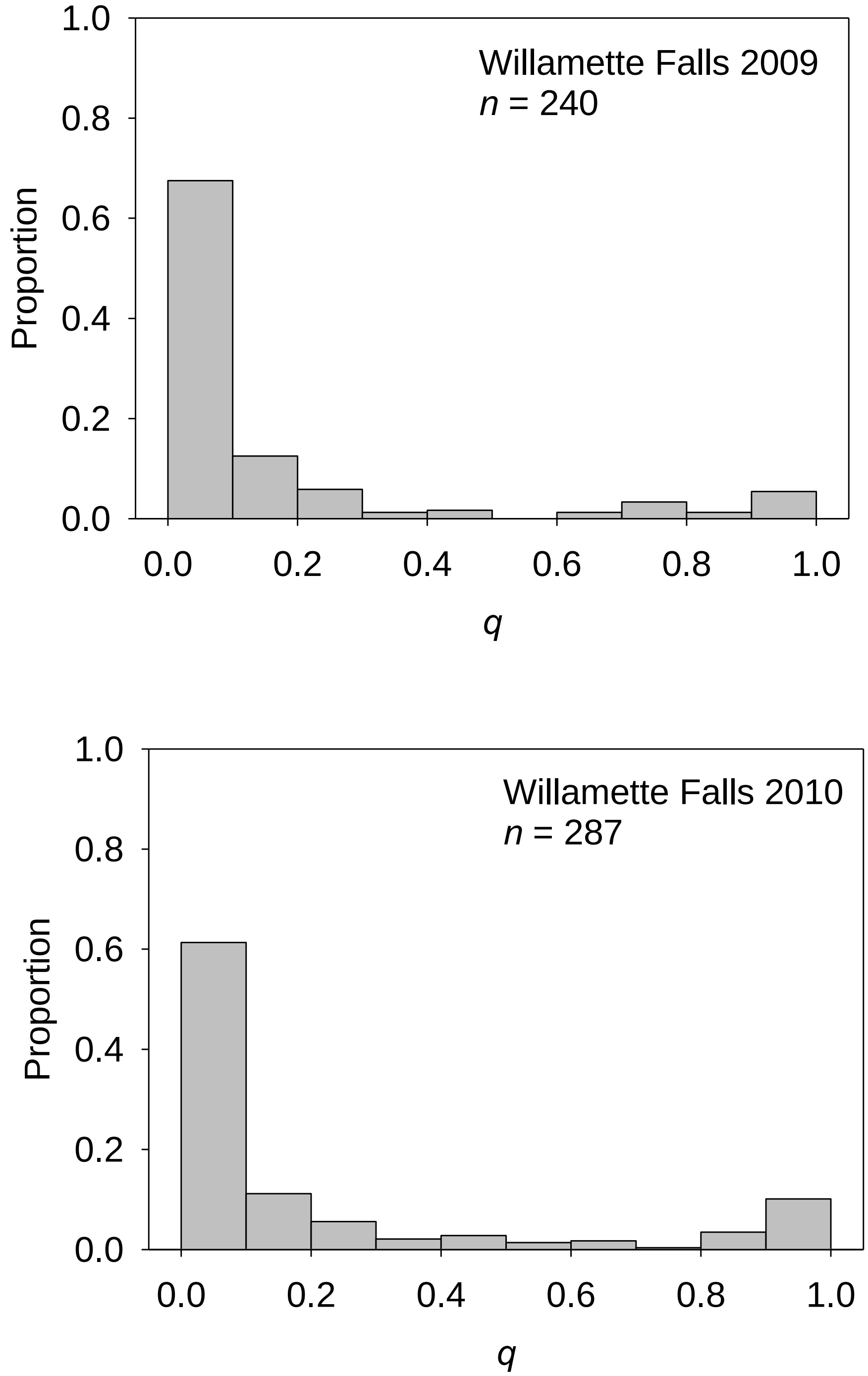


Figure 6. The proportion of juvenile *O. mykiss* samples (*y*-axis) with various levels of summer steelhead ancestry (*x*-axis) by sample location and year. The proportion *q* describes the fraction of each genome descended from the summer steelhead group.

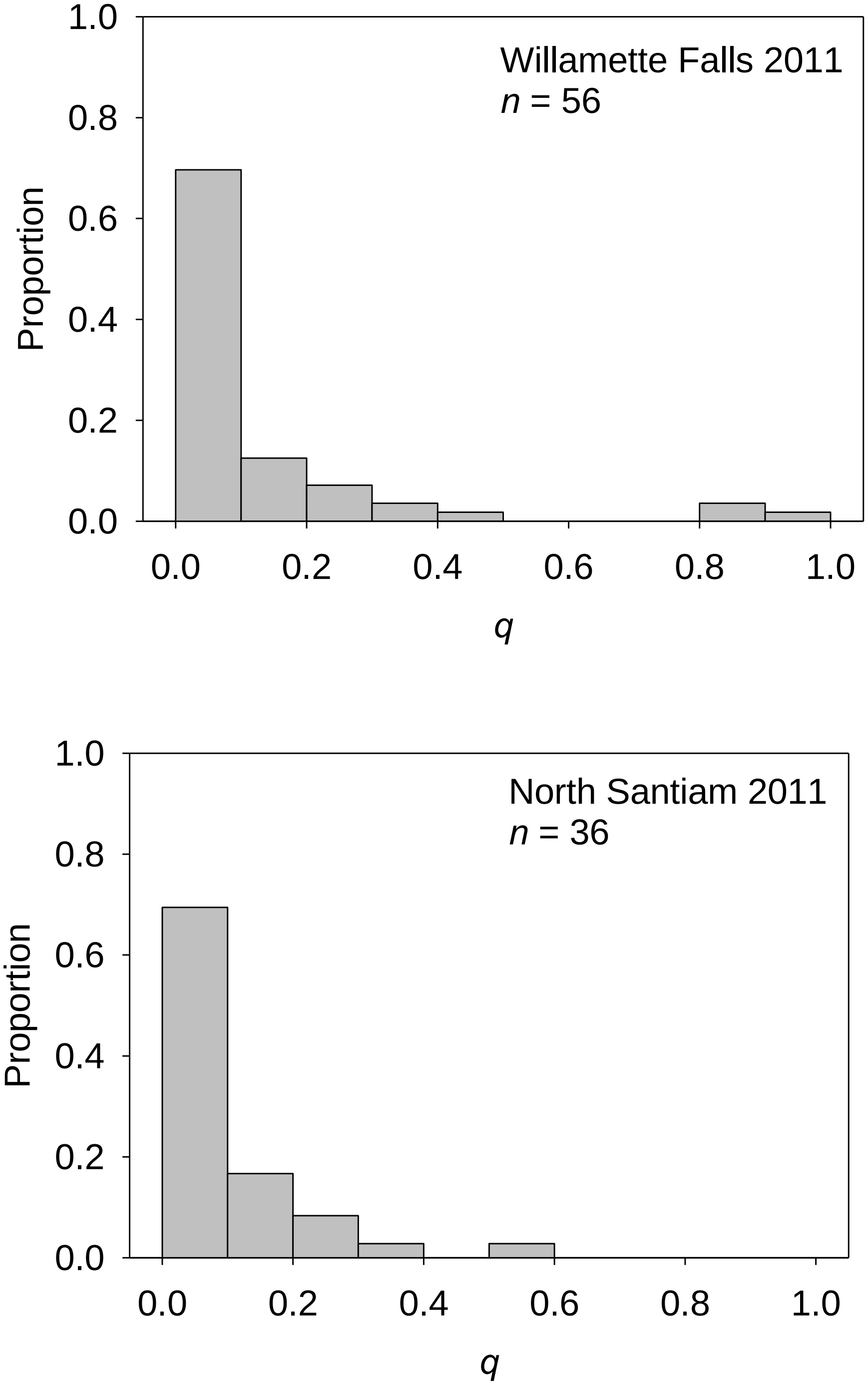


Figure 6 (*continued*).

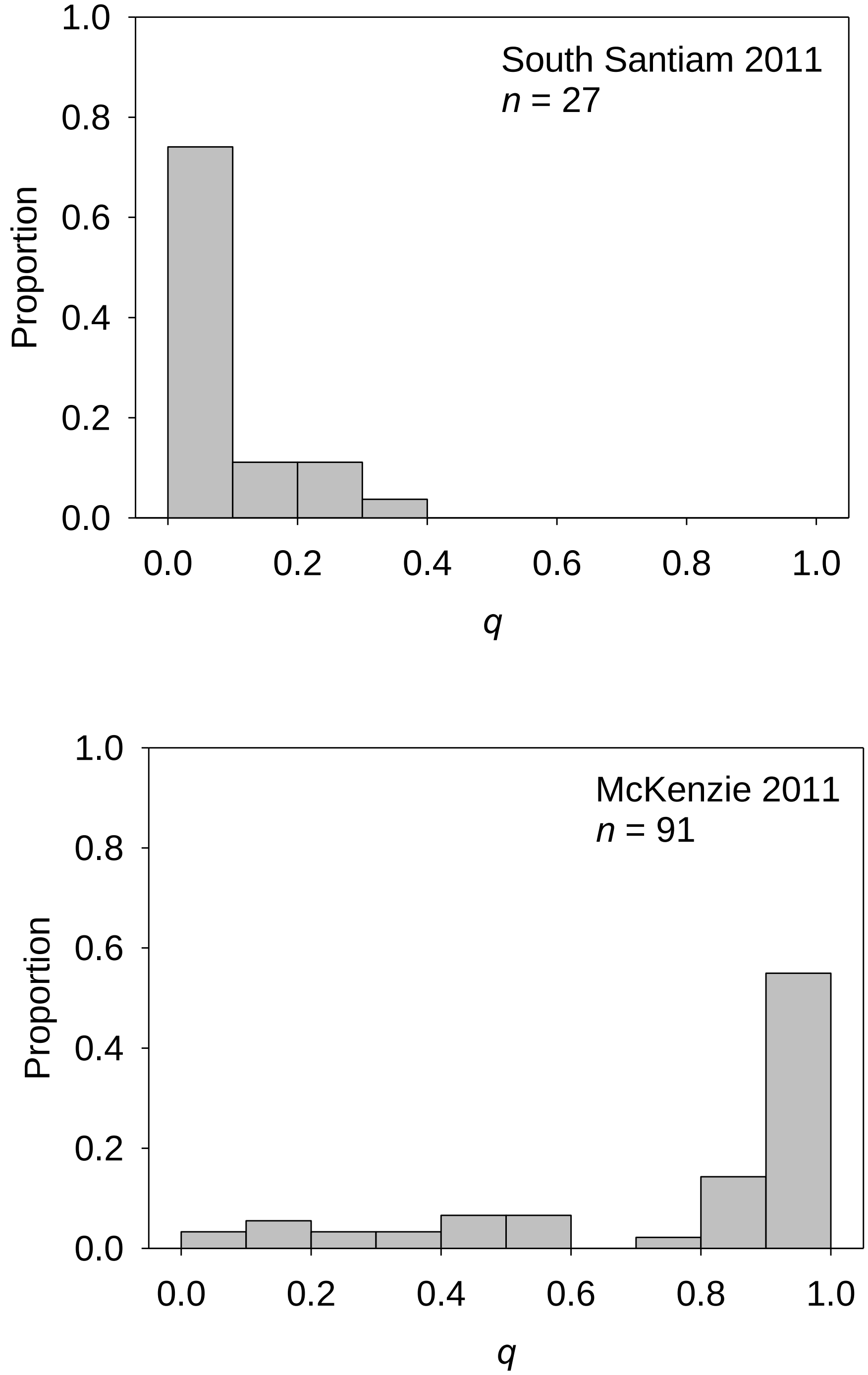


Figure 6 (*continued*).

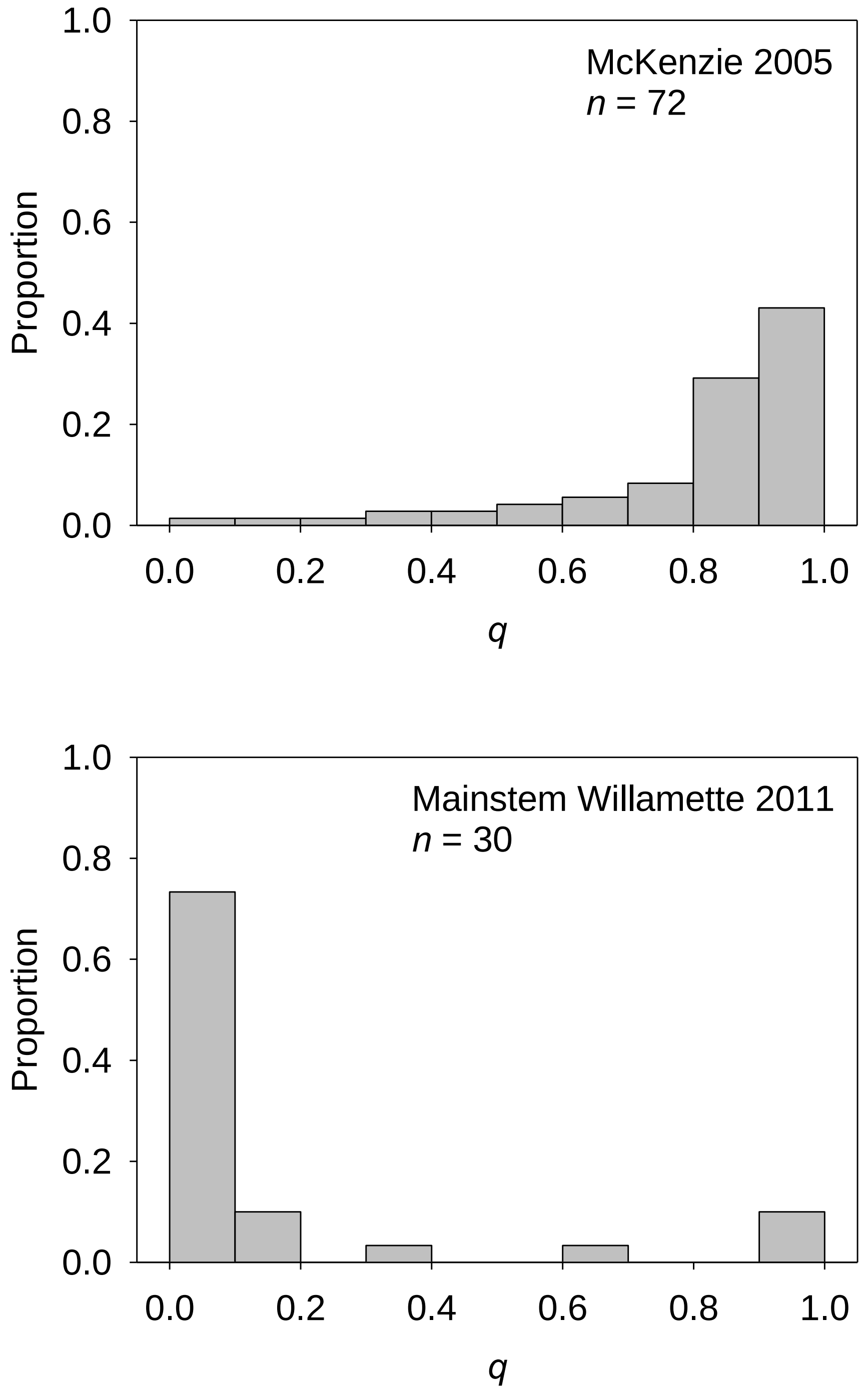


Figure 6 (*continued*).

Table 4. Genetic composition of adult *O. mykiss* sampled from various locations of the upper Willamette River, as determined by STRUCTURE (Pritchard et al. 2000) analyses of genotypic data for 15 microsatellite loci. Individual samples are classified as summer steelhead (S), eastside tributary Willamette winter steelhead (EW), resident rainbow trout (RB), westside tributary Willamette winter steelhead (WW) or hybrids of these groups. Data are presented as counts and percent of total counts for each location.

Year	Location	*n*	S	EW	RB	WW	SxWW	SxEW	SxRB	WWxEW	WWxRB	EWxRB	3x Hybrid
2009	S. Santiam R., Foster	50	0	42	0	0	0	5	0	2	0	1	0
	Percent of Total		0.0	84.0	0.0	0.0	0.0	10.0	0.0	4.0	0.0	2.0	0.0
2003	N. Santiam R., Bennett	28	2	7	0	0	0	16	0	1	0	1	1
2009	N. Santiam R., Minto Ponds	11	0	8	0	0	0	2	0	1	0	0	0
2010	N. Santiam R., Minto Ponds	1	0	1	0	0	0	0	0	0	0	0	0
	Percent of Total		5.0	40.0	0.0	0.0	0.0	45.0	0.0	5.0	0.0	2.5	2.5
2005	Mainstem Willamette R.	1	0	1	0	0	0	0	0	0	0	0	0
2010	Willamette R., Fall Cr.	19	0	16	0	0	0	0	0	0	0	3	0
2011	Willamette R., Fall Cr.	16	0	16	0	0	0	0	0	0	0	0	0
	Percent of Total		0.0	91.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.3	0.0
2005	McKenzie R., Mohawk R.	1	0	1	0	0	0	0	0	0	0	0	0
2011	McKenzie R., Leaburg	6	3	0	1	0	0	1	1	0	0	0	0
	Percent of Total		42.9	14.3	14.3	0.0	0.0	14.3	14.3	0.0	0.0	0.0	0.0

juveniles). Many (378 of 788; 48%) half-sibling relationships identified by ML RELATE were illogical pairings, and may have occurred as a result of low genetic diversity among summer steelhead samples. Results from this analysis therefore appeared to be unreliable, precluding further inference.

Natural production of summer steelhead by subbasin

ONCOR

In their GSI analyses of Willamette River steelhead, Van Doornik and Teel (2010, 2011, 2012) used the program ONCOR to perform population assignments for juvenile and adult *O. mykiss* sampled at various locations of the basin. They found that in 2009, 2010 and 2011, summer steelhead comprised 7.5%, 13.2% and 5.4% of juveniles sampled at Willamette Falls. Analyses of samples collected within major subbasins of the upper Willamette River provided evidence for substantial natural production of summer steelhead in the McKenzie River, contrasted with scant evidence for natural summer steelhead production in the North Santiam River and no evidence from the South Santiam River (Table 5; Van Doornik and Teel 2012). Summer steelhead were found at several locations along the mainstem Willamette River (Table 5), though the subbasin of origin for these summer steelhead remained uncertain and could include the McKenzie River.

Table 5. Estimated percentage of Willamette River basin juvenile *O. mykiss* samples assigned to each reporting group (EW = eastern tributaries winter steelhead, S = summer steelhead, WW = western tributaries winter steelhead, RB = resident rainbow trout) with the program ONCOR (Kalinowski 2007). Table adapted from Van Doornik and Teel (2010, 2011, 2012).

Location	Year	*N*	EW	S	WW	RB
Willamette Falls	2009	240	88.3%	7.5%	4.2%	0.0%
Willamette Falls	2010	287	78.0%	13.2%	8.7%	0.0%
Willamette Falls	2011	56	89.3%	5.4%	5.4%	0.0%
Willamette R., TOTAL of 8 samples below	2011	29	58.6%	13.8%	0.0%	27.6%
Willamette R., Buena Vista	2011	3	66.7%	0.0%	0.0%	33.3%
Willamette R., Harrisburg	2011	14	35.7%	21.4%	0.0%	42.9%
Willamette R., Marshall downstream	2011	1	100.0%	0.0%	0.0%	0.0%
Willamette R., Marshall Island	2011	2	100.0%	0.0%	0.0%	0.0%
Willamette R., McCartney	2011	4	50.0%	25.0%	0.0%	25.0%
Willamette R., McKenzie to Marshall	2011	1	100.0%	0.0%	0.0%	0.0%
Willamette R., Mouth of Santiam	2011	1	100.0%	0.0%	0.0%	0.0%
Willamette R., Salem	2011	3	100.0%	0.0%	0.0%	0.0%
Upper Willamette R., Blue Ruin Island	2011	1	0.0%	0.0%	0.0%	100.0%
Santiam R., Mouth	2011	11	90.9%	9.1%	0.0%	0.0%
North Santiam R.	2011	36	94.4%	2.8%	0.0%	2.8%
South Santiam R.	2011	27	100.0%	0.0%	0.0%	0.0%
McKenzie R., Leaburg Bypass	2005	72	25.0%	75.0%	0.0%	0.0%
McKenzie R., Leaburg Bypass	2011	91	27.5%	68.1%	0.0%	4.4%

STRUCTURE

In several respects, results from our STRUCTURE analyses of juvenile Willamette *O. mykiss* genotypes corroborate the findings of Van Doornik and Teel (2012). For example, both STRUCTURE and ONCOR analyses provided strong evidence for substantial natural production of summer steelhead in the McKenzie River and no evidence of pure summer steelhead among juveniles sampled in the South Santiam River (Table 3; Table 5). Most of the juveniles that assigned as summer steelhead by ONCOR (90%) were found to be pure summer steelhead with STRUCTURE (Appendix).

However, ONCOR and STRUCTURE employ different population assignment algorithms and provide different forms of information. Whereas ONCOR assigns individuals to their most likely population of origin (and provides a second best population estimate), STRUCTURE estimates the proportion of each individual's genome that assigns to clusters inferred to be present in the data. It is therefore not surprising that we observed some noteworthy differences between results from these two programs.

First, STRUCTURE provided compelling evidence for low levels of SxEW hybridization in the South Santiam River (Table 3), where no juvenile summer steelhead were detected with ONCOR (Table 5). For the four putative SxEW hybrid samples collected from the South Santiam River (samples 2058-2060, 2079 in Appendix), an estimated mean 27.6% of their genomes assigned to the summer steelhead group, suggesting that these were not F_1 hybrids, but instead offspring of hybrids (F_2 hybrids).

STRUCTURE results also indicated that four SxEW hybrids (samples 2009, 2013, 2024, 2038 in Appendix) were among the 36 juvenile samples from the North Santiam River. Only one of these appeared to be a F_1 hybrid (sample 2009 in Appendix), as all others presented $q <$ 25% for the summer steelhead (S) group. Interestingly, the single juvenile sample assigned by ONCOR as a summer steelhead from this subbasin had a 90% WW genome, according to STRUCTURE results.

Overall, our results suggested that naturally-produced *O. mykiss* sampled in the McKenzie River were predominately summer steelhead, and that very few pure summer steelhead were naturally produced in the Santiam rivers. However, some SxEW hybrids were found in the McKenzie, South Santiam and North Santiam rivers.

Differences among subbasins for summer steelhead production

Both ONCOR and STRUCTURE analyses indicated that the majority of juvenile *O. mykiss* samples from the North and South Santiam rivers were EW steelhead (Table 6). In contrast, most samples from the McKenzie River assigned as S steelhead. Results from ONCOR and STRUCTURE generally agreed, though STRUCTURE results suggested that some individuals that assigned as EW by ONCOR were instead SxEW or other hybrids. Such classification differences were particularly common among samples from the McKenzie River, where all but 2 of 25 samples that assigned as EW by ONCOR were determined to be S hybrid classes by STRUCTURE analyses (Table 6; Appendix).

Table 6. Counts of juvenile *O. mykiss*, according to group or hybrid class (EW = eastern tributaries winter steelhead, S = summer steelhead, WW = western tributaries winter steelhead, RB = resident rainbow trout) as inferred through ONCOR and STRUCTURE analyses of genotypic data from 15 microsatellite loci. Samples were collected in 2011 from the McKenzie, North Santiam and South Santiam rivers. The S hybrid classes include SxEW, SxWW and SxRB. See Appendix for other hybrid classes.

	Class	McKenzie R.	N. Santiam R.	S. Santiam R.
ONCOR				
	S	62	1	0
	EW	25	34	27
	RB	4	1	0
	WW	0	0	0
STRUCTURE				
	S	63	0	0
	EW	2	25	20
	RB	4	0	0
	WW	0	1	1
	S hybrids	18	4	4
	Other hybrids	4	6	2

Pairwise Fisher's exact tests indicated no significant difference ($P = 1.00$) between the proportions of fish assigned to different classes for the North and South Santiam rivers, regardless of assignment method (ONCOR or STRUCTURE). Proportions for class assignment counts were significantly different between the McKenzie River and both Santiam rivers ($P < 0.001$), as samples from the McKenzie River included a relatively high proportion of summer steelhead.

Discussion

Overview

Observations made during spawning surveys suggested that low levels of natural production by summer steelhead may occur in the UWR basin, as well as possible hybridization with winter steelhead (Firman et al. 2004). Our findings substantiate these reports with the first quantitative evidence for natural production and genetic introgression from summer steelhead in the UWR basin.

The UWR Conservation and Recovery Plan for Chinook Salmon and Steelhead (ODFW and NMFS 2011) established that the proportion of hatchery origin spawners (pHOS) should be < 0.05 total spawners in most subbasins of the UWR steelhead DPS, so as to allow threatened native populations to meet desired population status goals. Although our results do not provide direct estimates for pHOS, they do suggest that about 10% of unmarked juvenile *O. mykiss* sampled at Willamette Falls in 2009-2011 were summer steelhead and that an additional 10% of these were summer steelhead hybrids. Most *O. mykiss* sampled from the McKenzie River were either summer steelhead or SxEW hybrids. Natural production of pure summer steelhead appeared to be minimal or absent in the North and South Santiam rivers, though SxEW hybrids represented 11.1% and 14.8% of samples. We emphasize that these estimates of hybrid fraction likely represent cumulative effects from multiple generations of natural production by hatchery summer steelhead in the basin and may therefore exceed pHOS of any single generation.

Results from STRUCTURE and ONCOR analyses were generally in agreement, though we observed some minor differences. We found no evidence for natural production of pure summer steelhead in the Santiam rivers from STRUCTURE analyses, though summer steelhead hybrids were detected in these subbasins. Previous GSI results suggested that a single juvenile sample collected from the North Santiam River (n = 36) was a summer steelhead and that no summer steelhead were among the 27 juvenile samples collected from the South Santiam River in 2011. ONCOR and STRUCTURE results agreed that most juvenile *O. mykiss* sampled from the McKenzie River were summer steelhead and that several summer steelhead were among samples collected from the mainstem Willamette River.

Natural production and hybridization from summer steelhead

By examining genetic and count data from adult and juvenile steelhead, Kostow et al. (2003) found that natural production by hatchery summer steelhead accounted for one third to one half of the naturally produced smolts in the Clackamas River (lower Willamette River basin), but contributed little to adult returns. Those authors found little evidence for hybridization between native winter steelhead and introduced summer steelhead, but concluded that competition with naturally-produced summer steelhead likely posed a serious ecological risk to juvenile winter steelhead.

Similar to results from the Clackamas River, we found a high proportion of summer steelhead among unmarked juvenile *O. mykiss* samples from the McKenzie River, which clearly demonstrated that natural production of steelhead in this subbasin was dominated by either naturalized or stray hatchery fish. However, unlike the Clackamas River, winter steelhead are not native to the McKenzie River. Interactions between summer and winter steelhead in this subbasin have likely been limited by low local abundance of the latter. However, summer steelhead may negatively affect other native forms of *O. mykiss*, such as resident rainbow trout, as suggested by our observation of SxRB hybrids among McKenzie River samples (Table 3). The low proportion of pure resident rainbow trout among samples from the McKenzie River is likely due to sampling bias (only fish with smolt-like appearance were sampled) and not a reflection of the true *O. mykiss* stock structure in that subbasin.

In contrast with findings from the Clackamas River (Kostow et al. 2003) and McKenzie River (this study), we found little evidence for natural production by summer steelhead in the North, South or mainstem Santiam rivers. Results from ONCOR suggested that only a single juvenile from the North Santiam River (n = 36) and another from the lower mainstem Santiam River (n = 11) were from the summer steelhead reporting group. No juvenile *O. mykiss* from the South Santiam River (n = 27) was found to be a summer steelhead. The STRUCTURE results from the same data similarly suggested low levels of natural production by summer steelhead in Santiam River subbasins. However, STRUCTURE provided evidence of hybridization between summer steelhead and native winter steelhead.

Our findings of genetic introgression suggest that temporospatial overlap can occur between naturally spawning summer and winter steelhead in UWR subbasins, and that assortative mating and current management have not entirely prevented hybridization between native and introduced *O. mykiss* stocks. Interbreeding with hatchery summer steelhead could lower the fitness of native UWR winter steelhead, as hatchery-reared Skamania stock summer steelhead have low fitness in the wild (Chilcote et al. 1986; Kostow et al. 2003; Leider et al. 1990). Notwithstanding our findings, the proportion of summer steelhead hybrids among our samples was generally lower than has been described in hybrid zones of other trout and salmon species (Boyer et al. 2008; Kinziger et al. 2008; Ostberg et al. 2004; Simmons et al. 2009; Rubidge and Taylor 2004), though our ability to provide conclusions regarding interannual variability and site-specific patterns was limited by the small number of samples collected within subbasins during a single year.

Management Implications

Our findings of natural production by summer steelhead and genetic introgression between summer and winter steelhead provide empirical evidence of ecological and genetic risks from upper Willamette River hatchery steelhead programs and have implications for current and future fisheries management. Although the magnitude of risk appears to be low within the winter steelhead DPS, we recommend several actions to further understand and reduce risk from UWR hatchery steelhead:

1) We recommend that managers consider strategies to reduce the occurrence of hatchery steelhead on natural spawning grounds. Modifications to trap operations (opening and closure dates), recycling programs, acclimation and release protocols, and harvest regulations should all be considered.

2) We recommend that managers investigate and apply measures to promote reproductive isolation between hatchery steelhead and native winter steelhead. Opportunities for spatial and temporal segregation (e.g., wild fish sanctuaries and selection on spawn timing by hatchery fish) should be exploited while novel approaches are considered for development.

3) We recommend that additional sampling and genetic analyses be performed to further evaluate the genetic structure and integrity of both juvenile and adult steelhead from UWR subbasins. This effort should include sampling of adult steelhead released into wild fish sanctuaries (currently, only above Foster Dam), which could be coupled with other research efforts and used to plan and improve reintroduction programs on the North and South Santiam rivers. For example, a suite of phenotypic traits might be identified as characteristic of SxEW hybrids that would allow screening aimed to promote genetic integrity of the winter steelhead population.

In addition to these actions, managers should define acceptable levels of natural production and introgression from hatchery steelhead in UWR subbasins, such that the effectiveness of management actions may be evaluated in the context of objective and clearly identified goals.

Acknowledgments

The authors would like to thank the many ODFW staff who contributed to this work. Mike Hogansen, Kirk Schroeder, and Bart DeBow provided adult and juvenile *O. mykiss* samples from the mainstem Willamette River and subbasins. Additional adult steelhead samples were provided by ODFW hatchery managers Brett Boyd and Greg Grenbemer. Lisa Borgerson and Kanani Bowden provided the archived scale samples. Some of the baseline genetic data used in this study were collected at the Northwest Fisheries Science Center by Maureen Hess (Columbia River Inter-Tribal Fish Commission). We appreciate the helpful comments of Lance Kruzic (National Marine Fisheries Service), Bernadette Graham-Hudson (ODFW) and Steve Marx

(ODFW) on earlier versions of the report. This work was funded by the USACE (Task Order W9127N-10-2-0008-0015), administered by David Leonhardt.

References

Blankenship, S. M., M. R. Campbell, J. E. Hess, M. A. Hess, T. K. Kassler, C. C. Kozfkay, A. P. Matala, S. R. Narum, M. M. Paquin, M. P. Small, J. J. Stephenson, and K. I. Warheit. 2011. Major lineages and metapopulations in Columbia River *Oncorhynchus mykiss* are structured by dynamic landscape features and environments. Transactions of the American Fisheries Society 140: 665-684.

Boyer, M. C., C. C. Muhlfeld and F. W. Allendorf. 2008. Rainbow trout (*Oncorhynchus mykiss*) invasion and the spread of hybridization with native westslope cutthroat trout (*Oncorhynchus clarkia lewisi*). Canadian Journal of Fisheries and Aquatic Sciences 65: 658-669.

Burgarella, C., Z. Lorenzo, R. Jabbour-Zahab, R. Lumaret, E. Guichoux, R. J. Petit, Á. Soto and L. Gil. 2009. Detection of hybrids in nature: application to oaks (*Quercus suber* and *Q. ilex*). Heredity 102: 442-452.

Chilcote, M. W., S. A. Leider and J .J. Loch. 1986. Differential reproductive success of hatchery and wild summer-run steelhead under natural conditions. Transactions of the American Fisheries Society 115: 726-735.

Earl, D. A. and B. M. vonHoldt. 2012. STRUCTURE HARVESTER: a website and program for visualizing STRUCTURE output and implementing the Evanno method. Conservation Genetics Resources 4: 359-361.

Evanno, G., S. Regnaut and J. Goudet. 2005. Detecting the number of clusters of individuals using the software STRUCTURE: a simulation study. Molecular Ecology 14: 2611-2620.

Firman, J., R. Schroeder, R. Lindsay, K. Kenaston, and M. Hogansen. 2004. Work Completed for Compliance with the Biological Opinion for Hatchery Programs in the Willamette Basin, USACE funding: 2003. Final Report to the U.S. Army Corps of Engineers, Task Order NWP-OP-FH-02-01. Oregon Department of Fish and Wildlife, Corvallis.

Holm, S. 1979. A simple sequentially rejective multiple test procedure. Scandinavian Journal of Statistics 6: 65-70.

Hubisz, M. J., D. Falush, M. Stephens, J. K. Pritchard. 2009. Inferring weak population structure with the assistance of sample group information. Molecular Ecology Resources 9: 1322-1332.

Kalinowski, S. T. 2007. ONCOR: Software for genetic stock identification. Available: http://www.montana.edu/kalinowski/Software/ONCOR.htm (November 2012).

Kalinowski, S. T., A. P. Wagner and M. L. Taper. 2006. ML-RELATE: a computer program for maximum likelihood estimation of relatedness and relationship. Molecular Ecology Notes 6: 576-579.

Kinziger, A. P., E. J. Loudenslager, D. G. Hankin, E. C. Anderson and J. C. Garza. 2008. Hybridization between spring- and fall-run Chinook salmon returning to the Trinity River, California. North American Journal of Fisheries Management 28:1426-1438.

Kostow, K. E., A. R. Marshall, and S. R. Phelps. 2003. Naturally spawning hatchery steelhead contribute to smolt production but experience low reproductive success. Transactions of the American Fisheries Society 132:780-790.

Leider, S. A., P. L. Hulett, J. J. Loch, M. W. Chilcote. 1990. Electrophoretic comparison of the reproductive success of naturally spawning transplanted and wild steelhead trout through the returning adult stage. Aquaculture 88:239-252.

NMFS (National Marine Fisheries Service). 2012. 5-Year Review: Summary and evaluation Upper Willamette River steelhead, Upper Willamette River Chinook. Available: http://www.nmfs.noaa.gov/pr/pdfs/species/upperwillametteriver_salmonids_5yearreview.pdf (February 2013).

NMFS (National Marine Fisheries Service). 1999a. Endangered and threatened species: threatened status for two ESUs of steelhead in Washington and Oregon. Federal Register 64:14517-14528.

NMFS (National Marine Fisheries Service). 2008. Endangered Species Act 7(a)(2) Consultation Biological Opinion & Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation: Consultation on the "Willamette Basin Flood Control Project". NOAA-Fisheries F/NWR/2000/02117.

ODFW (Oregon Department of Fish and Wildlife) and NMFS (National Marine Fisheries Service). 2011. Upper Willamette River Conservation and Recovery Plan for Chinook Salmon and Steelhead. Available: http://www.dfw.state.or.us/fish/CRP/upper_willamette_river_plan.asp. (November 2012).

Ostberg, C. O., S. L. Slatton and R. J. Rodriguez. 2004. Spatial partitioning and asymmetric hybridization among sympatric coastal steelhead trout (*Oncorhynchus mykiss irideus*), coastal cutthroat trout (*O. clarki clarki*) and interspecific hybrids. Molecular Ecology 13:2773-2788.

