July 2010

Final Draft Work Plan For
Coordinated Assessments for Salmon and Steelhead

Collaborative Information Management to Support Ongoing Assessments for Columbia River Basin Anadromous Salmon

Through the Columbia River Basin Anadromous Salmonid Monitoring Strategy (ASMS), the Federal Columbia River Power System (FCRPS) Action Agencies and Fishery Co-Managers have agreed to the necessary monitoring to provide data to answer key management questions related to VSP Parameters and began the discussion for key habitat and hatchery effectiveness assessments. Performing these assessments and reporting answers to these management questions on an ongoing basis is needed to assure 1) effective evaluation of the Federal Power System Biological Opinion (BiOp), 2) progress toward the recovery of anadromous salmonids listed under the Endangered Species Act (ESA), and 3) effective implementation of the anadromous salmonid elements of the Columbia River Basin Fish and Wildlife Program. This document describes a collaborative effort that will gather co-managers and other key agencies within the sub-regions of the ASMS to develop assessment and data sharing strategies for meeting regional reporting requirements. This effort will also identify gaps in data management and sharing capacities currently limiting the efficiency and effectiveness of data reporting, and establish strategies to close these gaps.

To support these assessment and reporting needs, the agencies and tribes commit to development of a comprehensive data sharing strategy that provides a regional approach to moving information from data collection, sharing, and evaluation to reporting for informed decision making. This comprehensive data sharing strategy will be based on the following components;

- **Partner Capacity:** Partner technical support (e.g. infrastructure, applications, databases and protocols) and staffing (e.g. collection, stewardship, exchange tools) required to move data from the point of collection to its availability in a common template for exchange.
- **Shared Technical Infrastructure:** Infrastructure that supports information flows for multiple partners. This will include repositories for reference information and for data, reporting tools, and translation and exchange tools.
- **Common Data Exchange Templates[1] (DET):** Common templates (formats) for three selected VSP indicators, data elements and metadata, which provide transparency into the semantics, analysis method and origin of the data as it is exchanged. Each DET will include an analysis flow chart depicting the major analysis steps reflected in the DET indicators. Once successful, the DET will be expanded to other VSP indicators, and habitat and hatchery effectiveness indicators.

[1] Data Exchange Template: A standardized format that identifies the types of information required or allowed in a particular document or exchange. Data exchange templates contain no data but instead define the format for exchange according to data standards and trading partner agreements.

- **Management and Governance:** Coordination and management of shared and individual partner investments and work. Ensuring that needed resources, guidance or other products to exchange data are developed and made available.

The intent of this data sharing strategy is to provide the framework and technical tools to support data sharing across disparate systems from the local level to the regional level; and, ensure that comparable data from different sources can be combined to facilitate assessment at the regional scale.

This effort will begin with a focus on the data for assessments of VSP parameters and then move to address habitat and hatchery effectiveness assessments as guidance for those efforts is developed. In an attempt to improve regional habitat-action effectiveness monitoring, the Pacific Northwest Aquatic Monitoring Partnership and WA Forum on Monitoring are hosting a series of work sessions over the course of the next several months to 1) integrate and align existing and new habitat monitoring efforts, 2) provide better, more scientifically robust data for use in management decisions, and 3) improve cost efficiency in the implementation of habitat monitoring programs. Also, NOAA Fisheries intends to develop guidance for monitoring habitat action effectiveness and reporting on hatchery effectiveness in the Columbia River Basin. The guidance and recommendations from all these efforts will be incorporated into the regional data sharing strategy as they become available.

This work plan describes the near, medium, and long term plans for developing the components listed above, with a focus on three specific fish population indicators in the Columbia River Basin:

1. Abundance of natural spawning anadromous salmonids,
2. Adult to adult return rate, and
3. Smolt to adult return rate.

While these three indicators will drive the near and mid-term efforts, the intent of this effort is to eventually expand to other VSP parameters and important habitat and hatchery effectiveness parameters.

