



Statement of Work Report

Project Title: Okanogan Basin Monitoring & Evaluation Program (OBMEP)
Project #: 2003-022-00
Contract Title: 2003-022-00 EXP MONITOR/EVAL OKANOGAN BASIN PRODUCTION
Contract #:
Province: Columbia Cascade **Subbasin:** Okanogan
Workorder ID: 188017 **Task ID:** 1
Perf. Period Budget: \$1,278,929 **Perf. Period:** 3/1/2009 - 2/28/2010
Contract Type: Request **Pricing Type:** Cost Reimbursement (CNF)
Contractor(s): Colville Confederated Tribes (Prime - COLVILLE00)
BPA Internal Ref: CR-104645
SOW Validation: Last validated 01/21/2009 with 0 problems, and 0 reviewable items
Contract Documents: [Property Inventory \(12/11/2008\)](#) OBMEP Property Inventory
[Budget - Contract \(02/10/2009\)](#) Line Item Budget 021009



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Work Element Table of Contents:

| <u>Work Element - Work Element Title</u> | <u>EC Needed*</u> | <u>Estimate</u> | <u>(%)</u> |
|--|-------------------|-----------------|------------|
| A : 185. Produce Pisces Status Report - Periodic Status Reports for BPA | | \$1,778 | (0 %) |
| B : 132. Produce (Annual) Progress Report - Produce annual report based on tasks identified within this scope of work | | \$39,867 | (3 %) |
| C : 165. Produce Environmental Compliance Documentation - Environmental Compliance | | \$5,571 | (0 %) |
| D : 156. Develop RM&E Methods and Designs - Develop Picket weir trapping protocols and update smolt trapping protocols | | \$53,745 | (4 %) |



| <u>Work Element - Work Element Title</u> | <u>EC Needed*</u> | <u>Estimate</u> | <u>(%)</u> |
|---|-------------------|--------------------|------------|
| E : 157. Collect/Generate/Validate Field and Lab Data - Monitoring changes in freshwater productivity using snorkel surveys and invertebrates at EMAP sites | * | \$66,718 | (5 %) |
| F : 157. Collect/Generate/Validate Field and Lab Data - Okanogan River summer Chinook and steelhead smolt trapping | * | \$162,879 | (13 %) |
| G : 157. Collect/Generate/Validate Field and Lab Data - Enumerate adult salmonid using underwater video | * | \$129,683 | (10 %) |
| H : 157. Collect/Generate/Validate Field and Lab Data - Steelhead enumeration in tributary streams using picket weir traps, video counts, and pit tags. | * | \$97,301 | (8 %) |
| I : 157. Collect/Generate/Validate Field and Lab Data - Conduct census redd counts for summer steelhead throughout the Okanogan River subbasin (U.S. only) | * | \$27,246 | (2 %) |
| J : 157. Collect/Generate/Validate Field and Lab Data - Collect water quality data for all EMAP tributary sites | * | \$72,714 | (6 %) |
| K : 157. Collect/Generate/Validate Field and Lab Data - Monitor threats to salmonid habitats at up to 50 sites | * | \$121,269 | (10 %) |
| L : 157. Collect/Generate/Validate Field and Lab Data - Operate & maintain 6 real-time discharge, temperature gauging stations in Okanogan subbasin | * | \$68,851 | (6 %) |
| M : 157. Collect/Generate/Validate Field and Lab Data - Collect continuous water temperature data from 38 tributary EMAP sites | * | \$46,206 | (4 %) |
| N : 157. Collect/Generate/Validate Field and Lab Data - Address known data gaps in the Okanogan Basin (Predator Study) | * | \$58,735 | (5 %) |
| O : 119. Manage and Administer Projects - Manage Projects: produce invoices, accrual estimates, develop contracts, etc. | | \$24,256 | (2 %) |
| P : 189. Regional Coordination - Project coordination/public outreach | | \$46,061 | (4 %) |
| Q : 161. Disseminate Raw/Summary Data and Results - Support of OBMEP web site and workshop/conference attendance | | \$40,344 | (3 %) |
| R : 160. Create/Manage/Maintain Database - Manage, maintain, and expand the OBMEP database | | \$72,957 | (6 %) |
| S : 162. Analyze/Interpret Data - Analyze collected and historical data on habitat, biological, and water quality parameters | | \$22,329 | (2 %) |
| T : 156. Develop RM&E Methods and Designs - EDT assessment and reports | | \$79,048 | (6 %) |
| Total: | | \$1,237,558 | |

* Environmental Compliance (EC) needed before work begins.