Pritchard, J. K., M. Stephens and P. Donnelly. 2000. Inference of population structure using multilocus genotype data. Genetics 155: 945-959.

Pritchard, J. K., X. Wen and D. Falush. Documentation for STRUCTURE software: Version 2.3. Available: http://pritch.bsd.uchicago.edu/structure.html (November 2012).

Pritchard, V. L., K. Jones and D. E. Cowley. 2007. Estimation of introgression in cutthroat trout populations using microsatellites. Conservation Genetics 8:1311-1329.

Pritchard, V. L., J. L. Metcalf, K. Jones, A. P. Martin and D. E. Cowley. 2009. Population structure and genetic management of Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*). Conservation Genetics 10: 1209-1221.

Rubidge, E. M. and E. B. Taylor. 2004. Hybrid zone structure and the potential role of selection in hybridizing populations of native westslope cutthroat trout (*Oncorhynchus clarki lewisi*) and introduced rainbow trout (*O. mykiss*). Molecular Ecology 13: 3735-3749.

Sanz, N., R. M. Araguas, R. Fernández, M. Vera and J. L. García-Marín. 2009. Efficiency of markers and methods for detecting hybrids and introgression in stocked populations. Conservation Genetics 10: 225-236.

Schroeder, R., M. Wade, J. Firman, M. Buckman, B. Cannon, M. Hogansen, K. Kenaston, and L. Krentz. 2006. Work Completed for Compliance with the Biological Opinion for Hatchery Programs in the Willamette Basin. Final Report to the U.S. Army Corps of Engineers, Task Order NWP-OP-FH-02-01. Oregon Department of Fish and Wildlife, Corvallis.

Simmons, R. E., P. Lavretsky and B. May. 2009. Introgressive hybridization of redband trout in the upper McCloud River watershed. Transactions of the American Fisheries Society 139: 201-213.

Vähä, J. P., and C. R. Primmer. 2006. Efficiency of model-based Bayesian methods for detecting hybrid individuals under different hybridization scenarios and with different numbers of loci. Molecular Ecology 15:63-72.

Van Doornik, D. M., and D. J. Teel. 2010. Genetic analysis of Willamette River steelhead of unknown run origin. Final Report to U.S. Army Corps of Engineers (Task Order W66QKZ01256317) and Oregon Department of Fish and Wildlife. 20 p.

Van Doornik, D. M., and D. J. Teel. 2011. Genetic analysis of Willamette River steelhead of unknown run origin: Year 2. Final Report to U.S. Army Corps of Engineers (Task Order W66QKZ03365690) and Oregon Department of Fish and Wildlife. 16 p.

Van Doornik, D. M., and D. J. Teel. 2012. Genetic analysis of Willamette River steelhead of unknown run origin: Year 3. Final Report to U.S. Army Corps of Engineers (Task Order W66QKZ13630210) and Oregon Department of Fish and Wildlife. 23 p.

Weir, B. S. and C. C. Cockerham. 1984. Estimating F-statistics for the analysis of population structure. Evolution 38:1358-1370.

Appendix

Location and collection year for Willamette *O. mykiss* samples analyzed with the program STRUCTURE. The reporting group (RG) or identification number (ID) is provided for samples included in baseline (BL) or mixture files of ONCOR analyses by Van Doornik and Teel (2010, 2011, 2012). ONCOR assignments are provided for mixture samples. For each sample, the proportions of the genome (*q*) assigning to the groups summer steelhead (S), east tributaries winter steelhead (EW), resident rainbow trout (RB) and west tributaries winter steelhead (WW) were used to classify genome ancestry. Hybrids indicated as (e.g.) SxEW.

			STRUCTURE *q* Values						
Sample	Location, Year	RG or ID	S	EW	RB	WW	STRUCTURE Classification	ONCOR Assignment	ONCOR Probability
1	Calapooia, 1997	EW	0.005	0.986	0.007	0.001	EW	BL	NA
2	Calapooia, 1997	EW	0.003	0.986	0.010	0.001	EW	BL	NA
3	Calapooia, 1997	EW	0.059	0.931	0.008	0.003	EW	BL	NA
4	Calapooia, 1997	EW	0.004	0.978	0.017	0.002	EW	BL	NA
5	Calapooia, 1997	EW	0.003	0.986	0.008	0.003	EW	BL	NA
6	Calapooia, 1997	EW	0.005	0.979	0.014	0.001	EW	BL	NA
7	Calapooia, 1997	EW	0.021	0.962	0.014	0.003	EW	BL	NA
8	Calapooia, 1997	EW	0.002	0.973	0.023	0.001	EW	BL	NA
9	Calapooia, 1997	EW	0.009	0.951	0.039	0.001	EW	BL	NA
10	Calapooia, 1997	EW	0.002	0.989	0.007	0.002	EW	BL	NA
11	Calapooia, 1997	EW	0.018	0.934	0.045	0.002	EW	BL	NA
12	Calapooia, 1997	EW	0.006	0.980	0.013	0.001	EW	BL	NA
13	Calapooia, 1997	EW	0.006	0.972	0.018	0.003	EW	BL	NA
14	Calapooia, 1997	EW	0.003	0.957	0.020	0.020	EW	BL	NA
15	Calapooia, 1997	EW	0.006	0.976	0.015	0.003	EW	BL	NA
16	Calapooia, 1997	EW	0.006	0.957	0.036	0.002	EW	BL	NA
17	Calapooia, 1997	EW	0.003	0.982	0.014	0.001	EW	BL	NA
18	Calapooia, 1997	EW	0.028	0.965	0.006	0.002	EW	BL	NA
19	Calapooia, 1997	EW	0.004	0.976	0.017	0.003	EW	BL	NA
20	Calapooia, 1997	EW	0.005	0.982	0.011	0.002	EW	BL	NA
21	Calapooia, 1997	EW	0.003	0.979	0.017	0.001	EW	BL	NA
22	Calapooia, 1997	EW	0.002	0.981	0.013	0.003	EW	BL	NA
23	Calapooia, 1997	EW	0.011	0.976	0.010	0.002	EW	BL	NA
24	Calapooia, 1997	EW	0.007	0.886	0.102	0.005	EW	BL	NA
25	Calapooia, 1997	EW	0.005	0.979	0.011	0.004	EW	BL	NA
26	Calapooia, 1997	EW	0.003	0.983	0.013	0.002	EW	BL	NA
27	Calapooia, 1997	EW	0.002	0.984	0.012	0.001	EW	BL	NA

28	Calapooia, 1997	EW	0.009	0.933	0.056	0.002	EW	BL	NA
29	Calapooia, 1997	EW	0.021	0.965	0.010	0.004	EW	BL	NA
30	Calapooia, 1997	EW	0.003	0.961	0.034	0.002	EW	BL	NA
31	Calapooia, 1997	EW	0.005	0.971	0.022	0.001	EW	BL	NA
32	Calapooia, 1997	EW	0.005	0.983	0.009	0.003	EW	BL	NA
33	Calapooia, 1997	EW	0.006	0.976	0.016	0.002	EW	BL	NA
34	Calapooia, 1997	EW	0.005	0.980	0.007	0.008	EW	BL	NA
35	Calapooia, 1997	EW	0.002	0.985	0.011	0.001	EW	BL	NA
36	Calapooia, 1997	EW	0.004	0.986	0.008	0.002	EW	BL	NA
37	Calapooia, 1997	EW	0.003	0.988	0.007	0.002	EW	BL	NA
38	Calapooia, 1997	EW	0.003	0.986	0.010	0.001	EW	BL	NA
39	Clackamas, 2000	EW	0.172	0.640	0.038	0.149	EW	BL	NA
40	Clackamas, 2000	EW	0.157	0.549	0.033	0.261	WWxEW	BL	NA
41	Clackamas, 2000	EW	0.193	0.537	0.119	0.151	EW	BL	NA
42	Clackamas, 2000	EW	0.290	0.414	0.040	0.255	3x	BL	NA
43	Clackamas, 2000	EW	0.236	0.488	0.033	0.243	3x	BL	NA
44	Clackamas, 2000	EW	0.295	0.456	0.066	0.183	SxEW	BL	NA
45	Clackamas, 2000	EW	0.195	0.568	0.055	0.182	EW	BL	NA
46	Clackamas, 2000	EW	0.194	0.513	0.110	0.183	EW	BL	NA
47	Clackamas, 2000	EW	0.371	0.471	0.041	0.116	SxEW	BL	NA
48	Clackamas, 2000	EW	0.247	0.468	0.046	0.239	3x	BL	NA
49	Clackamas, 2000	EW	0.238	0.523	0.025	0.213	3x	BL	NA
50	Clackamas, 2000	EW	0.149	0.671	0.055	0.126	EW	BL	NA
51	Clackamas, 2000	EW	0.218	0.547	0.062	0.173	SxEW	BL	NA
52	Clackamas, 2000	EW	0.168	0.545	0.087	0.201	WWxEW	BL	NA
53	Clackamas, 2000	EW	0.168	0.648	0.054	0.130	EW	BL	NA
54	Clackamas, 2000	EW	0.183	0.594	0.033	0.189	EW	BL	NA
55	Clackamas, 2000	EW	0.216	0.502	0.096	0.186	SxEW	BL	NA
56	Clackamas, 2000	EW	0.157	0.633	0.027	0.183	EW	BL	NA
57	Clackamas, 2000	EW	0.181	0.570	0.056	0.193	EW	BL	NA
58	Clackamas, 2000	EW	0.211	0.493	0.033	0.264	3x	BL	NA
59	Clackamas, 2000	EW	0.173	0.606	0.041	0.179	EW	BL	NA
60	Clackamas, 2000	EW	0.239	0.407	0.055	0.299	3x	BL	NA
61	Clackamas, 2000	EW	0.265	0.507	0.064	0.163	SxEW	BL	NA
62	Clackamas, 2000	EW	0.193	0.665	0.034	0.108	EW	BL	NA
63	Clackamas, 2000	EW	0.191	0.536	0.036	0.236	WWxEW	BL	NA
64	Clackamas, 2000	EW	0.357	0.378	0.061	0.204	3x	BL	NA
65	Clackamas, 2000	EW	0.168	0.665	0.028	0.140	EW	BL	NA
66	Clackamas, 2000	EW	0.180	0.494	0.153	0.173	-	BL	NA

67	Clackamas, 2000	EW	0.200	0.546	0.065	0.188	SxEW	BL	NA
68	Clackamas, 2000	EW	0.272	0.549	0.040	0.139	SxEW	BL	NA
69	Clackamas, 2000	EW	0.326	0.418	0.040	0.216	3x	BL	NA
70	Clackamas, 2000	EW	0.217	0.482	0.043	0.257	3x	BL	NA
71	Clackamas, 2000	EW	0.476	0.345	0.033	0.146	SxEW	BL	NA
72	Clackamas, 2000	EW	0.322	0.382	0.052	0.244	3x	BL	NA
73	Clackamas, 2000	EW	0.346	0.460	0.037	0.156	SxEW	BL	NA
74	Clackamas, 2000	EW	0.120	0.723	0.037	0.120	EW	BL	NA
75	Clackamas, 2000	EW	0.305	0.466	0.034	0.195	SxEW	BL	NA
76	Clackamas, 2000	EW	0.267	0.501	0.037	0.195	SxEW	BL	NA
77	Clackamas, 2000	EW	0.320	0.369	0.047	0.264	3x	BL	NA
78	Clackamas, 2000	EW	0.132	0.623	0.033	0.212	WWxEW	BL	NA
79	Clackamas, 2000	EW	0.244	0.519	0.033	0.204	3x	BL	NA
80	Clackamas, 2000	EW	0.232	0.568	0.037	0.163	SxEW	BL	NA
81	Clackamas, 2000	EW	0.058	0.766	0.003	0.173	EW	BL	NA
82	Clackamas, 2000	EW	0.054	0.792	0.003	0.152	EW	BL	NA
83	Clackamas, 2000	EW	0.049	0.730	0.004	0.217	WWxEW	BL	NA
84	Clackamas, 2000	EW	0.048	0.781	0.004	0.166	EW	BL	NA
85	Clackamas, 2000	EW	0.059	0.779	0.004	0.159	EW	BL	NA
86	Clackamas, 2000	EW	0.042	0.772	0.002	0.183	EW	BL	NA
87	Clackamas, 2000	EW	0.042	0.796	0.003	0.159	EW	BL	NA
88	Clackamas, 2000	EW	0.089	0.688	0.002	0.221	WWxEW	BL	NA
89	Clackamas, 2000	EW	0.055	0.707	0.004	0.234	WWxEW	BL	NA
90	Clackamas, 2000	EW	0.131	0.691	0.003	0.176	EW	BL	NA
91	Clackamas, 2000	EW	0.059	0.789	0.003	0.149	EW	BL	NA
92	Clackamas, 2000	EW	0.063	0.726	0.002	0.209	WWxEW	BL	NA
93	Clackamas, 2000	EW	0.055	0.760	0.004	0.181	EW	BL	NA
94	Clackamas, 2000	EW	0.049	0.813	0.004	0.135	EW	BL	NA
95	Clackamas, 2000	EW	0.041	0.806	0.003	0.150	EW	BL	NA
96	Clackamas, 2000	EW	0.084	0.697	0.003	0.217	WWxEW	BL	NA
97	Clackamas, 2000	EW	0.053	0.770	0.006	0.172	EW	BL	NA
98	Clackamas, 2000	EW	0.034	0.832	0.003	0.132	EW	BL	NA
99	Clackamas, 2000	EW	0.056	0.800	0.002	0.142	EW	BL	NA
100	Clackamas, 2000	EW	0.043	0.736	0.003	0.217	WWxEW	BL	NA
101	Clackamas, 2000	EW	0.051	0.773	0.003	0.174	EW	BL	NA
102	Clackamas, 2000	EW	0.042	0.798	0.005	0.155	EW	BL	NA
103	Clackamas, 2000	EW	0.067	0.744	0.005	0.183	EW	BL	NA
104	Clackamas, 2000	EW	0.046	0.681	0.003	0.270	WWxEW	BL	NA
105	Clackamas, 2000	EW	0.095	0.771	0.006	0.128	EW	BL	NA
106	Clackamas, 2000	EW	0.044	0.788	0.005	0.163	EW	BL	NA

107	Clackamas, 2000	EW	0.044	0.726	0.002	0.227	WWxEW	BL	NA
108	Clackamas, 2000	EW	0.063	0.710	0.003	0.224	WWxEW	BL	NA
109	Clackamas, 2000	EW	0.044	0.763	0.003	0.190	EW	BL	NA
110	Clackamas, 2000	EW	0.064	0.753	0.003	0.181	EW	BL	NA
111	Clackamas, 2000	EW	0.040	0.842	0.005	0.113	EW	BL	NA
112	Clackamas, 2000	EW	0.065	0.707	0.003	0.224	WWxEW	BL	NA
113	Clackamas, 2000	EW	0.046	0.761	0.003	0.190	EW	BL	NA
114	Clackamas, 2000	EW	0.062	0.685	0.003	0.250	WWxEW	BL	NA
115	Clackamas, 2000	EW	0.058	0.779	0.004	0.160	EW	BL	NA
116	Clackamas, 2000	EW	0.061	0.769	0.004	0.166	EW	BL	NA
117	Clackamas, 2000	EW	0.053	0.697	0.003	0.247	WWxEW	BL	NA
118	Clackamas, 2000	EW	0.056	0.748	0.002	0.194	EW	BL	NA
119	Clackamas, 2000	EW	0.066	0.746	0.004	0.185	EW	BL	NA
120	Clackamas, 2000	EW	0.053	0.747	0.003	0.197	EW	BL	NA
121	Clackamas, 2000	EW	0.045	0.845	0.003	0.107	EW	BL	NA
122	Clackamas, 2000	EW	0.039	0.812	0.002	0.147	EW	BL	NA
123	Clackamas, 2000	EW	0.055	0.750	0.004	0.191	EW	BL	NA
124	Clackamas, 2000	EW	0.075	0.754	0.004	0.167	EW	BL	NA
125	Clackamas, 2000	EW	0.066	0.719	0.003	0.212	WWxEW	BL	NA
126	Clackamas, 2000	EW	0.037	0.845	0.006	0.113	EW	BL	NA
127	Clackamas, 2000	EW	0.075	0.763	0.004	0.159	EW	BL	NA
128	Clackamas, 2000	EW	0.051	0.752	0.004	0.194	EW	BL	NA
129	Clackamas, 2000	EW	0.046	0.675	0.002	0.277	WWxEW	BL	NA
130	Clackamas, 2000	EW	0.043	0.739	0.003	0.214	WWxEW	BL	NA
131	Clackamas, 2000	EW	0.073	0.703	0.003	0.221	WWxEW	BL	NA
132	Clackamas, 2000	EW	0.049	0.798	0.003	0.149	EW	BL	NA
133	Clackamas, 2000	EW	0.042	0.842	0.002	0.113	EW	BL	NA
134	Clackamas, 2000	EW	0.040	0.764	0.003	0.193	EW	BL	NA
135	Clackamas, 2000	EW	0.058	0.759	0.002	0.181	EW	BL	NA
136	Clackamas, 2000	EW	0.046	0.757	0.003	0.195	EW	BL	NA
137	Clackamas, 2000	EW	0.043	0.790	0.003	0.164	EW	BL	NA
138	Clackamas, 2000	EW	0.048	0.759	0.003	0.191	EW	BL	NA
139	Clackamas, 2000	EW	0.064	0.736	0.003	0.198	EW	BL	NA
140	Clackamas, 2000	EW	0.037	0.745	0.002	0.216	WWxEW	BL	NA
141	Clackamas, 2000	EW	0.045	0.761	0.004	0.190	EW	BL	NA
142	Clackamas, 2000	EW	0.051	0.782	0.003	0.164	EW	BL	NA
143	Clackamas, 2000	EW	0.082	0.767	0.003	0.149	EW	BL	NA
144	Clackamas, 2000	EW	0.060	0.804	0.002	0.133	EW	BL	NA
145	Clackamas, 2000	EW	0.073	0.713	0.002	0.211	WWxEW	BL	NA
146	Clackamas, 2000	EW	0.039	0.770	0.003	0.188	EW	BL	NA

147	Clackamas, 2000	EW	0.062	0.762	0.003	0.173	EW	BL	NA
148	Clackamas, 2000	EW	0.054	0.648	0.003	0.295	WWxEW	BL	NA
149	Clackamas, 2000	EW	0.047	0.779	0.003	0.171	EW	BL	NA
150	Clackamas, 2000	EW	0.036	0.820	0.004	0.139	EW	BL	NA
151	Clackamas, 2000	EW	0.049	0.808	0.004	0.139	EW	BL	NA
152	Clackamas, 2000	EW	0.046	0.811	0.003	0.141	EW	BL	NA
153	Clackamas, 2000	EW	0.060	0.743	0.006	0.192	EW	BL	NA
154	Clackamas, 2000	EW	0.038	0.778	0.003	0.181	EW	BL	NA
155	Clackamas, 2000	EW	0.066	0.767	0.004	0.163	EW	BL	NA
156	Clackamas, 2000	EW	0.080	0.714	0.003	0.204	WWxEW	BL	NA
157	Clackamas, 2000	EW	0.038	0.797	0.003	0.162	EW	BL	NA
158	Clackamas, 2000	EW	0.042	0.825	0.004	0.129	EW	BL	NA
159	Clackamas, 2000	EW	0.046	0.760	0.002	0.191	EW	BL	NA
160	Clackamas, 2000	EW	0.044	0.805	0.003	0.148	EW	BL	NA
161	Eagle Cr. Wild, 2000	EW	0.047	0.546	0.018	0.388	WWxEW	BL	NA
162	Eagle Cr. Wild, 2000	EW	0.123	0.642	0.013	0.221	WWxEW	BL	NA
163	Eagle Cr. Wild, 2000	EW	0.070	0.718	0.008	0.204	WWxEW	BL	NA
164	Eagle Cr. Wild, 2000	EW	0.106	0.525	0.008	0.361	WWxEW	BL	NA
165	Eagle Cr. Wild, 2000	EW	0.067	0.555	0.008	0.370	WWxEW	BL	NA
166	Eagle Cr. Wild, 2000	EW	0.054	0.784	0.027	0.135	EW	BL	NA
167	Eagle Cr. Wild, 2000	EW	0.083	0.481	0.007	0.429	WWxEW	BL	NA
168	Eagle Cr. Wild, 2000	EW	0.040	0.777	0.013	0.170	EW	BL	NA
169	Eagle Cr. Wild, 2000	EW	0.051	0.803	0.031	0.115	EW	BL	NA
170	Eagle Cr. Wild, 2000	EW	0.077	0.723	0.092	0.109	EW	BL	NA
171	Eagle Cr. Wild, 2000	EW	0.082	0.726	0.011	0.181	EW	BL	NA
172	Eagle Cr. Wild, 2000	EW	0.090	0.422	0.011	0.477	WWxEW	BL	NA
173	Eagle Cr. Wild, 2000	EW	0.090	0.623	0.014	0.273	WWxEW	BL	NA
174	Eagle Cr. Wild, 2000	EW	0.044	0.722	0.012	0.223	WWxEW	BL	NA
175	Eagle Cr. Wild, 2000	EW	0.050	0.695	0.009	0.246	WWxEW	BL	NA
176	Eagle Cr. Wild, 2000	EW	0.103	0.664	0.010	0.223	WWxEW	BL	NA
177	Eagle Cr. Wild, 2000	EW	0.065	0.754	0.019	0.162	EW	BL	NA
178	Eagle Cr. Wild, 2000	EW	0.058	0.732	0.017	0.192	EW	BL	NA
179	Eagle Cr. Wild, 2000	EW	0.055	0.696	0.007	0.242	WWxEW	BL	NA
180	Eagle Cr. Wild, 2000	EW	0.051	0.804	0.013	0.132	EW	BL	NA
181	Eagle Cr. Wild, 2000	EW	0.050	0.738	0.015	0.198	EW	BL	NA
182	Eagle Cr. Wild, 2000	EW	0.051	0.680	0.053	0.216	WWxEW	BL	NA
183	Eagle Cr. Wild, 2000	EW	0.047	0.659	0.022	0.271	WWxEW	BL	NA
184	Eagle Cr. Wild, 2000	EW	0.059	0.767	0.048	0.126	EW	BL	NA
185	Eagle Cr. Wild, 2000	EW	0.051	0.708	0.008	0.233	WWxEW	BL	NA
186	Eagle Cr. Wild, 2000	EW	0.050	0.762	0.009	0.179	EW	BL	NA

187	Eagle Cr. Wild, 2000	EW	0.107	0.524	0.009	0.360	WWxEW	BL	NA
188	Eagle Cr. Wild, 2000	EW	0.048	0.798	0.019	0.135	EW	BL	NA
189	Eagle Cr. Wild, 2000	EW	0.065	0.676	0.010	0.250	WWxEW	BL	NA
190	Eagle Cr. Wild, 2000	EW	0.078	0.525	0.014	0.383	WWxEW	BL	NA
191	Eagle Cr. Wild, 2000	EW	0.055	0.486	0.012	0.446	WWxEW	BL	NA
192	Eagle Cr. Wild, 2000	EW	0.063	0.713	0.012	0.212	WWxEW	BL	NA
193	Eagle Cr. Wild, 2000	EW	0.046	0.510	0.008	0.435	WWxEW	BL	NA
194	Eagle Cr. Wild, 2000	EW	0.105	0.636	0.012	0.247	WWxEW	BL	NA
195	Eagle Cr. Wild, 2000	EW	0.045	0.835	0.010	0.110	EW	BL	NA
196	Eagle Cr. Wild, 2000	EW	0.051	0.615	0.008	0.326	WWxEW	BL	NA
197	Eagle Cr. Wild, 2000	EW	0.062	0.696	0.012	0.230	WWxEW	BL	NA
198	Eagle Cr. Wild, 2000	EW	0.105	0.708	0.012	0.175	EW	BL	NA
199	Eagle Cr. Wild, 2000	EW	0.116	0.611	0.016	0.257	WWxEW	BL	NA
200	Eagle Cr. Wild, 2000	EW	0.059	0.819	0.013	0.110	EW	BL	NA
201	Eagle Cr. Wild, 2000	EW	0.051	0.795	0.009	0.145	EW	BL	NA
202	Eagle Cr. Wild, 2000	EW	0.072	0.809	0.017	0.101	EW	BL	NA
203	Eagle Cr. Wild, 2000	EW	0.055	0.603	0.011	0.330	WWxEW	BL	NA
204	Eagle Cr. Wild, 2000	EW	0.039	0.826	0.009	0.125	EW	BL	NA
205	Eagle Cr. Wild, 2000	EW	0.067	0.776	0.019	0.138	EW	BL	NA
206	Eagle Cr. Wild, 2000	EW	0.035	0.730	0.013	0.222	WWxEW	BL	NA
207	Eagle Cr. Wild, 2000	EW	0.097	0.689	0.019	0.194	EW	BL	NA
208	Eagle Cr. Wild, 2000	EW	0.083	0.746	0.012	0.159	EW	BL	NA
209	Eagle Cr. Wild, 2000	EW	0.042	0.741	0.007	0.209	WWxEW	BL	NA
210	Eagle Cr. Wild, 2000	EW	0.119	0.510	0.015	0.356	WWxEW	BL	NA
211	Eagle Cr. Wild, 2000	EW	0.061	0.574	0.006	0.358	WWxEW	BL	NA
212	Eagle Cr. Wild, 2000	EW	0.058	0.769	0.011	0.161	EW	BL	NA
213	Eagle Cr. Wild, 2000	EW	0.058	0.735	0.017	0.190	EW	BL	NA
214	Eagle Cr. Wild, 2000	EW	0.088	0.425	0.011	0.476	WWxEW	BL	NA
215	Eagle Cr. Wild, 2000	EW	0.045	0.805	0.010	0.140	EW	BL	NA
216	Eagle Cr. Wild, 2000	EW	0.089	0.748	0.014	0.150	EW	BL	NA
217	Eagle Cr. Wild, 2000	EW	0.133	0.582	0.015	0.270	WWxEW	BL	NA
218	Eagle Cr. Wild, 2000	EW	0.067	0.589	0.015	0.329	WWxEW	BL	NA
219	Eagle Cr. Wild, 2000	EW	0.032	0.727	0.007	0.234	WWxEW	BL	NA
220	Eagle Cr. Wild, 2000	EW	0.035	0.775	0.014	0.175	EW	BL	NA
221	Eagle Cr. Wild, 2000	EW	0.074	0.754	0.027	0.145	EW	BL	NA
222	Eagle Cr. Wild, 2000	EW	0.043	0.677	0.018	0.263	WWxEW	BL	NA
223	Eagle Cr. Wild, 2000	EW	0.058	0.735	0.010	0.197	EW	BL	NA
224	N. Santiam R., 1998	EW	0.013	0.944	0.040	0.003	EW	BL	NA
225	N. Santiam R., 1998	EW	0.009	0.976	0.013	0.003	EW	BL	NA
226	N. Santiam R., 1998	EW	0.004	0.970	0.024	0.002	EW	BL	NA

227	N. Santiam R., 1998	EW	0.014	0.970	0.010	0.006	EW	BL	NA
228	N. Santiam R., 1998	EW	0.004	0.967	0.028	0.002	EW	BL	NA
229	N. Santiam R., 1998	EW	0.005	0.970	0.022	0.003	EW	BL	NA
230	N. Santiam R., 1998	EW	0.006	0.977	0.014	0.003	EW	BL	NA
231	N. Santiam R., 1998	EW	0.006	0.966	0.026	0.002	EW	BL	NA
232	N. Santiam R., 1998	EW	0.006	0.980	0.012	0.003	EW	BL	NA
233	N. Santiam R., 1998	EW	0.005	0.971	0.022	0.002	EW	BL	NA
234	N. Santiam R., 1998	EW	0.009	0.969	0.020	0.002	EW	BL	NA
235	N. Santiam R., 1998	EW	0.007	0.970	0.020	0.003	EW	BL	NA
236	N. Santiam R., 1998	EW	0.006	0.960	0.032	0.002	EW	BL	NA
237	N. Santiam R., 1998	EW	0.004	0.953	0.041	0.002	EW	BL	NA
238	N. Santiam R., 1998	EW	0.010	0.885	0.090	0.014	EW	BL	NA
239	N. Santiam R., 1998	EW	0.005	0.976	0.017	0.002	EW	BL	NA
240	N. Santiam R., 1998	EW	0.005	0.984	0.010	0.002	EW	BL	NA
241	N. Santiam R., 1998	EW	0.007	0.973	0.018	0.003	EW	BL	NA
242	N. Santiam R., 1998	EW	0.007	0.977	0.015	0.002	EW	BL	NA
243	N. Santiam R., 1998	EW	0.017	0.929	0.053	0.001	EW	BL	NA
244	N. Santiam R., 1998	EW	0.003	0.981	0.014	0.001	EW	BL	NA
245	N. Santiam R., 1998	EW	0.006	0.973	0.020	0.002	EW	BL	NA
246	N. Santiam R., 1998	EW	0.003	0.982	0.014	0.002	EW	BL	NA
247	N. Santiam R., 1998	EW	0.003	0.978	0.017	0.002	EW	BL	NA
248	N. Santiam R., 1998	EW	0.005	0.953	0.041	0.002	EW	BL	NA
249	N. Santiam R., 1998	EW	0.003	0.912	0.083	0.001	EW	BL	NA
250	N. Santiam R., 1998	EW	0.110	0.835	0.051	0.003	EW	BL	NA
251	N. Santiam R., 1998	EW	0.004	0.965	0.030	0.002	EW	BL	NA
252	N. Santiam R., 1998	EW	0.010	0.975	0.011	0.004	EW	BL	NA
253	N. Santiam R., 1998	EW	0.008	0.967	0.023	0.001	EW	BL	NA
254	N. Santiam R., 1998	EW	0.006	0.972	0.020	0.002	EW	BL	NA
255	N. Santiam R., 1998	EW	0.005	0.953	0.039	0.002	EW	BL	NA
256	N. Santiam R., 1998	EW	0.005	0.977	0.012	0.006	EW	BL	NA
257	N. Santiam R., 1998	EW	0.003	0.975	0.019	0.003	EW	BL	NA
258	N. Santiam R., 1998	EW	0.004	0.974	0.021	0.002	EW	BL	NA
259	N. Santiam R., 1998	EW	0.003	0.984	0.011	0.002	EW	BL	NA
260	N. Santiam R., 1998	EW	0.007	0.952	0.039	0.003	EW	BL	NA
261	N. Santiam R., 1998	EW	0.004	0.971	0.024	0.001	EW	BL	NA
262	N. Santiam R., 1998	EW	0.004	0.981	0.014	0.002	EW	BL	NA
263	N. Santiam R., 1998	EW	0.005	0.983	0.011	0.002	EW	BL	NA
264	N. Santiam R., 1998	EW	0.007	0.959	0.031	0.003	EW	BL	NA
265	N. Santiam R., 1998	EW	0.008	0.967	0.021	0.004	EW	BL	NA
266	N. Santiam R., 1998	EW	0.004	0.984	0.010	0.002	EW	BL	NA

267	N. Santiam R., 1998	EW	0.004	0.976	0.019	0.002	EW	BL	NA
268	N. Santiam R., 1998	EW	0.003	0.972	0.023	0.002	EW	BL	NA
269	Molalla R., 1996	EW	0.030	0.888	0.002	0.081	EW	BL	NA
270	Molalla R., 1996	EW	0.089	0.865	0.012	0.035	EW	BL	NA
271	Molalla R., 1996	EW	0.021	0.928	0.002	0.049	EW	BL	NA
272	Molalla R., 1996	EW	0.655	0.301	0.003	0.041	SxEW	BL	NA
273	Molalla R., 1996	EW	0.026	0.717	0.001	0.256	WWxEW	BL	NA
274	Molalla R., 1996	EW	0.041	0.912	0.004	0.043	EW	BL	NA
275	Molalla R., 1996	EW	0.034	0.814	0.001	0.151	EW	BL	NA
276	Molalla R., 1996	EW	0.052	0.915	0.003	0.031	EW	BL	NA
277	Molalla R., 1996	EW	0.029	0.842	0.004	0.124	EW	BL	NA
278	Molalla R., 1996	EW	0.266	0.656	0.005	0.074	SxEW	BL	NA
279	Molalla R., 1996	EW	0.063	0.905	0.002	0.030	EW	BL	NA
280	Molalla R., 1996	EW	0.075	0.853	0.004	0.068	EW	BL	NA
281	Molalla R., 1996	EW	0.065	0.764	0.003	0.168	EW	BL	NA
282	Molalla R., 1996	EW	0.101	0.794	0.002	0.103	EW	BL	NA
283	Molalla R., 1996	EW	0.036	0.909	0.004	0.051	EW	BL	NA
284	Molalla R., 1996	EW	0.147	0.790	0.002	0.061	EW	BL	NA
285	Molalla R., 1996	EW	0.022	0.924	0.003	0.052	EW	BL	NA
286	Molalla R., 1996	EW	0.023	0.951	0.005	0.021	EW	BL	NA
287	Molalla R., 1996	EW	0.050	0.848	0.003	0.099	EW	BL	NA
288	Molalla R., 1996	EW	0.015	0.949	0.001	0.034	EW	BL	NA
289	Molalla R., 1996	EW	0.045	0.884	0.003	0.068	EW	BL	NA
290	Molalla R., 1996	EW	0.036	0.881	0.002	0.082	EW	BL	NA
291	Molalla R., 1996	EW	0.032	0.929	0.002	0.037	EW	BL	NA
292	Molalla R., 1996	EW	0.049	0.891	0.002	0.058	EW	BL	NA
293	Molalla R., 1996	EW	0.031	0.931	0.002	0.036	EW	BL	NA
294	Molalla R., 1996	EW	0.019	0.942	0.004	0.035	EW	BL	NA
295	Molalla R., 1996	EW	0.019	0.913	0.002	0.067	EW	BL	NA
296	Molalla R., 1996	EW	0.049	0.927	0.001	0.024	EW	BL	NA
297	Molalla R., 1996	EW	0.028	0.940	0.002	0.030	EW	BL	NA
298	Molalla R., 1996	EW	0.069	0.881	0.003	0.047	EW	BL	NA
299	Molalla R., 1996	EW	0.165	0.770	0.013	0.052	EW	BL	NA
300	Molalla R., 1996	EW	0.038	0.895	0.003	0.063	EW	BL	NA
301	Molalla R., 1996	EW	0.236	0.681	0.003	0.080	SxEW	BL	NA
302	Molalla R., 1996	EW	0.037	0.844	0.002	0.117	EW	BL	NA
303	Molalla R., 1996	EW	0.020	0.452	0.003	0.525	WWxEW	BL	NA
304	Molalla R., 1996	EW	0.050	0.911	0.003	0.036	EW	BL	NA
305	Molalla R., 1996	EW	0.016	0.954	0.007	0.023	EW	BL	NA
306	Molalla R., 1996	EW	0.025	0.927	0.002	0.047	EW	BL	NA