As discussed above, this workplan places an early emphasis on the development of a DET and partner infrastructure (e.g. field staff capacity and agency/tribe IT/IM systems), with the intention that early data exchanges can be accomplished through manual email or file upload processes using a draft DET. This alone would be a major accomplishment over current practice. Over time, as merited by the business requirements of the partners, a greater emphasis will be placed on more advanced data transport approaches and automation, including shared data hosting and data publishing/web services.

Near-term (summer 2010):

Goal: Conduct internal agency reconnaissance and develop proof-of-concept examples to demonstrate potential for using a Data Exchange Template for sharing three selected VSP indicators. Funding for this near term effort would come from remaining FY10 BPA data management funding (~$200k through PNAMP), CBFWA coordination funding, and agency/tribal in-kind contributions.

Near-term actions to prepare for regional workshops:

1. Vet this document and the timeline within agencies and tribes.
2. Conduct internal agency/tribe reconnaissance to understand existing data sources, status, and intentions of managing data within exiting monitoring projects to provide informed participation in the September/October regional workshop. [Partner Capacity]
3. Develop proof-of-concept materials for regional data workshop scheduled to occur in September/October 2010.
    a. The planning group will create a Data Flow Example Story that demonstrates exactly how the DET will be used and implemented. [Demonstrate Shared Technical Infrastructure]
    b. A contractor, working closely with the agencies and tribes, will create a first iteration Data Exchange Template (DET) as an example for use in sharing key fish population indicators and appropriate metrics data. The template will build off the Data Matrix (Appendix B) and include analysis flow diagrams and a data dictionary for the three selected indicators. [Common Data Exchange Template]
    c. A contractor, working closely with the agencies and tribes, will create a metadata template defining the fields required for describing the selected indicators and key metrics for salmon and steelhead populations following the Federal Geospatial Data Committee (FDGC) Biological Data Profile. Use information collected during the NPCC RME Categorical Review to guide development of the metadata template and ensure its compatibility with the DET. [Common Data Exchange Template, Shared Technical Infrastructure]
    d. A contractor or database project, working closely with the agencies and tribes, will produce four example data sets, formatted per the draft DET as a proof-of-concept, for four Technical Recovery Team (TRT) populations, one from each sub-region/ESU. [examples of implementation of the Common Data Exchange Template]

Medium-term (FY 2011):

Goal: Assess agency and tribal data management needs to support assessments and reporting for the three VSP indicators identified above. Establish basin-wide data management and sharing priorities to guide development of 2012-2016 data management project proposals. Funding for this effort would come from FY11 BPA data management funding (~$500k) and CBFWA coordination funding already assigned to agencies and tribes. Work elements will be included in StreamNet and CRITFC FY11 work plans to support these activities.

Medium-term actions to assess basin-wide data management priorities:

1. Conduct September/October regional data workshop to review proof-of-concept products and approve work plan to complete implementation of draft DET.
    a. Review and approve draft DET (data matrix, data dictionary, minimum metadata requirements, and generic examples data analysis flow diagrams).
    b. Review and approve sub-regional workshop guidance and expectations.
    c. Review and approve work plan and schedule for completion of first iteration DET data sets and data management gaps assessment based on completion of those data sets.
2. For all salmon and steelhead populations where data is available, produce a description of the existence, location, format, completeness, availability, and gaps of the three key VSP Indicators, including a data flow diagram or map describing data pathways. Where the estimates and related information are readily available, the data will be obtained and compiled in a spreadsheet or simple relational database.
3. Facilitate sub-regional workshops in November/December to meet with field biologists and data managers to document existing sub-regional data management approaches and get feedback on the DET and other products.
    a. Use DET exercise, along with internal agency/tribe reconnaissance on existing data sources, data flows, status, and intentions of managing data within monitoring projects to identify issues, collaboration opportunities and gaps.
    b. Use these to develop sub-regional data management strategies for FY2012-2016 that address needed field office and agency and tribal infrastructure/capacity and scheduling.
    c. Frame a sub-regional data management strategy for each sub-region including: identification of priority data for the sub-region, needed tools/applications/databases for local data management and exchange, provisioning options (e.g. local hosting, shared hosting or a combination), staffing and workflows.
4. Conduct a second regional workshop in February/March to align sub-regional data management strategies and establish data management priorities and sequences for FY12-16. Finalize the DET for future exchanges of indicator data.
5. Develop FY2012-2016 project proposals, and propose adjustments to work elements within appropriate projects, to address sub-regional and regional data management strategies. The current list of data management projects include:
    a. 1988-108-04, StreamNet, $2,016,428
    b. 1996-019-00, Data Access in Real Time (DART), $291,316
    c. 2003-072-00, Habitat and Biodiversity Information System (IBIS), $165,821
    d. 2008-505-00, StreamNet Library (Accord project), $441,326
    e. 2008-507-00, Tribal Monitoring Data (Accord project), $357,633
    f. 2008-727-00, Regional Data Management Support and Coordination, $500,000