Contract Description:

Performance and Budget Period: March 1 - February 28



Project title: Okanogan Basin Monitoring and Evaluation Program (OBMEP)

Project number: 200302200

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Project goal:

Monitoring and Evaluation of anadromous fish at a sub-basin scale requires a long-term commitment as most outcomes will not be realized for 7 to 20+ years. This project is designed to ultimately achieve these goals:

1. Determine if there is a meaningful biological change at the population scale for summer/fall, spring Chinook, sockeye, and steelhead in the Okanogan basin (7-20+ year time frame).
2. Determine if there is a meaningful change in selected physical habitat parameters over time (12-20+ year time frame).
3. Determine if selected water quality parameters are changing over time in the Okanogan basin (5-20+ year time frame).
4. Determine if change is occurring in VSP parameter from the cumulative habitat restoration actions occurring throughout the Okanogan basin (12-20+ year time frame).
5. Administer contracts and ensure that this effort continues (long-term) in a scientifically sound manner that is closely coordinated across the Okanogan River Basin, Geo-political boundaries, Upper Columbia ESU, Columbia River basin, and Pacific Northwest region (20+ year time frame).

This program is designed to address a multitude of questions and at the same time eliminate duplication of work, reduce costs, and increase monitoring efficiency. The implementation of valid statistical designs, probabilistic sampling, standardized data collection protocols, consistent data reporting methods, and selection of sensitive indicators will increase monitoring efficacy. For this program to be successful, all organizations involved must be willing to cooperate and freely share information. Cooperation includes sharing monitoring responsibilities, adjusting or changing sampling methods to comport with standardized protocols, adhering to statistical design criteria, and strict use of informatics to distribute and archive data. In those cases where the standardized method for measuring an indicator is different from what was used in the past, it may be necessary to measure the indicator with both methods for a few years so that a relationship can be developed between the two methods.

Primary Goal for 2009:

Implement a basin wide monitoring and evaluation program to the best extent possible. Collect data using standardized OBMEP protocols and construct or maintain needed infrastructure. Our efforts in 2009, will contribute to maintaining long-term data sets that will provide status and trend data for all anadromous fish species in the Okanogan River basin and provide a basis for evaluating the overall effectiveness of salmon recovery and restoration projects conducted throughout the basin.

Although we cannot hope to answer all possible management questions we will attempt to address as many fundamental questions related to management and recovery of anadromous salmonids as our funding allows.



Including basic uncertainties about targeted fish population processes, with respect to both the trends in abundance and the factors regulating salmonid population dynamics. When coupled with well-coordinated management actions, this program will help resource managers prescribe integrated management actions and assess the successes and failures of achieving the desired abundance, distribution, and trends of targeted fish populations. Moreover, well-coordinated management actions, when coupled with this relevant monitoring and evaluation program will reduce uncertainty about the effect of actions on population productivity.

The Colville Tribes have used, extended, and modified the structure and methods employed by the Monitoring Strategy for the Upper Columbia Basin (Hillman 2004) for use in the Okanogan subbasin in the design of the OBMEP program. OBMEP is aligned tightly with the priorities expressed in documents and guideline put out by The Columbia Basin Monitoring and Evaluation Project (CSMEP), Pacific Northwest Aquatic Monitoring Partnership (PNAMP), Northwest Power and Conservation Council's (NPCC) Fish and Wildlife Program, Subbasin Plans, NOAA Fisheries guidance, 2008 BIOP and monitoring appendix P, the Upper Columbia Salmon recovery Plan, Upper Columbia Biological Strategy, The Upper Columbia Monitoring Strategy, Environmental Protection Agency (EPA), Washington Department of Ecology, and the Independent Scientific Review Panel (ISRP).