307	Molalla R., 1996	EW	0.020	0.905	0.003	0.072	EW	BL	NA
308	Molalla R., 1996	EW	0.019	0.923	0.002	0.056	EW	BL	NA
309	Molalla R., 1996	EW	0.573	0.387	0.004	0.036	SxEW	BL	NA
310	Molalla R., 1996	EW	0.043	0.717	0.003	0.237	WWxEW	BL	NA
311	Molalla R., 1996	EW	0.036	0.858	0.002	0.104	EW	BL	NA
312	Molalla R., 1996	EW	0.022	0.610	0.006	0.362	WWxEW	BL	NA
313	Molalla R., 1996	EW	0.064	0.839	0.011	0.086	EW	BL	NA
314	Molalla R., 1996	EW	0.064	0.721	0.001	0.214	WWxEW	BL	NA
315	Molalla R., 1996	EW	0.034	0.768	0.002	0.195	EW	BL	NA
316	Molalla R., 1996	EW	0.015	0.945	0.003	0.038	EW	BL	NA
317	Molalla R., 1996	EW	0.122	0.793	0.003	0.083	EW	BL	NA
318	Molalla R., 1996	EW	0.029	0.921	0.003	0.047	EW	BL	NA
319	N. Santiam R., Bennett Dam, 2005	EW	0.031	0.759	0.197	0.013	EW	BL	NA
320	N. Santiam R., Bennett Dam, 2005	EW	0.065	0.858	0.063	0.014	EW	BL	NA
321	N. Santiam R., Bennett Dam, 2005	EW	0.042	0.904	0.033	0.021	EW	BL	NA
322	N. Santiam R., Bennett Dam, 2005	EW	0.111	0.820	0.035	0.034	EW	BL	NA
323	N. Santiam R., Bennett Dam, 2005	EW	0.266	0.692	0.030	0.012	SxEW	BL	NA
324	N. Santiam R., Bennett Dam, 2005	EW	0.109	0.822	0.043	0.026	EW	BL	NA
325	N. Santiam R., Bennett Dam, 2005	EW	0.029	0.916	0.032	0.024	EW	BL	NA
326	N. Santiam R., Bennett Dam, 2005	EW	0.098	0.768	0.111	0.023	EW	BL	NA
327	N. Santiam R., Bennett Dam, 2005	EW	0.076	0.680	0.029	0.214	WWxEW	BL	NA
328	N. Santiam R., Bennett Dam, 2005	EW	0.058	0.867	0.037	0.038	EW	BL	NA
329	N. Santiam R., Bennett Dam, 2005	EW	0.032	0.789	0.039	0.140	EW	BL	NA
330	N. Santiam R., Bennett Dam, 2005	EW	0.035	0.906	0.037	0.023	EW	BL	NA
331	N. Santiam R., Bennett Dam, 2005	EW	0.035	0.896	0.035	0.034	EW	BL	NA
332	N. Santiam R., Bennett Dam, 2005	EW	0.039	0.915	0.026	0.020	EW	BL	NA
333	N. Santiam R., Bennett Dam, 2005	EW	0.025	0.927	0.031	0.017	EW	BL	NA
334	N. Santiam R., Bennett Dam, 2005	EW	0.038	0.913	0.034	0.015	EW	BL	NA
335	N. Santiam R., Bennett Dam, 2005	EW	0.035	0.883	0.058	0.024	EW	BL	NA
336	N. Santiam R., Bennett Dam, 2005	EW	0.085	0.834	0.055	0.025	EW	BL	NA
337	N. Santiam R., Bennett Dam, 2005	EW	0.063	0.863	0.059	0.015	EW	BL	NA
338	N. Santiam R., Bennett Dam, 2005	EW	0.047	0.869	0.063	0.021	EW	BL	NA
339	N. Santiam R., Bennett Dam, 2005	EW	0.053	0.875	0.060	0.011	EW	BL	NA
340	N. Santiam R., Bennett Dam, 2005	EW	0.046	0.904	0.029	0.020	EW	BL	NA
341	N. Santiam R., Bennett Dam, 2005	EW	0.206	0.748	0.031	0.015	SxEW	BL	NA
342	N. Santiam R., Bennett Dam, 2005	EW	0.043	0.905	0.031	0.021	EW	BL	NA
343	N. Santiam R., Bennett Dam, 2005	EW	0.027	0.926	0.037	0.010	EW	BL	NA
344	N. Santiam R., Bennett Dam, 2005	EW	0.025	0.932	0.030	0.013	EW	BL	NA
345	N. Santiam R., Bennett Dam, 2005	EW	0.059	0.877	0.047	0.017	EW	BL	NA
346	N. Santiam R., Bennett Dam, 2005	EW	0.064	0.891	0.028	0.018	EW	BL	NA

347	N. Santiam R., Bennett Dam, 2005	EW	0.058	0.874	0.031	0.037	EW	BL	NA
348	N. Santiam R., Bennett Dam, 2005	EW	0.081	0.836	0.048	0.035	EW	BL	NA
349	N. Santiam R., Bennett Dam, 2005	EW	0.149	0.713	0.110	0.028	EW	BL	NA
350	N. Santiam R., Bennett Dam, 2005	EW	0.032	0.822	0.135	0.011	EW	BL	NA
351	N. Santiam R., Bennett Dam, 2005	EW	0.059	0.829	0.061	0.051	EW	BL	NA
352	N. Santiam R., Bennett Dam, 2005	EW	0.030	0.869	0.080	0.020	EW	BL	NA
353	N. Santiam R., Bennett Dam, 2005	EW	0.033	0.909	0.031	0.027	EW	BL	NA
354	N. Santiam R., Bennett Dam, 2005	EW	0.037	0.858	0.076	0.028	EW	BL	NA
355	N. Santiam R., Bennett Dam, 2005	EW	0.038	0.917	0.031	0.014	EW	BL	NA
356	N. Santiam R., Bennett Dam, 2005	EW	0.051	0.872	0.062	0.016	EW	BL	NA
357	N. Santiam R., Bennett Dam, 2005	EW	0.040	0.919	0.021	0.021	EW	BL	NA
358	N. Santiam R., Bennett Dam, 2005	EW	0.030	0.902	0.058	0.011	EW	BL	NA
359	N. Santiam R., Bennett Dam, 2005	EW	0.029	0.921	0.039	0.010	EW	BL	NA
360	N. Santiam R., Bennett Dam, 2005	EW	0.033	0.899	0.047	0.020	EW	BL	NA
361	N. Santiam R., Bennett Dam, 2005	EW	0.083	0.845	0.048	0.024	EW	BL	NA
362	N. Santiam R., Bennett Dam, 2005	EW	0.033	0.897	0.055	0.015	EW	BL	NA
363	N. Santiam R., Bennett Dam, 2005	EW	0.018	0.935	0.036	0.011	EW	BL	NA
364	S. Santiam, Foster, 2005	EW	0.019	0.940	0.004	0.037	EW	BL	NA
365	S. Santiam, Foster, 2005	EW	0.020	0.906	0.006	0.068	EW	BL	NA
366	S. Santiam, Foster, 2005	EW	0.009	0.967	0.006	0.018	EW	BL	NA
367	S. Santiam, Foster, 2005	EW	0.015	0.946	0.002	0.036	EW	BL	NA
368	S. Santiam, Foster, 2005	EW	0.009	0.968	0.003	0.020	EW	BL	NA
369	S. Santiam, Foster, 2005	EW	0.052	0.775	0.005	0.168	EW	BL	NA
370	S. Santiam, Foster, 2005	EW	0.021	0.943	0.004	0.033	EW	BL	NA
371	S. Santiam, Foster, 2005	EW	0.013	0.936	0.003	0.047	EW	BL	NA
372	S. Santiam, Foster, 2005	EW	0.078	0.884	0.005	0.033	EW	BL	NA
373	S. Santiam, Foster, 2005	EW	0.022	0.944	0.002	0.032	EW	BL	NA
374	S. Santiam, Foster, 2005	EW	0.017	0.954	0.003	0.026	EW	BL	NA
375	S. Santiam, Foster, 2005	EW	0.030	0.894	0.002	0.074	EW	BL	NA
376	S. Santiam, Foster, 2005	EW	0.020	0.942	0.004	0.035	EW	BL	NA
377	S. Santiam, Foster, 2005	EW	0.009	0.963	0.004	0.024	EW	BL	NA
378	S. Santiam, Foster, 2005	EW	0.052	0.892	0.004	0.052	EW	BL	NA
379	S. Santiam, Foster, 2005	EW	0.015	0.940	0.003	0.042	EW	BL	NA
380	S. Santiam, Foster, 2005	EW	0.020	0.856	0.005	0.119	EW	BL	NA
381	S. Santiam, Foster, 2005	EW	0.016	0.929	0.006	0.049	EW	BL	NA
382	S. Santiam, Foster, 2005	EW	0.039	0.820	0.008	0.133	EW	BL	NA
383	S. Santiam, Foster, 2005	EW	0.013	0.958	0.005	0.024	EW	BL	NA
384	S. Santiam, Foster, 2005	EW	0.022	0.895	0.004	0.079	EW	BL	NA
385	S. Santiam, Foster, 2005	EW	0.023	0.744	0.011	0.222	WWxEW	BL	NA
386	S. Santiam, Foster, 2005	EW	0.311	0.536	0.015	0.138	SxEW	BL	NA

387	S. Santiam, Foster, 2005	EW	0.018	0.805	0.008	0.169	EW	BL	NA
388	S. Santiam, Foster, 2005	EW	0.056	0.840	0.007	0.097	EW	BL	NA
389	S. Santiam, Foster, 2005	EW	0.019	0.908	0.003	0.069	EW	BL	NA
390	S. Santiam, Foster, 2005	EW	0.018	0.819	0.004	0.159	EW	BL	NA
391	S. Santiam, Foster, 2005	EW	0.020	0.933	0.004	0.042	EW	BL	NA
392	S. Santiam, Foster, 2005	EW	0.008	0.966	0.003	0.022	EW	BL	NA
393	S. Santiam, Foster, 2005	EW	0.030	0.877	0.003	0.090	EW	BL	NA
394	S. Santiam, Foster, 2005	EW	0.062	0.841	0.003	0.095	EW	BL	NA
395	S. Santiam, Foster, 2005	EW	0.013	0.924	0.002	0.061	EW	BL	NA
396	S. Santiam, Foster, 2005	EW	0.015	0.950	0.003	0.032	EW	BL	NA
397	S. Santiam, Foster, 2005	EW	0.023	0.924	0.013	0.040	EW	BL	NA
398	S. Santiam, Foster, 2005	EW	0.012	0.886	0.004	0.099	EW	BL	NA
399	S. Santiam, Foster, 2005	EW	0.022	0.939	0.004	0.035	EW	BL	NA
400	S. Santiam, Foster, 2005	EW	0.032	0.928	0.005	0.035	EW	BL	NA
401	S. Santiam, Foster, 2005	EW	0.016	0.936	0.004	0.044	EW	BL	NA
402	S. Santiam, Foster, 2005	EW	0.018	0.902	0.003	0.078	EW	BL	NA
403	S. Santiam, Foster, 2005	EW	0.009	0.956	0.003	0.032	EW	BL	NA
404	S. Santiam, Foster, 2005	EW	0.038	0.929	0.002	0.031	EW	BL	NA
405	S. Santiam, Foster, 2005	EW	0.017	0.949	0.004	0.030	EW	BL	NA
406	S. Santiam, Foster, 2005	EW	0.020	0.944	0.008	0.028	EW	BL	NA
407	S. Santiam, Foster, 2005	EW	0.021	0.945	0.004	0.030	EW	BL	NA
408	S. Santiam, Foster, 2005	EW	0.017	0.930	0.005	0.048	EW	BL	NA
409	S. Santiam, Foster, 2005	EW	0.032	0.831	0.004	0.133	EW	BL	NA
410	S. Santiam, Foster, 2005	EW	0.018	0.862	0.004	0.116	EW	BL	NA
411	S. Santiam, Foster, 2005	EW	0.053	0.907	0.004	0.037	EW	BL	NA
412	S. Santiam, Foster, 2005	EW	0.564	0.385	0.003	0.047	SxEW	BL	NA
413	S. Santiam, Wiley Cr., 1997	EW	0.087	0.840	0.003	0.070	EW	BL	NA
414	S. Santiam, Wiley Cr., 1997	EW	0.070	0.838	0.004	0.089	EW	BL	NA
415	S. Santiam, Wiley Cr., 1997	EW	0.059	0.858	0.006	0.076	EW	BL	NA
416	S. Santiam, Wiley Cr., 1997	EW	0.108	0.767	0.005	0.120	EW	BL	NA
417	S. Santiam, Wiley Cr., 1997	EW	0.097	0.782	0.005	0.116	EW	BL	NA
418	S. Santiam, Wiley Cr., 1997	EW	0.149	0.770	0.012	0.069	EW	BL	NA
419	S. Santiam, Wiley Cr., 1997	EW	0.089	0.854	0.004	0.052	EW	BL	NA
420	S. Santiam, Wiley Cr., 1997	EW	0.152	0.770	0.007	0.072	EW	BL	NA
421	S. Santiam, Wiley Cr., 1997	EW	0.089	0.827	0.004	0.080	EW	BL	NA
422	S. Santiam, Wiley Cr., 1997	EW	0.097	0.775	0.005	0.123	EW	BL	NA
423	S. Santiam, Wiley Cr., 1997	EW	0.151	0.779	0.005	0.065	EW	BL	NA
424	S. Santiam, Wiley Cr., 1997	EW	0.069	0.858	0.005	0.067	EW	BL	NA
425	S. Santiam, Wiley Cr., 1997	EW	0.090	0.851	0.004	0.055	EW	BL	NA
426	S. Santiam, Wiley Cr., 1997	EW	0.082	0.819	0.005	0.094	EW	BL	NA

427	S. Santiam, Wiley Cr., 1997	EW	0.063	0.880	0.006	0.051	EW	BL	NA
428	S. Santiam, Wiley Cr., 1997	EW	0.109	0.800	0.007	0.083	EW	BL	NA
429	S. Santiam, Wiley Cr., 1997	EW	0.225	0.652	0.004	0.119	SxEW	BL	NA
430	S. Santiam, Wiley Cr., 1997	EW	0.063	0.867	0.005	0.064	EW	BL	NA
431	S. Santiam, Wiley Cr., 1997	EW	0.121	0.813	0.004	0.063	EW	BL	NA
432	S. Santiam, Wiley Cr., 1997	EW	0.079	0.853	0.017	0.051	EW	BL	NA
433	S. Santiam, Wiley Cr., 1997	EW	0.110	0.787	0.005	0.098	EW	BL	NA
434	S. Santiam, Wiley Cr., 1997	EW	0.094	0.854	0.004	0.048	EW	BL	NA
435	S. Santiam, Wiley Cr., 1997	EW	0.099	0.761	0.009	0.130	EW	BL	NA
436	S. Santiam, Wiley Cr., 1997	EW	0.087	0.856	0.005	0.052	EW	BL	NA
437	S. Santiam, Wiley Cr., 1997	EW	0.100	0.834	0.003	0.063	EW	BL	NA
438	S. Santiam, Wiley Cr., 1997	EW	0.155	0.782	0.003	0.059	EW	BL	NA
439	S. Santiam, Wiley Cr., 1997	EW	0.149	0.795	0.003	0.052	EW	BL	NA
440	S. Santiam, Wiley Cr., 1997	EW	0.168	0.778	0.004	0.050	EW	BL	NA
441	S. Santiam, Wiley Cr., 1997	EW	0.075	0.853	0.005	0.068	EW	BL	NA
442	S. Santiam, Wiley Cr., 1997	EW	0.129	0.802	0.005	0.065	EW	BL	NA
443	S. Santiam, Wiley Cr., 1997	EW	0.110	0.775	0.005	0.110	EW	BL	NA
444	S. Santiam, Wiley Cr., 1997	EW	0.077	0.814	0.005	0.104	EW	BL	NA
445	S. Santiam, Wiley Cr., 1997	EW	0.125	0.796	0.007	0.073	EW	BL	NA
446	S. Santiam, Wiley Cr., 1997	EW	0.160	0.759	0.008	0.073	EW	BL	NA
447	S. Santiam, Wiley Cr., 1997	EW	0.077	0.839	0.008	0.076	EW	BL	NA
448	S. Santiam, Wiley Cr., 1997	EW	0.093	0.737	0.006	0.165	EW	BL	NA
449	S. Santiam, Wiley Cr., 1997	EW	0.074	0.761	0.009	0.155	EW	BL	NA
450	S. Santiam, Wiley Cr., 1997	EW	0.200	0.668	0.005	0.127	SxEW	BL	NA
451	S. Santiam, Wiley Cr., 1997	EW	0.068	0.774	0.006	0.151	EW	BL	NA
452	Deer Cr., 1998	RB	0.002	0.001	0.997	0.000	RB	BL	NA
453	Deer Cr., 1998	RB	0.004	0.001	0.995	0.000	RB	BL	NA
454	Deer Cr., 1998	RB	0.011	0.003	0.986	0.000	RB	BL	NA
455	Deer Cr., 1998	RB	0.002	0.002	0.996	0.000	RB	BL	NA
456	Deer Cr., 1998	RB	0.003	0.001	0.996	0.000	RB	BL	NA
457	Deer Cr., 1998	RB	0.004	0.002	0.994	0.000	RB	BL	NA
458	Deer Cr., 1998	RB	0.003	0.001	0.996	0.000	RB	BL	NA
459	Deer Cr., 1998	RB	0.003	0.001	0.996	0.000	RB	BL	NA
460	Deer Cr., 1998	RB	0.063	0.003	0.933	0.001	RB	BL	NA
461	Deer Cr., 1998	RB	0.002	0.001	0.997	0.000	RB	BL	NA
462	Deer Cr., 1998	RB	0.003	0.002	0.995	0.000	RB	BL	NA
463	Deer Cr., 1998	RB	0.003	0.001	0.996	0.000	RB	BL	NA
464	Deer Cr., 1998	RB	0.003	0.001	0.996	0.000	RB	BL	NA
465	Deer Cr., 1998	RB	0.004	0.001	0.995	0.000	RB	BL	NA
466	Deer Cr., 1998	RB	0.015	0.005	0.979	0.001	RB	BL	NA

467	Deer Cr., 1998	RB	0.002	0.001	0.997	0.000	RB	BL	NA
468	Deer Cr., 1998	RB	0.003	0.003	0.994	0.000	RB	BL	NA
469	Deer Cr., 1998	RB	0.032	0.008	0.956	0.005	RB	BL	NA
470	Deer Cr., 1998	RB	0.002	0.003	0.994	0.000	RB	BL	NA
471	Deer Cr., 1998	RB	0.004	0.002	0.994	0.000	RB	BL	NA
472	Deer Cr., 1998	RB	0.003	0.001	0.996	0.000	RB	BL	NA
473	Deer Cr., 1998	RB	0.004	0.002	0.994	0.000	RB	BL	NA
474	Deer Cr., 1998	RB	0.002	0.001	0.996	0.000	RB	BL	NA
475	Deer Cr., 1998	RB	0.003	0.001	0.996	0.000	RB	BL	NA
476	Deer Cr., 1998	RB	0.003	0.001	0.996	0.000	RB	BL	NA
477	Deer Cr., 1998	RB	0.003	0.001	0.996	0.000	RB	BL	NA
478	Deer Cr., 1998	RB	0.002	0.001	0.997	0.000	RB	BL	NA
479	Deer Cr., 1998	RB	0.003	0.001	0.996	0.000	RB	BL	NA
480	Deer Cr., 1998	RB	0.007	0.003	0.990	0.000	RB	BL	NA
481	Deer Cr., 1998	RB	0.002	0.001	0.996	0.000	RB	BL	NA
482	Deer Cr., 1998	RB	0.002	0.001	0.996	0.000	RB	BL	NA
483	Deer Cr., 1998	RB	0.011	0.005	0.984	0.001	RB	BL	NA
484	Deer Cr., 1998	RB	0.008	0.003	0.989	0.000	RB	BL	NA
485	Deer Cr., 1998	RB	0.012	0.004	0.984	0.001	RB	BL	NA
486	Deer Cr., 1998	RB	0.003	0.001	0.996	0.000	RB	BL	NA
487	Deer Cr., 1998	RB	0.003	0.001	0.996	0.000	RB	BL	NA
488	Deer Cr., 1998	RB	0.004	0.002	0.994	0.000	RB	BL	NA
489	Deer Cr., 1998	RB	0.003	0.001	0.995	0.000	RB	BL	NA
490	Deer Cr., 1998	RB	0.003	0.002	0.996	0.000	RB	BL	NA
491	Deer Cr., 1998	RB	0.011	0.004	0.984	0.000	RB	BL	NA
492	North Fork of MF Willamette, 1998	RB	0.002	0.004	0.990	0.005	RB	BL	NA
493	North Fork of MF Willamette, 1998	RB	0.001	0.004	0.991	0.004	RB	BL	NA
494	North Fork of MF Willamette, 1998	RB	0.001	0.002	0.993	0.004	RB	BL	NA
495	North Fork of MF Willamette, 1998	RB	0.012	0.014	0.945	0.029	RB	BL	NA
496	North Fork of MF Willamette, 1998	RB	0.002	0.004	0.991	0.004	RB	BL	NA
497	North Fork of MF Willamette, 1998	RB	0.001	0.004	0.992	0.004	RB	BL	NA
498	North Fork of MF Willamette, 1998	RB	0.003	0.011	0.977	0.009	RB	BL	NA
499	North Fork of MF Willamette, 1998	RB	0.001	0.006	0.987	0.005	RB	BL	NA
500	North Fork of MF Willamette, 1998	RB	0.001	0.003	0.993	0.003	RB	BL	NA
501	North Fork of MF Willamette, 1998	RB	0.001	0.004	0.992	0.004	RB	BL	NA
502	North Fork of MF Willamette, 1998	RB	0.007	0.017	0.864	0.112	RB	BL	NA
503	North Fork of MF Willamette, 1998	RB	0.001	0.003	0.992	0.004	RB	BL	NA
504	North Fork of MF Willamette, 1998	RB	0.002	0.002	0.992	0.004	RB	BL	NA
505	North Fork of MF Willamette, 1998	RB	0.001	0.003	0.992	0.004	RB	BL	NA
506	North Fork of MF Willamette, 1998	RB	0.002	0.003	0.989	0.006	RB	BL	NA

507	North Fork of MF Willamette, 1998	RB	0.001	0.003	0.993	0.003	RB	BL	NA
508	North Fork of MF Willamette, 1998	RB	0.003	0.005	0.970	0.022	RB	BL	NA
509	North Fork of MF Willamette, 1998	RB	0.001	0.003	0.992	0.004	RB	BL	NA
510	North Fork of MF Willamette, 1998	RB	0.002	0.006	0.987	0.006	RB	BL	NA
511	North Fork of MF Willamette, 1998	RB	0.001	0.004	0.991	0.004	RB	BL	NA
512	North Fork of MF Willamette, 1998	RB	0.001	0.004	0.991	0.004	RB	BL	NA
513	North Fork of MF Willamette, 1998	RB	0.002	0.008	0.981	0.009	RB	BL	NA
514	North Fork of MF Willamette, 1998	RB	0.001	0.006	0.989	0.004	RB	BL	NA
515	North Fork of MF Willamette, 1998	RB	0.002	0.006	0.987	0.005	RB	BL	NA
516	North Fork of MF Willamette, 1998	RB	0.001	0.004	0.991	0.004	RB	BL	NA
517	North Fork of MF Willamette, 1998	RB	0.001	0.003	0.992	0.004	RB	BL	NA
518	North Fork of MF Willamette, 1998	RB	0.002	0.004	0.990	0.004	RB	BL	NA
519	North Fork of MF Willamette, 1998	RB	0.002	0.006	0.989	0.004	RB	BL	NA
520	North Fork of MF Willamette, 1998	RB	0.002	0.006	0.987	0.005	RB	BL	NA
521	North Fork of MF Willamette, 1998	RB	0.001	0.003	0.993	0.003	RB	BL	NA
522	North Fork of MF Willamette, 1998	RB	0.002	0.008	0.976	0.015	RB	BL	NA
523	Clackamas H., 2006	S	0.988	0.004	0.004	0.003	S	BL	NA
524	Clackamas H., 2006	S	0.962	0.007	0.017	0.015	S	BL	NA
525	Clackamas H., 2006	S	0.980	0.005	0.011	0.004	S	BL	NA
526	Clackamas H., 2006	S	0.969	0.006	0.023	0.002	S	BL	NA
527	Clackamas H., 2006	S	0.989	0.004	0.005	0.002	S	BL	NA
528	Clackamas H., 2006	S	0.991	0.003	0.004	0.003	S	BL	NA
529	Clackamas H., 2006	S	0.983	0.005	0.008	0.003	S	BL	NA
530	Clackamas H., 2006	S	0.967	0.006	0.025	0.002	S	BL	NA
531	Clackamas H., 2006	S	0.983	0.005	0.008	0.004	S	BL	NA
532	Clackamas H., 2006	S	0.986	0.005	0.007	0.003	S	BL	NA
533	Clackamas H., 2006	S	0.988	0.004	0.004	0.004	S	BL	NA
534	Clackamas H., 2006	S	0.968	0.007	0.023	0.002	S	BL	NA
535	Clackamas H., 2006	S	0.982	0.005	0.006	0.007	S	BL	NA
536	Clackamas H., 2006	S	0.975	0.007	0.009	0.009	S	BL	NA
537	Clackamas H., 2006	S	0.965	0.016	0.012	0.006	S	BL	NA
538	Clackamas H., 2006	S	0.981	0.005	0.005	0.010	S	BL	NA
539	Clackamas H., 2006	S	0.984	0.004	0.010	0.003	S	BL	NA
540	Clackamas H., 2006	S	0.974	0.008	0.005	0.013	S	BL	NA
541	Clackamas H., 2006	S	0.986	0.003	0.006	0.005	S	BL	NA
542	Clackamas H., 2006	S	0.974	0.006	0.014	0.006	S	BL	NA
543	Clackamas H., 2006	S	0.981	0.004	0.009	0.007	S	BL	NA
544	Clackamas H., 2006	S	0.988	0.004	0.005	0.003	S	BL	NA
545	Clackamas H., 2006	S	0.977	0.005	0.008	0.010	S	BL	NA
546	Clackamas H., 2006	S	0.990	0.003	0.005	0.002	S	BL	NA

547	Clackamas H., 2006	S	0.932	0.049	0.010	0.010	S	BL	NA
548	Clackamas H., 2006	S	0.969	0.009	0.020	0.003	S	BL	NA
549	Clackamas H., 2006	S	0.978	0.007	0.011	0.004	S	BL	NA
550	Clackamas H., 2006	S	0.972	0.015	0.009	0.004	S	BL	NA
551	Clackamas H., 2006	S	0.986	0.004	0.008	0.002	S	BL	NA
552	Clackamas H., 2006	S	0.988	0.003	0.005	0.004	S	BL	NA
553	Clackamas H., 2006	S	0.984	0.005	0.007	0.004	S	BL	NA
554	Clackamas H., 2006	S	0.978	0.005	0.013	0.003	S	BL	NA
555	Clackamas H., 2006	S	0.991	0.003	0.003	0.003	S	BL	NA
556	Clackamas H., 2006	S	0.984	0.006	0.008	0.003	S	BL	NA
557	Clackamas H., 2006	S	0.987	0.004	0.005	0.004	S	BL	NA
558	Clackamas H., 2006	S	0.988	0.004	0.006	0.002	S	BL	NA
559	Clackamas H., 2006	S	0.982	0.005	0.009	0.003	S	BL	NA
560	Clackamas H., 2006	S	0.978	0.007	0.011	0.004	S	BL	NA
561	Clackamas H., 2006	S	0.971	0.009	0.015	0.004	S	BL	NA
562	Clackamas H., 2006	S	0.990	0.002	0.005	0.002	S	BL	NA
563	Clackamas H., 2006	S	0.973	0.008	0.016	0.003	S	BL	NA
564	Clackamas H., 2006	S	0.986	0.005	0.005	0.005	S	BL	NA
565	Clackamas H., 2006	S	0.989	0.003	0.006	0.003	S	BL	NA
566	Clackamas H., 2006	S	0.988	0.004	0.006	0.002	S	BL	NA
567	Clackamas H., 2006	S	0.992	0.003	0.003	0.002	S	BL	NA
568	Clackamas H., 2006	S	0.983	0.006	0.007	0.004	S	BL	NA
569	Clackamas H., 2006	S	0.984	0.006	0.007	0.003	S	BL	NA
570	Clackamas H., 2006	S	0.991	0.002	0.004	0.003	S	BL	NA
571	Clackamas H., 2006	S	0.984	0.005	0.008	0.002	S	BL	NA
572	Clackamas H., 2006	S	0.977	0.008	0.012	0.003	S	BL	NA
573	Clackamas H., 2006	S	0.978	0.007	0.010	0.004	S	BL	NA
574	S. Santiam H., 2007	S	0.936	0.019	0.040	0.005	S	BL	NA
575	S. Santiam H., 2007	S	0.980	0.009	0.007	0.004	S	BL	NA
576	S. Santiam H., 2007	S	0.986	0.005	0.005	0.004	S	BL	NA
577	S. Santiam H., 2007	S	0.990	0.002	0.003	0.005	S	BL	NA
578	S. Santiam H., 2007	S	0.985	0.004	0.003	0.009	S	BL	NA
579	S. Santiam H., 2007	S	0.976	0.013	0.009	0.003	S	BL	NA
580	S. Santiam H., 2007	S	0.970	0.009	0.003	0.018	S	BL	NA
581	S. Santiam H., 2007	S	0.985	0.005	0.007	0.003	S	BL	NA
582	S. Santiam H., 2007	S	0.978	0.010	0.007	0.006	S	BL	NA
583	S. Santiam H., 2007	S	0.988	0.003	0.006	0.003	S	BL	NA
584	S. Santiam H., 2007	S	0.989	0.003	0.005	0.003	S	BL	NA
585	S. Santiam H., 2007	S	0.980	0.004	0.012	0.004	S	BL	NA
586	S. Santiam H., 2007	S	0.989	0.006	0.003	0.002	S	BL	NA

587	S. Santiam H., 2007	S	0.969	0.013	0.014	0.004	S	BL	NA
588	S. Santiam H., 2007	S	0.983	0.003	0.011	0.003	S	BL	NA
589	S. Santiam H., 2007	S	0.989	0.004	0.005	0.002	S	BL	NA
590	S. Santiam H., 2007	S	0.989	0.004	0.004	0.002	S	BL	NA
591	S. Santiam H., 2007	S	0.983	0.006	0.003	0.008	S	BL	NA
592	S. Santiam H., 2007	S	0.992	0.003	0.003	0.002	S	BL	NA
593	S. Santiam H., 2007	S	0.969	0.012	0.017	0.002	S	BL	NA
594	S. Santiam H., 2007	S	0.986	0.003	0.008	0.002	S	BL	NA
595	S. Santiam H., 2007	S	0.977	0.009	0.011	0.003	S	BL	NA
596	S. Santiam H., 2007	S	0.988	0.004	0.004	0.003	S	BL	NA
597	S. Santiam H., 2007	S	0.987	0.006	0.005	0.002	S	BL	NA
598	S. Santiam H., 2007	S	0.985	0.004	0.008	0.003	S	BL	NA
599	S. Santiam H., 2007	S	0.974	0.010	0.011	0.004	S	BL	NA
600	S. Santiam H., 2007	S	0.991	0.004	0.003	0.003	S	BL	NA
601	S. Santiam H., 2007	S	0.923	0.011	0.057	0.009	S	BL	NA
602	S. Santiam H., 2007	S	0.988	0.003	0.007	0.002	S	BL	NA
603	S. Santiam H., 2007	S	0.979	0.004	0.013	0.004	S	BL	NA
604	S. Santiam H., 2007	S	0.989	0.004	0.005	0.002	S	BL	NA
605	S. Santiam H., 2007	S	0.992	0.002	0.003	0.002	S	BL	NA
606	S. Santiam H., 2007	S	0.986	0.005	0.005	0.004	S	BL	NA
607	S. Santiam H., 2007	S	0.990	0.002	0.005	0.003	S	BL	NA
608	S. Santiam H., 2007	S	0.992	0.003	0.002	0.002	S	BL	NA
609	S. Santiam H., 2007	S	0.991	0.003	0.003	0.002	S	BL	NA
610	S. Santiam H., 2007	S	0.970	0.019	0.007	0.005	S	BL	NA
611	S. Santiam H., 2007	S	0.984	0.004	0.009	0.003	S	BL	NA
612	S. Santiam H., 2007	S	0.991	0.002	0.003	0.004	S	BL	NA
613	S. Santiam H., 2007	S	0.987	0.004	0.007	0.002	S	BL	NA
614	S. Santiam H., 2007	S	0.988	0.004	0.006	0.002	S	BL	NA
615	S. Santiam H., 2007	S	0.972	0.008	0.018	0.002	S	BL	NA
616	S. Santiam H., 2007	S	0.977	0.003	0.007	0.013	S	BL	NA
617	S. Santiam H., 2007	S	0.990	0.002	0.004	0.004	S	BL	NA
618	S. Santiam H., 2007	S	0.977	0.006	0.014	0.003	S	BL	NA
619	S. Santiam H., 2007	S	0.957	0.010	0.031	0.002	S	BL	NA
620	Canyon Cr., 1997	WW	0.001	0.006	0.001	0.992	WW	BL	NA
621	Canyon Cr., 1997	WW	0.001	0.003	0.001	0.995	WW	BL	NA
622	Canyon Cr., 1997	WW	0.001	0.002	0.000	0.996	WW	BL	NA
623	Canyon Cr., 1997	WW	0.000	0.002	0.001	0.997	WW	BL	NA
624	Canyon Cr., 1997	WW	0.003	0.021	0.002	0.974	WW	BL	NA
625	Canyon Cr., 1997	WW	0.000	0.003	0.000	0.996	WW	BL	NA
626	Canyon Cr., 1997	WW	0.001	0.003	0.001	0.994	WW	BL	NA

627	Canyon Cr., 1997	WW	0.001	0.006	0.002	0.992	WW	BL	NA
628	Canyon Cr., 1997	WW	0.001	0.005	0.002	0.992	WW	BL	NA
629	Canyon Cr., 1997	WW	0.000	0.004	0.001	0.994	WW	BL	NA
630	Canyon Cr., 1997	WW	0.000	0.015	0.002	0.982	WW	BL	NA
631	Canyon Cr., 1997	WW	0.001	0.003	0.000	0.996	WW	BL	NA
632	Canyon Cr., 1997	WW	0.002	0.006	0.001	0.992	WW	BL	NA
633	Canyon Cr., 1997	WW	0.000	0.003	0.001	0.996	WW	BL	NA
634	Canyon Cr., 1997	WW	0.001	0.002	0.001	0.996	WW	BL	NA
635	Canyon Cr., 1997	WW	0.000	0.003	0.002	0.994	WW	BL	NA
636	Canyon Cr., 1997	WW	0.001	0.006	0.003	0.990	WW	BL	NA
637	Canyon Cr., 1997	WW	0.001	0.005	0.001	0.994	WW	BL	NA
638	Canyon Cr., 1997	WW	0.002	0.040	0.014	0.944	WW	BL	NA
639	Canyon Cr., 1997	WW	0.001	0.019	0.002	0.978	WW	BL	NA
640	Canyon Cr., 1997	WW	0.001	0.005	0.001	0.993	WW	BL	NA
641	Canyon Cr., 1997	WW	0.000	0.003	0.001	0.995	WW	BL	NA
642	Canyon Cr., 1997	WW	0.001	0.003	0.001	0.995	WW	BL	NA
643	Canyon Cr., 1997	WW	0.001	0.003	0.002	0.994	WW	BL	NA
644	Canyon Cr., 1997	WW	0.001	0.683	0.004	0.312	WWxEW	BL	NA
645	Canyon Cr., 1997	WW	0.001	0.004	0.001	0.994	WW	BL	NA
646	Canyon Cr., 1997	WW	0.000	0.003	0.001	0.996	WW	BL	NA
647	Canyon Cr., 1997	WW	0.001	0.002	0.001	0.997	WW	BL	NA
648	Canyon Cr., 1997	WW	0.000	0.004	0.001	0.995	WW	BL	NA
649	Canyon Cr., 1997	WW	0.001	0.003	0.001	0.995	WW	BL	NA
650	Canyon Cr., 1997	WW	0.000	0.004	0.002	0.994	WW	BL	NA
651	Canyon Cr., 1997	WW	0.000	0.004	0.001	0.994	WW	BL	NA
652	Canyon Cr., 1997	WW	0.002	0.004	0.001	0.993	WW	BL	NA
653	Canyon Cr., 1997	WW	0.019	0.005	0.001	0.975	WW	BL	NA
654	Eagle Cr. H., 2000	WW	0.004	0.005	0.001	0.991	WW	BL	NA
655	Eagle Cr. H., 2000	WW	0.008	0.007	0.002	0.983	WW	BL	NA
656	Eagle Cr. H., 2000	WW	0.015	0.009	0.003	0.973	WW	BL	NA
657	Eagle Cr. H., 2000	WW	0.016	0.009	0.001	0.973	WW	BL	NA
658	Eagle Cr. H., 2000	WW	0.006	0.005	0.001	0.988	WW	BL	NA
659	Eagle Cr. H., 2000	WW	0.007	0.006	0.002	0.985	WW	BL	NA
660	Eagle Cr. H., 2000	WW	0.039	0.011	0.003	0.947	WW	BL	NA
661	Eagle Cr. H., 2000	WW	0.007	0.008	0.002	0.983	WW	BL	NA
662	Eagle Cr. H., 2000	WW	0.004	0.007	0.001	0.988	WW	BL	NA
663	Eagle Cr. H., 2000	WW	0.006	0.014	0.001	0.978	WW	BL	NA
664	Eagle Cr. H., 2000	WW	0.009	0.009	0.001	0.981	WW	BL	NA
665	Eagle Cr. H., 2000	WW	0.005	0.018	0.001	0.976	WW	BL	NA
666	Eagle Cr. H., 2000	WW	0.007	0.014	0.002	0.977	WW	BL	NA

