

In partnership with the Pacific Northwest Aquatic Monitoring Partnership (PNAMP), State of the Salmon Program welcomes you to:

An Expert Workshop to validate quantitative data gaps:  
how well can we assess trends in  
salmon abundance and productivity?

November 8-9, 2006 | Portland, OR

---

## **INFORMATION PACKET**

State of the Salmon | A joint program of Ecotrust and the Wild Salmon Center



ecotrust



## AGENDA

### WEDNESDAY, November 8, 2006

#### **10:00 AM**

Introductions: *Cathy Kellon, State of the Salmon, and Jennifer Bayer, PNAMP*

Welcome: *Xan Augerot, State of the Salmon*

Presentation: *Pete Rand, State of the Salmon*

Presentation: *Chris Jordan, NOAA Fisheries, NWFSC*

#### **Noon**

Lunch, hosted, on-site

#### **1:00 PM**

Workgroup Session: *"Maps of Knowledge"*

#### **2:45 PM**

Break

#### **3:00 PM**

Workgroup Session, cont'd

#### **5:00 PM**

Close

#### **6:30 PM**

Dinner, hosted, off-site: *Andina's at 1314 NW Glisan*

### THURSDAY, November 9, 2006

#### **8:30 AM**

Opening remarks: *Ed Backus, State of the Salmon*

#### **8:45 AM**

Workgroup session: *Monitoring activity validation*

#### **10:15 AM** Break

#### **10:30 AM**

Workgroup session, cont'd

#### **Noon** Lunch, hosted, on-site

#### **1:15 PM**

Summary and feedback of workgroup results

#### **1:45 PM**

Workgroup session: *Addressing data gaps: Problems and Solutions*

#### **2:30 PM** Break

#### **2:45 PM**

Workgroup session, cont'd

#### **3:45 PM**

Closing remarks and feedback: *Jen Bayer and Cathy Kellon*

#### **4:00 PM**

End

## WORKGROUP GOALS AND TECHNIQUES

### Day One: "Maps of Knowledge" (1 - 5 pm)

Goal: Create a series of species-specific maps that describe the appropriateness of available data to answer questions about abundance and productivity at the metapopulation and population levels.

Groups: Individuals are assigned to regional groups of 5-7 people each.

Decision-making techniques: Utilize nominal group techniques to solicit and aggregate scores for each unit/parameter of interest.

Criteria for inclusion:

- » Quantitative data obtained from field observations. Exclude modeled data.
- » Data span a time period that captures at least three generations of species of interest or a minimum of ten years with outlook through 2015. Casting forward to 2015 allows for consideration of recently initiated long-term monitoring efforts.

Parameters and units:

At the metapopulation level (species-specific ESUs representing metapopulations):

1. Harvest rate
2. Escapement, as measured by either relative or absolute abundance
3. Productivity, as measured by recruits per spawner
4. Productivity, as measured by smolt-to-adult survival

At the population level (species-specific population units):

5. Escapement, as measured by either relative or absolute abundance
6. Productivity, as measured by recruits per spawner
7. Productivity, as measured by smolt-to-adult survival

Species and units, in scoring order:

Chinook (all ESUs + populations)

Coho (all ESUs + populations)

Steelhead (T&E listed ESUs + populations only)

Sockeye (all)

Chum (all)

Pink (all)

Suitability Scoring System. Participants assign a score (0-4) to each unit/parameter. Individual scores, excluding “0”s, are averaged to derive a single numeric rank per unit/parameter.

<b>Table 1. Suitability: units</b>				
<b>Score</b>	<b>Descriptor</b>	<b>Definition</b>	<b>Estimate uncertainty</b>	<b>Color code</b>
<b>4</b>	<b>Excellent</b>	Data are available and appropriate to answer this question for this species at this level of biological organization with an estimate uncertainty of <10%. High precision data are available to provide the most defensible estimates for trends in abundance or productivity at the population or metapopulation level.	Low uncertainty	Green
<b>3</b>	<b>Good</b>	Data are available and appropriate to answer this question for this species at this level of biological organization with an estimate uncertainty of >10% and <50% .	Medium uncertainty	Orange
<b>2</b>	<b>Poor</b>	Data are available and appropriate to answer this question for this species at this level of biological organization with an estimate uncertainty of >50% .	High uncertainty	Yellow
<b>1</b>	<b>N/A</b>	Data are either not available or appropriate to answer this question for this species at this level of biological organization. Unavailable data means no data exist. Examples of inappropriate data are: available data do not meet the time period criteria of a minimum of 3 generations or 10 years; available data meet the time series criteria but data collection methods over the time period changed and no calibration has been made so data are not suitable for analyses.		Red
<b>0</b>	<b>Unknown</b>	Individual does not possess the knowledge to score this unit.		Gray

Estimate percent of wild/natural-origin fish: For each metapopulation unit and population unit, workgroups will derive consensus on the percentage of fish that are of wild- or natural-origin as well as a confidence score for that estimate.

1. Estimate the percentage of fish within the unit that are of wild- or natural-origin, selecting from the following options (enter the score):

<b>Table 2. Percent wild fish</b>		
<b>Score</b>	<b>Percent wild/natural estimate</b>	<b>Descriptor</b>
0	Unknown	Unknown
1	<25%	Low
2	>25% - <50%	Medium-Low
3	>50% - <75%	Medium-High
4	>75%	High

2. Participants score (on the same 0-4 suitability scoring system) whether this estimate of wild- and natural-origin fish is of high, medium, or low uncertainty.