    This list appears incomplete and may include other projects such as PTAGIS, Smolt Monitoring Program, ISEMP, and others.
6. On an iterative basis, expand data priorities to include additional VSP parameters and high priority habitat and hatchery effectiveness parameters as available and begin

development of DET for those parameters. Rely on PNAMP Data Management Leadership Team to coordinate and facilitate expansion of data priorities as they become available.

7. Maintain project list of un-funded data sharing needs for future funding opportunities.

Long-term (FY12-16):

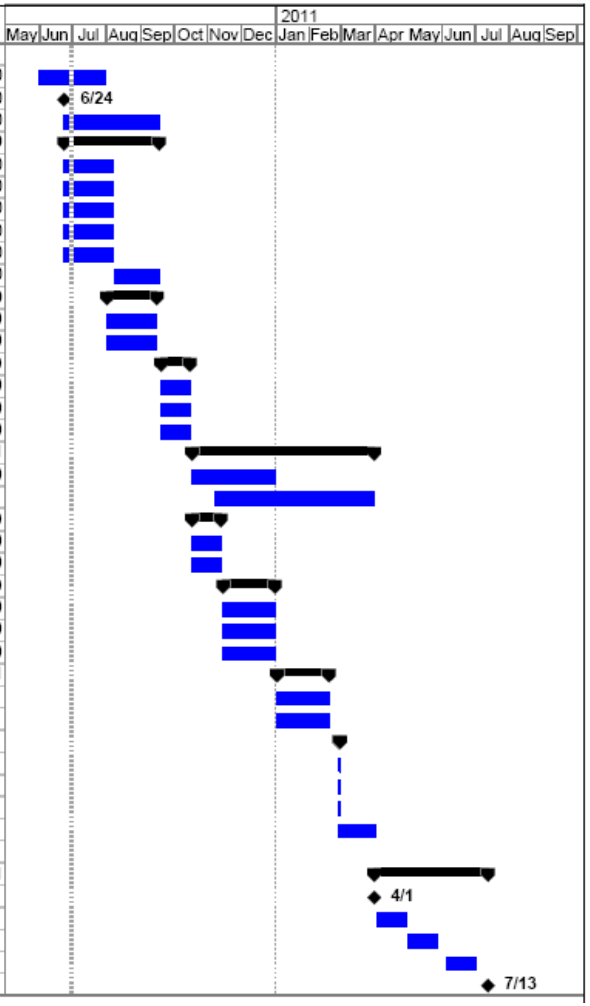
Goal: Fund and implement priority actions to develop basin-wide data management infrastructures, including infrastructure needed within individual agencies and tribes to manage their supporting data. Funding for this effort would include FY12-16 BPA data management funding (~$500k annually) and the re-prioritization of work elements within existing data management and other projects, as well as in-kind contributions from the agencies and tribes.

