BRIEF PROGRAM DESCRIPTION

OF THE

COLUMBIA HABITAT MONITORING PROGRAM

This document provides a brief overview of a proposed Columbia Basin-scale fish habitat monitoring program including program elements, map, and budget estimates. The Columbia Habitat Monitoring Program (CHaMP) is being proposed by the Integrated Status and Effectiveness Monitoring Program (ISEMP) and eight collaborating agencies[1] to help Bonneville Power Administration meet the requirements of the 2008 Federal Columbia River Power System Biological Opinion (BiOp, RPA 56.3). This program will provide information on the status/trends in habitat conditions, and will support habitat restoration, rehabilitation and conservation actions, performance assessments, and the adaptive management requirements of the 2008 FCRPS BiOp.

- CHaMP is a Columbia River basin-wide habitat status and trends monitoring program built around a single habitat monitoring protocol with a program-wide approach to data collection and management (meets FCRPS AA (2010) programmatic prescriptions for habitat monitoring).
- CHaMP will result in systematic habitat status and trends information that will be used to assess basin-wide habitat condition and correlated with biological response indicators to evaluate habitat management strategies.
- CHaMP is integrated with ongoing PNAMP and Recovery Planning efforts as well as the collaborative process across Columbia Basin fish management agencies and tribes and other state and federal agencies that are monitoring anadromous salmonids and/or their habitat.
- CHaMP meets RPA 56.3, RPA 57, and RPA 3 by characterizing stream and fish responses to watershed restoration and/or management actions in at least one population within each steelhead and Chinook MPG which have, or will have, fish in-fish out monitoring (identified in RPA 50.6).
- CHaMP habitat status and trend monitoring design follows a Generalized Random-Tessellation Sampling design with a 3 year rotating 1-to-1 split panel structure to distribute sampling effort in space and time, and has management tools for sampling design and metadata management.
- CHaMP collaborators will be supported by cross-project data management, stewardship and analysis staff, annual pre- and post-season meetings, annual field protocol and data management tool implementation training sessions.

[1] Colville Confederated Tribes, Oregon Department of Fish and Wildlife, Yakama Nation, Washington Department of Fish and Wildlife, Nez Perce Tribe, Shoshone-Bannock Tribes, Pacific Northwest Aquatic Monitoring Program, National Oceanic and Atmospheric Administration.

Program Elements

(1) Sampling Design

A generalized random tessellation stratified (GRTS) survey design was recommended by Crawford and Rumsey (2009) for monitoring habitat status and trend in the Columbia River Basin. The GRTS design was initially developed under the EPA's Environmental Monitoring and Assessment Program and is a probabilistic sampling design that has been shown to be advantageous for generating habitat condition parameters with known statistical characteristics. Implementing a GRTS survey design correctly is critical to producing a final dataset with known statistical characteristics requiring the implementation of strict procedures during the site evaluation and selection process. A GRTS Site Selection Protocol and Tool will be provided to each collaborator to support field crews with efficiently completing the process while strictly enforcing design requirements.

(2) Field Sampling

Habitat field sampling will follow the ISEMP (2010) protocol that was developed after a review of fish habitat requirements, interactions of processes that influence fish habitat, the spatial scales for the context of these interactions, and current monitoring programs. The protocol has the greatest probability of being comparable to other protocols and most relevant to salmonids and has been designed to be applied across varying spatial contexts depending on the logistical constrains of the sites. In areas where GPS signals can be obtained, along with aerial photos, habitat units within reaches can be superimposed onto aerial photos with a map grade GPS. In situations, where a GPS signal is not obtainable, units can be referenced to aerial photos and supplemented with on the ground measurements. Finally, in situations where a GPS signal and aerial photos cannot be obtained a stick-and-tape method can be employed to delineate the reach into habitat units. All approaches use a GPS map-grade data logger and thus do not require new gear for differing spatial contexts across related approaches.

Standardized Crew Training: Sampling and Data Capture Tool

Standardized field crew training in the recommended methods will be employed in all the CHaMP watersheds. This standardized approach will promote crew efficiency and improved standardization across the region. In addition to agency-specific safety and other training, ISEMP will provide the following training to support cooperating agencies that implement the recommended habitat protocol:

1. Three days of GIS training for contractors' GIS and sampling design coordinators to explain how to perform GRTS sample draws and allocate sample sites using a priori filters. By the end of this training, contractors could expect to have sample draws completed, mapped, and listed in field-ready forms.

2. Two weeks of in-field training for contractors' field crew leaders and technicians using the ISEMP protocol. Crews will be trained to perform all habitat survey techniques and data capture methods.

QA/QC crews to do repeat sampling across all participating watersheds

Repeated sampling of habitat monitoring sites within the same sampling season has proven to be an important component of GRTS-based, watershed-scale habitat monitoring. Repeat sampling assists with 1) quality assurance/quality control, 2) the assessment of crew variability as a component of variation, and 3) providing improvements to temporal variability recognition (i.e., trend detection). Furthermore, repeat sampling will be important to ISEMP's research goals of testing the performance of the recommended protocols across the Columbia Basin. To achieve these objectives, ISEMP proposes conducing repeat sampling visits for all watersheds in this program at 10 percent of all sampling sites during the same low-flow index period.