<b>Table 3. Rigor of percent wild fish estimate</b>		
<b>Score</b>	<b>Descriptor</b>	<b>Definition</b>
<b>4</b>	<b>Excellent</b>	An estimate uncertainty of <10%. High precision data are available to provide the most defensible estimates for the fraction of fish that are of wild origin at the population or metapopulation level. <b>LOW UNCERTAINTY</b>
<b>3</b>	<b>Good</b>	An estimate uncertainty of >10% and <50% . <b>MEDIUM UNCERTAINTY</b>
<b>2</b>	<b>Poor</b>	An estimate uncertainty of >50%. <b>HIGH UNCERTAINTY</b>
<b>1</b>	<b>N/A</b>	Data are not available to estimate hatchery contributions to the population or metapopulation.
<b>0</b>	<b>Unknown</b>	Individual does not possess the knowledge to estimate hatchery contributions to the population or metapopulation.

**Day Two Monitoring Activity Validation (8:45 am – 11:45 am)**

Goal: Identify and score monitoring efforts listed in our *Inventory of Salmon Monitoring Activities* that produce the most reliable data to assess the parameters discussed in Day One.

Groups: Individuals are assigned to cross-regional groups of 3-5 people each.

Decision-making techniques: Utilize a combination of group discussion and individual data entry to identify and score appropriate monitoring activities. Where multiple people submit scores for one monitoring activity, the average will be taken.

Criteria for inclusion:

- » Adult or juvenile abundance estimates, inc. where data are collected to determine age composition, that produce the most reliable data for that population or metapopulation
- » Data span a time period that captures at least three generations of species of interest or a minimum of ten years with outlook through 2015.

Suitability Scoring System: Participants assign a score of 0-4 to each activity for each parameter that can be assessed at either the population or metapopulation level. Multiple scores, excluding “0”s, are averaged to derive a single numeric rank per activity/parameter/unit. For example, a participant selects a dam count monitoring activity for chinook and scores it as a “4” for its utility to estimate escapement at the metapopulation level and a “2” for its utility to estimate escapement at the population level.

<b>Table 4. Suitability: monitoring activities</b>		
<b>Score</b>	<b>Descriptor</b>	<b>Definition</b>
<b>4</b>	<b>Excellent</b>	Data produced by this monitoring effort are appropriate to answer this question for this species at this level of biological organization with an estimate uncertainty of <10%. These are high precision data that provide the most defensible estimates for trends in abundance or productivity. <b>LOW UNCERTAINTY</b>
<b>3</b>	<b>Good</b>	Data produced by this monitoring effort are appropriate to answer this question for this species at this level of biological organization with an estimate uncertainty of >10% and <50%. <b>MEDIUM UNCERTAINTY</b>
<b>2</b>	<b>Poor</b>	Data produced by this monitoring effort are appropriate to answer this question for this species at this level of biological organization with an estimate uncertainty of >50%. <b>HIGH UNCERTAINTY</b>
<b>1</b>	<b>N/A</b>	Data produced by this monitoring effort are not appropriate to answer this question for this species at this level of biological organization. Examples of inappropriate data are: data do not meet the time period criteria of a minimum of 3 generations or 10 years; data meet the time series criteria but data collection methods over the time period changed and no calibration has been made so data are not suitable for analyses.
<b>0</b>	<b>Unknown</b>	Individual does not possess the knowledge to score the suitability of this monitoring activity to answer this question for this species at this level of biological organization.

Field Method Quality Scoring System:

Participants assign a score to each activity on a scale of 0-5 which describes the quality of survey data given the type of field method used and its application. Multiple scores, excluding “0”s, are averaged to derive a single numeric rank per activity. (Source: LGL Limited)

<b>Table 5. Field method quality: monitoring activities</b>		
<b>Score</b>	<b>Descriptor</b>	<b>Definition</b>
<b>5</b>	<b>Excellent</b>	An estimate of high resolution from an unbreached weir/fence count. This does not include stream estimates based exclusively on walking, floating or flying inspections, AUC calculations, Mark & Recapture estimates, or incomplete weir/fence counts. The estimate uncertainty is believed to be less than plus or minus 10% of the actual estimate.
<b>4</b>	<b>Very Good</b>	An estimate of high resolution based on documented data from a Mark & Recapture, incomplete (relative) weir/fence count, or highly unreliable AUC calculation with measured observer efficiency and stream or spawning residency time ranges. This does not include estimates based exclusively on walking, floating, or flying inspections. The estimate uncertainty is believed to be more than plus or minus 10% of the actual estimate.
<b>3</b>	<b>Good</b>	An estimate of high resolution based on three or more documented inspections of walking, floating, or flying which clearly define the peak of spawning and contain high adult live estimates and high stream reliabilities; or an estimate of medium resolution based on documented data from Mark & Recapture, Fixed site method, or medium to high AUC calculation. The estimate uncertainty is believed to be less than plus or minus 25% of the actual estimate.
<b>2</b>	<b>Fair</b>	An estimate of medium resolution based on the documentation of two or more walking, floating, or flying inspections around the peak of spawning containing high adult live estimates and high stream reliabilities; or possibly low reliable weir/fence count records, Mark & Recapture data or low to medium AUC calculations. The estimate uncertainty is believed to be no better than plus or minus 25% of the actual estimate.
<b>1</b>	<b>Poor</b>	An estimate of low resolution that would most likely exclude Mark & Recapture and Fixed Site estimate methods. A low number of documented surveys (e.g., 1 stream inspection), or vaguely defined, inconsistent, or poorly executed surveys or analyses. An estimate of unknown confidence/certainty. Could be used to record a minimum observed escapement in favor of stating Adults Present.
<b>0</b>	<b>Unknown</b>	Individual does not possess the knowledge to score the field method quality of this monitoring activity.