667	Eagle Cr. H., 2000	WW	0.024	0.104	0.014	0.859	WW	BL	NA
668	Eagle Cr. H., 2000	WW	0.006	0.008	0.002	0.985	WW	BL	NA
669	Eagle Cr. H., 2000	WW	0.018	0.006	0.001	0.975	WW	BL	NA
670	Eagle Cr. H., 2000	WW	0.011	0.005	0.001	0.983	WW	BL	NA
671	Eagle Cr. H., 2000	WW	0.030	0.016	0.002	0.952	WW	BL	NA
672	Eagle Cr. H., 2000	WW	0.011	0.009	0.001	0.979	WW	BL	NA
673	Eagle Cr. H., 2000	WW	0.009	0.004	0.002	0.985	WW	BL	NA
674	Eagle Cr. H., 2000	WW	0.007	0.009	0.002	0.982	WW	BL	NA
675	Eagle Cr. H., 2000	WW	0.009	0.006	0.002	0.984	WW	BL	NA
676	Eagle Cr. H., 2000	WW	0.004	0.005	0.001	0.989	WW	BL	NA
677	Eagle Cr. H., 2000	WW	0.026	0.024	0.011	0.939	WW	BL	NA
678	Eagle Cr. H., 2000	WW	0.012	0.009	0.001	0.977	WW	BL	NA
679	Eagle Cr. H., 2000	WW	0.007	0.016	0.002	0.975	WW	BL	NA
680	Eagle Cr. H., 2000	WW	0.008	0.018	0.001	0.973	WW	BL	NA
681	Eagle Cr. H., 2000	WW	0.006	0.028	0.002	0.964	WW	BL	NA
682	Eagle Cr. H., 2000	WW	0.026	0.012	0.002	0.960	WW	BL	NA
683	Eagle Cr. H., 2000	WW	0.003	0.007	0.001	0.989	WW	BL	NA
684	Eagle Cr. H., 2000	WW	0.006	0.017	0.002	0.976	WW	BL	NA
685	Eagle Cr. H., 2000	WW	0.010	0.009	0.001	0.980	WW	BL	NA
686	Eagle Cr. H., 2000	WW	0.014	0.040	0.005	0.941	WW	BL	NA
687	Eagle Cr. H., 2000	WW	0.009	0.007	0.001	0.983	WW	BL	NA
688	Eagle Cr. H., 2000	WW	0.016	0.069	0.024	0.890	WW	BL	NA
689	Eagle Cr. H., 2000	WW	0.003	0.007	0.001	0.988	WW	BL	NA
690	Eagle Cr. H., 2000	WW	0.014	0.010	0.005	0.972	WW	BL	NA
691	Eagle Cr. H., 2000	WW	0.009	0.010	0.002	0.979	WW	BL	NA
692	Eagle Cr. H., 2000	WW	0.009	0.005	0.001	0.986	WW	BL	NA
693	Eagle Cr. H., 2000	WW	0.020	0.050	0.004	0.925	WW	BL	NA
694	Eagle Cr. H., 2000	WW	0.019	0.025	0.008	0.947	WW	BL	NA
695	Eagle Cr. H., 2000	WW	0.011	0.015	0.002	0.973	WW	BL	NA
696	Eagle Cr. H., 2000	WW	0.003	0.010	0.001	0.986	WW	BL	NA
697	Eagle Cr. H., 2000	WW	0.009	0.025	0.002	0.963	WW	BL	NA
698	Eagle Cr. H., 2000	WW	0.030	0.024	0.005	0.941	WW	BL	NA
699	Eagle Cr. H., 2000	WW	0.027	0.048	0.002	0.922	WW	BL	NA
700	Eagle Cr. H., 2000	WW	0.007	0.005	0.001	0.987	WW	BL	NA
701	Eagle Cr. H., 2000	WW	0.008	0.009	0.002	0.980	WW	BL	NA
702	Eagle Cr. H., 2000	WW	0.005	0.006	0.002	0.987	WW	BL	NA
703	Eagle Cr. H., 2000	WW	0.019	0.011	0.003	0.967	WW	BL	NA
704	Eagle Cr. H., 2000	WW	0.005	0.008	0.001	0.985	WW	BL	NA
705	Eagle Cr. H., 2000	WW	0.009	0.009	0.002	0.980	WW	BL	NA
706	Eagle Cr. H., 2000	WW	0.013	0.005	0.001	0.981	WW	BL	NA

707	Eagle Cr. H., 2000	WW	0.008	0.013	0.002	0.977	WW	BL	NA
708	Eagle Cr. H., 2000	WW	0.014	0.007	0.001	0.978	WW	BL	NA
709	Eagle Cr. H., 2000	WW	0.018	0.012	0.006	0.964	WW	BL	NA
710	Eagle Cr. H., 2000	WW	0.006	0.005	0.001	0.988	WW	BL	NA
711	Eagle Cr. H., 2000	WW	0.006	0.005	0.001	0.988	WW	BL	NA
712	Eagle Cr. H., 2000	WW	0.004	0.016	0.001	0.979	WW	BL	NA
713	Eagle Cr. H., 2000	WW	0.010	0.008	0.001	0.980	WW	BL	NA
714	Eagle Cr. H., 2000	WW	0.042	0.008	0.002	0.947	WW	BL	NA
715	Eagle Cr. H., 2000	WW	0.012	0.010	0.002	0.976	WW	BL	NA
716	Luckiamute R., 1997	WW	0.004	0.048	0.008	0.940	WW	BL	NA
717	Luckiamute R., 1997	WW	0.003	0.026	0.004	0.967	WW	BL	NA
718	Luckiamute R., 1997	WW	0.004	0.034	0.004	0.958	WW	BL	NA
719	Luckiamute R., 1997	WW	0.003	0.028	0.005	0.963	WW	BL	NA
720	Luckiamute R., 1997	WW	0.003	0.039	0.003	0.955	WW	BL	NA
721	Luckiamute R., 1997	WW	0.006	0.159	0.037	0.797	WW	BL	NA
722	Luckiamute R., 1997	WW	0.003	0.111	0.010	0.875	WW	BL	NA
723	Luckiamute R., 1997	WW	0.003	0.026	0.004	0.967	WW	BL	NA
724	Luckiamute R., 1997	WW	0.004	0.039	0.005	0.952	WW	BL	NA
725	Luckiamute R., 1997	WW	0.003	0.026	0.004	0.967	WW	BL	NA
726	Luckiamute R., 1997	WW	0.003	0.028	0.004	0.965	WW	BL	NA
727	Luckiamute R., 1997	WW	0.003	0.053	0.005	0.939	WW	BL	NA
728	Luckiamute R., 1997	WW	0.003	0.051	0.004	0.943	WW	BL	NA
729	Luckiamute R., 1997	WW	0.003	0.022	0.003	0.973	WW	BL	NA
730	Luckiamute R., 1997	WW	0.007	0.060	0.006	0.927	WW	BL	NA
731	Luckiamute R., 1997	WW	0.003	0.036	0.010	0.950	WW	BL	NA
732	Luckiamute R., 1997	WW	0.005	0.329	0.007	0.659	WWxEW	BL	NA
733	Luckiamute R., 1997	WW	0.006	0.210	0.011	0.772	WWxEW	BL	NA
734	Luckiamute R., 1997	WW	0.004	0.077	0.012	0.907	WW	BL	NA
735	Luckiamute R., 1997	WW	0.003	0.021	0.002	0.974	WW	BL	NA
736	Luckiamute R., 1997	WW	0.002	0.020	0.003	0.974	WW	BL	NA
737	Luckiamute R., 1997	WW	0.002	0.020	0.002	0.975	WW	BL	NA
738	Luckiamute R., 1997	WW	0.003	0.038	0.005	0.954	WW	BL	NA
739	Luckiamute R., 1997	WW	0.003	0.018	0.002	0.976	WW	BL	NA
740	Luckiamute R., 1997	WW	0.004	0.029	0.004	0.964	WW	BL	NA
741	Luckiamute R., 1997	WW	0.006	0.046	0.016	0.931	WW	BL	NA
742	Luckiamute R., 1997	WW	0.024	0.070	0.006	0.899	WW	BL	NA
743	Luckiamute R., 1997	WW	0.003	0.019	0.002	0.976	WW	BL	NA
744	Luckiamute R., 1997	WW	0.006	0.027	0.004	0.963	WW	BL	NA
745	Luckiamute R., 1997	WW	0.004	0.045	0.003	0.948	WW	BL	NA
746	Luckiamute R., 1997	WW	0.002	0.025	0.004	0.969	WW	BL	NA

747	Willamina R., 1997	WW	0.008	0.075	0.101	0.816	WW	BL	NA
748	Willamina R., 1997	WW	0.005	0.072	0.135	0.788	WW	BL	NA
749	Willamina R., 1997	WW	0.005	0.126	0.135	0.734	WW	BL	NA
750	Willamina R., 1997	WW	0.005	0.089	0.069	0.837	WW	BL	NA
751	Willamina R., 1997	WW	0.006	0.111	0.115	0.768	WW	BL	NA
752	Willamina R., 1997	WW	0.006	0.069	0.099	0.825	WW	BL	NA
753	Willamina R., 1997	WW	0.007	0.080	0.074	0.839	WW	BL	NA
754	Willamina R., 1997	WW	0.006	0.073	0.149	0.773	WW	BL	NA
755	Willamina R., 1997	WW	0.005	0.059	0.096	0.839	WW	BL	NA
756	Willamina R., 1997	WW	0.004	0.061	0.080	0.856	WW	BL	NA
757	Willamina R., 1997	WW	0.006	0.123	0.110	0.761	WW	BL	NA
758	Willamina R., 1997	WW	0.006	0.081	0.098	0.815	WW	BL	NA
759	Willamina R., 1997	WW	0.007	0.051	0.070	0.872	WW	BL	NA
760	Willamina R., 1997	WW	0.004	0.051	0.086	0.858	WW	BL	NA
761	Willamina R., 1997	WW	0.005	0.061	0.102	0.831	WW	BL	NA
762	Willamina R., 1997	WW	0.007	0.059	0.084	0.850	WW	BL	NA
763	Willamina R., 1997	WW	0.006	0.060	0.087	0.846	WW	BL	NA
764	Willamina R., 1997	WW	0.005	0.056	0.086	0.853	WW	BL	NA
765	Willamina R., 1997	WW	0.005	0.058	0.090	0.847	WW	BL	NA
766	Willamina R., 1997	WW	0.004	0.054	0.085	0.857	WW	BL	NA
767	Willamina R., 1997	WW	0.006	0.049	0.091	0.855	WW	BL	NA
768	Willamina R., 1997	WW	0.006	0.070	0.093	0.830	WW	BL	NA
769	Willamina R., 1997	WW	0.007	0.068	0.112	0.813	WW	BL	NA
770	Willamina R., 1997	WW	0.005	0.079	0.105	0.812	WW	BL	NA
771	Willamina R., 1997	WW	0.005	0.058	0.107	0.830	WW	BL	NA
772	Willamina R., 1997	WW	0.005	0.089	0.158	0.749	WW	BL	NA
773	Willamina R., 1997	WW	0.005	0.069	0.116	0.810	WW	BL	NA
774	Willamina R., 1997	WW	0.008	0.077	0.142	0.773	WW	BL	NA
775	Willamina R., 1997	WW	0.009	0.089	0.089	0.813	WW	BL	NA
776	Willamina R., 1997	WW	0.005	0.048	0.081	0.866	WW	BL	NA
777	Willamina R., 1997	WW	0.005	0.096	0.096	0.804	WW	BL	NA
778	Willamina R., 1997	WW	0.011	0.078	0.104	0.808	WW	BL	NA
779	Willamina R., 1997	WW	0.007	0.073	0.110	0.810	WW	BL	NA
780	Willamina R., 1997	WW	0.008	0.077	0.107	0.809	WW	BL	NA
781	Foster Trap, S. Santiam, 2009	31696-51	0.015	0.968	0.003	0.014	EW	EW	1
782	Foster Trap, S. Santiam, 2009	31696-52	0.074	0.903	0.015	0.009	EW	EW	1
783	Foster Trap, S. Santiam, 2009	31696-53	0.016	0.961	0.007	0.017	EW	EW	1
784	Foster Trap, S. Santiam, 2009	31696-54	0.064	0.804	0.102	0.030	EW	EW	0.9997
785	Foster Trap, S. Santiam, 2009	31696-55	0.064	0.851	0.007	0.079	EW	EW	1
786	Foster Trap, S. Santiam, 2009	31696-56	0.020	0.965	0.002	0.012	EW	EW	1

787	Foster Trap, S. Santiam, 2009	31696-57	0.218	0.625	0.016	0.141	SxEW	EW	0.9994
788	Foster Trap, S. Santiam, 2009	31696-58	0.270	0.641	0.032	0.058	SxEW	EW	0.9999
789	Foster Trap, S. Santiam, 2009	31696-59	0.038	0.946	0.005	0.011	EW	EW	1
790	Foster Trap, S. Santiam, 2009	31696-60	0.029	0.950	0.010	0.011	EW	EW	1
791	Foster Trap, S. Santiam, 2009	31696-61	0.033	0.923	0.026	0.018	EW	EW	1
792	Foster Trap, S. Santiam, 2009	31696-62	0.012	0.544	0.435	0.009	EWxRB	EW	0.9999
793	Foster Trap, S. Santiam, 2009	31696-63	0.034	0.332	0.004	0.629	WWxEW	WW	0.654
794	Foster Trap, S. Santiam, 2009	31696-64	0.212	0.719	0.002	0.067	SxEW	EW	1
795	Foster Trap, S. Santiam, 2009	31696-65	0.283	0.680	0.023	0.014	SxEW	EW	0.99
796	Foster Trap, S. Santiam, 2009	31696-66	0.092	0.777	0.011	0.120	EW	EW	1
797	Foster Trap, S. Santiam, 2009	31696-67	0.036	0.939	0.002	0.023	EW	EW	1
798	Foster Trap, S. Santiam, 2009	31696-68	0.032	0.949	0.003	0.015	EW	EW	1
799	Foster Trap, S. Santiam, 2009	31696-69	0.031	0.958	0.003	0.008	EW	EW	1
800	Foster Trap, S. Santiam, 2009	31696-70	0.040	0.947	0.002	0.011	EW	EW	1
801	Foster Trap, S. Santiam, 2009	31696-71	0.021	0.961	0.004	0.014	EW	EW	1
802	Foster Trap, S. Santiam, 2009	31696-72	0.044	0.926	0.003	0.027	EW	EW	1
803	Foster Trap, S. Santiam, 2009	31696-73	0.019	0.964	0.004	0.013	EW	EW	1
804	Foster Trap, S. Santiam, 2009	31696-74	0.050	0.919	0.009	0.023	EW	EW	1
805	Foster Trap, S. Santiam, 2009	31696-75	0.187	0.516	0.002	0.295	WWxEW	EW	1
806	Foster Trap, S. Santiam, 2009	31696-76	0.088	0.891	0.009	0.012	EW	EW	1
807	Foster Trap, S. Santiam, 2009	31696-77	0.085	0.896	0.002	0.017	EW	EW	1
808	Foster Trap, S. Santiam, 2009	31696-78	0.042	0.944	0.005	0.009	EW	EW	1
809	Foster Trap, S. Santiam, 2009	31696-79	0.078	0.892	0.007	0.024	EW	EW	1
810	Foster Trap, S. Santiam, 2009	31696-80	0.025	0.925	0.005	0.044	EW	EW	1
811	Foster Trap, S. Santiam, 2009	31696-81	0.345	0.604	0.004	0.046	SxEW	EW	0.9936
812	Foster Trap, S. Santiam, 2009	31696-82	0.026	0.952	0.003	0.019	EW	EW	1
813	Foster Trap, S. Santiam, 2009	31696-83	0.024	0.864	0.002	0.109	EW	EW	1
814	Foster Trap, S. Santiam, 2009	31696-84	0.096	0.802	0.018	0.085	EW	EW	1
815	Foster Trap, S. Santiam, 2009	31696-85	0.018	0.971	0.003	0.008	EW	EW	1
816	Foster Trap, S. Santiam, 2009	31696-86	0.056	0.894	0.002	0.048	EW	EW	1
817	Foster Trap, S. Santiam, 2009	31696-87	0.190	0.786	0.007	0.017	EW	EW	0.9999
818	Foster Trap, S. Santiam, 2009	31696-88	0.094	0.889	0.003	0.013	EW	EW	1
819	Foster Trap, S. Santiam, 2009	31696-89	0.089	0.897	0.004	0.010	EW	EW	1
820	Foster Trap, S. Santiam, 2009	31696-90	0.023	0.954	0.007	0.016	EW	EW	1
821	Foster Trap, S. Santiam, 2009	31696-91	0.172	0.781	0.037	0.010	EW	EW	1
822	Foster Trap, S. Santiam, 2009	31696-92	0.032	0.932	0.002	0.034	EW	EW	1
823	Foster Trap, S. Santiam, 2009	31696-93	0.049	0.909	0.010	0.032	EW	EW	1
824	Foster Trap, S. Santiam, 2009	31696-94	0.019	0.970	0.003	0.008	EW	EW	1
825	Foster Trap, S. Santiam, 2009	31696-95	0.033	0.954	0.005	0.008	EW	EW	1
826	Foster Trap, S. Santiam, 2009	31696-96	0.030	0.953	0.004	0.013	EW	EW	1

827	Foster Trap, S. Santiam, 2009	31696-97	0.033	0.946	0.005	0.017	EW	EW	1
828	Foster Trap, S. Santiam, 2009	31696-98	0.049	0.923	0.010	0.018	EW	EW	1
829	Foster Trap, S. Santiam, 2009	31696-99	0.084	0.895	0.003	0.018	EW	EW	1
830	Foster Trap, S. Santiam, 2009	31696-100	0.066	0.878	0.003	0.052	EW	EW	0.9999
831	Minto Trap, N. Santiam, 2009	31697-1	0.035	0.951	0.002	0.012	EW	EW	1
832	Minto Trap, N. Santiam, 2009	31697-2	0.092	0.860	0.020	0.027	EW	EW	1
833	Minto Trap, N. Santiam, 2009	31697-3	0.040	0.936	0.013	0.010	EW	EW	1
834	Minto Trap, N. Santiam, 2009	31697-4	0.055	0.928	0.002	0.015	EW	EW	1
835	Minto Trap, N. Santiam, 2009	31697-5	0.226	0.749	0.009	0.016	SxEW	EW	1
836	Minto Trap, N. Santiam, 2009	31697-6	0.318	0.661	0.005	0.015	SxEW	EW	0.9999
837	Minto Trap, N. Santiam, 2009	31697-7	0.014	0.873	0.021	0.091	EW	EW	1
838	Minto Trap, N. Santiam, 2009	31697-8	0.029	0.578	0.008	0.385	WWxEW	EW	0.9994
839	Minto Trap, N. Santiam, 2009	31697-9	0.021	0.959	0.002	0.018	EW	EW	1
840	Minto Trap, N. Santiam, 2009	31697-10	0.084	0.854	0.025	0.037	EW	EW	1
841	Minto Trap, N. Santiam, 2009	31697-11	0.022	0.954	0.003	0.021	EW	EW	1
842	Clackamas, Summer, 1986	31698-2404	0.971	0.021	0.002	0.007	S	-	NA
843	Clackamas, Summer, 1986	31698-2405	0.943	0.044	0.006	0.007	S	-	NA
844	Clackamas, Summer, 1986	31698-2406	0.931	0.040	0.004	0.026	S	-	NA
845	Clackamas, Summer, 1986	31698-2407	0.054	0.894	0.011	0.040	EW	-	NA
846	Clackamas, Summer, 1986	31698-2408	0.924	0.037	0.003	0.036	S	-	NA
847	Clackamas, Summer, 1986	31698-2409	0.962	0.024	0.002	0.012	S	-	NA
848	Clackamas, Summer, 1986	31698-2410	0.934	0.038	0.006	0.022	S	-	NA
849	Clackamas, Summer, 1986	31698-2411	0.927	0.018	0.002	0.053	S	-	NA
850	Clackamas, Summer, 1986	31698-2412	0.971	0.015	0.002	0.012	S	-	NA
851	Clackamas, Summer, 1986	31698-2413	0.926	0.036	0.003	0.034	S	-	NA
852	Clackamas, Summer, 1986	31698-2414	0.963	0.025	0.004	0.008	S	-	NA
853	Clackamas, Summer, 1986	31698-2415	0.927	0.049	0.005	0.019	S	-	NA
854	Clackamas, Summer, 1986	31698-2416	0.969	0.015	0.001	0.016	S	-	NA
855	Clackamas, Summer, 1986	31698-2417	0.942	0.047	0.004	0.007	S	-	NA
856	Clackamas, Summer, 1986	31698-2418	0.941	0.037	0.004	0.018	S	-	NA
857	Clackamas, Summer, 1986	31698-2419	0.943	0.036	0.004	0.017	S	-	NA
858	Clackamas, Summer, 1986	31698-2420	0.945	0.036	0.003	0.016	S	-	NA
859	Clackamas, Summer, 1986	31698-2421	0.905	0.079	0.006	0.010	S	-	NA
860	Clackamas, Summer, 1986	31698-2422	0.941	0.021	0.002	0.036	S	-	NA
861	Clackamas, Summer, 1986	31698-2423	0.825	0.108	0.004	0.063	S	-	NA
862	Clackamas, Summer, 1986	31698-2424	0.925	0.060	0.003	0.011	S	-	NA
863	Clackamas, Summer, 1986	31698-2425	0.971	0.021	0.002	0.006	S	-	NA
864	Clackamas, Summer, 1986	31698-2426	0.931	0.030	0.003	0.035	S	-	NA
865	Clackamas, Summer, 1986	31698-2427	0.739	0.234	0.009	0.018	SxEW	-	NA
866	Clackamas, Summer, 1986	31698-2428	0.957	0.033	0.004	0.006	S	-	NA

867	Clackamas, Summer, 1986	31698-2429	0.971	0.017	0.002	0.011	S	-	NA
868	Clackamas, Summer, 1986	31698-2432	0.966	0.017	0.001	0.016	S	-	NA
869	Clackamas, Summer, 1986	31698-2433	0.951	0.028	0.009	0.011	S	-	NA
870	Clackamas, Summer, 1986	31698-2434	0.908	0.069	0.011	0.012	S	-	NA
871	Clackamas, Summer, 1986	31698-2435	0.938	0.044	0.003	0.015	S	-	NA
872	Clackamas, Summer, 1986	31698-2436	0.955	0.036	0.002	0.008	S	-	NA
873	Clackamas, Summer, 1986	31698-2437	0.944	0.040	0.005	0.011	S	-	NA
874	Clackamas, Summer, 1986	31698-2438	0.836	0.137	0.009	0.018	S	-	NA
875	Clackamas, Summer, 1986	31698-2439	0.255	0.059	0.003	0.683	SxWW	-	NA
876	Clackamas, Summer, 1986	31698-2440	0.950	0.035	0.003	0.012	S	-	NA
877	Clackamas, Summer, 1986	31698-2441	0.901	0.061	0.015	0.023	S	-	NA
878	Clackamas, Summer, 1986	31698-2442	0.932	0.042	0.013	0.013	S	-	NA
879	Clackamas, Summer, 1986	31698-2443	0.951	0.032	0.004	0.013	S	-	NA
880	Clackamas, Summer, 1986	31698-2444	0.941	0.033	0.004	0.023	S	-	NA
881	Clackamas, Summer, 1986	31698-2445	0.965	0.023	0.002	0.010	S	-	NA
882	Clackamas, Summer, 1986	31698-2446	0.961	0.026	0.002	0.011	S	-	NA
883	Clackamas, Summer, 1986	31698-2447	0.924	0.055	0.011	0.010	S	-	NA
884	Clackamas, Summer, 1986	31698-2448	0.883	0.084	0.024	0.009	S	-	NA
885	Clackamas, Summer, 1986	31698-2449	0.807	0.179	0.004	0.011	S	-	NA
886	Clackamas, Summer, 1986	31698-2450	0.938	0.031	0.001	0.030	S	-	NA
887	Clackamas, Summer, 1986	31698-2451	0.961	0.029	0.002	0.008	S	-	NA
888	Clackamas, Summer, 1986	31698-2452	0.896	0.085	0.005	0.014	S	-	NA
889	Clackamas, Summer, 1986	31698-2453	0.863	0.119	0.004	0.014	S	-	NA
890	Clackamas, Summer, 1986	31698-2454	0.946	0.034	0.007	0.013	S	-	NA
891	Clackamas, Summer, 1986	31698-2455	0.949	0.030	0.002	0.019	S	-	NA
892	Clackamas, Summer, 1986	31698-2456	0.895	0.065	0.010	0.031	S	-	NA
893	Clackamas, Summer, 1986	31698-2457	0.875	0.071	0.004	0.050	S	-	NA
894	Clackamas, Summer, 1986	31698-2458	0.966	0.017	0.001	0.015	S	-	NA
895	Clackamas, Summer, 1986	31698-2459	0.965	0.023	0.002	0.010	S	-	NA
896	Clackamas, Summer, 1986	31698-2460	0.947	0.037	0.002	0.014	S	-	NA
897	Clackamas, Summer, 1986	31698-2461	0.758	0.104	0.002	0.136	S	-	NA
898	Clackamas, Summer, 1986	31698-2462	0.800	0.133	0.017	0.050	S	-	NA
899	Clackamas, Summer, 1986	31698-2464	0.969	0.020	0.002	0.009	S	-	NA
900	Clackamas, Summer, 1986	31698-2465	0.911	0.046	0.005	0.037	S	-	NA
901	Clackamas, Summer, 1986	31698-2466	0.902	0.076	0.003	0.019	S	-	NA
902	Clackamas, Summer, 1986	31698-2467	0.972	0.019	0.002	0.006	S	-	NA
903	Clackamas, Summer, 1986	31698-2468	0.736	0.226	0.003	0.035	SxEW	-	NA
904	Clackamas, Summer, 1986	31698-2470	0.965	0.020	0.002	0.013	S	-	NA
905	Clackamas, Summer, 1986	31698-2471	0.958	0.032	0.003	0.007	S	-	NA
906	Clackamas, Summer, 1986	31698-2472	0.965	0.022	0.002	0.011	S	-	NA

907	Clackamas, Summer, 1986	31698-2473	0.965	0.027	0.002	0.006	S	-	NA
908	Clackamas, Summer, 1986	31698-2474	0.931	0.021	0.001	0.046	S	-	NA
909	Clackamas, Summer, 1986	31698-2475	0.833	0.074	0.043	0.050	S	-	NA
910	Clackamas, Summer, 1986	31698-2476	0.394	0.547	0.004	0.054	SxEW	-	NA
911	Clackamas, Summer, 1986	31698-2477	0.858	0.082	0.004	0.056	S	-	NA
912	Clackamas, Summer, 1986	31698-2479	0.892	0.074	0.011	0.023	S	-	NA
913	Clackamas, Summer, 1986	31698-2480	0.854	0.055	0.003	0.088	S	-	NA
914	Clackamas, Summer, 1986	31698-2481	0.830	0.111	0.003	0.056	S	-	NA
915	Clackamas, Summer, 1986	31698-2482	0.974	0.016	0.001	0.009	S	-	NA
916	Clackamas, Summer, 1986	31698-2483	0.971	0.020	0.001	0.007	S	-	NA
917	Clackamas, Summer, 1986	31698-2484	0.966	0.023	0.001	0.009	S	-	NA
918	Clackamas, Summer, 1986	31698-2485	0.940	0.044	0.006	0.010	S	-	NA
919	Clackamas, Summer, 1986	31698-2486	0.940	0.036	0.002	0.022	S	-	NA
920	Clackamas, Summer, 1986	31698-2487	0.928	0.036	0.002	0.035	S	-	NA
921	Clackamas, Summer, 1986	31698-2488	0.953	0.037	0.002	0.008	S	-	NA
922	Clackamas, Summer, 1986	31698-2489	0.971	0.019	0.002	0.009	S	-	NA
923	Clackamas, Summer, 1986	31698-2490	0.956	0.029	0.002	0.014	S	-	NA
924	Clackamas, Summer, 1986	31698-2491	0.975	0.017	0.001	0.007	S	-	NA
925	Clackamas, Summer, 1986	31698-2493	0.784	0.086	0.005	0.125	S	-	NA
926	Molalla, Summer, 1988	31699-9223	0.874	0.114	0.003	0.009	S	-	NA
927	Molalla, Summer, 1988	31699-9224	0.925	0.053	0.005	0.017	S	-	NA
928	Molalla, Summer, 1988	31699-9227	0.837	0.021	0.004	0.139	S	-	NA
929	Molalla, Summer, 1988	31699-9228	0.913	0.072	0.002	0.014	S	-	NA
930	Molalla, Summer, 1988	31699-9229	0.954	0.022	0.001	0.023	S	-	NA
931	Molalla, Summer, 1988	31699-9230	0.924	0.046	0.005	0.026	S	-	NA
932	Molalla, Summer, 1988	31699-9232	0.956	0.032	0.002	0.010	S	-	NA
933	Molalla, Summer, 1988	31699-9233	0.905	0.083	0.005	0.007	S	-	NA
934	Molalla, Summer, 1988	31699-9234	0.934	0.033	0.019	0.013	S	-	NA
935	Molalla, Summer, 1988	31699-9235	0.958	0.026	0.002	0.014	S	-	NA
936	Molalla, Summer, 1988	31699-9236	0.925	0.054	0.009	0.013	S	-	NA
937	Molalla, Summer, 1988	31699-9237	0.915	0.048	0.003	0.034	S	-	NA
938	Molalla, Summer, 1988	31699-9238	0.963	0.023	0.002	0.012	S	-	NA
939	Molalla, Summer, 1988	31699-9239	0.950	0.038	0.004	0.008	S	-	NA
940	Molalla, Summer, 1988	31699-9240	0.918	0.033	0.003	0.046	S	-	NA
941	Molalla, Summer, 1988	31699-9241	0.701	0.135	0.005	0.159	S	-	NA
942	Molalla, Summer, 1988	31699-9242	0.939	0.044	0.009	0.008	S	-	NA
943	Molalla, Summer, 1988	31699-9243	0.880	0.092	0.009	0.018	S	-	NA
944	Molalla, Summer, 1988	31699-9244	0.956	0.030	0.002	0.011	S	-	NA
945	Molalla, Summer, 1988	31699-9245	0.932	0.048	0.003	0.016	S	-	NA
946	Molalla, Summer, 1988	31699-9246	0.952	0.033	0.004	0.011	S	-	NA

947	Molalla, Summer, 1988	31699-9247	0.966	0.024	0.003	0.006	S	-	NA
948	Molalla, Summer, 1988	31699-9248	0.626	0.232	0.114	0.028	SxEW	-	NA
949	Molalla, Summer, 1988	31699-9249	0.953	0.039	0.002	0.007	S	-	NA
950	Molalla, Summer, 1988	31699-9250	0.842	0.138	0.003	0.017	S	-	NA
951	Molalla, Summer, 1988	31699-9251	0.976	0.016	0.003	0.005	S	-	NA
952	Molalla, Summer, 1988	31699-9252	0.858	0.102	0.014	0.025	S	-	NA
953	Molalla, Summer, 1988	31699-9253	0.960	0.030	0.002	0.007	S	-	NA
954	Molalla, Summer, 1988	31699-9254	0.961	0.020	0.002	0.017	S	-	NA
955	Molalla, Summer, 1988	31699-9255	0.797	0.112	0.045	0.046	S	-	NA
956	Molalla, Summer, 1988	31699-9256	0.958	0.023	0.002	0.017	S	-	NA
957	Molalla, Summer, 1988	31699-9257	0.946	0.031	0.004	0.018	S	-	NA
958	Molalla, Summer, 1988	31699-9258	0.903	0.073	0.004	0.019	S	-	NA
959	Molalla, Summer, 1988	31699-9259	0.950	0.040	0.002	0.008	S	-	NA
960	Molalla, Summer, 1988	31699-9260	0.962	0.022	0.002	0.014	S	-	NA
961	Molalla, Summer, 1988	31699-9261	0.880	0.096	0.006	0.018	S	-	NA
962	Molalla, Summer, 1988	31699-9263	0.924	0.058	0.003	0.015	S	-	NA
963	Molalla, Summer, 1988	31699-9269	0.957	0.030	0.001	0.011	S	-	NA
964	Molalla, Summer, 1988	31699-9277	0.971	0.018	0.002	0.009	S	-	NA
965	Molalla, Summer, 1988	31699-9278	0.963	0.026	0.001	0.009	S	-	NA
966	Molalla, Summer, 1988	31699-9279	0.896	0.071	0.004	0.029	S	-	NA
967	Molalla, Summer, 1988	31699-9281	0.801	0.074	0.016	0.109	S	-	NA
968	Molalla, Summer, 1988	31699-9284	0.959	0.031	0.002	0.009	S	-	NA
969	Molalla, Summer, 1988	31699-9285	0.893	0.085	0.008	0.014	S	-	NA
970	Molalla, Summer, 1988	31699-9292	0.950	0.037	0.002	0.011	S	-	NA
971	Molalla, Summer, 1988	31699-9296	0.814	0.115	0.005	0.065	S	-	NA
972	N. Santiam, Summer, 1986	31700-15423	0.932	0.040	0.005	0.023	S	-	NA
973	N. Santiam, Summer, 1986	31700-15426	0.024	0.866	0.048	0.062	EW	-	NA
974	N. Santiam, Summer, 1986	31700-15427	0.963	0.024	0.005	0.008	S	-	NA
975	N. Santiam, Summer, 1986	31700-15429	0.017	0.961	0.007	0.014	EW	-	NA
976	N. Santiam, Summer, 1986	31700-15430	0.064	0.920	0.008	0.007	EW	-	NA
977	N. Santiam, Summer, 1986	31700-15431	0.941	0.034	0.002	0.022	S	-	NA
978	N. Santiam, Summer, 1986	31700-15432	0.966	0.026	0.002	0.006	S	-	NA
979	N. Santiam, Summer, 1986	31700-15433	0.940	0.033	0.002	0.025	S	-	NA
980	N. Santiam, Summer, 1986	31700-15435	0.938	0.035	0.004	0.023	S	-	NA
981	N. Santiam, Summer, 1986	31700-15436	0.830	0.099	0.010	0.061	S	-	NA
982	N. Santiam, Summer, 1986	31700-15441	0.890	0.090	0.009	0.011	S	-	NA
983	N. Santiam, Summer, 1986	31700-15442	0.972	0.017	0.004	0.007	S	-	NA
984	N. Santiam, Summer, 1986	31700-15443	0.749	0.052	0.002	0.197	S	-	NA
985	N. Santiam, Summer, 1986	31700-15445	0.958	0.025	0.002	0.016	S	-	NA
986	N. Santiam, Summer, 1986	31700-15447	0.963	0.026	0.006	0.006	S	-	NA