While the near-term and ongoing need to report population assessments for the BiOp will require an ad hoc approach based on existing data sharing capabilities in the participating agencies/tribes, the long term goal is to develop a consistent regional approach that will allow efficient and reliable flow of data, and where appropriate this will include automation of some processes now conducted manually. To meet this goal we envision a series of incremental steps towards a data exchange network which would support participating agencies in developing and using more advanced and automated data transport options. These approaches will range from developing agency/tribal data systems, to shared hosting, to publishing data and metadata via 'web services' on the Internet. This will allow those conducting assessments and assembling the various reports to directly access the needed data. This network will directly support the following "customers:"

1. Annual reporting in Status of the Resource Report.
2. Northwest Power and Conservation Council High Level Indicators Report
3. State and regional reporting for status of anadromous salmonids (i.e., WA State of the Salmon Report, OWEB Biennial Reports, recovery board reporting, etc.).
4. Action Agency BiOp reporting in 2013 and 2016.
5. Columbia Basin Fish Accord reporting (i.e., Yakama Nation STAR report).
6. NOAA Fisheries 5-year check-in in 2015.

Appendix A – Work Plan Schedule for Developing Data Sharing Strategies

ID	Task Name	Duration	Start	Finish
1				
2	Develop and Submit Monitoring Proposals to RME Categorical Review	44 days?	Tue 6/1/10	Fri 7/30/10
3	Approve Coordinated Assessments Work Plan - July Final Draft	0 days	Thu 6/24/10	Thu 6/24/10
4	Internal Agency/Tribe Reconnaissance to understand existing status and intentions	62 days?	Thu 6/24/10	Fri 9/17/10
5	**Develop Proof-of-Concept materials**	**62 days?**	**Thu 6/24/10**	**Fri 9/17/10**
6	Example story for how DETs will be used	32 days?	Thu 6/24/10	Fri 8/6/10
7	1st Iteration Draft DET for three VSP indicators	32 days?	Thu 6/24/10	Fri 8/6/10
8	Summary and Detailed Analysis Flow Chart examples	32 days?	Thu 6/24/10	Fri 8/6/10
9	Data Dictionary (definitions in Data Matrix)	32 days?	Thu 6/24/10	Fri 8/6/10
10	Draft Schema and Metadata template examples	32 days?	Thu 6/24/10	Fri 8/6/10
11	Four populated data sets for four populations consistent with DET	30 days?	Mon 8/9/10	Fri 9/17/10
12	**Prepare for first Regional Workshop**	**33 days?**	**Mon 8/2/10**	**Wed 9/15/10**
13	Draft contextual report on basinwide status of DM per monitoring proposals	33 days?	Mon 8/2/10	Wed 9/15/10
14	Develop outline for Basinwide Data Management Plan	33 days?	Mon 8/2/10	Wed 9/15/10
15	**1st Regional Data Workshop in September/October**	**20 days?**	**Mon 9/20/10**	**Fri 10/15/10**
16	Review and Approve the Draft DET for 3 VSP indicators	20 days?	Mon 9/20/10	Fri 10/15/10
17	Review and approve sub-regional workshop guidance and expectations	20 days?	Mon 9/20/10	Fri 10/15/10
18	Review and Approve Work Plan for completing 1st iteration DET data sets	20 days?	Mon 9/20/10	Fri 10/15/10
19	**Develop 1st iteration DET data sets for all key populations**	**119 days?**	**Mon 10/18/10**	**Thu 3/31/11**
20	Scope availability of VSP indicators for key populations	55 days?	Mon 10/18/10	Fri 12/31/10
21	Obtain all readily available indicators and supporting information	104 days?	Mon 11/8/10	Thu 3/31/11
22	**Prepare for Subregional Workshops**	**20 days?**	**Mon 10/18/10**	**Fri 11/12/10**
23	Internal Agency/Tribe statement of existing DM status and intentions	20 days?	Mon 10/18/10	Fri 11/12/10
24	Document proposed sub-regional data management strategies	20 days?	Mon 10/18/10	Fri 11/12/10
25	**Subregional Workshops**	**35 days?**	**Mon 11/15/10**	**Fri 12/31/10**
26	Review DET	35 days?	Mon 11/15/10	Fri 12/31/10
27	Status and experience completing DET data sets	35 days?	Mon 11/15/10	Fri 12/31/10
28	Review and approve sub-regional data management strategies	35 days?	Mon 11/15/10	Fri 12/31/10
29	**Prepare for second Regional Workshop**	**35 days?**	**Mon 1/3/11**	**Fri 2/18/11**
30	Align co-manager Data Management Plans	35 days?	Mon 1/3/11	Fri 2/18/11
31	Identify draft priorities for data management tasks for FY12-16	35 days?	Mon 1/3/11	Fri 2/18/11
32	**2nd Regional Workshop in February/March**	**1 day**	**Mon 2/28/11**	**Mon 2/28/11**
33	Approve final DET for 3 VSP indicators	1 day	Mon 2/28/11	Mon 2/28/11
34	Review and consent on Basin Data Mgmt Plan	1 day	Mon 2/28/11	Mon 2/28/11
35	Identify basin-wide data management priorities and schedule	1 day	Mon 2/28/11	Mon 2/28/11
36	Prepare Data Management Proposals for FY12-16	25 days?	Mon 2/28/11	Fri 4/1/11
37				
38	**RM&E Categorical Review of Data Management Projects**	**73 days?**	**Fri 4/1/11**	**Wed 7/13/11**
39	Submit 2012-2016 Data Management Proposals	0 days	Fri 4/1/11	Fri 4/1/11
40	ISRP Review	20 days?	Mon 4/4/11	Fri 4/29/11
41	Staff recommendations	20 days?	Mon 5/2/11	Fri 5/27/11
42	Fish and Wildlife Committee Review	20 days?	Mon 6/6/11	Fri 7/1/11
43	Council Decision	0 days	Wed 7/13/11	Wed 7/13/11