Data Availability Questionnaire. Participants answer three questions pertaining to data access for identified monitoring activities.

1. **Data access** - Are data currently and readily available to share with interested users? For example, if someone inquires today, can the data from the previous year's survey be provided to them within two weeks?

Select one: Yes \_\_\_\_\_ No \_\_\_\_\_

2. **Data users** - Who are the intended users of this dataset (i.e. from whom are the data primarily collected)? Select all that apply from the following list:

Select all  
that apply

User groups

- \_\_\_\_\_ in-house management
- \_\_\_\_\_ commercial fishermen
- \_\_\_\_\_ recreational fishermen
- \_\_\_\_\_ independent scientists
- \_\_\_\_\_ academic researchers
- \_\_\_\_\_ tribes/first nations
- \_\_\_\_\_ other agencies
- \_\_\_\_\_ non-governmental organizations
- \_\_\_\_\_ private citizens
- \_\_\_\_\_ legislators
- \_\_\_\_\_ other -- please specify:

3. **Data acquisition:** in a few words, describe where a potential user should go to acquire the most current and accurate version of this data? E.g., call the district biologist or download from agency web site?



## **Day Two: Addressing data gaps: problems and solutions (1:45 pm – 3:45 pm)**

### **Problems – 45 minutes (1:45 – 2:30)**

*Goal:* Identify and rank impediments to addressing identified gaps.

*Question:* “What are the impediments to addressing the monitoring/data gaps identified at this workshop?” There are (at least) three ways to interpret the issue of “addressing gaps”. We will consider the following:

1. improving the statistical reliability (accuracy and precision) of monitoring (i.e., how do we get more green lights or low uncertainty estimates?), **or**
2. expanding monitoring to places it currently isn’t done (i.e., how do we eliminate as many red lights or “n/a”s as possible?), **or**
3. both of the above. The two are not mutually exclusive but should and can be addressed at the same time.

*Groups:* Individuals are assigned to one of three groups of 6-9 people each.

*Techniques:* Utilize modified nominal group techniques to identify and rank impediments to improving quantitative information for Pacific salmon. Share the top 5 ranked problems with the entire workshop group. The top one (excluding duplicates) from each group will be combined into a final list of three.

### **Solutions – (3:00-3:45)**

*Goal:* Identify solutions to the 3 highest ranked problems identified above.

*Question:* “What can be done to address these issues?”

*Groups:* Individuals are re-assigned to one of three groups of 6-9 people each.

*Techniques:* Utilize modified nominal group techniques to identify solutions to each of the 3 problems and share a summary of the group’s discussion with the entire workshop group. 30 minutes in small group discussion, 15 minutes in large group discussion.

## SOURCES AND METHODS

### **Monitoring Activity Information**

The *North Pacific Rim Salmon Monitoring Inventory* was initiated in 2004 in Alaska and extended to British Columbia and the U.S. Pacific Northwest in 2005. We embarked on a range-wide inventory of anadromous Pacific salmon monitoring to:

- identify, and facilitate efforts to address, gaps in salmon monitoring and information;
- source data needed to conduct quantitative range-wide salmon trend assessments; and, ultimately,
- provide a transparent and useful information tool to support credible salmon research, management, and conservation decision-making.

### ***Conceptual Approach***

To make such an extensive project tractable we developed a conceptual framework to identify and describe monitoring activities around the North Pacific. Key to the success of this effort is to standardize metadata to facilitate accurate automated queries of the resulting data base while preserving enough information to characterize data quality and utility. Our approach is designed to be transferable and reproducible for all anadromous Pacific salmon species across their natural range.

It's important to clarify that we chose to circumvent the full characterization of datasets per se and, instead, describe the data collection efforts. This approach was taken for three important and interrelated reasons:

(1) Raw observational data (field data) are a basic building block for scientific investigations. Documenting raw data is essential for preserving data for future use and for researchers to address new questions or to test new methods which aren't practicable with highly processed datasets. Given their long term value, we chose to focus on observational data collection and, as a result, we can link published derived datasets to their source field surveys.

(2) Data producers are typically the only individuals knowledgeable enough to adequately document any given dataset. The scope of this project precludes interviewing all data producers or reconstructing historical expert knowledge which would be necessary to create comprehensive dataset-level documentation. However, by using publicly available information it is feasible to identify major field collection efforts and describe important features thereof.

(3) Observational data quality and utility can be at least partially evaluated in light of factors such as the statistical sampling design and field methods used. Some of this information is available in published format or can be deduced. We therefore focused on characterizing key components of monitoring activities at a uniform granule to permit transboundary analyses.