987	N. Santiam, Summer, 1986	31700-15448	0.965	0.014	0.001	0.020	S	-	NA
988	N. Santiam, Summer, 1986	31700-15450	0.966	0.023	0.002	0.010	S	-	NA
989	N. Santiam, Summer, 1986	31700-15451	0.888	0.100	0.002	0.010	S	-	NA
990	N. Santiam, Summer, 1986	31700-15452	0.896	0.067	0.002	0.035	S	-	NA
991	N. Santiam, Summer, 1986	31700-15458	0.955	0.032	0.003	0.010	S	-	NA
992	N. Santiam, Summer, 1986	31700-15459	0.964	0.024	0.002	0.010	S	-	NA
993	N. Santiam, Summer, 1986	31700-15460	0.962	0.024	0.003	0.011	S	-	NA
994	N. Santiam, Summer, 1986	31700-15463	0.867	0.095	0.002	0.035	S	-	NA
995	Clackamas, Winter, 1986	31701-2359	0.022	0.029	0.003	0.946	WW	-	NA
996	Clackamas, Winter, 1986	31701-2361	0.040	0.033	0.003	0.924	WW	-	NA
997	Clackamas, Winter, 1986	31701-2363	0.920	0.053	0.006	0.021	S	-	NA
998	Clackamas, Winter, 1986	31701-2364	0.010	0.053	0.003	0.934	WW	-	NA
999	Clackamas, Winter, 1986	31701-2365	0.075	0.083	0.036	0.807	WW	-	NA
1000	Clackamas, Winter, 1986	31701-2366	0.044	0.172	0.003	0.781	WW	-	NA
1001	Clackamas, Winter, 1986	31701-2368	0.022	0.035	0.004	0.939	WW	-	NA
1002	Clackamas, Winter, 1986	31701-2369	0.044	0.037	0.001	0.917	WW	-	NA
1003	Clackamas, Winter, 1986	31701-2371	0.020	0.028	0.002	0.950	WW	-	NA
1004	Clackamas, Winter, 1986	31701-2372	0.054	0.019	0.002	0.926	WW	-	NA
1005	Clackamas, Winter, 1986	31701-2373	0.031	0.583	0.320	0.066	EWxRB	-	NA
1006	Clackamas, Winter, 1986	31701-2374	0.949	0.027	0.002	0.023	S	-	NA
1007	Clackamas, Winter, 1986	31701-2375	0.163	0.100	0.002	0.735	WW	-	NA
1008	Clackamas, Winter, 1986	31701-2376	0.020	0.045	0.002	0.933	WW	-	NA
1009	Clackamas, Winter, 1986	31701-2377	0.033	0.045	0.005	0.917	WW	-	NA
1010	Clackamas, Winter, 1986	31701-2378	0.017	0.039	0.002	0.942	WW	-	NA
1011	Clackamas, Winter, 1986	31701-2379	0.600	0.118	0.008	0.274	SxWW	-	NA
1012	Clackamas, Winter, 1986	31701-2380	0.789	0.105	0.004	0.102	S	-	NA
1013	Clackamas, Winter, 1986	31701-2381	0.113	0.133	0.007	0.748	WW	-	NA
1014	Clackamas, Winter, 1986	31701-2382	0.038	0.049	0.010	0.903	WW	-	NA
1015	Clackamas, Winter, 1986	31701-2383	0.023	0.061	0.003	0.913	WW	-	NA
1016	Clackamas, Winter, 1986	31701-2384	0.148	0.063	0.006	0.783	WW	-	NA
1017	Clackamas, Winter, 1986	31701-2385	0.610	0.328	0.003	0.060	SxEW	-	NA
1018	Clackamas, Winter, 1986	31701-2386	0.118	0.039	0.003	0.839	WW	-	NA
1019	Clackamas, Winter, 1986	31701-2387	0.030	0.108	0.002	0.860	WW	-	NA
1020	Clackamas, Winter, 1986	31701-2388	0.016	0.955	0.020	0.008	EW	-	NA
1021	Clackamas, Winter, 1986	31701-2389	0.051	0.318	0.007	0.625	WWxEW	-	NA
1022	Clackamas, Winter, 1986	31701-2390	0.949	0.037	0.002	0.011	S	-	NA
1023	Clackamas, Winter, 1986	31701-2391	0.021	0.022	0.002	0.955	WW	-	NA
1024	Clackamas, Winter, 1986	31701-2392	0.915	0.070	0.003	0.012	S	-	NA
1025	Clackamas, Winter, 1986	31701-2393	0.036	0.202	0.021	0.741	WWxEW	-	NA
1026	Clackamas, Winter, 1986	31701-2394	0.015	0.022	0.003	0.960	WW	-	NA

1027	Clackamas, Winter, 1986	31701-2395	0.037	0.041	0.010	0.911	WW	-	NA
1028	Clackamas, Winter, 1986	31701-2396	0.959	0.026	0.004	0.010	S	-	NA
1029	Clackamas, Winter, 1986	31701-2397	0.972	0.020	0.002	0.007	S	-	NA
1030	Clackamas, Winter, 1986	31701-2398	0.530	0.368	0.018	0.084	SxEW	-	NA
1031	Clackamas, Winter, 1986	31701-2399	0.834	0.075	0.072	0.019	S	-	NA
1032	Clackamas, Winter, 1986	31701-2400	0.229	0.536	0.008	0.227	3x	-	NA
1033	Clackamas, Winter, 1986	31701-2401	0.270	0.626	0.024	0.081	SxEW	-	NA
1034	Clackamas, Winter, 1986	31701-2402	0.859	0.114	0.012	0.015	S	-	NA
1035	Molalla, Winter, 1986	31702-9036	0.025	0.065	0.002	0.907	WW	-	NA
1036	Molalla, Winter, 1986	31702-9037	0.025	0.039	0.006	0.930	WW	-	NA
1037	Molalla, Winter, 1986	31702-9038	0.016	0.031	0.002	0.950	WW	-	NA
1038	Molalla, Winter, 1986	31702-9039	0.031	0.906	0.035	0.028	EW	-	NA
1039	Molalla, Winter, 1986	31702-9041	0.037	0.027	0.001	0.936	WW	-	NA
1040	Molalla, Winter, 1986	31702-9042	0.014	0.968	0.004	0.014	EW	-	NA
1041	Molalla, Winter, 1986	31702-9043	0.117	0.773	0.005	0.105	EW	-	NA
1042	Molalla, Winter, 1986	31702-9044	0.014	0.059	0.004	0.923	WW	-	NA
1043	Molalla, Winter, 1986	31702-9045	0.014	0.018	0.001	0.967	WW	-	NA
1044	Molalla, Winter, 1986	31702-9046	0.325	0.520	0.009	0.146	SxEW	-	NA
1045	Molalla, Winter, 1986	31702-9047	0.031	0.032	0.001	0.935	WW	-	NA
1046	Molalla, Winter, 1986	31702-9048	0.080	0.040	0.006	0.875	WW	-	NA
1047	Molalla, Winter, 1986	31702-9049	0.021	0.082	0.002	0.895	WW	-	NA
1048	Molalla, Winter, 1986	31702-9051	0.014	0.915	0.003	0.068	EW	-	NA
1049	Molalla, Winter, 1986	31702-9052	0.055	0.050	0.008	0.886	WW	-	NA
1050	Molalla, Winter, 1986	31702-9053	0.043	0.120	0.022	0.814	WW	-	NA
1051	Molalla, Winter, 1986	31702-9054	0.018	0.135	0.003	0.844	WW	-	NA
1052	Molalla, Winter, 1986	31702-9055	0.023	0.016	0.001	0.960	WW	-	NA
1053	Molalla, Winter, 1986	31702-9056	0.019	0.048	0.003	0.930	WW	-	NA
1054	Molalla, Winter, 1986	31702-9057	0.029	0.024	0.001	0.946	WW	-	NA
1055	Molalla, Winter, 1986	31702-9058	0.030	0.046	0.002	0.922	WW	-	NA
1056	Molalla, Winter, 1986	31702-9059	0.033	0.040	0.002	0.925	WW	-	NA
1057	Molalla, Winter, 1986	31702-9060	0.023	0.029	0.008	0.940	WW	-	NA
1058	Molalla, Winter, 1986	31702-9062	0.021	0.048	0.003	0.928	WW	-	NA
1059	Molalla, Winter, 1986	31702-9063	0.101	0.079	0.002	0.819	WW	-	NA
1060	Molalla, Winter, 1986	31702-9064	0.064	0.655	0.008	0.273	WWxEW	-	NA
1061	Molalla, Winter, 1986	31702-9065	0.058	0.830	0.003	0.108	EW	-	NA
1062	Molalla, Winter, 1986	31702-9066	0.028	0.060	0.006	0.905	WW	-	NA
1063	Molalla, Winter, 1986	31702-9067	0.021	0.133	0.028	0.818	WW	-	NA
1064	Molalla, Winter, 1986	31702-9068	0.187	0.061	0.002	0.750	WW	-	NA
1065	Molalla, Winter, 1986	31702-9069	0.017	0.159	0.004	0.821	WW	-	NA
1066	Molalla, Winter, 1986	31702-9070	0.020	0.028	0.004	0.949	WW	-	NA

1067	Molalla, Winter, 1986	31702-9071	0.113	0.232	0.033	0.622	WWxEW	-	NA
1068	Molalla, Winter, 1986	31702-9072	0.120	0.820	0.006	0.054	EW	-	NA
1069	Molalla, Winter, 1986	31702-9073	0.096	0.421	0.010	0.473	WWxEW	-	NA
1070	Molalla, Winter, 1986	31702-9074	0.025	0.953	0.013	0.009	EW	-	NA
1071	Molalla, Winter, 1986	31702-9075	0.040	0.922	0.001	0.037	EW	-	NA
1072	Molalla, Winter, 1986	31702-9076	0.015	0.877	0.002	0.106	EW	-	NA
1073	Molalla, Winter, 1986	31702-9077	0.057	0.116	0.053	0.774	WW	-	NA
1074	Molalla, Winter, 1986	31702-9078	0.144	0.527	0.003	0.326	WWxEW	-	NA
1075	Molalla, Winter, 1986	31702-9079	0.017	0.027	0.001	0.955	WW	-	NA
1076	Molalla, Winter, 1986	31702-9080	0.055	0.866	0.003	0.076	EW	-	NA
1077	Molalla, Winter, 1986	31702-9081	0.099	0.771	0.008	0.122	EW	-	NA
1078	Molalla, Winter, 1986	31702-9082	0.045	0.895	0.002	0.057	EW	-	NA
1079	Molalla, Winter, 1986	31702-9083	0.027	0.940	0.014	0.019	EW	-	NA
1080	Molalla, Winter, 1986	31702-9084	0.028	0.038	0.003	0.931	WW	-	NA
1081	Molalla, Winter, 1986	31702-9085	0.029	0.075	0.008	0.889	WW	-	NA
1082	Molalla, Winter, 1986	31702-9086	0.035	0.949	0.002	0.013	EW	-	NA
1083	Molalla, Winter, 1986	31702-9087	0.073	0.015	0.001	0.911	WW	-	NA
1084	Molalla, Winter, 1986	31702-9088	0.057	0.040	0.005	0.898	WW	-	NA
1085	Molalla, Winter, 1986	31702-9089	0.025	0.584	0.002	0.389	WWxEW	-	NA
1086	Molalla, Winter, 1986	31702-9090	0.057	0.072	0.002	0.869	WW	-	NA
1087	Molalla, Winter, 1986	31702-9091	0.021	0.042	0.003	0.934	WW	-	NA
1088	Molalla, Winter, 1986	31702-9093	0.024	0.951	0.003	0.022	EW	-	NA
1089	Molalla, Winter, 1986	31702-9094	0.024	0.966	0.002	0.007	EW	-	NA
1090	Molalla, Winter, 1986	31702-9095	0.027	0.925	0.002	0.047	EW	-	NA
1091	Molalla, Winter, 1986	31702-9096	0.031	0.048	0.002	0.919	WW	-	NA
1092	Molalla, Winter, 1986	31702-9097	0.028	0.959	0.005	0.008	EW	-	NA
1093	Molalla, Winter, 1986	31702-9098	0.146	0.608	0.003	0.243	WWxEW	-	NA
1094	Molalla, Winter, 1986	31702-9099	0.027	0.958	0.005	0.010	EW	-	NA
1095	Molalla, Winter, 1986	31702-9100	0.009	0.982	0.005	0.004	EW	-	NA
1096	Molalla, Winter, 1986	31702-9102	0.501	0.442	0.045	0.012	SxEW	-	NA
1097	Molalla, Winter, 1986	31702-9106	0.020	0.965	0.004	0.011	EW	-	NA
1098	Molalla, Winter, 1986	31702-9107	0.046	0.930	0.013	0.012	EW	-	NA
1099	Molalla, Winter, 1986	31702-9108	0.049	0.891	0.004	0.056	EW	-	NA
1100	N. Santiam, Winter, 1986	31703-15385	0.922	0.055	0.009	0.013	S	-	NA
1101	N. Santiam, Winter, 1986	31703-15386	0.496	0.472	0.004	0.028	SxEW	-	NA
1102	N. Santiam, Winter, 1986	31703-15387	0.950	0.026	0.004	0.019	S	-	NA
1103	N. Santiam, Winter, 1986	31703-15388	0.898	0.064	0.028	0.009	S	-	NA
1104	N. Santiam, Winter, 1986	31703-15389	0.954	0.033	0.003	0.010	S	-	NA
1105	N. Santiam, Winter, 1986	31703-15391	0.203	0.776	0.010	0.011	SxEW	-	NA
1106	N. Santiam, Winter, 1986	31703-15392	0.010	0.979	0.005	0.006	EW	-	NA

1107	N. Santiam, Winter, 1986	31703-15393	0.029	0.950	0.003	0.017	EW	-	NA
1108	N. Santiam, Winter, 1986	31703-15394	0.384	0.498	0.003	0.114	SxEW	-	NA
1109	N. Santiam, Winter, 1986	31703-15395	0.025	0.948	0.016	0.011	EW	-	NA
1110	N. Santiam, Winter, 1986	31703-15396	0.054	0.905	0.028	0.012	EW	-	NA
1111	N. Santiam, Winter, 1986	31703-15397	0.206	0.752	0.002	0.039	SxEW	-	NA
1112	N. Santiam, Winter, 1986	31703-15398	0.031	0.765	0.002	0.202	WWxEW	-	NA
1113	N. Santiam, Winter, 1986	31703-15399	0.591	0.359	0.012	0.039	SxEW	-	NA
1114	N. Santiam, Winter, 1986	31703-15400	0.971	0.021	0.001	0.007	S	-	NA
1115	N. Santiam, Winter, 1986	31703-15401	0.010	0.979	0.004	0.006	EW	-	NA
1116	N. Santiam, Winter, 1986	31703-15402	0.087	0.873	0.006	0.034	EW	-	NA
1117	N. Santiam, Winter, 1986	31703-15403	0.012	0.979	0.002	0.006	EW	-	NA
1118	N. Santiam, Winter, 1986	31703-15404	0.036	0.940	0.004	0.021	EW	-	NA
1119	N. Santiam, Winter, 1986	31703-15405	0.013	0.975	0.003	0.009	EW	-	NA
1120	N. Santiam, Winter, 1986	31703-15406	0.934	0.020	0.001	0.045	S	-	NA
1121	N. Santiam, Winter, 1986	31703-15407	0.037	0.952	0.002	0.010	EW	-	NA
1122	N. Santiam, Winter, 1986	31703-15408	0.931	0.045	0.006	0.018	S	-	NA
1123	N. Santiam, Winter, 1986	31703-15409	0.020	0.962	0.004	0.014	EW	-	NA
1124	N. Santiam, Winter, 1986	31703-15410	0.295	0.674	0.018	0.013	SxEW	-	NA
1125	N. Santiam, Winter, 1986	31703-15411	0.955	0.036	0.002	0.008	S	-	NA
1126	N. Santiam, Winter, 1986	31703-15412	0.959	0.029	0.003	0.008	S	-	NA
1127	N. Santiam, Winter, 1986	31703-15413	0.020	0.966	0.003	0.011	EW	-	NA
1128	N. Santiam, Winter, 1986	31703-15414	0.761	0.112	0.005	0.123	S	-	NA
1129	N. Santiam, Winter, 1986	31703-15415	0.103	0.314	0.002	0.581	WWxEW	-	NA
1130	N. Santiam, Winter, 1986	31703-15416	0.076	0.835	0.006	0.083	EW	-	NA
1131	N. Santiam, Winter, 1986	31703-15417	0.063	0.842	0.059	0.036	EW	-	NA
1132	N. Santiam, Winter, 1986	31703-15418	0.018	0.967	0.003	0.012	EW	-	NA
1133	N. Santiam, Winter, 1986	31703-15419	0.014	0.969	0.012	0.005	EW	-	NA
1134	N. Santiam, Winter, 1986	31703-15420	0.980	0.012	0.001	0.007	S	-	NA
1135	N. Santiam, Winter, 1986	31703-15421	0.949	0.027	0.003	0.021	S	-	NA
1136	N. Santiam, Winter, 1986	31703-15422	0.014	0.967	0.009	0.010	EW	-	NA
1137	N. Santiam, Winter, 1986	31703-15424	0.023	0.909	0.033	0.035	EW	-	NA
1138	N. Santiam, Winter, 1986	31703-15425	0.033	0.943	0.011	0.013	EW	-	NA
1139	N. Santiam, Summer, 1987	31704-15474	0.011	0.980	0.002	0.007	EW	-	NA
1140	N. Santiam, Summer, 1987	31704-15475	0.808	0.079	0.016	0.097	S	-	NA
1141	N. Santiam, Summer, 1987	31704-15476	0.021	0.954	0.003	0.022	EW	-	NA
1142	N. Santiam, Summer, 1987	31704-15478	0.874	0.062	0.002	0.063	S	-	NA
1143	N. Santiam, Summer, 1987	31704-15479	0.933	0.023	0.001	0.043	S	-	NA
1144	N. Santiam, Summer, 1987	31704-15480	0.945	0.025	0.002	0.028	S	-	NA
1145	N. Santiam, Summer, 1987	31704-15481	0.958	0.032	0.003	0.006	S	-	NA
1146	N. Santiam, Summer, 1987	31704-15483	0.887	0.096	0.003	0.014	S	-	NA

1147	N. Santiam, Summer, 1987	31704-15484	0.880	0.055	0.005	0.059	S	-	NA
1148	N. Santiam, Summer, 1987	31704-15485	0.964	0.019	0.006	0.012	S	-	NA
1149	N. Santiam, Summer, 1987	31704-15486	0.901	0.083	0.003	0.013	S	-	NA
1150	N. Santiam, Summer, 1987	31704-15487	0.936	0.054	0.002	0.008	S	-	NA
1151	N. Santiam, Summer, 1987	31704-15488	0.834	0.093	0.003	0.070	S	-	NA
1152	N. Santiam, Summer, 1987	31704-15489	0.882	0.101	0.004	0.012	S	-	NA
1153	N. Santiam, Summer, 1987	31704-15490	0.844	0.133	0.003	0.020	S	-	NA
1154	N. Santiam, Summer, 1987	31704-15491	0.907	0.069	0.002	0.021	S	-	NA
1155	Willamette Falls, Smolt, 2009	90357-1	0.072	0.797	0.016	0.115	EW	EW	0.9999
1156	Willamette Falls, Smolt, 2009	90357-2	0.050	0.027	0.005	0.918	WW	EW	0.6294
1157	Willamette Falls, Smolt, 2009	90357-3	0.018	0.029	0.002	0.951	WW	WW	0.9984
1158	Willamette Falls, Smolt, 2009	90357-4	0.095	0.844	0.010	0.051	EW	EW	1
1159	Willamette Falls, Smolt, 2009	90357-5	0.012	0.973	0.002	0.013	EW	EW	1
1160	Willamette Falls, Smolt, 2009	90357-6	0.970	0.021	0.002	0.007	S	S	0.9999
1161	Willamette Falls, Smolt, 2009	90357-7	0.051	0.905	0.037	0.007	EW	EW	1
1162	Willamette Falls, Smolt, 2009	90357-8	0.199	0.077	0.003	0.721	WW	WW	0.9832
1163	Willamette Falls, Smolt, 2009	90357-9	0.014	0.978	0.002	0.006	EW	EW	1
1164	Willamette Falls, Smolt, 2009	90357-10	0.017	0.967	0.003	0.013	EW	EW	1
1165	Willamette Falls, Smolt, 2009	90357-11	0.049	0.847	0.087	0.017	EW	EW	1
1166	Willamette Falls, Smolt, 2009	90357-12	0.927	0.047	0.002	0.025	S	S	1
1167	Willamette Falls, Smolt, 2009	90357-13	0.027	0.958	0.011	0.005	EW	EW	1
1168	Willamette Falls, Smolt, 2009	90357-14	0.100	0.146	0.107	0.648	WW	EW	0.9997
1169	Willamette Falls, Smolt, 2009	90357-15	0.022	0.037	0.002	0.938	WW	WW	0.9869
1170	Willamette Falls, Smolt, 2009	90357-16	0.032	0.886	0.002	0.080	EW	EW	1
1171	Willamette Falls, Smolt, 2009	90357-17	0.124	0.823	0.027	0.026	EW	EW	1
1172	Willamette Falls, Smolt, 2009	90357-18	0.041	0.801	0.031	0.126	EW	EW	1
1173	Willamette Falls, Smolt, 2009	90357-19	0.063	0.924	0.002	0.011	EW	EW	1
1174	Willamette Falls, Smolt, 2009	90357-20	0.151	0.034	0.003	0.811	WW	WW	0.9982
1175	Willamette Falls, Smolt, 2009	90357-21	0.033	0.921	0.005	0.041	EW	EW	1
1176	Willamette Falls, Smolt, 2009	90357-22	0.020	0.058	0.003	0.920	WW	WW	0.9982
1177	Willamette Falls, Smolt, 2009	90357-23	0.045	0.855	0.009	0.092	EW	EW	1
1178	Willamette Falls, Smolt, 2009	90357-24	0.088	0.067	0.027	0.818	WW	EW	0.8241
1179	Willamette Falls, Smolt, 2009	90357-25	0.029	0.194	0.013	0.764	WW	EW	0.9833
1180	Willamette Falls, Smolt, 2009	90357-26	0.051	0.898	0.006	0.044	EW	EW	1
1181	Willamette Falls, Smolt, 2009	90357-27	0.017	0.826	0.080	0.077	EW	EW	1
1182	Willamette Falls, Smolt, 2009	90357-28	0.039	0.884	0.068	0.009	EW	EW	0.9999
1183	Willamette Falls, Smolt, 2009	90357-29	0.064	0.049	0.004	0.883	WW	WW	0.9995
1184	Willamette Falls, Smolt, 2009	90357-30	0.041	0.939	0.004	0.016	EW	EW	1
1185	Willamette Falls, Smolt, 2009	90357-31	0.735	0.227	0.016	0.022	SxEW	S	0.6318
1186	Willamette Falls, Smolt, 2009	90357-32	0.053	0.924	0.006	0.017	EW	EW	0.9981

1187	Willamette Falls, Smolt, 2009	90357-33	0.050	0.917	0.001	0.032	EW	EW	1
1188	Willamette Falls, Smolt, 2009	90357-34	0.102	0.781	0.091	0.026	EW	EW	0.9963
1189	Willamette Falls, Smolt, 2009	90357-35	0.138	0.807	0.011	0.044	EW	EW	0.9484
1190	Willamette Falls, Smolt, 2009	90357-36	0.037	0.923	0.001	0.039	EW	EW	1
1191	Willamette Falls, Smolt, 2009	90357-37	0.134	0.807	0.011	0.049	EW	EW	0.9484
1192	Willamette Falls, Smolt, 2009	90357-38	0.031	0.939	0.003	0.027	EW	EW	1
1193	Willamette Falls, Smolt, 2009	90357-39	0.143	0.491	0.007	0.360	WWxEW	EW	0.9998
1194	Willamette Falls, Smolt, 2009	90357-40	0.016	0.967	0.004	0.014	EW	EW	1
1195	Willamette Falls, Smolt, 2009	90357-41	0.040	0.939	0.007	0.015	EW	EW	1
1196	Willamette Falls, Smolt, 2009	90357-42	0.012	0.977	0.004	0.007	EW	EW	1
1197	Willamette Falls, Smolt, 2009	90357-43	0.127	0.504	0.004	0.365	WWxEW	EW	0.9958
1198	Willamette Falls, Smolt, 2009	90357-44	0.026	0.683	0.002	0.288	WWxEW	EW	1
1199	Willamette Falls, Smolt, 2009	90357-45	0.076	0.871	0.017	0.036	EW	EW	0.9999
1200	Willamette Falls, Smolt, 2009	90357-46	0.217	0.728	0.001	0.055	SxEW	EW	1
1201	Willamette Falls, Smolt, 2009	90357-47	0.067	0.910	0.010	0.013	EW	EW	1
1202	Willamette Falls, Smolt, 2009	90357-48	0.160	0.080	0.005	0.755	WW	EW	0.6888
1203	Willamette Falls, Smolt, 2009	90357-49	0.064	0.110	0.005	0.820	WW	EW	0.9237
1204	Willamette Falls, Smolt, 2009	90357-50	0.116	0.795	0.015	0.074	EW	EW	1
1205	Willamette Falls, Smolt, 2009	90357-51	0.014	0.968	0.005	0.013	EW	EW	1
1206	Willamette Falls, Smolt, 2009	90357-52	0.031	0.912	0.021	0.036	EW	EW	1
1207	Willamette Falls, Smolt, 2009	90357-53	0.024	0.953	0.009	0.014	EW	EW	1
1208	Willamette Falls, Smolt, 2009	90357-54	0.056	0.923	0.005	0.017	EW	EW	1
1209	Willamette Falls, Smolt, 2009	90357-55	0.012	0.966	0.009	0.013	EW	EW	1
1210	Willamette Falls, Smolt, 2009	90357-56	0.089	0.744	0.003	0.163	EW	EW	1
1211	Willamette Falls, Smolt, 2009	90357-57	0.030	0.921	0.004	0.045	EW	EW	1
1212	Willamette Falls, Smolt, 2009	90357-58	0.056	0.419	0.012	0.513	WWxEW	EW	0.937
1213	Willamette Falls, Smolt, 2009	90357-59	0.860	0.114	0.006	0.020	S	S	1
1214	Willamette Falls, Smolt, 2009	90357-60	0.025	0.966	0.003	0.007	EW	EW	1
1215	Willamette Falls, Smolt, 2009	90357-61	0.060	0.093	0.038	0.809	WW	EW	0.968
1216	Willamette Falls, Smolt, 2009	90357-62	0.056	0.935	0.003	0.005	EW	EW	1
1217	Willamette Falls, Smolt, 2009	90357-63	0.015	0.966	0.002	0.017	EW	EW	1
1218	Willamette Falls, Smolt, 2009	90357-64	0.038	0.926	0.003	0.033	EW	EW	0.9803
1219	Willamette Falls, Smolt, 2009	90357-65	0.929	0.048	0.009	0.015	S	S	0.9999
1220	Willamette Falls, Smolt, 2009	90357-66	0.041	0.283	0.002	0.675	WWxEW	EW	0.9997
1221	Willamette Falls, Smolt, 2009	90357-67	0.037	0.046	0.003	0.914	WW	WW	0.9934
1222	Willamette Falls, Smolt, 2009	90357-68	0.028	0.212	0.004	0.756	WWxEW	WW	0.9608
1223	Willamette Falls, Smolt, 2009	90357-69	0.018	0.950	0.010	0.022	EW	EW	1
1224	Willamette Falls, Smolt, 2009	90357-70	0.193	0.727	0.008	0.072	EW	EW	0.9989
1225	Willamette Falls, Smolt, 2009	90357-71	0.034	0.886	0.007	0.074	EW	EW	1
1226	Willamette Falls, Smolt, 2009	90357-72	0.018	0.410	0.008	0.564	WWxEW	WW	0.9636

1227	Willamette Falls, Smolt, 2009	90357-73	0.168	0.778	0.014	0.040	EW	EW	1
1228	Willamette Falls, Smolt, 2009	90357-74	0.088	0.872	0.002	0.037	EW	EW	1
1229	Willamette Falls, Smolt, 2009	90357-75	0.028	0.352	0.003	0.616	WWxEW	EW	0.9756
1230	Willamette Falls, Smolt, 2009	90357-76	0.043	0.382	0.003	0.572	WWxEW	EW	0.9985
1231	Willamette Falls, Smolt, 2009	90357-77	0.067	0.896	0.001	0.036	EW	EW	1
1232	Willamette Falls, Smolt, 2009	90357-78	0.021	0.418	0.014	0.547	WWxEW	EW	1
1233	Willamette Falls, Smolt, 2009	90357-79	0.040	0.940	0.009	0.011	EW	EW	1
1234	Willamette Falls, Smolt, 2009	90357-80	0.020	0.934	0.033	0.013	EW	EW	1
1235	Willamette Falls, Smolt, 2009	90357-81	0.032	0.018	0.009	0.941	WW	WW	0.9227
1236	Willamette Falls, Smolt, 2009	90357-82	0.139	0.844	0.004	0.012	EW	EW	1
1237	Willamette Falls, Smolt, 2009	90357-83	0.116	0.440	0.013	0.431	WWxEW	WW	1
1238	Willamette Falls, Smolt, 2009	90357-84	0.082	0.803	0.005	0.110	EW	EW	1
1239	Willamette Falls, Smolt, 2009	90357-85	0.017	0.974	0.002	0.007	EW	EW	1
1240	Willamette Falls, Smolt, 2009	90357-86	0.021	0.729	0.109	0.140	EW	EW	1
1241	Willamette Falls, Smolt, 2009	90357-87	0.039	0.400	0.018	0.543	WWxEW	EW	0.7582
1242	Willamette Falls, Smolt, 2009	90357-88	0.044	0.882	0.004	0.070	EW	EW	1
1243	Willamette Falls, Smolt, 2009	90357-89	0.021	0.965	0.003	0.011	EW	EW	1
1244	Willamette Falls, Smolt, 2009	90357-90	0.026	0.948	0.012	0.014	EW	EW	1
1245	Willamette Falls, Smolt, 2009	90357-91	0.062	0.905	0.015	0.018	EW	EW	1
1246	Willamette Falls, Smolt, 2009	90357-92	0.018	0.024	0.002	0.956	WW	WW	1
1247	Willamette Falls, Smolt, 2009	90357-93	0.082	0.905	0.002	0.011	EW	EW	1
1248	Willamette Falls, Smolt, 2009	90357-94	0.164	0.815	0.007	0.014	EW	EW	1
1249	Willamette Falls, Smolt, 2009	90357-95	0.731	0.205	0.040	0.024	SxEW	EW	0.8787
1250	Willamette Falls, Smolt, 2009	90357-96	0.096	0.118	0.004	0.782	WW	EW	0.5441
1251	Willamette Falls, Smolt, 2009	90357-97	0.030	0.598	0.014	0.358	WWxEW	EW	0.9991
1252	Willamette Falls, Smolt, 2009	90357-98	0.073	0.902	0.002	0.023	EW	EW	1
1253	Willamette Falls, Smolt, 2009	90357-99	0.099	0.398	0.026	0.477	WWxEW	EW	0.9995
1254	Willamette Falls, Smolt, 2009	90357-100	0.014	0.967	0.006	0.013	EW	EW	1
1255	Willamette Falls, Smolt, 2009	90357-102	0.191	0.773	0.028	0.009	EW	EW	0.9991
1256	Willamette Falls, Smolt, 2009	90357-103	0.958	0.031	0.002	0.009	S	S	1
1257	Willamette Falls, Smolt, 2009	90357-104	0.034	0.781	0.021	0.164	EW	EW	1
1258	Willamette Falls, Smolt, 2009	90357-105	0.935	0.050	0.002	0.012	S	S	0.9971
1259	Willamette Falls, Smolt, 2009	90357-106	0.038	0.930	0.005	0.027	EW	EW	1
1260	Willamette Falls, Smolt, 2009	90357-107	0.047	0.925	0.017	0.011	EW	EW	1
1261	Willamette Falls, Smolt, 2009	90357-108	0.272	0.712	0.006	0.011	SxEW	EW	1
1262	Willamette Falls, Smolt, 2009	90357-109	0.019	0.962	0.003	0.016	EW	EW	1
1263	Willamette Falls, Smolt, 2009	90357-110	0.024	0.948	0.005	0.023	EW	EW	1
1264	Willamette Falls, Smolt, 2009	90357-111	0.226	0.516	0.024	0.235	3x	EW	0.9998
1265	Willamette Falls, Smolt, 2009	90357-112	0.056	0.726	0.002	0.216	WWxEW	EW	1
1266	Willamette Falls, Smolt, 2009	90357-113	0.022	0.960	0.003	0.016	EW	EW	1

1267	Willamette Falls, Smolt, 2009	90357-114	0.019	0.959	0.003	0.019	EW	EW	1
1268	Willamette Falls, Smolt, 2009	90357-115	0.813	0.111	0.061	0.015	S	S	0.9951
1269	Willamette Falls, Smolt, 2009	90357-116	0.028	0.945	0.002	0.026	EW	EW	1
1270	Willamette Falls, Smolt, 2009	90357-117	0.025	0.228	0.007	0.740	WWxEW	EW	0.9969
1271	Willamette Falls, Smolt, 2009	90357-119	0.253	0.399	0.003	0.345	3x	EW	1
1272	Willamette Falls, Smolt, 2009	90357-120	0.023	0.956	0.007	0.014	EW	EW	1
1273	Willamette Falls, Smolt, 2009	90357-121	0.020	0.965	0.005	0.010	EW	EW	1
1274	Willamette Falls, Smolt, 2009	90357-122	0.951	0.021	0.002	0.026	S	S	0.9991
1275	Willamette Falls, Smolt, 2009	90357-123	0.641	0.222	0.099	0.038	SxEW	S	0.6925
1276	Willamette Falls, Smolt, 2009	90357-124	0.141	0.729	0.014	0.116	EW	EW	0.9998
1277	Willamette Falls, Smolt, 2009	90357-126	0.033	0.909	0.048	0.010	EW	EW	1
1278	Willamette Falls, Smolt, 2009	90357-127	0.038	0.452	0.046	0.464	WWxEW	EW	1
1279	Willamette Falls, Smolt, 2009	90357-129	0.114	0.065	0.004	0.817	WW	EW	0.6618
1280	Willamette Falls, Smolt, 2009	90357-130	0.238	0.731	0.005	0.026	SxEW	EW	1
1281	Willamette Falls, Smolt, 2009	90357-131	0.253	0.732	0.005	0.009	SxEW	EW	1
1282	Willamette Falls, Smolt, 2009	90357-132	0.039	0.601	0.004	0.356	WWxEW	EW	0.9971
1283	Willamette Falls, Smolt, 2009	90357-133	0.046	0.936	0.003	0.015	EW	EW	1
1284	Willamette Falls, Smolt, 2009	90357-134	0.114	0.087	0.003	0.796	WW	EW	0.8967
1285	Willamette Falls, Smolt, 2009	90357-135	0.061	0.903	0.003	0.032	EW	EW	1
1286	Willamette Falls, Smolt, 2009	90357-136	0.082	0.109	0.006	0.804	WW	EW	0.6289
1287	Willamette Falls, Smolt, 2009	90357-137	0.137	0.248	0.003	0.612	WWxEW	EW	0.9957
1288	Willamette Falls, Smolt, 2009	90357-138	0.019	0.972	0.003	0.007	EW	EW	1
1289	Willamette Falls, Smolt, 2009	90357-139	0.060	0.098	0.004	0.838	WW	EW	0.7133
1290	Willamette Falls, Smolt, 2009	90357-140	0.042	0.930	0.011	0.017	EW	EW	1
1291	Willamette Falls, Smolt, 2009	90357-141	0.293	0.683	0.008	0.016	SxEW	EW	0.8802
1292	Willamette Falls, Smolt, 2009	90357-142	0.028	0.929	0.001	0.041	EW	EW	1
1293	Willamette Falls, Smolt, 2009	90357-143	0.019	0.964	0.005	0.012	EW	EW	1
1294	Willamette Falls, Smolt, 2009	90357-144	0.064	0.085	0.004	0.846	WW	WW	0.8214
1295	Willamette Falls, Smolt, 2009	90357-145	0.056	0.904	0.005	0.035	EW	EW	1
1296	Willamette Falls, Smolt, 2009	90357-146	0.694	0.215	0.003	0.088	SxEW	S	0.6484
1297	Willamette Falls, Smolt, 2009	90357-147	0.362	0.451	0.146	0.040	SxEW	EW	0.5802
1298	Willamette Falls, Smolt, 2009	90357-148	0.028	0.823	0.008	0.141	EW	EW	1
1299	Willamette Falls, Smolt, 2009	90357-149	0.202	0.763	0.023	0.012	SxEW	EW	0.9933
1300	Willamette Falls, Smolt, 2009	90357-150	0.020	0.062	0.005	0.913	WW	EW	0.5138
1301	Willamette Falls, Smolt, 2009	90357-151	0.050	0.907	0.027	0.017	EW	EW	1
1302	Willamette Falls, Smolt, 2009	90357-152	0.294	0.652	0.001	0.053	SxEW	EW	1
1303	Willamette Falls, Smolt, 2009	90357-153	0.014	0.975	0.004	0.007	EW	EW	1
1304	Willamette Falls, Smolt, 2009	90357-154	0.018	0.911	0.007	0.065	EW	EW	1
1305	Willamette Falls, Smolt, 2009	90357-155	0.013	0.011	0.001	0.975	WW	WW	0.951
1306	Willamette Falls, Smolt, 2009	90357-156	0.141	0.780	0.007	0.072	EW	EW	1