(3) Data Management

For a monitoring program at the scale of the Columbia River Basin to be successful a robust data management system must be in place before initiating data collection. Monitoring habitat in the CHaMP watersheds will generate a massive volume of data. A system of data processing, storage, analysis, reporting, and distribution is available to meet the needs of a large-scale monitoring program, such as (a) documenting monitoring objectives, study design and intended analysis; (b) summarizing how, when, and where the monitoring data were collected, (c) supporting a range of analytical methods, such as hypothesis testing, time series analysis, structural equation modeling, and GIS support; and (d) adapting to changing requirements in the future. The data system includes a centralized data warehouse and web-based data discovery tool (Status Trend and Effectiveness Monitoring, STEM Databank); data exchange and loading procedures; a database schema that defines data storage format (Aquatic Resources Schema, ARS); metadata tools; data capture, validation, and summary tools (Automated Template Module, ATM); quality control and assurance procedures; and data stewards who support the system.

Field Data Capture Tools: Hand Held Loggers or ATMs and Paper Forms

Field crews will need applications to support data capture, review, summarization, and reporting and a suite of handheld and desktop tools to support both habitat and fish monitoring is available. These tools have XML-based mechanisms to synchronize data. For example, the Automated Template Module (ATM) supports the full breath of the data capture workflow. This workflow includes documenting metadata about project and statistical design, entering survey event information and observations, performing quality assurance procedures, deriving metrics, and submitting data for archiving. Currently, the ATM supports a wide range of data collection protocols including habitat, macro-invertebrate, water quality, snorkeling, screw trap, and PIT tagging protocols and customized data entry forms can be developed to support the recommended habitat monitoring protocols.

GIS Data Management and Geoprocessing

The large spatial scales that the CHaMP regional monitoring program will cover means that assimilating and managing spatial datasets in GIS, accounting for the geomorphic context of sampling, and performing watershed or subbasin-scale analyses are important data features within these programs. GIS data management support, coordination, and basic processing for monitoring programs that require data management guidance or processing assistance is available and development of geospatial models, the use of remote sensing technologies to

collect continuous GIS datasets, such as LIDAR and aerial photos, and integrating field-based tabular data within a geospatial context is ongoing.

Data Storage and Retrieval

The CHaMP will have multiple groups collecting data and it will be critical to have data accessible and available for use by all groups within the program. The STEM Databank serves as a long-term storage facility for monitoring datasets including metadata and features online interfaces for searching, viewing, and downloading datasets and documents associated with the coordinated monitoring program.

Table 1. Watersheds, fish populations and collaborators participating in the Columbia Habitat Monitoring Program.

Watershed Name/ Population	Major Population Group	ESU/Focal Species	Collaborator/ Data Collector	Collaborating Program	Project or proposal #	Status of work
Hood	Gorge	Lower Columbia River Chinook	ODFW	Hood River Production Program	1998-053-04	new
Wind	Gorge	L. Columbia R. Steelhead, Coho	WDFW	Wind River Watershed Studies	1998-019	new
Toppenish	Yakima	Middle Columbia Steelhead	YN	Yakama Watersheds Restoration Project	1996-035-01	new
Klickitat	Eastern Cascades	Middle Columbia Steelhead	YN	Klickitat River Monitoring and Evaluation-Yakima/Klickitat Fisheries Project	1995-063-35	new
Fifteen Mile	Eastern Cascades	Middle Columbia Steelhead	ODFW	Abundance, Productivity, and Life History of Fifteenmile Creek Steelhead	2010-035-00	new
L. & U. Mainstem, North, Middle and South Fork	John Day	Middle Columbia Steelhead	ODFW	Escapement & Productivity of Spring Chinook and Steelhead in the John Day Basin	1998-016-00	new
Umatilla	Umatilla/Walla Walla	Middle Columbia Steelhead	ODFW	Umatilla Juvenile Salmonid Outmigraion Evaluation	1989-024-01	new
Upper Grande Ronde	Grand Ronde/Imnaha	Snake R. Sp/Su Chinook, Steelhead	ODFW	Grande Ronde Chinook Early Life History Study	1992-026-04	new
Catherine Ck	Grand Ronde/Imnaha	Snake River Sp/Su Chinook	ODFW	Grande Ronde Chinook Early Life History Study	1992-026-04	new
Imnaha, S.F. Clearwater, Lochsa	Imnaha	Snake River Steelhead	NPT	Nez Perce Tribe Watershed Monitoring and Evaluation Plan	2002-068-00	new
Lolo Ck	Clearwater	Snake River Steelhead	NPT	Nez Perce Tribe Watershed Monitoring and Evaluation Plan	2002-068-00	new
Tucannon	Lower Snake	Snake River Sp/Su Chinook	ISEMP	ISEMP	2003-017	new
Asotin	Lower Snake	Snake River Steelhead	ISEMP	ISEMP	2003-017	new
SF Salmon	South Fork Salmon	Snake R. Sp/Su Chinook, Steelhead	ISEMP	ISEMP	2003-017	expansion
Big Ck	Middle Fork Salmon	Snake River Sp/Su Chinook	ISEMP	ISEMP	2003-017	new
Lemhi	U. Salmon/Salmon	Snake R. Sp/Su Chinook, Steelhead	ISEMP	ISEMP	2003-017	expansion
Pahsimeroi	Upper Salmon	Snake River Sp/Su Chinook	ISEMP	ISEMP	2003-017	new
Yankee Fork	Upper Salmon	Snake River Sp/Su Chinook	SBT	Salmon River Basin Nutrient Enhancement	2008-904-00	new
Wenatchee	Upper Columbia	UC Sp Chinook, UC Steelhead	ISEMP	ISEMP	2003-017	expansion
Entiat	Upper Columbia	UC Sp Chinook, UC Steelhead	ISEMP	ISEMP	2003-017	expansion
Methow	Upper Columbia	UC Sp Chinook, UC Steelhead	ISEMP	ISEMP	2003-017	expansion
Okanogan	Upper Columbia	Upper Columbia Steelhead	CCT	Okanogan Basin Monitoring and Evaluation Program	2003-022-00	expansion

Map of the CHaMP watersheds