The following criteria were used to determine whether a monitoring activity should be included in the Inventory:

- where Chinook, coho, steelhead, sockeye, chum, or pink are surveyed, *and*
- where these fish are of wild, natural, or mixed origin<sup>1</sup>, *and*
- where ten years or more of data have been or will be collected, *and*
- where the collected data can be used to assess abundance\*, productivity\*, survival\*, distribution, or diversity <sup>2</sup> (\*SoS priority parameters)

A common definition for “monitoring activity” is a fundamental component of this type of project. In order to classify activities or standardize descriptive information – prerequisites to any type of analyses - we have attempted to parse monitoring activities into a uniform granularity. Thus, we define a unique monitoring activity in the following manner:

*One species being monitored for a primary objective<sup>3</sup> using a primary field method.*

A good example of how this works is sockeye monitoring in Bristol Bay, Alaska where the Alaska Department of Fish and Game (ADFG) surveys just downstream of each major nursery lake. At the same site they count migrating adult sockeye from a tower and collect individuals with a beach seine to gather information to age fish and determine sex and length (ASL). ADFG calls this one project whereas we parse this into two unique monitoring activities, reflecting the two different methods and objectives. If ADFG were to conduct tower counts and ASL sampling for Chinook at this same site then these are listed as two more unique monitoring activities in the Inventory.

We use a ten-year criterion to establish trends for two principal reasons: ten years capture approximately three generations of an average salmon species and spans a long enough period of time to capture climate cycles (e.g., El Nino/Southern Oscillation and Pacific Decadal Oscillation) that are recognized as influential drivers of population dynamics. There are exceptions to the ten year minimum requirement. Data do not need to be collected over ten successive years so long as there are ten or more years in total and data breaks can be clearly characterized. We also included nascent monitoring activities where there is an expectation they will continue for at least ten years. Certain types of “snapshot” data, such as presence-absence surveys, are not fully represented in the inventory.

Once selected for inclusion, each monitoring activity was georeferenced with the finest resolution location information readily available, including latitude/longitude, routed stream reach, or statistical area used by the lead monitoring agency. Each activity was assigned a

---

<sup>1</sup> We recognize that while much of the monitoring that occurs in this region targets fish of different origins, we are focused on wild fish for this project. State of the Salmon has a separate initiative to build a geodatabase of hatchery facilities and recent releases.

<sup>2</sup> The original criteria included certain types of “snapshot” data such as presence/absence surveys and a number of other survey types that contribute to assessing spatial structure and diversity. Unfortunately, we had to further limit the scope of the project in the name of efficiency. As a result, these types of activities are not fully represented in the Inventory. Although we will not be including all listed parameters in the Validation Workshop, they will be made available with the rest of the Inventory results in 2007.

<sup>3</sup> Objective, as used in the Inventory, is defined by what application the data may be applied towards, not necessarily the original purpose of the activity as described by those conducting the monitoring.

primary field method (e.g., weir, aerial survey) and one of four monitoring objectives (abundance, productivity, distribution, or diversity). Objective, as used in the Inventory, is defined by what application the data may be applied towards, not necessarily the original purpose of the activity as described by those conducting the monitoring. Additional types of information collected include, species lifestage, field method, and sample design.

Where location, field method, objective, and lifestage information were available, we classified activities into one of three Monitoring Tiers. Tier classification is a hierarchical schema that addresses the fit of a monitoring effort within one of three levels of biological organization: regional grouping (Tier 1), metapopulation (Tier 2) and population (Tier 3). Fisheries agencies may strive to define stocks that represent a natural grouping but these definitions are not universal (Geiger and Gharrett 1997, Ricker 1972). For our purposes, we use the word “stock” to indicate a recognized, managed group of fish and employ our Tier schema to impose a common classification that is based on fundamental, biological criteria.

Tier 1 monitoring, primarily commercial harvest rates, is still the most abundant type of data in some regions in the North Pacific, and was necessary for us to apply our approach range-wide. Tier 2 is meant to represent a group of populations that have likely undergone some degree of regional adaptation, or have a shared, unique ancestry. In general, Tier 2 monitoring occurs in the lower river, using gear intended to estimate fish numbers across a larger river channel or lake where it is likely that individuals from a number of distinct populations are encountered. Tier 2 may capture any “en route” monitoring – between entry to freshwater and spawning grounds - where the destination of targeted fish is uncertain or the observer cannot ascertain whether surveyed individuals hail from a particular population. Conversely, those adult monitoring activities conducted in creeks that are on or in close proximity to the spawning grounds were considered Tier 3. Tier 3 monitoring activities are intended to assess discrete, reproductively isolated populations or demes.

### ***Acquisition of Metadata***

State of the Salmon hired contracting teams to conduct the Inventory. The teams relied primarily upon public information sources such as aggregate databases, published literature, and pre-existing surveys to create metadata (data about data) for monitoring activities. In some cases, agency personnel were contacted to identify appropriate activities for inclusion and supply public documentation. Metadata were subsequently entered directly into a relational database. Output was also used to develop geodatabases in ArcGIS.