1307	Willamette Falls, Smolt, 2009	90357-157	0.178	0.013	0.002	0.806	WW	EW	0.9827
1308	Willamette Falls, Smolt, 2009	90357-158	0.047	0.702	0.004	0.247	WWxEW	EW	0.9901
1309	Willamette Falls, Smolt, 2009	90357-159	0.475	0.149	0.358	0.018	SxRB	EW	0.9924
1310	Willamette Falls, Smolt, 2009	90357-160	0.677	0.094	0.040	0.189	S	EW	0.6202
1311	Willamette Falls, Smolt, 2009	90357-161	0.048	0.525	0.005	0.422	WWxEW	EW	0.8461
1312	Willamette Falls, Smolt, 2009	90357-162	0.075	0.360	0.005	0.560	WWxEW	EW	0.9996
1313	Willamette Falls, Smolt, 2009	90357-163	0.089	0.888	0.005	0.018	EW	EW	1
1314	Willamette Falls, Smolt, 2009	90357-164	0.224	0.727	0.025	0.025	SxEW	EW	1
1315	Willamette Falls, Smolt, 2009	90357-165	0.792	0.148	0.014	0.046	S	S	0.9212
1316	Willamette Falls, Smolt, 2009	90357-166	0.020	0.969	0.004	0.007	EW	EW	1
1317	Willamette Falls, Smolt, 2009	90357-167	0.055	0.928	0.004	0.013	EW	EW	0.9999
1318	Willamette Falls, Smolt, 2009	90357-168	0.012	0.971	0.011	0.005	EW	EW	1
1319	Willamette Falls, Smolt, 2009	90357-169	0.063	0.925	0.001	0.011	EW	EW	1
1320	Willamette Falls, Smolt, 2009	90357-170	0.265	0.295	0.004	0.436	3x	EW	0.7849
1321	Willamette Falls, Smolt, 2009	90357-172	0.076	0.901	0.008	0.015	EW	EW	1
1322	Willamette Falls, Smolt, 2009	90357-173	0.058	0.899	0.028	0.014	EW	EW	1
1323	Willamette Falls, Smolt, 2009	90357-174	0.021	0.947	0.001	0.031	EW	EW	1
1324	Willamette Falls, Smolt, 2009	90357-175	0.035	0.334	0.003	0.628	WWxEW	EW	0.9933
1325	Willamette Falls, Smolt, 2009	90357-176	0.023	0.320	0.003	0.655	WWxEW	EW	0.521
1326	Willamette Falls, Smolt, 2009	90357-177	0.913	0.032	0.004	0.051	S	S	0.9888
1327	Willamette Falls, Smolt, 2009	90357-178	0.974	0.017	0.002	0.006	S	S	1
1328	Willamette Falls, Smolt, 2009	90357-179	0.152	0.075	0.004	0.769	WW	EW	0.9937
1329	Willamette Falls, Smolt, 2009	90357-180	0.136	0.056	0.002	0.806	WW	WW	0.7077
1330	Willamette Falls, Smolt, 2009	90357-181	0.727	0.201	0.013	0.059	SxEW	EW	0.7939
1331	Willamette Falls, Smolt, 2009	90357-182	0.701	0.159	0.102	0.037	S	EW	0.5409
1332	Willamette Falls, Smolt, 2009	90357-183	0.072	0.571	0.008	0.349	WWxEW	EW	0.9997
1333	Willamette Falls, Smolt, 2009	90357-184	0.205	0.072	0.028	0.696	SxWW	WW	0.6692
1334	Willamette Falls, Smolt, 2009	90357-185	0.018	0.631	0.002	0.349	WWxEW	EW	0.9444
1335	Willamette Falls, Smolt, 2009	90357-186	0.058	0.892	0.013	0.037	EW	EW	0.9996
1336	Willamette Falls, Smolt, 2009	90357-187	0.181	0.277	0.020	0.522	WWxEW	EW	0.9997
1337	Willamette Falls, Smolt, 2009	90357-188	0.019	0.923	0.002	0.056	EW	EW	0.9999
1338	Willamette Falls, Smolt, 2009	90357-189	0.113	0.772	0.004	0.111	EW	EW	0.9997
1339	Willamette Falls, Smolt, 2009	90357-190	0.029	0.572	0.029	0.371	WWxEW	EW	1
1340	Willamette Falls, Smolt, 2009	90357-192	0.015	0.917	0.003	0.065	EW	EW	1
1341	Willamette Falls, Smolt, 2009	90357-193	0.088	0.741	0.033	0.138	EW	EW	1
1342	Willamette Falls, Smolt, 2009	90357-194	0.953	0.033	0.002	0.011	S	S	1
1343	Willamette Falls, Smolt, 2009	90357-195	0.026	0.959	0.005	0.011	EW	EW	1
1344	Willamette Falls, Smolt, 2009	90357-196	0.013	0.952	0.010	0.025	EW	EW	1
1345	Willamette Falls, Smolt, 2009	90357-197	0.025	0.597	0.019	0.360	WWxEW	EW	0.9998
1346	Willamette Falls, Smolt, 2009	90357-198	0.011	0.977	0.002	0.010	EW	EW	1

1347	Willamette Falls, Smolt, 2009	90357-199	0.019	0.964	0.004	0.012	EW	EW	1
1348	Willamette Falls, Smolt, 2009	90357-200	0.024	0.111	0.004	0.860	WW	EW	0.9622
1349	Willamette Falls, Smolt, 2009	90357-201	0.020	0.968	0.007	0.005	EW	EW	1
1350	Willamette Falls, Smolt, 2009	90357-202	0.057	0.508	0.003	0.432	WWxEW	EW	1
1351	Willamette Falls, Smolt, 2009	90357-203	0.100	0.855	0.005	0.041	EW	EW	1
1352	Willamette Falls, Smolt, 2009	90357-204	0.016	0.970	0.007	0.006	EW	EW	1
1353	Willamette Falls, Smolt, 2009	90357-205	0.022	0.967	0.004	0.006	EW	EW	1
1354	Willamette Falls, Smolt, 2009	90357-206	0.716	0.226	0.048	0.010	SxEW	EW	0.8819
1355	Willamette Falls, Smolt, 2009	90357-208	0.280	0.587	0.022	0.111	SxEW	EW	0.9968
1356	Willamette Falls, Smolt, 2009	90357-209	0.015	0.974	0.004	0.007	EW	EW	1
1357	Willamette Falls, Smolt, 2009	90357-210	0.012	0.015	0.002	0.971	WW	WW	1
1358	Willamette Falls, Smolt, 2009	90357-211	0.716	0.227	0.005	0.053	SxEW	EW	0.9662
1359	Willamette Falls, Smolt, 2009	90357-212	0.950	0.028	0.001	0.021	S	S	1
1360	Willamette Falls, Smolt, 2009	90357-213	0.458	0.484	0.043	0.015	SxEW	EW	0.9977
1361	Willamette Falls, Smolt, 2009	90357-214	0.014	0.954	0.004	0.028	EW	EW	1
1362	Willamette Falls, Smolt, 2009	90357-215	0.026	0.957	0.007	0.010	EW	EW	1
1363	Willamette Falls, Smolt, 2009	90357-216	0.085	0.891	0.002	0.021	EW	EW	1
1364	Willamette Falls, Smolt, 2009	90357-217	0.019	0.951	0.004	0.026	EW	EW	1
1365	Willamette Falls, Smolt, 2009	90357-218	0.117	0.829	0.003	0.051	EW	EW	1
1366	Willamette Falls, Smolt, 2009	90357-219	0.962	0.024	0.002	0.011	S	S	1
1367	Willamette Falls, Smolt, 2009	90357-220	0.779	0.207	0.003	0.011	SxEW	S	0.9856
1368	Willamette Falls, Smolt, 2009	90357-221	0.024	0.702	0.266	0.007	EWxRB	EW	1
1369	Willamette Falls, Smolt, 2009	90357-222	0.339	0.603	0.005	0.053	SxEW	EW	0.9994
1370	Willamette Falls, Smolt, 2009	90357-223	0.048	0.943	0.004	0.005	EW	EW	1
1371	Willamette Falls, Smolt, 2009	90357-224	0.030	0.143	0.809	0.018	RB	EW	0.9553
1372	Willamette Falls, Smolt, 2009	90357-225	0.341	0.585	0.001	0.073	SxEW	EW	1
1373	Willamette Falls, Smolt, 2009	90357-226	0.102	0.778	0.022	0.098	EW	EW	1
1374	Willamette Falls, Smolt, 2009	90357-227	0.026	0.016	0.002	0.957	WW	EW	0.9721
1375	Willamette Falls, Smolt, 2009	90357-228	0.022	0.020	0.002	0.956	WW	WW	0.9997
1376	Willamette Falls, Smolt, 2009	90357-229	0.039	0.779	0.008	0.174	EW	EW	0.9999
1377	Willamette Falls, Smolt, 2009	90357-230	0.030	0.934	0.002	0.035	EW	EW	1
1378	Willamette Falls, Smolt, 2009	90357-231	0.964	0.018	0.001	0.016	S	S	0.9999
1379	Willamette Falls, Smolt, 2009	90357-232	0.034	0.954	0.004	0.008	EW	EW	1
1380	Willamette Falls, Smolt, 2009	90357-233	0.081	0.773	0.005	0.141	EW	EW	1
1381	Willamette Falls, Smolt, 2009	90357-234	0.019	0.895	0.011	0.075	EW	EW	1
1382	Willamette Falls, Smolt, 2009	90357-235	0.026	0.103	0.001	0.869	WW	EW	0.9977
1383	Willamette Falls, Smolt, 2009	90357-236	0.071	0.056	0.005	0.868	WW	EW	0.9869
1384	Willamette Falls, Smolt, 2009	90357-237	0.960	0.031	0.003	0.006	S	S	1
1385	Willamette Falls, Smolt, 2009	90357-238	0.044	0.394	0.003	0.558	WWxEW	EW	0.99
1386	Willamette Falls, Smolt, 2009	90357-239	0.445	0.410	0.077	0.067	SxEW	EW	0.9995

1387	Willamette Falls, Smolt, 2009	90357-240	0.429	0.387	0.168	0.015	SxEW	EW	0.9956
1388	Willamette Falls, Smolt, 2009	90357-242	0.190	0.786	0.004	0.020	EW	EW	0.9999
1389	Willamette Falls, Smolt, 2009	90357-243	0.076	0.873	0.002	0.049	EW	EW	1
1390	Willamette Falls, Smolt, 2009	90357-244	0.863	0.084	0.002	0.050	S	S	0.9994
1391	Willamette Falls, Smolt, 2009	90357-245	0.023	0.957	0.013	0.008	EW	EW	1
1392	Willamette Falls, Smolt, 2009	90357-246	0.022	0.862	0.002	0.114	EW	EW	1
1393	Willamette Falls, Smolt, 2009	90357-247	0.041	0.021	0.002	0.935	WW	EW	0.5978
1394	Willamette Falls, Smolt, 2009	90357-248	0.014	0.975	0.003	0.009	EW	EW	1
1395	Willamette Falls, Smolt, 2010	90450-1	0.043	0.910	0.002	0.045	EW	EW	1
1396	Willamette Falls, Smolt, 2010	90450-2	0.016	0.964	0.004	0.016	EW	EW	1
1397	Willamette Falls, Smolt, 2010	90450-4	0.255	0.686	0.047	0.012	SxEW	EW	0.9997
1398	Willamette Falls, Smolt, 2010	90450-5	0.055	0.593	0.001	0.351	WWxEW	EW	0.9867
1399	Willamette Falls, Smolt, 2010	90450-8	0.030	0.937	0.008	0.025	EW	EW	1
1400	Willamette Falls, Smolt, 2010	90450-11	0.269	0.619	0.027	0.085	SxEW	EW	0.9593
1401	Willamette Falls, Smolt, 2010	90450-15	0.090	0.729	0.003	0.178	EW	EW	1
1402	Willamette Falls, Smolt, 2010	90450-17	0.015	0.955	0.005	0.025	EW	EW	1
1403	Willamette Falls, Smolt, 2010	90450-18	0.036	0.083	0.002	0.879	WW	EW	0.9998
1404	Willamette Falls, Smolt, 2010	90450-19	0.015	0.876	0.004	0.105	EW	EW	1
1405	Willamette Falls, Smolt, 2010	90450-20	0.913	0.060	0.005	0.021	S	S	0.9716
1406	Willamette Falls, Smolt, 2010	90450-21	0.938	0.032	0.001	0.029	S	S	1
1407	Willamette Falls, Smolt, 2010	90450-22	0.647	0.212	0.015	0.125	SxEW	S	0.9929
1408	Willamette Falls, Smolt, 2010	90450-23	0.032	0.953	0.008	0.007	EW	EW	1
1409	Willamette Falls, Smolt, 2010	90450-24	0.948	0.042	0.004	0.006	S	S	1
1410	Willamette Falls, Smolt, 2010	90450-25	0.192	0.782	0.013	0.014	EW	EW	0.8503
1411	Willamette Falls, Smolt, 2010	90450-26	0.021	0.935	0.036	0.009	EW	EW	0.9955
1412	Willamette Falls, Smolt, 2010	90450-27	0.028	0.941	0.010	0.020	EW	EW	1
1413	Willamette Falls, Smolt, 2010	90450-28	0.110	0.846	0.003	0.040	EW	EW	1
1414	Willamette Falls, Smolt, 2010	90450-29	0.014	0.036	0.004	0.946	WW	WW	0.9994
1415	Willamette Falls, Smolt, 2010	90450-30	0.047	0.084	0.001	0.869	WW	EW	0.9981
1416	Willamette Falls, Smolt, 2010	90450-31	0.129	0.675	0.018	0.178	EW	EW	0.9999
1417	Willamette Falls, Smolt, 2010	90450-32	0.061	0.063	0.003	0.873	WW	EW	0.9368
1418	Willamette Falls, Smolt, 2010	90450-33	0.917	0.062	0.009	0.012	S	S	1
1419	Willamette Falls, Smolt, 2010	90450-35	0.602	0.380	0.003	0.016	SxEW	EW	0.6229
1420	Willamette Falls, Smolt, 2010	90450-36	0.057	0.825	0.105	0.014	EW	EW	1
1421	Willamette Falls, Smolt, 2010	90450-37	0.091	0.852	0.012	0.045	EW	EW	1
1422	Willamette Falls, Smolt, 2010	90450-38	0.034	0.925	0.002	0.039	EW	EW	1
1423	Willamette Falls, Smolt, 2010	90450-39	0.060	0.080	0.003	0.857	WW	WW	0.7487
1424	Willamette Falls, Smolt, 2010	90450-40	0.023	0.939	0.003	0.034	EW	EW	1
1425	Willamette Falls, Smolt, 2010	90450-41	0.170	0.343	0.002	0.485	WWxEW	EW	0.9996
1426	Willamette Falls, Smolt, 2010	90450-42	0.071	0.913	0.007	0.009	EW	EW	1

1427	Willamette Falls, Smolt, 2010	90450-43	0.072	0.909	0.005	0.014	EW	EW	1
1428	Willamette Falls, Smolt, 2010	90450-44	0.018	0.940	0.003	0.038	EW	EW	1
1429	Willamette Falls, Smolt, 2010	90450-45	0.039	0.043	0.003	0.916	WW	EW	0.9157
1430	Willamette Falls, Smolt, 2010	90450-46	0.011	0.976	0.007	0.005	EW	EW	1
1431	Willamette Falls, Smolt, 2010	90450-47	0.196	0.783	0.009	0.012	EW	EW	1
1432	Willamette Falls, Smolt, 2010	90450-49	0.949	0.040	0.005	0.007	S	S	1
1433	Willamette Falls, Smolt, 2010	90450-50	0.073	0.500	0.136	0.292	WWxEW	EW	1
1434	Willamette Falls, Smolt, 2010	90450-51	0.018	0.954	0.016	0.012	EW	EW	1
1435	Willamette Falls, Smolt, 2010	90450-52	0.019	0.050	0.003	0.928	WW	WW	0.9975
1436	Willamette Falls, Smolt, 2010	90450-53	0.025	0.955	0.009	0.012	EW	EW	1
1437	Willamette Falls, Smolt, 2010	90450-54	0.226	0.348	0.013	0.413	3x	EW	0.9674
1438	Willamette Falls, Smolt, 2010	90450-55	0.022	0.041	0.002	0.935	WW	WW	1
1439	Willamette Falls, Smolt, 2010	90450-56	0.499	0.482	0.006	0.013	SxEW	S	0.7111
1440	Willamette Falls, Smolt, 2010	90450-57	0.023	0.959	0.002	0.016	EW	EW	1
1441	Willamette Falls, Smolt, 2010	90450-59	0.032	0.911	0.006	0.051	EW	EW	1
1442	Willamette Falls, Smolt, 2010	90450-60	0.026	0.935	0.005	0.034	EW	EW	1
1443	Willamette Falls, Smolt, 2010	90450-61	0.074	0.887	0.008	0.031	EW	EW	1
1444	Willamette Falls, Smolt, 2010	90450-62	0.185	0.239	0.006	0.570	WWxEW	EW	0.9805
1445	Willamette Falls, Smolt, 2010	90450-63	0.060	0.930	0.001	0.009	EW	EW	1
1446	Willamette Falls, Smolt, 2010	90450-64	0.027	0.042	0.004	0.927	WW	WW	0.9938
1447	Willamette Falls, Smolt, 2010	90450-65	0.028	0.021	0.002	0.948	WW	WW	1
1448	Willamette Falls, Smolt, 2010	90450-66	0.042	0.823	0.004	0.131	EW	EW	0.9975
1449	Willamette Falls, Smolt, 2010	90450-67	0.027	0.947	0.003	0.023	EW	EW	0.9999
1450	Willamette Falls, Smolt, 2010	90450-68	0.022	0.962	0.006	0.010	EW	EW	1
1451	Willamette Falls, Smolt, 2010	90450-69	0.014	0.976	0.003	0.008	EW	EW	1
1452	Willamette Falls, Smolt, 2010	90450-70	0.025	0.811	0.157	0.007	EW	EW	0.9994
1453	Willamette Falls, Smolt, 2010	90450-72	0.041	0.601	0.001	0.357	WWxEW	EW	0.9999
1454	Willamette Falls, Smolt, 2010	90450-74	0.187	0.712	0.035	0.066	EW	EW	1
1455	Willamette Falls, Smolt, 2010	90450-75	0.268	0.652	0.006	0.073	SxEW	EW	1
1456	Willamette Falls, Smolt, 2010	90450-76	0.046	0.918	0.007	0.029	EW	EW	0.9994
1457	Willamette Falls, Smolt, 2010	90450-79	0.181	0.241	0.004	0.574	WWxEW	EW	0.9899
1458	Willamette Falls, Smolt, 2010	90450-80	0.227	0.386	0.001	0.386	3x	EW	0.9976
1459	Willamette Falls, Smolt, 2010	90450-81	0.132	0.787	0.006	0.075	EW	EW	0.9971
1460	Willamette Falls, Smolt, 2010	90450-82	0.021	0.885	0.013	0.080	EW	EW	1
1461	Willamette Falls, Smolt, 2010	90450-83	0.186	0.800	0.002	0.012	EW	EW	0.9984
1462	Willamette Falls, Smolt, 2010	90450-86	0.821	0.073	0.091	0.015	S	EW	0.5267
1463	Willamette Falls, Smolt, 2010	90450-87	0.013	0.933	0.017	0.038	EW	EW	1
1464	Willamette Falls, Smolt, 2010	90450-88	0.059	0.171	0.061	0.710	WW	EW	0.6198
1465	Willamette Falls, Smolt, 2010	90450-89	0.067	0.808	0.002	0.123	EW	EW	1
1466	Willamette Falls, Smolt, 2010	90450-91	0.129	0.231	0.538	0.102	EWxRB	EW	1

1467	Willamette Falls, Smolt, 2010	90450-93	0.964	0.024	0.003	0.010	S	S	1
1468	Willamette Falls, Smolt, 2010	90450-94	0.044	0.941	0.005	0.010	EW	EW	1
1469	Willamette Falls, Smolt, 2010	90450-96	0.053	0.923	0.001	0.023	EW	EW	1
1470	Willamette Falls, Smolt, 2010	90450-97	0.020	0.957	0.007	0.016	EW	EW	1
1471	Willamette Falls, Smolt, 2010	90450-99	0.067	0.074	0.004	0.856	WW	WW	0.5169
1472	Willamette Falls, Smolt, 2010	90450-100	0.103	0.765	0.039	0.093	EW	EW	1
1473	Willamette Falls, Smolt, 2010	90450-101	0.402	0.102	0.003	0.494	SxWW	EW	0.9989
1474	Willamette Falls, Smolt, 2010	90450-102	0.141	0.834	0.005	0.021	EW	EW	1
1475	Willamette Falls, Smolt, 2010	90450-106	0.032	0.275	0.005	0.688	WWxEW	EW	0.9964
1476	Willamette Falls, Smolt, 2010	90450-108	0.029	0.947	0.007	0.018	EW	EW	1
1477	Willamette Falls, Smolt, 2010	90450-109	0.040	0.943	0.006	0.012	EW	EW	1
1478	Willamette Falls, Smolt, 2010	90450-110	0.039	0.944	0.004	0.014	EW	EW	1
1479	Willamette Falls, Smolt, 2010	90450-111	0.967	0.024	0.001	0.008	S	S	1
1480	Willamette Falls, Smolt, 2010	90450-113	0.013	0.934	0.044	0.009	EW	EW	1
1481	Willamette Falls, Smolt, 2010	90450-115	0.050	0.069	0.002	0.879	WW	EW	0.9996
1482	Willamette Falls, Smolt, 2010	90450-116	0.044	0.728	0.011	0.217	WWxEW	EW	0.6623
1483	Willamette Falls, Smolt, 2010	90450-117	0.019	0.178	0.002	0.801	WW	EW	0.972
1484	Willamette Falls, Smolt, 2010	90450-118	0.126	0.849	0.004	0.022	EW	EW	0.9993
1485	Willamette Falls, Smolt, 2010	90450-119	0.128	0.813	0.013	0.045	EW	EW	0.7751
1486	Willamette Falls, Smolt, 2010	90450-120	0.042	0.865	0.008	0.086	EW	EW	1
1487	Willamette Falls, Smolt, 2010	90450-124	0.653	0.078	0.031	0.237	SxWW	EW	0.8736
1488	Willamette Falls, Smolt, 2010	90450-128	0.020	0.961	0.008	0.012	EW	EW	1
1489	Willamette Falls, Smolt, 2010	90450-129	0.037	0.923	0.012	0.027	EW	EW	1
1490	Willamette Falls, Smolt, 2010	90450-131	0.024	0.949	0.018	0.009	EW	EW	1
1491	Willamette Falls, Smolt, 2010	90450-132	0.069	0.044	0.001	0.886	WW	WW	0.5794
1492	Willamette Falls, Smolt, 2010	90450-133	0.025	0.035	0.003	0.937	WW	WW	0.9999
1493	Willamette Falls, Smolt, 2010	90450-135	0.016	0.974	0.005	0.005	EW	EW	1
1494	Willamette Falls, Smolt, 2010	90450-139	0.526	0.307	0.070	0.097	SxEW	S	0.6147
1495	Willamette Falls, Smolt, 2010	90450-144	0.025	0.914	0.003	0.058	EW	EW	1
1496	Willamette Falls, Smolt, 2010	90450-170	0.218	0.755	0.004	0.023	SxEW	EW	1
1497	Willamette Falls, Smolt, 2010	90450-172	0.027	0.963	0.005	0.005	EW	EW	1
1498	Willamette Falls, Smolt, 2010	90450-174	0.015	0.037	0.007	0.941	WW	WW	0.5317
1499	Willamette Falls, Smolt, 2010	90450-184	0.255	0.669	0.011	0.065	SxEW	EW	0.9999
1500	Willamette Falls, Smolt, 2010	90450-185	0.201	0.784	0.002	0.013	SxEW	EW	1
1501	Willamette Falls, Smolt, 2010	90450-186	0.897	0.087	0.003	0.013	S	S	0.9976
1502	Willamette Falls, Smolt, 2010	90450-195	0.021	0.954	0.016	0.009	EW	EW	1
1503	Willamette Falls, Smolt, 2010	90450-197	0.015	0.965	0.007	0.013	EW	EW	1
1504	Willamette Falls, Smolt, 2010	90450-205	0.013	0.019	0.001	0.968	WW	S	0.9674
1505	Willamette Falls, Smolt, 2010	90450-206	0.051	0.056	0.037	0.855	WW	WW	0.9969
1506	Willamette Falls, Smolt, 2010	90450-212	0.025	0.015	0.002	0.958	WW	WW	0.998

1507	Willamette Falls, Smolt, 2010	90450-213	0.093	0.750	0.002	0.155	EW	EW	1
1508	Willamette Falls, Smolt, 2010	90450-221	0.047	0.403	0.002	0.548	WWxEW	EW	0.8473
1509	Willamette Falls, Smolt, 2010	90450-222	0.042	0.734	0.002	0.222	WWxEW	EW	0.9996
1510	Willamette Falls, Smolt, 2010	90450-223	0.211	0.731	0.005	0.053	SxEW	EW	0.9967
1511	Willamette Falls, Smolt, 2010	90450-224	0.031	0.011	0.001	0.957	WW	EW	0.7147
1512	Willamette Falls, Smolt, 2010	90450-225	0.905	0.080	0.003	0.012	S	S	0.5057
1513	Willamette Falls, Smolt, 2010	90450-226	0.084	0.759	0.003	0.154	EW	EW	1
1514	Willamette Falls, Smolt, 2010	90450-227	0.343	0.459	0.001	0.196	SxEW	EW	1
1515	Willamette Falls, Smolt, 2010	90450-228	0.916	0.071	0.006	0.007	S	S	0.9959
1516	Willamette Falls, Smolt, 2010	90450-229	0.023	0.947	0.003	0.028	EW	EW	1
1517	Willamette Falls, Smolt, 2010	90450-230	0.051	0.931	0.006	0.012	EW	EW	1
1518	Willamette Falls, Smolt, 2010	90450-231	0.084	0.755	0.002	0.159	EW	EW	0.96
1519	Willamette Falls, Smolt, 2010	90450-232	0.024	0.966	0.003	0.007	EW	EW	1
1520	Willamette Falls, Smolt, 2010	90450-233	0.455	0.256	0.004	0.285	3x	EW	0.5538
1521	Willamette Falls, Smolt, 2010	90450-234	0.049	0.863	0.008	0.080	EW	EW	1
1522	Willamette Falls, Smolt, 2010	90450-235	0.024	0.046	0.002	0.927	WW	EW	0.9991
1523	Willamette Falls, Smolt, 2010	90450-236	0.034	0.957	0.003	0.007	EW	EW	1
1524	Willamette Falls, Smolt, 2010	90450-237	0.191	0.299	0.008	0.502	WWxEW	EW	0.9999
1525	Willamette Falls, Smolt, 2010	90450-238	0.027	0.221	0.026	0.726	WWxEW	EW	0.5987
1526	Willamette Falls, Smolt, 2010	90450-239	0.062	0.903	0.003	0.032	EW	EW	1
1527	Willamette Falls, Smolt, 2010	90450-241	0.881	0.099	0.005	0.015	S	S	0.9598
1528	Willamette Falls, Smolt, 2010	90450-242	0.594	0.332	0.025	0.049	SxEW	EW	0.9991
1529	Willamette Falls, Smolt, 2010	90450-244	0.018	0.971	0.003	0.008	EW	EW	1
1530	Willamette Falls, Smolt, 2010	90450-245	0.066	0.916	0.004	0.014	EW	EW	0.9981
1531	Willamette Falls, Smolt, 2010	90450-246	0.059	0.927	0.003	0.011	EW	EW	1
1532	Willamette Falls, Smolt, 2010	90450-248	0.035	0.717	0.238	0.010	EWxRB	EW	1
1533	Willamette Falls, Smolt, 2010	90450-249	0.015	0.075	0.002	0.907	WW	WW	0.8283
1534	Willamette Falls, Smolt, 2010	90450-250	0.098	0.714	0.013	0.176	EW	EW	1
1535	Willamette Falls, Smolt, 2010	90450-251	0.045	0.364	0.161	0.430	WWxEW	EW	1
1536	Willamette Falls, Smolt, 2010	90450-252	0.593	0.379	0.004	0.024	SxEW	EW	0.5938
1537	Willamette Falls, Smolt, 2010	90450-253	0.105	0.760	0.046	0.089	EW	EW	1
1538	Willamette Falls, Smolt, 2010	90450-254	0.165	0.071	0.003	0.761	WW	EW	0.9976
1539	Willamette Falls, Smolt, 2010	90450-255	0.947	0.020	0.004	0.029	S	S	0.9999
1540	Willamette Falls, Smolt, 2010	90450-260	0.438	0.213	0.006	0.343	3x	WW	0.9366
1541	Willamette Falls, Smolt, 2010	90450-261	0.019	0.035	0.005	0.942	WW	WW	0.9781
1542	Willamette Falls, Smolt, 2010	90450-262	0.226	0.738	0.006	0.030	SxEW	EW	1
1543	Willamette Falls, Smolt, 2010	90450-263	0.044	0.913	0.002	0.040	EW	EW	1
1544	Willamette Falls, Smolt, 2010	90450-264	0.119	0.861	0.002	0.018	EW	EW	1
1545	Willamette Falls, Smolt, 2010	90450-265	0.035	0.167	0.009	0.788	WW	EW	0.6045
1546	Willamette Falls, Smolt, 2010	90450-267	0.016	0.975	0.004	0.006	EW	EW	1

1547	Willamette Falls, Smolt, 2010	90450-268	0.048	0.915	0.019	0.018	EW	EW	1
1548	Willamette Falls, Smolt, 2010	90450-269	0.014	0.479	0.002	0.506	WWxEW	EW	0.9988
1549	Willamette Falls, Smolt, 2010	90450-270	0.024	0.954	0.002	0.021	EW	EW	1
1550	Willamette Falls, Smolt, 2010	90450-272	0.071	0.864	0.025	0.040	EW	EW	1
1551	Willamette Falls, Smolt, 2010	90450-273	0.045	0.917	0.010	0.028	EW	EW	1
1552	Willamette Falls, Smolt, 2010	90450-274	0.156	0.774	0.008	0.062	EW	EW	1
1553	Willamette Falls, Smolt, 2010	90450-275	0.394	0.526	0.031	0.050	SxEW	EW	1
1554	Willamette Falls, Smolt, 2010	90450-276	0.079	0.322	0.006	0.593	WWxEW	EW	0.9483
1555	Willamette Falls, Smolt, 2010	90450-277	0.026	0.016	0.002	0.956	WW	EW	0.6571
1556	Willamette Falls, Smolt, 2010	90450-278	0.075	0.812	0.003	0.110	EW	EW	0.9999
1557	Willamette Falls, Smolt, 2010	90450-279	0.173	0.760	0.032	0.035	EW	EW	1
1558	Willamette Falls, Smolt, 2010	90450-280	0.924	0.059	0.003	0.014	S	S	0.7157
1559	Willamette Falls, Smolt, 2010	90450-281	0.032	0.946	0.014	0.008	EW	EW	1
1560	Willamette Falls, Smolt, 2010	90450-282	0.014	0.974	0.003	0.010	EW	EW	1
1561	Willamette Falls, Smolt, 2010	90450-283	0.822	0.028	0.002	0.148	S	S	0.8847
1562	Willamette Falls, Smolt, 2010	90450-284	0.036	0.643	0.005	0.317	WWxEW	EW	1
1563	Willamette Falls, Smolt, 2010	90450-285	0.940	0.040	0.002	0.017	S	S	0.9999
1564	Willamette Falls, Smolt, 2010	90450-286	0.020	0.967	0.005	0.008	EW	EW	1
1565	Willamette Falls, Smolt, 2010	90450-287	0.026	0.960	0.003	0.011	EW	EW	1
1566	Willamette Falls, Smolt, 2010	90450-288	0.072	0.279	0.003	0.646	WWxEW	EW	0.9924
1567	Willamette Falls, Smolt, 2010	90450-289	0.101	0.022	0.003	0.874	WW	WW	0.983
1568	Willamette Falls, Smolt, 2010	90450-290	0.087	0.883	0.023	0.007	EW	EW	1
1569	Willamette Falls, Smolt, 2010	90450-291	0.012	0.971	0.006	0.010	EW	EW	1
1570	Willamette Falls, Smolt, 2010	90450-292	0.920	0.042	0.004	0.033	S	S	1
1571	Willamette Falls, Smolt, 2010	90450-293	0.928	0.049	0.002	0.021	S	S	0.9962
1572	Willamette Falls, Smolt, 2010	90450-294	0.022	0.308	0.005	0.665	WWxEW	WW	0.9823
1573	Willamette Falls, Smolt, 2010	90450-295	0.171	0.791	0.022	0.016	EW	EW	1
1574	Willamette Falls, Smolt, 2010	90450-297	0.221	0.756	0.004	0.019	SxEW	EW	1
1575	Willamette Falls, Smolt, 2010	90450-298	0.410	0.546	0.004	0.040	SxEW	EW	0.9999
1576	Willamette Falls, Smolt, 2010	90450-299	0.029	0.948	0.004	0.020	EW	EW	1
1577	Willamette Falls, Smolt, 2010	90450-300	0.045	0.911	0.003	0.040	EW	EW	1
1578	Willamette Falls, Smolt, 2010	90450-301	0.061	0.909	0.018	0.011	EW	EW	1
1579	Willamette Falls, Smolt, 2010	90450-302	0.019	0.971	0.004	0.007	EW	EW	1
1580	Willamette Falls, Smolt, 2010	90450-303	0.095	0.851	0.004	0.050	EW	EW	1
1581	Willamette Falls, Smolt, 2010	90450-304	0.468	0.316	0.129	0.086	SxEW	EW	0.9998
1582	Willamette Falls, Smolt, 2010	90450-305	0.105	0.843	0.026	0.026	EW	EW	1
1583	Willamette Falls, Smolt, 2010	90450-306	0.016	0.969	0.006	0.009	EW	EW	1
1584	Willamette Falls, Smolt, 2010	90450-307	0.031	0.945	0.010	0.014	EW	EW	1
1585	Willamette Falls, Smolt, 2010	90450-310	0.016	0.968	0.003	0.013	EW	EW	1
1586	Willamette Falls, Smolt, 2010	90450-311	0.916	0.066	0.005	0.014	S	S	1