Appendix B. Data Matrix for Coordinated Data Assessments

(Data to be exchanged as part of the initial focus)

To facilitate a successful first effort in coordinating assessments, the anadromous salmonid managers agreed to concentrate first on data addressing the VSP criteria of abundance and productivity. Many of these data also address other VSP criteria, hatchery effectiveness, and habitat action effectiveness. Expanding the effort to explicitly include data that addresses these other criteria or measures will follow successful implementation of this initial effort.

This matrix is intended to give a **high-level overview** of the information required for this initial effort. Each indicator, metric, or measurement may require further detailed information such as confidence intervals, etc. Additional information (measurements) may also be required, depending on the approach (type of measurement). These more detailed types of information will be provided with subsequent data flow diagrams. Detailed information will also be provided in the meta-data.

Metrics and Measurements are grouped by Indicator (each of the three Indicatores includes a suite of Metrics and Measurements). Not all Metrics may be available for each Indicator, and not all Measurements will be necessary to derive each Metric. The suite of Metrics and Measurements for each Indicator is a generalized list.

General definitions for the terms and cell formats used are provided at the bottom of the matrix. Final terminology and definitions will be consistent with those developed by PNAMP and used by BPA.

INDICATOR	METRIC	MEASUREMENT	DEFINITION	VSP CRITERIA				AHSWG HATCHERY EFFECTIVENESS PERFORMANCE MEASURES						Habitat Action Effectiveness Measures
				ABUNDANCE	PRODUCTIVITY	SPATIAL STRUCTURE	DIVERSITY	Abundance	Productivity	Distribution	Genetic	Life-History	In-Hatchery Measures	
Abundance of Natural Spawners			Estimated number of natural origin (parents spawned in the wild) spawners contributing to spawning. Should specifiy whether or not both adults and jacks are included.	X	X	X	X							X
	Abundance of Total Adult Fish		Estimated number of total spawners on the spawning ground. Should specify whether or not both adults and jacks are included.	X	X									X
	Fraction: Adult Fish: Hatchery Origin and Natural Origin		Percent or number of fish on the spawning ground that originated from a hatchery.	X	X		X	X	X		X			
	Number of Pre-Spawn Mortalities: Hatchery Origin and Natural Origin		Percent or number of adults that die after reaching the spawning grounds but before spawning.	X					X					X
	Number of Natural Origin Broodstock Removed		Fish of natural origin removed from the returning run for use as hatchery broodstock.	X			X				X		X	
	Number of Mortalities From Fisheries -- (both Hatchery-origin and Natural-origin)		The number of additional wild fish that would have returned to spawn in a given year had there not been a catch (harvest). Ocean + Mainstem+Tributary (tribal, sport, or commercial) harvest. Includes mortality rate assigned to fish caught and released.	X				X						
		Fish Counts: Hatchery Origin and Natural Origin	The number of fish that return to a monitoring site (e.g., dam counts, weir counts, tag detections, estimates to specific tributaries, etc.)	X	X			X	X					