The information collected was provided to State of the Salmon in the summer of 2006. For a complete list of sources please see Table 7 at the end of this document. Upon receipt, we reviewed the dataset to identify and resolve, where possible, categorical errors and omissions. This process alerted us to data entry problems and general completeness of information. Examples include: no primary field method selected, multiple species names given for one activity, or no georeferenced location information available. However, we could not otherwise ascertain the correctness of information without input from those conducting the monitoring. Thus, starting the last week of September 2006, State of the Salmon began the first external review of its results from the Inventory (referred to as “Round 1” review). The purpose of this

exercise was to ensure monitoring groups were aware of the information collected to date, and, to the greatest extent possible, resolve significant errors and omissions.

Based on what we identified as priority fields in our database, data about those activities (or metadata) was organized into “reviewer packets,” which were sent out to state agencies and tribal groups in Washington, Oregon, Idaho, and California (WOCI). Apart from those groups and agencies, the data was further arranged by monitoring program, program contact, and then by ESU to facilitate the distribution and review of activities by regional and district fisheries biologists. Reviewers were provided several weeks to complete this process, with a mid-October deadline so that changes could be incorporated into the master database in time for the November workshop. In spite of that deadline, however, we acknowledge the time constraints and are welcoming edits until the end of the calendar year. The process of this Round 1 review, including our correspondences with reviewers, has served as a basis of how and where to proceed during the validation workshop and with the inventory into the future.

<b>Table 6. Round 1 Reviewers</b>	
<i>* indicates comments received after the Oct. 31 deadline; edits not reflected in current version of the Inventory</i>	
<b>Organization</b>	<b>Reviewer Name</b>
California Department of Fish and Game	Philip Bairrington
	Scott Downie
Colville Confederated Tribes	John Arterburn
	Scott Fisher
Green Diamond Resource CO.	Lowell Diller
	Matt House
Nez Perce Tribe	Brian Michaels
Oregon Department of Fish and Wildlife	David Jepsen
	Ken Kenaston
	Mark Lewis*
	Eric Schindler
	Mark Wade
Washington Department of Fish and Wildlife	Michelle Groesbeck
	Lee Hoines*
	Kelly Jenkins*
	Susan Markey*
	Charlie Snow
Yakama Nation	Bill Bosch
	Paul Huffman

We have endeavored to minimize the burden on monitoring staff but crucial pieces of information are still needed. In a workshop setting, participants’ exclusive knowledge of monitoring efforts and design and implementation issues can be documented and used to classify the relative quality of monitoring effort. We can also incorporate further edits or additions received by the end of this calendar year (December 31, 2006). As of January 2007, Inventory results will be considered final for Washington, Oregon, California, and Idaho. If interested, you can peruse existing Inventory records at [www.stateofthesalmon.org/ws](http://www.stateofthesalmon.org/ws).

## **Geographic data sources**

### **Metapopulation units :**

Under the Endangered Species Act, NOAA Fisheries developed “evolutionarily significant units,” or ESUs. Scientists established two criteria for ESUs: 1) the population must show substantial reproductive isolation; and 2) there must be an important component of the evolutionary legacy of the species as a whole. ESUs delineated by NOAA Fisheries NWFSC and SWFSC.

### **Population units:**

*Columbia Basin, including the Willamette:* The population units were developed by the Columbia River Intertribal Fish Commission (CRITFC) using REO 6th field hydrologic units (HUCs). These populations are generally aggregations of spawning fish that are genetically distinct from other populations and contain their own distinct characteristics. Because genetics are not readily available in many cases, these populations may also be identified and separated based on their life history patterns or other considerations. This information was primarily generated by reviewing all of the Columbia subbasin plans created in the recent (2000-2005) Northwest Power and Conservation Council planning process.

*Coastal Oregon\*:* The populations were developed for Oregon's Native Fish Conservation Policy by the Oregon Department of Fish and Wildlife. The data were used to update REO 6th field HUCs to display the populations. ODFW defines a fish population as “a group of fish originating and reproducing in a particular time which do not interbreed to any substantial degree with any other group reproducing in a different area, or in the same area at a different time” [OAR 635-007-0501(45)].

*Western Washington and Puget Sound\*:* Population units developed by The State of the Salmon Consortium based the on WDFW definition of a fish stock as "a group of fish within a species which is substantially reproductively isolated from other groups of the same species" [http://wdfw.wa.gov/fish/sasi/sasi\\_2002\\_glossary.htm](http://wdfw.wa.gov/fish/sasi/sasi_2002_glossary.htm). The spatial layer was delineated by grouping the REO 6th field HUCs that encompassed the spawning areas depicted in the SASI Database.

*California:* The populations were developed by the NOAA Southwest Fisheries Science Center and the Technical Recovery Team for the North-Central California Coast Recovery Domain. Delineation and classification of populations took into account genetic relationships, basin environmental characteristics, models of intrinsic potential for salmon habitat and the geographic distances between areas of high intrinsic potential. Basins were delineated using Calwater watershed planning units (slightly finer than 6th field HUCs).

\* Population units derived from NMFS Technical Recovery Team reports within the following ESUs: *Oregon coastal Coho, Puget Sound Chinook, Hood Canal Summer-run chum*

## DIRECTIONS

### **Parking**

Please note that parking is limited to hourly, metered street parking. We encourage you to take public transportation, if possible.