1587	Willamette Falls, Smolt, 2010	90450-314	0.012	0.018	0.001	0.969	WW	WW	0.9986
1588	Willamette Falls, Smolt, 2010	90450-317	0.325	0.506	0.008	0.161	SxEW	EW	0.999
1589	Willamette Falls, Smolt, 2010	90450-320	0.017	0.944	0.002	0.036	EW	EW	1
1590	Willamette Falls, Smolt, 2010	90450-322	0.039	0.182	0.007	0.772	WW	WW	1
1591	Willamette Falls, Smolt, 2010	90450-326	0.102	0.796	0.037	0.064	EW	EW	1
1592	Willamette Falls, Smolt, 2010	90450-327	0.079	0.863	0.006	0.051	EW	EW	0.9994
1593	Willamette Falls, Smolt, 2010	90450-390	0.028	0.091	0.003	0.878	WW	WW	0.888
1594	Willamette Falls, Smolt, 2010	90450-395	0.302	0.683	0.003	0.012	SxEW	EW	0.9984
1595	Willamette Falls, Smolt, 2010	90450-397	0.962	0.027	0.003	0.008	S	S	1
1596	Willamette Falls, Smolt, 2010	90450-398	0.051	0.432	0.003	0.514	WWxEW	WW	0.5777
1597	Willamette Falls, Smolt, 2010	90450-399	0.059	0.096	0.003	0.842	WW	EW	0.9801
1598	Willamette Falls, Smolt, 2010	90450-400	0.861	0.071	0.007	0.062	S	EW	0.9517
1599	Willamette Falls, Smolt, 2010	90450-404	0.029	0.955	0.007	0.009	EW	EW	0.9999
1600	Willamette Falls, Smolt, 2010	90450-408	0.019	0.952	0.003	0.027	EW	EW	1
1601	Willamette Falls, Smolt, 2010	90450-412	0.058	0.368	0.002	0.571	WWxEW	EW	0.995
1602	Willamette Falls, Smolt, 2010	90450-414	0.025	0.955	0.008	0.013	EW	EW	1
1603	Willamette Falls, Smolt, 2010	90450-417	0.034	0.953	0.003	0.010	EW	EW	1
1604	Willamette Falls, Smolt, 2010	90450-419	0.012	0.974	0.004	0.010	EW	EW	1
1605	Willamette Falls, Smolt, 2010	90450-426	0.227	0.288	0.011	0.474	3x	EW	1
1606	Willamette Falls, Smolt, 2010	90450-428	0.080	0.380	0.010	0.530	WWxEW	EW	0.8583
1607	Willamette Falls, Smolt, 2010	90450-429	0.029	0.942	0.020	0.008	EW	EW	1
1608	Willamette Falls, Smolt, 2010	90450-431	0.014	0.951	0.008	0.028	EW	EW	1
1609	Willamette Falls, Smolt, 2010	90450-433	0.030	0.904	0.054	0.012	EW	EW	1
1610	Willamette Falls, Smolt, 2010	90450-434	0.033	0.130	0.010	0.828	WW	WW	0.9207
1611	Willamette Falls, Smolt, 2010	90450-435	0.060	0.922	0.003	0.015	EW	EW	1
1612	Willamette Falls, Smolt, 2010	90450-438	0.197	0.762	0.015	0.026	EW	EW	1
1613	Willamette Falls, Smolt, 2010	90450-443	0.016	0.931	0.004	0.050	EW	EW	1
1614	Willamette Falls, Smolt, 2010	90450-447	0.010	0.979	0.003	0.008	EW	EW	1
1615	Willamette Falls, Smolt, 2010	90450-449	0.027	0.953	0.007	0.012	EW	EW	1
1616	Willamette Falls, Smolt, 2010	90450-450	0.023	0.963	0.002	0.012	EW	EW	1
1617	Willamette Falls, Smolt, 2010	90450-452	0.317	0.664	0.003	0.015	SxEW	EW	0.9638
1618	Willamette Falls, Smolt, 2010	90450-453	0.959	0.030	0.002	0.009	S	S	0.9997
1619	Willamette Falls, Smolt, 2010	90450-455	0.047	0.694	0.002	0.257	WWxEW	EW	0.9997
1620	Willamette Falls, Smolt, 2010	90450-459	0.150	0.801	0.018	0.031	EW	EW	0.9995
1621	Willamette Falls, Smolt, 2010	90450-460	0.137	0.790	0.003	0.071	EW	EW	0.9992
1622	Willamette Falls, Smolt, 2010	90450-462	0.100	0.879	0.004	0.018	EW	EW	1
1623	Willamette Falls, Smolt, 2010	90450-463	0.075	0.913	0.004	0.009	EW	EW	1
1624	Willamette Falls, Smolt, 2010	90450-468	0.975	0.016	0.002	0.007	S	S	0.9999
1625	Willamette Falls, Smolt, 2010	90450-472	0.955	0.035	0.001	0.009	S	S	0.9999
1626	Willamette Falls, Smolt, 2010	90450-473	0.437	0.138	0.200	0.226	SxWW	EW	0.9184

1627	Willamette Falls, Smolt, 2010	90450-475	0.017	0.969	0.006	0.008	EW	EW	1
1628	Willamette Falls, Smolt, 2010	90450-476	0.050	0.905	0.029	0.016	EW	EW	1
1629	Willamette Falls, Smolt, 2010	90450-478	0.018	0.541	0.002	0.439	WWxEW	EW	0.9999
1630	Willamette Falls, Smolt, 2010	90450-482	0.016	0.966	0.010	0.008	EW	EW	1
1631	Willamette Falls, Smolt, 2010	90450-488	0.012	0.959	0.007	0.022	EW	EW	1
1632	Willamette Falls, Smolt, 2010	90450-489	0.020	0.943	0.018	0.020	EW	EW	1
1633	Willamette Falls, Smolt, 2010	90450-493	0.055	0.905	0.005	0.035	EW	EW	1
1634	Willamette Falls, Smolt, 2010	90450-496	0.829	0.139	0.018	0.014	S	EW	0.6362
1635	Willamette Falls, Smolt, 2010	90450-497	0.021	0.919	0.029	0.031	EW	EW	1
1636	Willamette Falls, Smolt, 2010	90450-501	0.027	0.949	0.012	0.012	EW	EW	1
1637	Willamette Falls, Smolt, 2010	90450-506	0.047	0.069	0.015	0.869	WW	WW	0.7602
1638	Willamette Falls, Smolt, 2010	90450-507	0.041	0.942	0.003	0.015	EW	EW	1
1639	Willamette Falls, Smolt, 2010	90450-508	0.178	0.745	0.006	0.071	EW	EW	1
1640	Willamette Falls, Smolt, 2010	90450-509	0.018	0.964	0.005	0.012	EW	EW	1
1641	Willamette Falls, Smolt, 2010	90450-514	0.188	0.301	0.479	0.033	EWxRB	EW	0.9946
1642	Willamette Falls, Smolt, 2010	90450-517	0.867	0.097	0.021	0.016	S	S	0.9941
1643	Willamette Falls, Smolt, 2010	90450-518	0.016	0.956	0.006	0.021	EW	EW	1
1644	Willamette Falls, Smolt, 2010	90450-519	0.966	0.024	0.002	0.008	S	S	0.9992
1645	Willamette Falls, Smolt, 2010	90450-520	0.012	0.941	0.040	0.007	EW	EW	1
1646	Willamette Falls, Smolt, 2010	90450-522	0.221	0.081	0.004	0.694	SxWW	EW	0.8408
1647	Willamette Falls, Smolt, 2010	90450-528	0.948	0.038	0.002	0.012	S	S	1
1648	Willamette Falls, Smolt, 2010	90450-530	0.968	0.024	0.003	0.005	S	S	1
1649	Willamette Falls, Smolt, 2010	90450-540	0.959	0.030	0.003	0.008	S	S	1
1650	Willamette Falls, Smolt, 2010	90450-541	0.081	0.170	0.005	0.744	WW	EW	0.9888
1651	Willamette Falls, Smolt, 2010	90450-545	0.736	0.243	0.006	0.015	SxEW	S	0.9983
1652	Willamette Falls, Smolt, 2010	90450-548	0.069	0.826	0.002	0.103	EW	EW	1
1653	Willamette Falls, Smolt, 2010	90450-552	0.941	0.040	0.008	0.011	S	S	1
1654	Willamette Falls, Smolt, 2010	90450-554	0.027	0.944	0.003	0.026	EW	EW	1
1655	Willamette Falls, Smolt, 2010	90450-555	0.052	0.927	0.004	0.016	EW	EW	1
1656	Willamette Falls, Smolt, 2010	90450-556	0.052	0.937	0.003	0.008	EW	EW	1
1657	Willamette Falls, Smolt, 2010	90450-565	0.009	0.011	0.001	0.979	WW	WW	0.9837
1658	Willamette Falls, Smolt, 2010	90450-571	0.122	0.857	0.010	0.011	EW	EW	1
1659	Willamette Falls, Smolt, 2010	90450-572	0.870	0.054	0.006	0.069	S	S	0.9996
1660	Willamette Falls, Smolt, 2010	90450-574	0.032	0.773	0.012	0.183	EW	EW	0.9886
1661	Willamette Falls, Smolt, 2010	90450-575	0.421	0.567	0.004	0.008	SxEW	EW	1
1662	Willamette Falls, Smolt, 2010	90450-576	0.051	0.641	0.003	0.305	WWxEW	EW	0.9952
1663	Willamette Falls, Smolt, 2010	90450-577	0.936	0.042	0.005	0.018	S	S	0.9998
1664	Willamette Falls, Smolt, 2010	90450-578	0.951	0.034	0.001	0.014	S	S	0.9989
1665	Willamette Falls, Smolt, 2010	90450-579	0.970	0.020	0.002	0.008	S	S	1
1666	Willamette Falls, Smolt, 2010	90450-580	0.475	0.512	0.004	0.009	SxEW	S	0.8466

1667	Willamette Falls, Smolt, 2010	90450-581	0.030	0.950	0.010	0.011	EW	EW	1
1668	Willamette Falls, Smolt, 2010	90450-582	0.020	0.964	0.008	0.008	EW	EW	1
1669	Willamette Falls, Smolt, 2010	90450-583	0.030	0.464	0.014	0.491	WWxEW	EW	0.995
1670	Willamette Falls, Smolt, 2010	90450-584	0.056	0.869	0.005	0.070	EW	EW	1
1671	Willamette Falls, Smolt, 2010	90450-585	0.056	0.119	0.811	0.015	RB	EW	0.9993
1672	Willamette Falls, Smolt, 2010	90450-586	0.018	0.017	0.001	0.964	WW	WW	0.9984
1673	Willamette Falls, Smolt, 2010	90450-591	0.836	0.137	0.014	0.014	S	S	0.9999
1674	Willamette Falls, Smolt, 2010	90450-592	0.394	0.591	0.003	0.013	SxEW	EW	0.6068
1675	Willamette Falls, Smolt, 2010	90450-594	0.621	0.209	0.009	0.161	SxEW	WW	0.9661
1676	Willamette Falls, Smolt, 2010	90450-595	0.977	0.016	0.001	0.006	S	S	1
1677	Willamette Falls, Smolt, 2010	90450-596	0.090	0.884	0.009	0.017	EW	EW	1
1678	Willamette Falls, Smolt, 2010	90450-597	0.872	0.080	0.003	0.045	S	S	0.996
1679	Willamette Falls, Smolt, 2010	90450-598	0.286	0.505	0.135	0.075	SxEW	EW	0.9991
1680	Willamette Falls, Smolt, 2010	90450-599	0.660	0.326	0.005	0.010	SxEW	EW	0.5772
1681	Willamette Falls, Smolt, 2010	90450-600	0.857	0.118	0.007	0.018	S	S	0.6912
1682	Upper Willamette, Smolt, 2010	90451-601	0.075	0.182	0.521	0.222	WWxRB	EW	0.9219
1683	Upper Willamette, Smolt, 2010	90451-602	0.913	0.031	0.002	0.053	S	S	0.9999
1684	Upper Willamette, Smolt, 2010	90451-603	0.019	0.967	0.003	0.010	EW	EW	1
1685	Upper Willamette, Smolt, 2010	90451-701	0.019	0.939	0.023	0.019	EW	EW	1
1686	Upper Willamette, Smolt, 2010	90451-749	0.147	0.824	0.003	0.026	EW	EW	1
1687	Upper Willamette, Smolt, 2010	90451-750	0.020	0.898	0.047	0.036	EW	EW	1
1688	N. Santiam, Bennett, Adults, 2003	90452-1	0.040	0.939	0.007	0.014	EW	EW	1
1689	N. Santiam, Bennett, Adults, 2003	90452-3	0.531	0.412	0.003	0.054	SxEW	EW	0.9996
1690	N. Santiam, Bennett, Adults, 2003	90452-4	0.540	0.442	0.004	0.013	SxEW	EW	0.9025
1691	N. Santiam, Bennett, Adults, 2003	90452-5	0.352	0.605	0.005	0.038	SxEW	EW	0.8922
1692	N. Santiam, Bennett, Adults, 2003	90452-6	0.954	0.035	0.002	0.009	S	S	0.9354
1693	N. Santiam, Bennett, Adults, 2003	90452-7	0.043	0.833	0.006	0.118	EW	EW	1
1694	N. Santiam, Bennett, Adults, 2003	90452-8	0.303	0.675	0.005	0.016	SxEW	EW	1
1695	N. Santiam, Bennett, Adults, 2003	90452-9	0.592	0.386	0.005	0.017	SxEW	S	0.5005
1696	N. Santiam, Bennett, Adults, 2003	90452-10	0.134	0.818	0.009	0.038	EW	EW	1
1697	N. Santiam, Bennett, Adults, 2003	90452-11	0.700	0.266	0.011	0.023	SxEW	S	0.9025
1698	N. Santiam, Bennett, Adults, 2003	90452-12	0.576	0.336	0.038	0.050	SxEW	EW	0.9995
1699	N. Santiam, Bennett, Adults, 2003	90452-13	0.303	0.640	0.009	0.047	SxEW	EW	0.9999
1700	N. Santiam, Bennett, Adults, 2003	90452-14	0.746	0.225	0.003	0.026	SxEW	S	0.9843
1701	N. Santiam, Bennett, Adults, 2003	90452-15	0.522	0.318	0.046	0.114	SxEW	EW	0.8866
1702	N. Santiam, Bennett, Adults, 2003	90452-16	0.470	0.478	0.004	0.049	SxEW	EW	0.9999
1703	N. Santiam, Bennett, Adults, 2003	90452-17	0.157	0.812	0.012	0.020	EW	EW	1
1704	N. Santiam, Bennett, Adults, 2003	90452-18	0.298	0.309	0.026	0.366	3x	EW	0.986
1705	N. Santiam, Bennett, Adults, 2003	90452-19	0.527	0.423	0.004	0.046	SxEW	EW	0.9412
1706	N. Santiam, Bennett, Adults, 2003	90452-20	0.194	0.580	0.002	0.224	WWxEW	EW	0.9999

1707	N. Santiam, Bennett, Adults, 2003	90452-88	0.752	0.173	0.057	0.018	S	EW	0.942
1708	N. Santiam, Bennett, Adults, 2003	90452-170	0.647	0.335	0.004	0.015	SxEW	EW	0.9943
1709	N. Santiam, Bennett, Adults, 2003	90452-172	0.101	0.439	0.433	0.027	EWxRB	EW	0.9999
1710	N. Santiam, Bennett, Adults, 2003	90452-175	0.020	0.968	0.002	0.009	EW	EW	1
1711	N. Santiam, Bennett, Adults, 2003	90452-189	0.218	0.770	0.003	0.009	SxEW	EW	0.9996
1712	N. Santiam, Bennett, Adults, 2003	90452-204	0.085	0.888	0.006	0.021	EW	EW	0.9995
1713	N. Santiam, Bennett, Adults, 2003	90452-207	0.019	0.965	0.006	0.010	EW	EW	1
1714	N. Santiam, Bennett, Adults, 2003	90452-210	0.335	0.632	0.004	0.029	SxEW	EW	0.9749
1715	N. Santiam, Bennett, Adults, 2003	90452-217	0.409	0.540	0.002	0.048	SxEW	EW	1
1716	N. Santiam, Minto, Adults, 2010	90453-2200	0.160	0.818	0.005	0.017	EW	EW	1
1717	McKenzie R., Leaburg, Smolt, 2005	50623-2	0.944	0.036	0.003	0.017	S	S	0.997
1718	McKenzie R., Leaburg, Smolt, 2005	50623-3	0.948	0.040	0.004	0.008	S	S	0.9987
1719	McKenzie R., Leaburg, Smolt, 2005	50623-4	0.883	0.063	0.003	0.051	S	S	0.7931
1720	McKenzie R., Leaburg, Smolt, 2005	50623-5	0.952	0.037	0.002	0.009	S	S	0.9996
1721	McKenzie R., Leaburg, Smolt, 2005	50623-6	0.933	0.046	0.009	0.012	S	S	0.9985
1722	McKenzie R., Leaburg, Smolt, 2005	50623-7	0.962	0.021	0.003	0.014	S	S	1
1723	McKenzie R., Leaburg, Smolt, 2005	50623-9	0.931	0.059	0.004	0.007	S	S	0.9989
1724	McKenzie R., Leaburg, Smolt, 2005	50623-10	0.941	0.047	0.004	0.008	S	S	0.998
1725	McKenzie R., Leaburg, Smolt, 2005	50623-11	0.948	0.034	0.003	0.014	S	S	0.9987
1726	McKenzie R., Leaburg, Smolt, 2005	50623-12	0.967	0.023	0.002	0.008	S	S	1
1727	McKenzie R., Leaburg, Smolt, 2005	50623-13	0.951	0.035	0.003	0.010	S	S	1
1728	McKenzie R., Leaburg, Smolt, 2005	50623-14	0.961	0.022	0.005	0.011	S	S	1
1729	McKenzie R., Leaburg, Smolt, 2005	50623-16	0.872	0.100	0.010	0.018	S	S	0.9981
1730	McKenzie R., Leaburg, Smolt, 2005	50623-17	0.744	0.208	0.009	0.038	SxEW	EW	0.9249
1731	McKenzie R., Leaburg, Smolt, 2005	50623-18	0.889	0.089	0.002	0.019	S	S	0.9915
1732	McKenzie R., Leaburg, Smolt, 2005	50623-20	0.965	0.025	0.002	0.008	S	S	0.9999
1733	McKenzie R., Leaburg, Smolt, 2005	50623-21	0.937	0.039	0.013	0.011	S	S	0.9998
1734	McKenzie R., Leaburg, Smolt, 2005	50623-22	0.919	0.062	0.006	0.013	S	S	0.9999
1735	McKenzie R., Leaburg, Smolt, 2005	50623-23	0.886	0.065	0.003	0.046	S	S	0.9517
1736	McKenzie R., Leaburg, Smolt, 2005	50623-24	0.922	0.039	0.002	0.037	S	S	0.9995
1737	McKenzie R., Leaburg, Smolt, 2005	50623-25	0.951	0.024	0.002	0.023	S	S	0.9998
1738	McKenzie R., Leaburg, Smolt, 2005	50623-26	0.930	0.053	0.005	0.012	S	S	0.9984
1739	McKenzie R., Leaburg, Smolt, 2005	50623-27	0.161	0.780	0.007	0.052	EW	EW	0.9997
1740	McKenzie R., Leaburg, Smolt, 2005	50623-28	0.808	0.052	0.005	0.135	S	EW	0.8629
1741	McKenzie R., Leaburg, Smolt, 2005	50623-31	0.935	0.047	0.002	0.016	S	S	0.9997
1742	McKenzie R., Leaburg, Smolt, 2005	50623-33	0.828	0.085	0.005	0.082	S	S	0.9946
1743	McKenzie R., Leaburg, Smolt, 2005	50623-34	0.785	0.139	0.002	0.074	S	EW	0.8466
1744	McKenzie R., Leaburg, Smolt, 2005	50623-35	0.670	0.267	0.004	0.059	SxEW	S	0.9531
1745	McKenzie R., Leaburg, Smolt, 2005	50623-36	0.958	0.023	0.003	0.016	S	S	1
1746	McKenzie R., Leaburg, Smolt, 2005	50623-37	0.780	0.202	0.004	0.014	SxEW	EW	0.9632

1747	McKenzie R., Leaburg, Smolt, 2005	50623-38	0.915	0.044	0.004	0.037	S	S	0.9986
1748	McKenzie R., Leaburg, Smolt, 2005	50623-41	0.920	0.031	0.002	0.047	S	S	0.9988
1749	McKenzie R., Leaburg, Smolt, 2005	50623-42	0.975	0.014	0.001	0.009	S	S	0.9998
1750	McKenzie R., Leaburg, Smolt, 2005	50623-43	0.942	0.041	0.005	0.012	S	S	0.9997
1751	McKenzie R., Leaburg, Smolt, 2005	50623-45	0.870	0.092	0.007	0.032	S	S	0.9596
1752	McKenzie R., Leaburg, Smolt, 2005	50623-46	0.947	0.041	0.004	0.007	S	S	1
1753	McKenzie R., Leaburg, Smolt, 2005	50623-47	0.910	0.072	0.003	0.015	S	S	1
1754	McKenzie R., Leaburg, Smolt, 2005	50623-48	0.889	0.054	0.036	0.021	S	S	0.5249
1755	McKenzie R., Leaburg, Smolt, 2005	50623-49	0.964	0.026	0.001	0.009	S	S	0.9995
1756	McKenzie R., Leaburg, Smolt, 2005	50623-50	0.778	0.134	0.076	0.012	S	S	0.9
1757	McKenzie R., Leaburg, Smolt, 2005	50623-51	0.900	0.069	0.023	0.008	S	S	0.9991
1758	McKenzie R., Leaburg, Smolt, 2005	50623-52	0.914	0.023	0.001	0.062	S	S	0.9999
1759	McKenzie R., Leaburg, Smolt, 2005	50623-53	0.829	0.099	0.061	0.011	S	S	0.6155
1760	McKenzie R., Leaburg, Smolt, 2005	50623-54	0.557	0.388	0.021	0.034	SxEW	EW	0.7429
1761	McKenzie R., Leaburg, Smolt, 2005	50623-55	0.679	0.061	0.010	0.251	SxWW	S	0.8676
1762	McKenzie R., Leaburg, Smolt, 2005	50623-56	0.892	0.043	0.012	0.054	S	S	0.9999
1763	McKenzie R., Leaburg, Smolt, 2005	50623-57	0.546	0.379	0.061	0.015	SxEW	EW	0.8538
1764	McKenzie R., Leaburg, Smolt, 2005	50623-58	0.881	0.069	0.033	0.016	S	S	0.9234
1765	McKenzie R., Leaburg, Smolt, 2005	50623-59	0.868	0.105	0.009	0.018	S	S	0.9801
1766	McKenzie R., Leaburg, Smolt, 2005	50623-61	0.829	0.100	0.047	0.024	S	S	0.9148
1767	McKenzie R., Leaburg, Smolt, 2005	50623-62	0.212	0.101	0.664	0.022	SxRB	EW	0.979
1768	McKenzie R., Leaburg, Smolt, 2005	50623-63	0.962	0.018	0.002	0.018	S	S	1
1769	McKenzie R., Leaburg, Smolt, 2005	50623-64	0.847	0.121	0.004	0.029	S	EW	0.8131
1770	McKenzie R., Leaburg, Smolt, 2005	50623-65	0.918	0.066	0.003	0.013	S	S	0.9979
1771	McKenzie R., Leaburg, Smolt, 2005	50623-66	0.456	0.314	0.042	0.188	SxEW	EW	0.7575
1772	McKenzie R., Leaburg, Smolt, 2005	50623-67	0.645	0.269	0.017	0.069	SxEW	S	0.6643
1773	McKenzie R., Leaburg, Smolt, 2005	50623-68	0.636	0.328	0.020	0.015	SxEW	EW	0.8768
1774	McKenzie R., Leaburg, Smolt, 2005	50623-69	0.894	0.074	0.004	0.029	S	S	0.9863
1775	McKenzie R., Leaburg, Smolt, 2005	50623-70	0.593	0.354	0.037	0.016	SxEW	EW	0.8538
1776	McKenzie R., Leaburg, Smolt, 2005	50623-71	0.859	0.122	0.006	0.013	S	S	0.998
1777	McKenzie R., Leaburg, Smolt, 2005	50623-72	0.777	0.156	0.003	0.064	S	EW	0.9566
1778	McKenzie R., Leaburg, Smolt, 2005	50623-73	0.826	0.161	0.003	0.010	S	S	0.9928
1779	McKenzie R., Leaburg, Smolt, 2005	50623-74	0.957	0.030	0.005	0.008	S	S	1
1780	McKenzie R., Leaburg, Smolt, 2005	50623-75	0.373	0.437	0.022	0.168	SxEW	EW	0.9867
1781	McKenzie R., Leaburg, Smolt, 2005	50623-76	0.329	0.326	0.330	0.014	3x	EW	0.9727
1782	McKenzie R., Leaburg, Smolt, 2005	50623-78	0.465	0.524	0.002	0.008	SxEW	EW	0.992
1783	McKenzie R., Leaburg, Smolt, 2005	50623-79	0.832	0.128	0.006	0.034	S	S	0.6442
1784	McKenzie R., Leaburg, Smolt, 2005	50623-81	0.853	0.116	0.004	0.027	S	S	0.7777
1785	McKenzie R., Leaburg, Smolt, 2005	50623-82	0.857	0.109	0.017	0.017	S	S	0.9299
1786	McKenzie R., Leaburg, Smolt, 2005	50623-83	0.785	0.073	0.125	0.017	S	S	0.9956

1787	McKenzie R., Leaburg, Smolt, 2005	50623-84	0.857	0.069	0.025	0.050	S	S	0.9203
1788	McKenzie R., Leaburg, Smolt, 2005	50623-R1	0.061	0.468	0.009	0.462	WWxEW	EW	0.9447
1789	Willamette R., Adult, Winter, 2005	50624-Q1	0.035	0.938	0.015	0.012	EW	EW	1
1790	McKenzie R., Adult, Winter, 2005	50625-A1	0.028	0.946	0.017	0.009	EW	EW	1
1791	McKenzie R., Leaburg, Rainbow, 2011	50626-58	0.093	0.082	0.813	0.013	RB	RB	0.6077
1792	McKenzie R., Leaburg, Rainbow, 2011	50626-67	0.975	0.016	0.002	0.007	S	S	1
1793	McKenzie R., Leaburg, Rainbow, 2011	50626-76	0.334	0.034	0.610	0.022	SxRB	EW	0.9838
1794	McKenzie R., Leaburg, Rainbow, 2011	50626-106	0.222	0.647	0.123	0.009	SxEW	EW	1
1795	McKenzie R., Leaburg, Rainbow, 2011	50626-108	0.976	0.016	0.001	0.007	S	S	1
1796	McKenzie R., Leaburg, Rainbow, 2011	50626-271	0.809	0.135	0.028	0.027	S	S	0.9541
1797	McKenzie R., Leaburg, Smolt, 2011	50627-55	0.695	0.272	0.025	0.009	SxEW	S	0.9972
1798	McKenzie R., Leaburg, Smolt, 2011	50627-56	0.935	0.051	0.004	0.009	S	S	0.9991
1799	McKenzie R., Leaburg, Smolt, 2011	50627-57	0.945	0.044	0.003	0.007	S	S	1
1800	McKenzie R., Leaburg, Smolt, 2011	50627-59	0.889	0.077	0.010	0.024	S	S	0.9985
1801	McKenzie R., Leaburg, Smolt, 2011	50627-60	0.925	0.031	0.003	0.041	S	S	0.9505
1802	McKenzie R., Leaburg, Smolt, 2011	50627-61	0.956	0.035	0.002	0.007	S	S	1
1803	McKenzie R., Leaburg, Smolt, 2011	50627-62	0.957	0.030	0.002	0.011	S	S	0.9994
1804	McKenzie R., Leaburg, Smolt, 2011	50627-63	0.966	0.024	0.002	0.008	S	S	0.9996
1805	McKenzie R., Leaburg, Smolt, 2011	50627-64	0.875	0.034	0.002	0.089	S	S	1
1806	McKenzie R., Leaburg, Smolt, 2011	50627-65	0.887	0.076	0.005	0.032	S	S	0.8372
1807	McKenzie R., Leaburg, Smolt, 2011	50627-66	0.897	0.084	0.003	0.016	S	EW	0.6812
1808	McKenzie R., Leaburg, Smolt, 2011	50627-68	0.955	0.034	0.002	0.009	S	S	1
1809	McKenzie R., Leaburg, Smolt, 2011	50627-69	0.913	0.055	0.002	0.030	S	S	0.9259
1810	McKenzie R., Leaburg, Smolt, 2011	50627-70	0.410	0.221	0.343	0.027	3x	EW	1
1811	McKenzie R., Leaburg, Smolt, 2011	50627-71	0.347	0.056	0.588	0.009	SxRB	EW	0.6089
1812	McKenzie R., Leaburg, Smolt, 2011	50627-72	0.393	0.533	0.005	0.069	SxEW	EW	0.9985
1813	McKenzie R., Leaburg, Smolt, 2011	50627-73	0.942	0.042	0.008	0.009	S	S	0.9998
1814	McKenzie R., Leaburg, Smolt, 2011	50627-74	0.959	0.026	0.002	0.013	S	S	1
1815	McKenzie R., Leaburg, Smolt, 2011	50627-75	0.780	0.202	0.007	0.012	SxEW	S	0.9835
1816	McKenzie R., Leaburg, Smolt, 2011	50627-77	0.914	0.067	0.005	0.014	S	S	1
1817	McKenzie R., Leaburg, Smolt, 2011	50627-78	0.407	0.120	0.464	0.009	SxRB	EW	0.9975
1818	McKenzie R., Leaburg, Smolt, 2011	50627-79	0.404	0.435	0.150	0.011	SxEW	EW	0.9999
1819	McKenzie R., Leaburg, Smolt, 2011	50627-80	0.915	0.073	0.002	0.010	S	S	0.9625
1820	McKenzie R., Leaburg, Smolt, 2011	50627-82	0.812	0.099	0.017	0.073	S	S	0.9979
1821	McKenzie R., Leaburg, Smolt, 2011	50627-83	0.876	0.109	0.004	0.011	S	S	0.9874
1822	McKenzie R., Leaburg, Smolt, 2011	50627-84	0.949	0.035	0.004	0.012	S	S	1
1823	McKenzie R., Leaburg, Smolt, 2011	50627-86	0.053	0.069	0.811	0.067	RB	RB	0.7356
1824	McKenzie R., Leaburg, Smolt, 2011	50627-87	0.816	0.158	0.007	0.019	S	EW	0.7069
1825	McKenzie R., Leaburg, Smolt, 2011	50627-88	0.905	0.038	0.002	0.055	S	S	0.578
1826	McKenzie R., Leaburg, Smolt, 2011	50627-89	0.897	0.033	0.002	0.069	S	S	0.9921

1827	McKenzie R., Leaburg, Smolt, 2011	50627-90	0.956	0.029	0.006	0.008	S	S	1
1828	McKenzie R., Leaburg, Smolt, 2011	50627-91	0.558	0.396	0.016	0.031	SxEW	EW	0.8856
1829	McKenzie R., Leaburg, Smolt, 2011	50627-92	0.437	0.100	0.318	0.145	SxRB	S	0.9543
1830	McKenzie R., Leaburg, Smolt, 2011	50627-93	0.918	0.069	0.005	0.007	S	S	0.9997
1831	McKenzie R., Leaburg, Smolt, 2011	50627-95	0.951	0.035	0.005	0.010	S	S	1
1832	McKenzie R., Leaburg, Smolt, 2011	50627-96	0.911	0.061	0.002	0.026	S	S	0.9999
1833	McKenzie R., Leaburg, Smolt, 2011	50627-97	0.537	0.389	0.056	0.019	SxEW	EW	0.9891
1834	McKenzie R., Leaburg, Smolt, 2011	50627-99	0.573	0.075	0.022	0.330	SxWW	S	0.7704
1835	McKenzie R., Leaburg, Smolt, 2011	50627-100	0.813	0.151	0.026	0.009	S	S	0.996
1836	McKenzie R., Leaburg, Smolt, 2011	50627-101	0.893	0.051	0.043	0.012	S	S	1
1837	McKenzie R., Leaburg, Smolt, 2011	50627-102	0.898	0.071	0.004	0.027	S	S	0.9999
1838	McKenzie R., Leaburg, Smolt, 2011	50627-103	0.971	0.014	0.001	0.014	S	S	0.9964
1839	McKenzie R., Leaburg, Smolt, 2011	50627-105	0.918	0.045	0.025	0.012	S	S	1
1840	McKenzie R., Leaburg, Smolt, 2011	50627-107	0.270	0.058	0.647	0.025	SxRB	EW	0.6367
1841	McKenzie R., Leaburg, Smolt, 2011	50627-110	0.594	0.246	0.124	0.037	SxEW	EW	0.9974
1842	McKenzie R., Leaburg, Smolt, 2011	50627-111	0.582	0.355	0.049	0.014	SxEW	EW	0.954
1843	McKenzie R., Leaburg, Smolt, 2011	50627-112	0.956	0.027	0.002	0.014	S	S	1
1844	McKenzie R., Leaburg, Smolt, 2011	50627-113	0.895	0.072	0.008	0.025	S	EW	0.7142
1845	McKenzie R., Leaburg, Smolt, 2011	50627-115	0.867	0.101	0.010	0.023	S	EW	0.9288
1846	McKenzie R., Leaburg, Smolt, 2011	50627-116	0.940	0.040	0.002	0.018	S	S	1
1847	McKenzie R., Leaburg, Smolt, 2011	50627-117	0.925	0.050	0.002	0.023	S	S	0.9994
1848	McKenzie R., Leaburg, Smolt, 2011	50627-118	0.879	0.062	0.008	0.051	S	S	0.9693
1849	McKenzie R., Leaburg, Smolt, 2011	50627-119	0.931	0.053	0.007	0.009	S	S	0.9999
1850	McKenzie R., Leaburg, Smolt, 2011	50627-120	0.940	0.040	0.009	0.011	S	S	0.9982
1851	McKenzie R., Leaburg, Smolt, 2011	50627-261	0.974	0.018	0.002	0.006	S	S	1
1852	McKenzie R., Leaburg, Smolt, 2011	50627-262	0.216	0.355	0.421	0.008	3x	EW	0.9893
1853	McKenzie R., Leaburg, Smolt, 2011	50627-263	0.903	0.036	0.002	0.058	S	S	0.9999
1854	McKenzie R., Leaburg, Smolt, 2011	50627-264	0.943	0.043	0.002	0.012	S	S	0.9989
1855	McKenzie R., Leaburg, Smolt, 2011	50627-265	0.455	0.366	0.159	0.020	SxEW	EW	0.8371
1856	McKenzie R., Leaburg, Smolt, 2011	50627-266	0.935	0.042	0.004	0.019	S	S	1
1857	McKenzie R., Leaburg, Smolt, 2011	50627-267	0.963	0.017	0.001	0.019	S	S	1
1858	McKenzie R., Leaburg, Smolt, 2011	50627-270	0.137	0.712	0.140	0.011	EW	EW	0.9996
1859	McKenzie R., Leaburg, Smolt, 2011	50627-272	0.949	0.019	0.001	0.031	S	S	1
1860	McKenzie R., Leaburg, Smolt, 2011	50627-274	0.934	0.049	0.006	0.011	S	EW	0.7416
1861	McKenzie R., Leaburg, Smolt, 2011	50627-275	0.940	0.043	0.008	0.009	S	S	0.9997
1862	McKenzie R., Leaburg, Smolt, 2011	50627-276	0.962	0.028	0.002	0.007	S	S	1
1863	McKenzie R., Leaburg, Smolt, 2011	50627-277	0.920	0.064	0.006	0.010	S	S	0.9987
1864	McKenzie R., Leaburg, Smolt, 2011	50627-278	0.453	0.471	0.069	0.008	SxEW	EW	0.995
1865	McKenzie R., Leaburg, Smolt, 2011	50627-279	0.945	0.039	0.004	0.012	S	S	1
1866	McKenzie R., Leaburg, Smolt, 2011	50627-280	0.051	0.033	0.880	0.036	RB	RB	0.9741