		Redd Counts	Counts of redds in spawning areas (index area (trend), extensive areas, and supplemental areas).	X	X	X								X
		Carcass Counts: Hatchery Origin and Natural Origin	Counts of carcasses in spawning areas (index area (trend), extensive areas, and supplemental areas).	X	X	X		X	X					
		Number of Fish Harvested: Hatchery Origin and Natural Origin	Number of fish caught in all fisheries.	X				X						
		Fish per Redd	Number of fish divided by the total number of redds. How and when the estimate is derived will be included in the metadata. This may be considered a Metric if not measured on-site and time.	X										

		Female Spawner per Redd	Number of female spawners divided by the total number of redds above weir. How and when the estimate is derived will be included in the metadata. This may be considered a Metric if not measured on-site and time.	X										
Progeny-per-Parent Ratio: Adult to Adult			Adult to adult ratio calculated for naturally spawning fish and hatchery fish separately as the brood year ratio of return adult to parent spawner abundance.		X		X	X	X			X		
	Age Structure of Spawners		Age distribution of spawners on spawning ground. Calculated for wild and hatchery fish as appropriate.		X		X	X	X			X		
		Age -at-Return	Age determinations of individual fish. Assessed via scale method, dorsal fin ray ageing, or mark recoveries.		X		X	X	X			X		
		Number of Spawners at Each Age	Number of spawners in each age category.		X		X	X	X			X		
Smolt -to-Adult Return Rate			The number of adult returns from a given brood year returning to a point (stream mouth, weir, dam) divided by the number of smolts that left this point previously.		X				X					X
	Abundance of Smolts		Smolt estimates, which result from juvenile emigrant trapping and PIT tagging, are derived by estimating the proportion of the total juvenile abundance estimate at the tributary comprised of each juvenile life stage (parr, presmolt, smolt).		X				X					X
	Abundance of Total Adult Fish			X	X									
		Juvenile Emigrant Counts.	Counts of outmigrating juveniles (e.g., estimate from number collected in traps, tag detections, snorkel surveys, etc.).		X				X					X
		Adult Counts	Estimated number of adult fish returning to a point (stream mouth, weir, dam).	X	X									

INDICATOR - Reported value resulting from the processing of Metrics and/or Measurements. Directly addresses VSP Criteria. **DISTRIBUTION NECESSARY**	**METRIC**- Derived value resulting from reduction or processing of Measurements. **DISTRIBUTION RECOMMENDED**	**MEASUREMENT**- Important value resulting from field or lab data collection (raw data) used to derive Metrics or Indicators. **DISTRIBUTION RECOMMENDED**
	METRIC - derived value resulting from reduction or processing of Measurements. (May be distributed by a different entity or personnel than other metrics addressing the same indicator). **DISTRIBUTION RECOMMENDED**	**MEASUREMENT** - Important value resulting from field or lab data collection (raw data) to derive Metrics or Indicators. Distribution not required during initial phase of coordinated assessments. **DISTRIBUTION OPTIONAL**

Appendix C – Summary Analysis Flow Diagram for Abundance of Natural Spawners.

Summary Analysis Flow Diagram for Abundance of Natural Spawners