For *out-of-town guests* staying in hotels in downtown or northwest Portland, we recommend taking the Portland Streetcar which runs every 15 minutes. From the Mark Spencer, it stops directly in front of the NCC at 10<sup>th</sup> and Johnson. From the Inn at Northrup Station, it stops one block west of the NCC at 11<sup>th</sup> and Johnson.

For *in-town guests* we recommend either public transportation (see below) or public parking. There is limited public parking available on the 4<sup>th</sup> floor of the REI building located at 14<sup>th</sup> and Johnson; it's often full by 9 am and cost is ~\$7/12 hrs. There is also a large Smart Park at Station Place located near the Broadway Bridge; see <http://www.portlandonline.com/smarpark/index.cfm?&a=62409&c=35506>.

### **Public Transportation in Portland**

- TriMet Route Finder for the Max and the Portland Streetcar [www.trimet.org](http://www.trimet.org)
- Portland Streetcar from Downtown or Northwest Portland to Pearl District:  
Portland Streetcar travels every 15 minutes from downtown to our offices at NW 10<sup>th</sup> and Johnson. See TriMet web site listed above for details.

### **Ecotrust to Andina's Restaurant (.3 Miles)**

1. Start at 721 NW 9TH AVE, PORTLAND going toward NW IRVING ST - go 0.1 mi
2. Turn right on NW GLISAN ST - go 0.2 mi
3. Arrive at **1314 NW GLISAN ST, PORTLAND**



Table 7. Detailed Summary of WOCI Inventory Sources and Status

State / Region	Subregion/Area Covered	Data Provider/Source	Data Type	Metadata Received?	Number of Records	Format Data Received	Data Processing / Manipulation	Upload Format	Missing or Incomplete Program Metadata	Missing or Incomplete Activity Metadata	Other Issues
California	Klamath National Forest Land - "all streams with water"	Klamath National Forest	Escapement; Juvenile enumeration;	Yes	14	personal communication	Data entered from communication notes	Manual entry	Program data relatively complete	Budget (i). Effort (i). Stock (i). Area of inference (i).	Potentially several hundred streams. NF Director requires FOIA request for data release
	Klamath River and tributaries			Yes	101	Metadata records, data observation records	Metadata records and observation data records converted into SoS metadata format. Verified and appended with StreamNet data.	Manual entry		Program (i). Budget (i). Effort (i). Stock (i). Population (i).	
	Coastal California streams, entire state	NOAA - California Coastal Salmon Monitoring Database, StreamNet		Yes	363	Metadata records, data observation records	Metadata records and observation data records converted into SoS metadata format. Verified and appended with StreamNet data.	Manual entry	No program data	Budget (i). Race (i). Stock (i). Sample design (i). Area of inference (i). Users (i). References (i).	
	Misc. coastal rivers (San Lorenzo, Soquel Creek, Gualala River)	NOAA - California Coastal Salmon Monitoring Database		Yes	49	Database records	Spreadsheet data were entered into database	Manual entry	Program data relatively complete	Budget (i). Race (i). Stock (i). Sample design (i). Area of inference (i). Users (i). References (i).	Data entered prior to database modifications. Will require revision.
	Nor. Cal. Private timberlands	NOAA - Cambell / Hawthorne Timber Group		Yes	308	Hardcopy report; personal communication	Report information was entered into the database	Manual entry	Program data incomplete	Budget (i). Stock (i). Production (i). Area of inference (i). Location (p). Sample design (i). Users (i). References (i).	Could be compressed in to fewer activities with multiple locations. Data entered prior to database modifications. Will require revision.
	California - Central Valley river systems	California Department of Fish and Game, NOAA Fisheries, U.S. Fish & Wildlife Service, U.S. Bureau of Reclamation and other various organizations in California		Yes	154	Hardcopy report, StreamNet data records	Data records developed from hardcopy report. StreamNet data used to verify and append dataset.	Manual entry		Budget (p). Effort (i). Stock (i) Population (i). Area of inference (i). Location (p).	For many of these records, data entered prior to database modifications. Will require revision.
	California ocean and freshwater commercial harvest areas	California Department of Fish and Game, Pacific Fisheries Management Council		Harvest	Yes	20	Hardcopy reports	Activity records developed by marine statistical areas	Manual entry	Program data relatively complete	Budget (i). Race (i). ESU (i). Stock (i). Population (i). Area of inference (i). Location (p).
Idaho	Idaho anadromous zone	Idaho Department of Fish and Game - Evan Brown	Escapement; Juvenile enumeration; Biological: age/sex/length/tissue ;	Yes	671	reports, personal communication, spatial data, StreamNet tabular data, agency database queries	Data were compiled into several spreadsheets and prepared for mass upload.	Mass upload, manual entry	Program data relatively complete	Primary contact (p). Effort (i). Budget (i). Stock (i). Population (i). Area of inference (i).	N/A
	Salmon River	Idaho Department of Fish and Game	Biological: age/sex/length/tissue	Yes	26	CSMEP tabular data, strengths and weaknesses assessment	CSMEP Spreadsheet data were entered into database	Manual entry	Program data incomplete	Effort (i). Budget (i). Stock (i). Area of inference (i). Sample design (i). Users (i). References (i).	N/A
	Oregon coast and Oregon-side lower Columbia	Oregon Department of Fish and Wildlife - various personnel in the OASIS (Oregon Adult Salmonid Inventory and Sampling) program	Escapement	Yes	105	Hardcopy reports, personal communication, spatial data, tabular data	information was gathered primarily from reports and personal communication an entered into the database.	Mass upload, manual entry		Effort (p). Budget (i). Stock (i). Production (p). Area of inference (i). Sample design (i). Users (i). References (i).	