1867	McKenzie R., Leaburg, Smolt, 2011	50627-281	0.874	0.088	0.017	0.021	S	S	0.5419
1868	McKenzie R., Leaburg, Smolt, 2011	50627-283	0.899	0.068	0.019	0.014	S	S	0.9227
1869	McKenzie R., Leaburg, Smolt, 2011	50627-284	0.953	0.031	0.004	0.013	S	S	0.9998
1870	McKenzie R., Leaburg, Smolt, 2011	50627-285	0.845	0.054	0.002	0.100	S	S	0.9999
1871	McKenzie R., Leaburg, Smolt, 2011	50627-286	0.153	0.466	0.360	0.022	EWxRB	EW	1
1872	McKenzie R., Leaburg, Smolt, 2011	50627-287	0.159	0.420	0.258	0.163	EWxRB	EW	1
1873	McKenzie R., Leaburg, Smolt, 2011	50627-288	0.974	0.017	0.002	0.007	S	S	1
1874	McKenzie R., Leaburg, Smolt, 2011	50627-289	0.951	0.024	0.002	0.022	S	S	1
1875	McKenzie R., Leaburg, Smolt, 2011	50627-290	0.306	0.091	0.585	0.018	SxRB	EW	0.9679
1876	McKenzie R., Leaburg, Smolt, 2011	50627-291	0.956	0.025	0.002	0.017	S	S	0.9997
1877	McKenzie R., Leaburg, Smolt, 2011	50627-292	0.796	0.186	0.005	0.012	S	S	0.9803
1878	McKenzie R., Leaburg, Smolt, 2011	50627-294	0.965	0.027	0.002	0.007	S	S	1
1879	McKenzie R., Leaburg, Smolt, 2011	50627-295	0.188	0.059	0.746	0.007	RB	RB	0.8643
1880	McKenzie R., Leaburg, Smolt, 2011	50627-296	0.515	0.116	0.361	0.008	SxRB	EW	1
1881	McKenzie R., Leaburg, Smolt, 2011	50627-297	0.115	0.792	0.079	0.015	EW	EW	0.9976
1882	McKenzie R., Leaburg, Smolt, 2011	50627-298	0.917	0.065	0.004	0.014	S	S	0.997
1883	McKenzie R., Leaburg, Smolt, 2011	50627-299	0.019	0.033	0.937	0.011	RB	EW	0.9559
1884	McKenzie R., Leaburg, Smolt, 2011	50627-300	0.955	0.033	0.004	0.009	S	S	1
1885	Willamette R., Fall Cr., Adult, Winter, 2010	50628-2	0.013	0.906	0.006	0.075	EW	EW	1
1886	Willamette R., Fall Cr., Adult, Winter, 2010	50628-3	0.015	0.944	0.030	0.012	EW	EW	1
1887	Willamette R., Fall Cr., Adult, Winter, 2010	50628-4	0.025	0.956	0.011	0.008	EW	EW	1
1888	Willamette R., Fall Cr., Adult, Winter, 2010	50628-5	0.107	0.866	0.005	0.021	EW	EW	1
1889	Willamette R., Fall Cr., Adult, Winter, 2010	50628-6	0.038	0.715	0.235	0.012	EWxRB	EW	1
1890	Willamette R., Fall Cr., Adult, Winter, 2010	50628-7	0.069	0.263	0.611	0.056	EWxRB	EW	1
1891	Willamette R., Fall Cr., Adult, Winter, 2010	50628-8	0.021	0.965	0.006	0.007	EW	EW	1
1892	Willamette R., Fall Cr., Adult, Winter, 2010	50628-9	0.029	0.843	0.056	0.073	EW	EW	0.9999
1893	Willamette R., Fall Cr., Adult, Winter, 2010	50628-10	0.034	0.923	0.034	0.008	EW	EW	1
1894	Willamette R., Fall Cr., Adult, Winter, 2010	50628-11	0.032	0.933	0.004	0.031	EW	EW	1
1895	Willamette R., Fall Cr., Adult, Winter, 2010	50628-12	0.024	0.942	0.025	0.008	EW	EW	1
1896	Willamette R., Fall Cr., Adult, Winter, 2010	50628-13	0.048	0.431	0.505	0.017	EWxRB	EW	0.9869
1897	Willamette R., Fall Cr., Adult, Winter, 2010	50628-14	0.012	0.979	0.002	0.007	EW	EW	1
1898	Willamette R., Fall Cr., Adult, Winter, 2010	50628-15	0.029	0.949	0.004	0.018	EW	EW	1
1899	Willamette R., Fall Cr., Adult, Winter, 2010	50628-16	0.043	0.939	0.004	0.014	EW	EW	1
1900	Willamette R., Fall Cr., Adult, Winter, 2010	50628-17	0.014	0.975	0.004	0.006	EW	EW	1
1901	Willamette R., Fall Cr., Adult, Winter, 2010	50628-18	0.071	0.900	0.014	0.015	EW	EW	1
1902	Willamette R., Fall Cr., Adult, Winter, 2010	50628-19	0.027	0.962	0.005	0.006	EW	EW	1
1903	Willamette R., Fall Cr., Adult, Winter, 2010	50628-20	0.014	0.967	0.012	0.007	EW	EW	1
1904	Willamette R., Fall Cr., 2011	50629-21	0.025	0.966	0.004	0.006	EW	EW	1
1905	Willamette R., Fall Cr., 2011	50629-22	0.058	0.865	0.061	0.016	EW	EW	1
1906	Willamette R., Fall Cr., 2011	50629-23	0.022	0.864	0.101	0.013	EW	EW	1

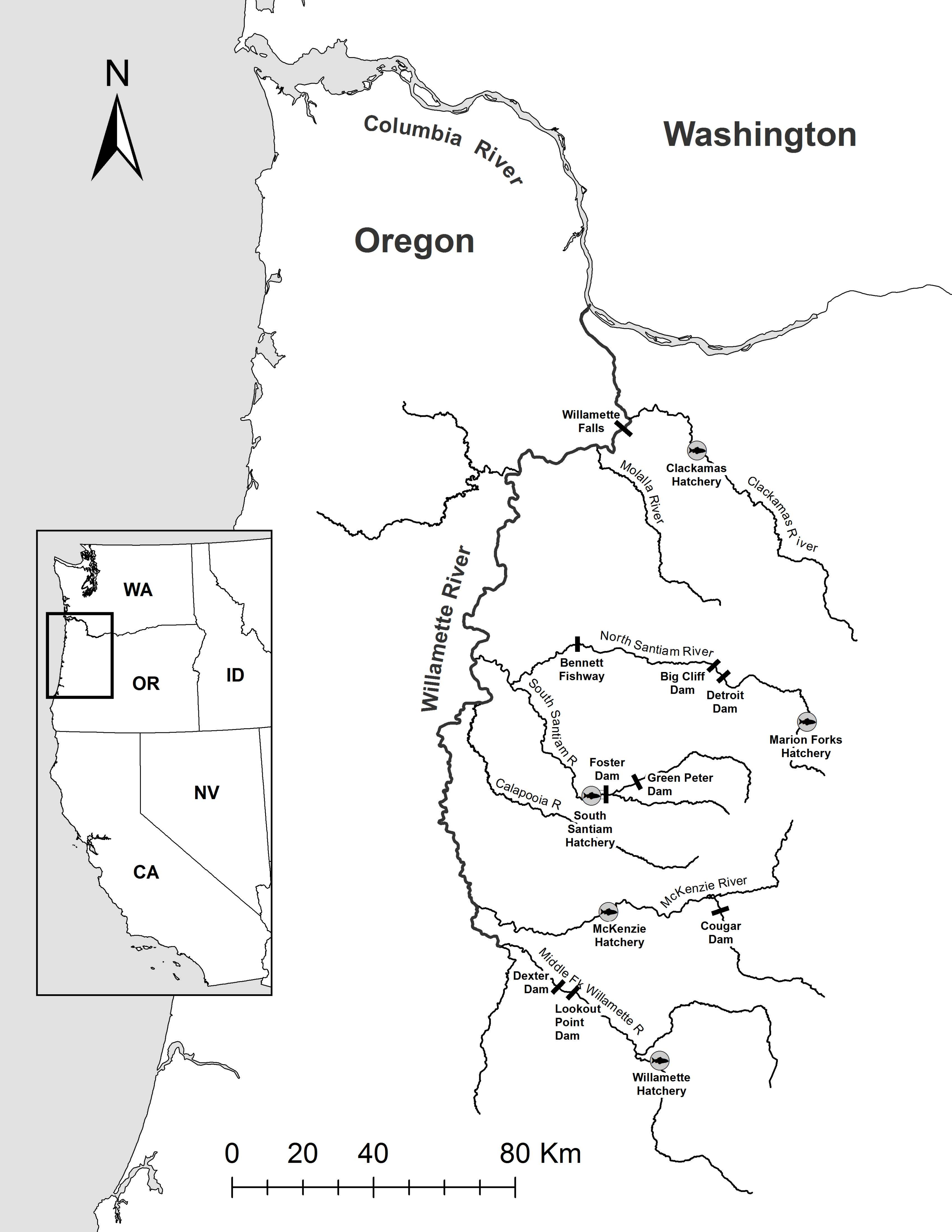
1907	Willamette R., Fall Cr., 2011	50629-24	0.036	0.910	0.039	0.015	EW	EW	1
1908	Willamette R., Fall Cr., 2011	50629-25	0.030	0.879	0.071	0.021	EW	EW	1
1909	Willamette R., Fall Cr., 2011	50629-26	0.089	0.881	0.012	0.018	EW	EW	0.9998
1910	Willamette R., Fall Cr., 2011	50629-B	0.028	0.949	0.004	0.019	EW	EW	1
1911	Willamette R., Fall Cr., Adult, Winter, 2011	50630-1	0.012	0.971	0.012	0.005	EW	EW	1
1912	Willamette R., Fall Cr., Adult, Winter, 2011	50630-27	0.022	0.958	0.013	0.006	EW	EW	1
1913	Willamette R., Fall Cr., Adult, Winter, 2011	50630-28	0.027	0.952	0.003	0.017	EW	EW	1
1914	Willamette R., Fall Cr., Adult, Winter, 2011	50630-29	0.017	0.946	0.021	0.016	EW	EW	1
1915	Willamette R., Fall Cr., Adult, Winter, 2011	50630-30	0.016	0.942	0.030	0.012	EW	EW	1
1916	Willamette R., Fall Cr., Adult, Winter, 2011	50630-31	0.013	0.951	0.029	0.007	EW	EW	1
1917	Willamette R., Fall Cr., Adult, Winter, 2011	50630-32	0.038	0.941	0.014	0.006	EW	EW	1
1918	Willamette R., Fall Cr., Adult, Winter, 2011	50630-33	0.017	0.968	0.006	0.009	EW	EW	1
1919	Willamette R., Fall Cr., Adult, Winter, 2011	50630-34	0.022	0.925	0.042	0.011	EW	EW	1
1920	Willamette Falls, Smolt, 2011	90523-1	0.097	0.713	0.016	0.175	EW	EW	0.972
1921	Willamette Falls, Smolt, 2011	90523-2	0.862	0.106	0.016	0.016	S	S	0.7436
1922	Willamette Falls, Smolt, 2011	90523-3	0.020	0.966	0.006	0.008	EW	EW	1
1923	Willamette Falls, Smolt, 2011	90523-4	0.070	0.706	0.003	0.220	WWxEW	EW	0.9986
1924	Willamette Falls, Smolt, 2011	90523-5	0.021	0.962	0.002	0.016	EW	EW	1
1925	Willamette Falls, Smolt, 2011	90523-6	0.053	0.048	0.013	0.886	WW	EW	0.9564
1926	Willamette Falls, Smolt, 2011	90523-7	0.023	0.955	0.002	0.020	EW	EW	1
1927	Willamette Falls, Smolt, 2011	90523-8	0.012	0.973	0.005	0.010	EW	EW	1
1928	Willamette Falls, Smolt, 2011	90523-9	0.145	0.425	0.012	0.417	WWxEW	EW	0.9926
1929	Willamette Falls, Smolt, 2011	90523-10	0.302	0.505	0.133	0.059	SxEW	EW	0.9999
1930	Willamette Falls, Smolt, 2011	90523-11	0.054	0.863	0.060	0.023	EW	EW	0.8697
1931	Willamette Falls, Smolt, 2011	90523-12	0.029	0.742	0.002	0.227	WWxEW	EW	1
1932	Willamette Falls, Smolt, 2011	90523-13	0.036	0.145	0.007	0.812	WW	EW	0.8814
1933	Willamette Falls, Smolt, 2011	90523-14	0.040	0.905	0.002	0.053	EW	EW	1
1934	Willamette Falls, Smolt, 2011	90523-15	0.026	0.864	0.007	0.103	EW	EW	1
1935	Willamette Falls, Smolt, 2011	90523-16	0.022	0.938	0.022	0.018	EW	EW	1
1936	Willamette Falls, Smolt, 2011	90523-17	0.102	0.875	0.006	0.017	EW	EW	0.9997
1937	Willamette Falls, Smolt, 2011	90523-18	0.025	0.559	0.003	0.414	WWxEW	EW	0.9993
1938	Willamette Falls, Smolt, 2011	90523-20	0.052	0.921	0.003	0.024	EW	EW	1
1939	Willamette Falls, Smolt, 2011	90523-21	0.030	0.923	0.036	0.011	EW	EW	1
1940	Willamette Falls, Smolt, 2011	90523-22	0.089	0.878	0.013	0.019	EW	EW	0.9969
1941	Willamette Falls, Smolt, 2011	90523-23	0.077	0.746	0.008	0.169	EW	EW	1
1942	Willamette Falls, Smolt, 2011	90523-24	0.152	0.029	0.002	0.818	WW	EW	0.6598
1943	Willamette Falls, Smolt, 2011	90523-25	0.050	0.108	0.005	0.837	WW	EW	0.9999
1944	Willamette Falls, Smolt, 2011	90523-26	0.171	0.048	0.004	0.777	WW	EW	0.8202
1945	Willamette Falls, Smolt, 2011	90523-27	0.024	0.048	0.002	0.927	WW	WW	0.999
1946	Willamette Falls, Smolt, 2011	90523-28	0.022	0.964	0.002	0.012	EW	EW	1

1947	Willamette Falls, Smolt, 2011	90523-29	0.028	0.030	0.002	0.940	WW	WW	0.997
1948	Willamette Falls, Smolt, 2011	90523-30	0.051	0.061	0.004	0.884	WW	EW	0.9983
1949	Willamette Falls, Smolt, 2011	90523-31	0.197	0.042	0.002	0.759	WW	EW	0.9018
1950	Willamette Falls, Smolt, 2011	90523-32	0.046	0.936	0.008	0.011	EW	EW	1
1951	Willamette Falls, Smolt, 2011	90523-33	0.017	0.964	0.002	0.018	EW	EW	1
1952	Willamette Falls, Smolt, 2011	90523-34	0.046	0.909	0.002	0.043	EW	EW	1
1953	Willamette Falls, Smolt, 2011	90523-35	0.031	0.943	0.004	0.021	EW	EW	1
1954	Willamette Falls, Smolt, 2011	90523-36	0.052	0.178	0.002	0.768	WW	EW	0.9179
1955	Willamette Falls, Smolt, 2011	90523-37	0.188	0.038	0.003	0.771	WW	EW	0.9353
1956	Willamette Falls, Smolt, 2011	90523-38	0.043	0.361	0.001	0.594	WWxEW	EW	0.9999
1957	Willamette Falls, Smolt, 2011	90523-39	0.329	0.462	0.038	0.171	SxEW	EW	0.9999
1958	Willamette Falls, Smolt, 2011	90523-40	0.225	0.210	0.011	0.554	3x	EW	0.9933
1959	Willamette Falls, Smolt, 2011	90523-41	0.012	0.973	0.003	0.012	EW	EW	1
1960	Willamette Falls, Smolt, 2011	90523-42	0.223	0.046	0.001	0.730	SxWW	EW	1
1961	Willamette Falls, Smolt, 2011	90523-43	0.405	0.570	0.003	0.021	SxEW	EW	0.9999
1962	Willamette Falls, Smolt, 2011	90523-44	0.012	0.973	0.003	0.013	EW	EW	1
1963	Willamette Falls, Smolt, 2011	90523-45	0.048	0.929	0.005	0.019	EW	EW	1
1964	Willamette Falls, Smolt, 2011	90523-46	0.078	0.063	0.002	0.857	WW	WW	0.999
1965	Willamette Falls, Smolt, 2011	90523-763	0.021	0.068	0.008	0.903	WW	EW	1
1966	Willamette Falls, Smolt, 2011	90523-764	0.101	0.879	0.005	0.014	EW	EW	1
1967	Willamette Falls, Smolt, 2011	90523-765	0.024	0.956	0.003	0.017	EW	EW	1
1968	Willamette Falls, Smolt, 2011	90523-766	0.960	0.026	0.002	0.013	S	S	1
1969	Willamette Falls, Smolt, 2011	90523-767	0.087	0.763	0.004	0.145	EW	EW	0.9993
1970	Willamette Falls, Smolt, 2011	90523-768	0.034	0.945	0.003	0.018	EW	EW	1
1971	Willamette Falls, Smolt, 2011	90523-769	0.022	0.964	0.004	0.010	EW	EW	1
1972	Willamette Falls, Smolt, 2011	90523-770	0.044	0.921	0.025	0.010	EW	EW	1
1973	Willamette Falls, Smolt, 2011	90523-771	0.247	0.330	0.016	0.407	3x	EW	0.658
1974	Willamette Falls, Smolt, 2011	90523-772	0.857	0.085	0.005	0.053	S	S	0.9564
1975	Willamette Falls, Smolt, 2011	90523-773	0.013	0.978	0.003	0.006	EW	EW	1
1976	Willamette R., Smolt, 2011	90524-121	0.021	0.950	0.017	0.012	EW	EW	1
1977	Willamette R., Smolt, 2011	90524-122	0.113	0.108	0.769	0.011	RB	RB	0.5278
1978	Willamette R., Smolt, 2011	90524-124	0.947	0.028	0.002	0.023	S	S	1
1979	Willamette R., Smolt, 2011	90524-125	0.019	0.791	0.182	0.008	EW	EW	0.9998
1980	Willamette R., Smolt, 2011	90524-126	0.033	0.943	0.005	0.019	EW	EW	1
1981	Willamette R., Smolt, 2011	90524-132	0.023	0.582	0.390	0.005	EWxRB	EW	1
1982	Willamette R., Smolt, 2011	90524-139	0.015	0.955	0.021	0.009	EW	EW	1
1983	Willamette R., Smolt, 2011	90524-140	0.169	0.689	0.010	0.133	EW	EW	1
1984	Willamette R., Smolt, 2011	90524-145	0.610	0.037	0.003	0.350	SxWW	S	0.9805
1985	Willamette R., Smolt, 2011	90524-156	0.016	0.044	0.929	0.011	RB	EW	0.7926
1986	Willamette R., Smolt, 2011	90524-157	0.332	0.391	0.120	0.156	SxEW	EW	0.9968

1987	Willamette R., Smolt, 2011	90524-158	0.015	0.034	0.946	0.005	RB	RB	0.9814
1988	Willamette R., Smolt, 2011	90524-159	0.089	0.473	0.392	0.046	EWxRB	EW	0.9999
1989	Willamette R., Smolt, 2011	90524-160	0.017	0.896	0.076	0.011	EW	EW	1
1990	Willamette R., Smolt, 2011	90524-161	0.109	0.098	0.772	0.021	RB	RB	0.5708
1991	Willamette R., Smolt, 2011	90524-162	0.085	0.613	0.294	0.008	EWxRB	EW	1
1992	Willamette R., Smolt, 2011	90524-163	0.955	0.032	0.002	0.010	S	S	0.9999
1993	Willamette R., Smolt, 2011	90524-164	0.019	0.285	0.690	0.006	EWxRB	EW	0.9999
1994	Willamette R., Smolt, 2011	90524-165	0.011	0.043	0.874	0.072	RB	RB	0.9999
1995	Willamette R., Smolt, 2011	90524-166	0.031	0.065	0.881	0.024	RB	RB	0.7794
1996	Willamette R., Smolt, 2011	90524-167	0.014	0.132	0.849	0.005	RB	RB	0.9959
1997	Willamette R., Smolt, 2011	90524-168	0.016	0.946	0.029	0.009	EW	EW	1
1998	Willamette R., Smolt, 2011	90524-176	0.013	0.978	0.003	0.005	EW	EW	1
1999	Willamette R., Smolt, 2011	90524-177	0.045	0.719	0.225	0.011	EWxRB	EW	1
2000	Willamette R., Smolt, 2011	90524-179	0.015	0.025	0.954	0.005	RB	RB	0.9972
2001	Willamette R., Smolt, 2011	90524-180	0.082	0.895	0.003	0.019	EW	EW	1
2002	Willamette R., Smolt, 2011	90524-181	0.012	0.967	0.010	0.011	EW	EW	1
2003	Willamette R., Smolt, 2011	90524-182	0.951	0.029	0.001	0.019	S	S	1
2004	Willamette R., Smolt, 2011	90524-183	0.031	0.127	0.806	0.036	RB	EW	0.9986
2005	Willamette R., Smolt, 2011	90524-190	0.013	0.041	0.940	0.006	RB	RB	0.9996
2006	N. Santiam R., Smolt, 2011	90525-133	0.025	0.947	0.014	0.013	EW	EW	1
2007	N. Santiam R., Smolt, 2011	90525-134	0.054	0.921	0.012	0.013	EW	EW	1
2008	N. Santiam R., Smolt, 2011	90525-135	0.035	0.933	0.009	0.023	EW	EW	1
2009	N. Santiam R., Smolt, 2011	90525-136	0.547	0.404	0.002	0.047	SxEW	EW	0.9995
2010	N. Santiam R., Smolt, 2011	90525-137	0.023	0.815	0.134	0.028	EW	EW	1
2011	N. Santiam R., Smolt, 2011	90525-138	0.037	0.898	0.002	0.063	EW	EW	0.9999
2012	N. Santiam R., Smolt, 2011	90525-146	0.029	0.925	0.016	0.031	EW	EW	1
2013	N. Santiam R., Smolt, 2011	90525-147	0.230	0.750	0.002	0.018	SxEW	EW	1
2014	N. Santiam R., Smolt, 2011	90525-148	0.032	0.936	0.005	0.027	EW	EW	1
2015	N. Santiam R., Smolt, 2011	90525-149	0.121	0.826	0.025	0.028	EW	EW	1
2016	N. Santiam R., Smolt, 2011	90525-151	0.070	0.848	0.043	0.038	EW	EW	1
2017	N. Santiam R., Smolt, 2011	90525-152	0.027	0.932	0.002	0.038	EW	EW	0.9991
2018	N. Santiam R., Smolt, 2011	90525-153	0.014	0.503	0.004	0.479	WWxEW	EW	1
2019	N. Santiam R., Smolt, 2011	90525-154	0.013	0.217	0.760	0.010	EWxRB	EW	0.8397
2020	N. Santiam R., Smolt, 2011	90525-155	0.114	0.809	0.059	0.017	EW	EW	1
2021	N. Santiam R., Smolt, 2011	90525-191	0.064	0.633	0.081	0.223	WWxEW	EW	0.9936
2022	N. Santiam R., Smolt, 2011	90525-192	0.151	0.832	0.006	0.011	EW	EW	1
2023	N. Santiam R., Smolt, 2011	90525-193	0.065	0.905	0.007	0.023	EW	EW	1
2024	N. Santiam R., Smolt, 2011	90525-194	0.242	0.712	0.004	0.042	SxEW	EW	1
2025	N. Santiam R., Smolt, 2011	90525-195	0.034	0.945	0.008	0.012	EW	EW	1
2026	N. Santiam R., Smolt, 2011	90525-196	0.092	0.758	0.009	0.141	EW	EW	0.999

2027	N. Santiam R., Smolt, 2011	90525-197	0.039	0.948	0.005	0.008	EW	EW	1
2028	N. Santiam R., Smolt, 2011	90525-198	0.030	0.648	0.121	0.201	WWxEW	EW	1
2029	N. Santiam R., Smolt, 2011	90525-199	0.060	0.904	0.006	0.030	EW	EW	1
2030	N. Santiam R., Smolt, 2011	90525-202	0.069	0.028	0.003	0.899	WW	S	0.896
2031	N. Santiam R., Smolt, 2011	90525-203	0.322	0.386	0.247	0.045	3x	EW	0.987
2032	N. Santiam R., Smolt, 2011	90525-212	0.032	0.952	0.004	0.012	EW	EW	1
2033	N. Santiam R., Smolt, 2011	90525-216	0.111	0.848	0.009	0.032	EW	EW	1
2034	N. Santiam R., Smolt, 2011	90525-217	0.038	0.946	0.005	0.011	EW	EW	1
2035	N. Santiam R., Smolt, 2011	90525-218	0.115	0.378	0.017	0.490	WWxEW	EW	0.9972
2036	N. Santiam R., Smolt, 2011	90525-219	0.027	0.936	0.006	0.031	EW	EW	1
2037	N. Santiam R., Smolt, 2011	90525-220	0.087	0.883	0.005	0.025	EW	EW	1
2038	N. Santiam R., Smolt, 2011	90525-221	0.248	0.553	0.072	0.127	SxEW	EW	0.9992
2039	N. Santiam R., Smolt, 2011	90525-222	0.069	0.899	0.024	0.007	EW	EW	1
2040	N. Santiam R., Smolt, 2011	90525-223	0.111	0.872	0.006	0.011	EW	EW	1
2041	N. Santiam R., Smolt, 2011	90525-224	0.033	0.941	0.005	0.020	EW	EW	1
2042	Santiam R., Mouth, Smolt, 2011	90526-127	0.052	0.820	0.003	0.125	EW	EW	1
2043	Santiam R., Mouth, Smolt, 2011	90526-128	0.089	0.871	0.016	0.024	EW	EW	1
2044	Santiam R., Mouth, Smolt, 2011	90526-129	0.371	0.364	0.013	0.252	3x	EW	0.9916
2045	Santiam R., Mouth, Smolt, 2011	90526-130	0.196	0.540	0.019	0.245	WWxEW	EW	0.9994
2046	Santiam R., Mouth, Smolt, 2011	90526-131	0.091	0.862	0.028	0.019	EW	EW	0.9999
2047	Santiam R., Mouth, Smolt, 2011	90526-184	0.037	0.953	0.002	0.008	EW	EW	1
2048	Santiam R., Mouth, Smolt, 2011	90526-185	0.042	0.050	0.708	0.199	RB	EW	0.9967
2049	Santiam R., Mouth, Smolt, 2011	90526-186	0.070	0.073	0.849	0.008	RB	RB	0.9991
2050	Santiam R., Mouth, Smolt, 2011	90526-187	0.113	0.857	0.001	0.028	EW	EW	0.9999
2051	Santiam R., Mouth, Smolt, 2011	90526-188	0.227	0.731	0.023	0.019	SxEW	EW	0.9968
2052	Santiam R., Mouth, Smolt, 2011	90526-189	0.013	0.876	0.006	0.106	EW	EW	1
2053	S. Santiam R., Smolt, 2011	90527-1	0.018	0.968	0.006	0.007	EW	EW	1
2054	S. Santiam R., Smolt, 2011	90527-2	0.124	0.846	0.003	0.027	EW	EW	1
2055	S. Santiam R., Smolt, 2011	90527-3	0.067	0.884	0.035	0.014	EW	EW	1
2056	S. Santiam R., Smolt, 2011	90527-4	0.037	0.937	0.002	0.024	EW	EW	1
2057	S. Santiam R., Smolt, 2011	90527-98	0.116	0.860	0.004	0.020	EW	EW	1
2058	S. Santiam R., Smolt, 2011	90527-99	0.262	0.661	0.003	0.074	SxEW	EW	1
2059	S. Santiam R., Smolt, 2011	90527-141	0.265	0.586	0.002	0.146	SxEW	EW	0.9911
2060	S. Santiam R., Smolt, 2011	90527-142	0.324	0.544	0.008	0.124	SxEW	EW	1
2061	S. Santiam R., Smolt, 2011	90527-143	0.041	0.943	0.002	0.014	EW	EW	1
2062	S. Santiam R., Smolt, 2011	90527-200	0.016	0.963	0.011	0.010	EW	EW	1
2063	S. Santiam R., Smolt, 2011	90527-201	0.045	0.905	0.039	0.011	EW	EW	0.9999
2064	S. Santiam R., Smolt, 2011	90527-204	0.089	0.866	0.003	0.042	EW	EW	1
2065	S. Santiam R., Smolt, 2011	90527-205	0.038	0.662	0.005	0.294	WWxEW	EW	1
2066	S. Santiam R., Smolt, 2011	90527-206	0.028	0.954	0.008	0.010	EW	EW	1

2067	S. Santiam R., Smolt, 2011	90527-207	0.050	0.790	0.003	0.156	EW	EW	1
2068	S. Santiam R., Smolt, 2011	90527-208	0.041	0.929	0.003	0.027	EW	EW	1
2069	S. Santiam R., Smolt, 2011	90527-209	0.019	0.972	0.002	0.008	EW	EW	1
2070	S. Santiam R., Smolt, 2011	90527-210	0.026	0.963	0.004	0.006	EW	EW	1
2071	S. Santiam R., Smolt, 2011	90527-211	0.016	0.934	0.002	0.048	EW	EW	1
2072	S. Santiam R., Smolt, 2011	90527-225	0.021	0.380	0.004	0.595	WWxEW	EW	0.9976
2073	S. Santiam R., Smolt, 2011	90527-1496	0.116	0.794	0.003	0.086	EW	EW	1
2074	S. Santiam R., Smolt, 2011	90527-1497	0.019	0.899	0.013	0.068	EW	EW	1
2075	S. Santiam R., Smolt, 2011	90527-1498	0.016	0.071	0.003	0.910	WW	EW	0.9906
2076	S. Santiam R., Smolt, 2011	90527-1553	0.022	0.958	0.003	0.016	EW	EW	1
2077	S. Santiam R., Smolt, 2011	90527-1554	0.040	0.937	0.003	0.019	EW	EW	1
2078	S. Santiam R., Smolt, 2011	90527-1555	0.028	0.953	0.005	0.015	EW	EW	1
2079	S. Santiam R., Smolt, 2011	90527-1556	0.251	0.713	0.007	0.029	SxEW	EW	1
2080	McKenzie R., Leaburg, Smolt, 2011	90528-51	0.964	0.019	0.001	0.015	S	S	1
2081	McKenzie R., Leaburg, Smolt, 2011	90528-52	0.210	0.599	0.171	0.020	SxEW	EW	0.9999
2082	McKenzie R., Leaburg, Smolt, 2011	90528-53	0.917	0.064	0.004	0.015	S	S	0.999


N
Columbia River
Washington
Oregon
Willamette Falls
Clackamas Hatchery
Molalla River
Clackamas River
Willamette River
North Santiam River
Bennett Fishway
Big Cliff Dam
Detroit Dam
Marion Forks Hatchery
South Santiam R
Foster Dam
Green Peter Dam
Calapooia R
South Santiam Hatchery
McKenzie River
McKenzie Hatchery
Cougar Dam
Middle Fk Willamette R
Dexter Dam
Lookout Point Dam
Willamette Hatchery
0 20 40 80 Km
WA
OR
ID
NV
CA

Oregon
John A Kitzhaber MD., Governor

Department of Fish and Wildlife
South Willamette Watershed District Office
7118 NE Vandenberg Avenue
Corvallis, OR 97330
(541) 757-4186
FAX (541) 757-4252

December 11, 2013

Dear Restoration and Enhancement Board,

The hatchery steelhead hybridization study proposed by Marc Johnson will provide needed information to manage the summer steelhead stocking programs on the North and South Santiam Rivers. Currently ODFW releases hundreds of thousands of smolt-sized summer steelhead each year into these rivers (to substitute for the loss of trout and the historic winter steelhead runs). While there are studies outside the Willamette Valley that examine hybridization and competition issues between hatchery and native steelhead, ODFW needs basin-specific scientific studies and findings to guide our management decisions.

A previous analysis indicated a relatively high introgression rate between summer and winter steelhead on the N. and S. Santiam. Unfortunately, the samples upon which that analysis was based were collected in an arbitrary and, in some cases, biased manner, rendering the results of that analysis challenging to use for management decisions. However those findings are interesting not only to ODFW but also to the National Marine Fisheries Service and the Army Corps of Engineers who are in the process of meeting the Willamette River spring chinook and winter steelhead recovery plan and biological opinion objectives for the North and South Santiam basins. Meeting these objectives may require changes to ODFW's hatchery program. As the District Fish Biologist, I need information derived from an unbiased, scientific study on which to base summer steelhead management decisions and to guide interagency discussion.

The work included in this proposal is critical to increasing ODFW's ability to manage summer steelhead stocks and could have a significant impact on summer steelhead angling opportunities. I fully support Dr. Johnson's work, and I ask that you lend him your support as well.

Thank you for your time.

Best Regards,

[redacted]

Elise Kelley, Ph.D.
Mid-Willamette District Fish Biologist

Oregon
John A Kitzhaber MD., Governor

Department of Fish and Wildlife
SPRINGFIELD FIELD OFFICE
3150 Main Street
Springfield, OR 97478
(541) 726-3515
FAX: (541) 726-2505
Internet: www.dfw.state.or.us/

December 11, 2013

Oregon Department of Fish and Wildlife
Restoration and Enhancement Board
4034 Fairview Industrial Dr. SE
Salem OR 97302

RE: Assessing hatchery-wild hybridization in steelhead

Dear Restoration and Enhancement Board and Review Committee,

The Oregon Department of Fish and Wildlife (ODFW) Springfield Field Office strongly supports Marc Johnson's request for Restoration and Enhancement Board funds to support his proposed project "Assessing hatchery-wild hybridization in steelhead". This project will provide systematically derived data that will be critical to ODFW and other fish agencies for managing summer steelhead in the upper Willamette River Basin.

Additionally, the proposed work will build on previous studies that provided initial genetic information on introgression between Willamette winter steelhead and summer steelhead as well as distribution and potentially origin of *Oncorhynchus mykiss* in the entire Willamette Basin. A portion of this work was funded by the Restoration and Enhancement Board in 2007 (Project #07-116) and produced the report: Genetic origin of *Oncorhynchus mykiss* collected from the Upper Willamette River Basin, OR. The information in this report has been essential to developing fisheries management alternatives for wild rainbow trout in the South Willamette Watershed District.

Although not included as match in the proposed budget, ODFW Fish Staff in the Springfield Office are committed to assisting with the sample collections in the McKenzie, Middle Fork Willamette and Coast Fork Willamette Basins.

Thank you for your consideration of this proposal.

Sincerely,

[redacted]

Jeff Ziller
South Willamette Watershed District Fish Biologist
Oregon Department of Fish and Wildlife
541-726-3515 x26
Jeffrey.S.Ziller@state.or.us