Table 7. Detailed Summary of WOCI Inventory Sources and Status

State / Region	Subregion/Area Covered	Data Provider/Source	Data Type	Metadata Received?	Number of Records	Format Data Received	Data Processing / Manipulation	Upload Format	Missing or Incomplete Program Metadata	Missing or Incomplete Activity Metadata	Other Issues
Oregon	Lower Columbia River catch monitoring areas and zones. Some Oregon-side Lower Columbia tribes, and the Molalla basin.	Oregon Department of Fish and Wildlife - various personnel in the Columbia River Management program	Escapement; Harvest	Yes	186	Hardcopy reports, personal communication, online research	Information was gathered primarily from reports and personal communication and entered into the database.	Manual entry		Race (p). ESU (p). Stock (i). Population (p). Area of inference (i). Sample design (p). Users (i). Reference (i).	Data entered prior to database modifications. Location data in GIS
	Grande Ronde	Oregon Department of Fish and Wildlife - Northeastern Oregon Fisheries Research Program	Escapement; Biological: age/sex/length/tissue; Survival	Yes	42	CSEMP - tabular data, strengths and weaknesses assessment	Spreadsheet data were entered into database	Manual entry		Stock (i). Production (i). Area of inference (i). Location data (p).	Data entered prior to database modifications. Will require revision.
	Oregon coastal and Willamette basins	Oregon Department of Fish and Wildlife - Salmon Life-Cycle Monitoring Program, Western Oregon Rearing Project, Willamette Salmonid Inventory and Willamette Spring Chinook program	Escapement; Juvenile enumeration	Yes	73	reports, personal communication, spatial data, tabular data.	Information was gathered primarily from reports and personal communication and entered into the database.	Manual entry		Stock (p). Production (p). Area of inference (i). Location data (p). Sample Design (i). Users (i). References (i).	Data entered prior to database modifications. Location data in GIS
	Oregon Coast harvest areas	Oregon Department of Fish and Wildlife - Ocean Salmon Management Program, Pacific Fisheries Management Council	Harvest	Yes	24	Hardcopy reports	Activity records developed by marine statistical areas	Manual entry		Effort (i). Budget (i). Race (i). ESU (i). Stock (i). Population (i). Area of inference (i). Location (p). Users (p).	N/A
Oregon	Columbia River harvest areas	Oregon Department of Fish and Wildlife - Columbia River Management Program	Harvest (commercial and recreational), escapement (spawning ground surveys)	Yes	186	Hardcopy reports, personal communication	Information was gathered primarily from reports and personal communication and entered into the database.	Manual entry	Program data relatively complete	Race (p). ESU (p). Stock (p). Population (p). Area of inference (i). Location (p). Sample design (i). Users (i). References (i).	N/A
	Lower Columbia and Deschutes	Oregon Department of Fish and Wildlife - Lower Columbia Chinook salmon monitoring, Lower Columbia coho monitoring, Lower Columbia steelhead monitoring and Mid-Columbia Fish District Monitoring	Escapement; Survival	Yes	31	Hardcopy reports, personal communication	Information was gathered primarily from reports and personal communication and entered into the database.	Manual entry		Effort (i). Budget (i). ESU (p). Stock (i). Population (i). Production (p). Area of inference (i). Location (p). Sample design (i). Users (i). Reference (i).	Data entered prior to database modifications.
	Imnaha Basin	Oregon Department of Fish and Wildlife - Imnaha river salmonid monitoring project/ Nez Perce Tribe	Escapement; Survival; Biological: age/sex/length/tissue; Juvenile enumeration; Survival; Escapement	Yes	29	CSMEP tabular data, strengths and weaknesses assessment	Data compiled from CSMEP database output, strengths and weaknesses evaluation spreadsheets and narrative	Manual entry	Program data relatively complete - contact information complete but notes fields are empty	Effort (i). Budget (i). Production (p). Stock (i). Area of inference (i). Location (p).	N/A
	Imnaha basin	Fish Passage Center	Survival; Derived dataset	Yes	2	CSEMP - tabular data and strengths and weaknesses evaluation	Data compiled from CSMEP database output, strengths and weaknesses evaluation spreadsheets and narrative	Manual entry	Program data relatively complete	Budget (i). Effort (i) Years (i). Stock (i). Area of inference (i). Location (i). Sample design (i). Method (p). Users (i). References (i).	N/A

Table 7. Detailed Summary of WOCI Inventory Sources and Status

State / Region	Subregion/Area Covered	Data Provider/Source	Data Type	Metadata Received?	Number of Records	Format Data Received	Data Processing / Manipulation	Upload Format	Missing or Incomplete Program Metadata	Missing or Incomplete Activity Metadata	Other Issues
	Other Eastern Oregon Basins	Oregon Department of Fish and Wildlife - Regional Offices, StreamNet	All data types	Yes	1,525	StreamNet data records, hardcopy reports	Preliminary records compiled from StreamNet observational data records	Mass upload	No program data provided, placeholder program name created.	Budget (i). Effort (i). Stock (i). Population (i) Area of Inference (i). Sample design (i). Users (p). Reference (i).	N/A
	Lower Columbia	Oregon State University, Dr. Schreck,	survival (juvenile)	Yes	8	CSMEP tabular data, strengths and weaknesses assessment	Data compiled from CSMEP database output, strengths and weaknesses evaluation spreadsheets and narrative	Manual entry	Program data incomplete	Budget (i). Effort (i). Stock (i). Area of inference (i). Location (i).	N/A
	Clackamas and Sandy basins	Oregon Department of Fish and Wildlife - Clackamas River Fisheries Working Group	Biological: age/sex/length/tissue; Juvenile enumeration; Escapement	Yes	44	Reports, personal communication	Data were compiled from reports and conversations and entered into the database	Manual entry	Program data relatively complete	Budget (i). Effort (i). Race (p). Stock (i). Population (p) Location (p). Users (i). References (i).	N/A
WA, OR, CA to Mendocino	250 subwatersheds in Forest Service Region 6	AREMP - Aquatic & Riparian Effectiveness Monitoring Program	Juvenile enumeration; Biological: age/sex/length/tissue	Yes	829	reports, personal communication, spatial data, tabular data	Created an example record and this basic structure was used for the mass upload. Database records are differentiated based on activity/species combinations. For these data we assumed activity/species combinations based on species presence for each subwatershed.	Mass upload	Program data relatively complete	Contact (p). Effort (i). Budget (i). Race (i). ESU (i). Stock (i). Population (i). Area of inference (i).	N/A
	Washington State	Washington Department of Fish and Wildlife - SaSI database - Ann Blakley	Escapement; Harvest; Fisheries-season assessment; Juvenile enumeration	Yes	500	SaSI - Microsoft Access Database	Used SaSI database to create spreadsheets for mass upload.	Mass upload	Program data relatively complete	Budget (i). Effort (i). Population (i).	N/A
	Washington State, Methow basin	Washington Department of Fish and Wildlife - Lower Columbia Chinook Salmon Monitoring, Methow Hatchery, Methow River Anadromous Salmonid Monitoring program, Okanogan Anadromous Fish Monitoring and Wells Dam monitoring programs	Escapement; Survival; Biological: age/sex/length/tissue; Derived dataset	Yes	16	Intensively monitored watershed program data, CSMEP Strengths and weaknesses evaluations.	Data compiled from CSMEP database output, strengths and weaknesses evaluation spreadsheets and narrative, and data downloaded from web.	Manual entry		Budget (i). Effort (i). Stock (i) Area of inference (i) and location (p).	N/A
	Yakima and Klickitat basins	Yakima Nation and Washington Department of Fish and Wildlife	Escapement; Survival; Biological: age/sex/length/tissue; Derived dataset; Juvenile enumeration	Yes	66	Intensively monitored watershed program data, CSMEP Strengths and weaknesses evaluations.	Data compiled from CSMEP database output, strengths and weaknesses evaluation spreadsheets and narrative, and data downloaded from web.	Manual entry		Budget (i). Effort (i). Stock (i). Area of inference (i). Location (p).	N/A

**Table 7. Detailed Summary of WOCI Inventory Sources and Status**

State / Region	Subregion/Area Covered	Data Provider/Source	Data Type	Metadata Received?	Number of Records	Format Data Received	Data Processing / Manipulation	Upload Format	Missing or Incomplete Program Metadata	Missing or Incomplete Activity Metadata	Other Issues	
Washington	Okanogan basin	Colville Confederated Tribes	Escapement; Survival; Biological; age/sex/length/tissue	Yes	6	Intensively monitored watershed program data, CSMEP Strengths and weaknesses evaluations.	Data compiled from CSMEP database output, strengths and weaknesses evaluation spreadsheets and narrative, and data downloaded from web.	Manual entry		Budget (i). Effort (i). Stock (i). Area of inference (i). Location (p).	N/A	
	Entire state	Washington Department of Fish and Wildlife	Juvenile monitoring data	Yes	20	Online data reports, hardcopy reports	Compile records by stream from available data	Manual entry				
	Washington Coastal and Inland marine fishing areas	Washington Department of Fish and Wildlife, Pacific Fisheries Management Council	Port sampling for abundance, genetics, age, sex, length.	Yes	530	Hardcopy reports	Activity records developed by marine statistical areas	Mass upload	Program data incomplete	?	N/A	
	Washington Commercial Landings data	Washington Department of Fish and Wildlife	The LIFT database – fish tickets	Yes	402	Delimited text file with accompanying metadata document	Data compiled from LIFT ticket commercial database	Mass upload			Budget (i). Effort (i). Stock (i). Area of inference (i). Location (p).	
	Washington Sport Catch and Harvest data	Washington Department of Fish and Wildlife	The CRC database – catch reporting cards	Yes	234	Delimited text file with accompanying metadata document	Data compiled from marine and freshwater catch reporting database	Mass upload			Budget (i). Effort (i). Stock (i). Area of inference (i). Location (p).	

(i) = Information incomplete

(p) = Information partially complete

- = Indicates estimated number of metadata records