The Okanogan subbasin plan calls for its vision to be supported by nine priority themes that represent the large scale agreement between all stake holders within the subbasin. The eighth theme is "continue Research, Monitoring, and Evaluation" and OBMEP is specifically linked to this activity;

"Continued Research, Monitoring, and Evaluation: To apply adaptive management and make informed decisions will require an on-going commitment to research, monitoring and evaluation. Research allows important questions to be answered in a scientific rather than subjective manner and allows the best possible decisions on how and why to take a specific course of action. A considerable lack of knowledge exists in the Okanogan and this situation will continue to exist without continued research efforts. Evaluation of monitoring data, remote sensing data, and information from areas outside the Okanogan subbasin will also provide a mechanism to determine if progress is being made toward achieving the priority themes, and objectives contained in the subbasin plan. To track progress and inaugurate an adaptive management process, the subbasin plan relies upon a sound monitoring framework outlined under the Okanogan Basin Monitoring and Evaluation Program (OBMEP). This program was developed concurrently with Bonneville's and NOAA fisheries IMW pilot studies in the Wenatchee, John Day and Salmon River systems; with guidance provided by the Pacific Northwest Aquatic Monitoring Partnership; the Coordinated Systemwide Monitoring and Evaluation Projects; the federal Research Monitoring and Evaluation Program, and, is directly linked to the Upper Columbia Salmon Recovery plan as the monitoring vehicle for listed stocks in the Okanogan subbasin. This monitoring plan will also continue to evolve as the region continues toward a fully integrated regional monitoring approach, but has at its core, the ability to effectively track status and trend for fish populations and habitat indicators in the interim. Specific monitoring elements targeting hatchery and wild fish performance, disease, genetics, fish morphology, ecological interactions and other parameters will be added as additional production programs come on line."(Okanogan Subbasin Plan, Management Plan, page 9).

Within the Okanogan subbasin, independent research projects and piecemeal monitoring activities were conducted by various state, federal, tribal, agencies, and to some extent by watershed councils or landowners, until the creation of OBMEP. Today these efforts are coordinated into a cohesive overall framework for RM&E efforts related to salmon and steelhead fish stocks.

OBMEP is specifically designed to address status and trend monitoring for the Okanogan subbasin over the next 20+ years. Benefits to generating information on listed and non-listed fish will accrue in three different ways: (i) by supporting direct management of these species with respect to exploitation and recovery planning; (ii) by supporting the planning, development and implementation of restoration and recovery actions directly benefiting the listed and non-listed populations; and (iii) by supporting the planning, development and implementation of management actions indirectly impacting salmonid populations.

Sampling Design:

The intent of status/trend monitoring is to accurately describe existing conditions in the basin and to document changes in conditions over time. This requires temporal and spatial replication and probabilistic sampling. As adapted from Hillman (2004), we implemented the EMAP sampling framework, a statistically based and spatially explicit sampling design, to quantify trends in juvenile and adult salmonids and status and trends in stream and



riparian habitats. For more information see Hillman (2004).

In the Okanogan basin, EMAP sites were selected according to the generalized random tessellation stratified design (GRTS+) (Stevens 1997; Stevens and Olsen 1999; Stevens and Urquhart 2000; Stevens 2002). Briefly, the GRTS design achieves a random, nearly regular sample point pattern via a random function that maps two-dimensional space onto a one-dimensional line (linear space). A systematic sample is selected in the linear space, and the sample points are mapped back into two-dimensional space. The GRTS design is used to select samples for all panels. OBMEP site selection process began with collaboration with Tony Olsen and the EPA regional office located in Corvallis, OR who provided the random sample of 300 possible sites. Once selected OBMEP then verified these sites for access, secured landowner permissions when necessary, and reduced the list to the 150 sites split between the United States and Canada portions of the Okanogan basin. A map of these sites can be obtained off our web-site at: <http://nrd.colvilletribes.com/obmep/us cansites.htm>

The Monitoring Strategy for the Upper Columbia Basin (Hillman 2004) recommends a suite of biological and physical/environmental indicators suitable for status and trend monitoring. Not all indicators listed in the Hillman document are relevant for the Okanogan subbasin. The protocols provide general instructions for collecting data, but specific methodologies that alter temporal, spatial, and economic realities make sampling some of the indicators more feasible than others. The indicators selected and the methods used to collect these data were adapted from Hillman (2004). Protocols were developed specifically for the Okanogan Basin Monitoring and Evaluation Project (OBMEP) to be compatible with both the Monitoring Strategy for the Upper Columbia Basin (Hillman 2004) and the Ecosystems Diagnosis and Treatment (EDT) model input fields. The Ecosystem Diagnosis and Treatment process was previously used to identify limiting factors for anadromous fish in the assessment portion of the Okanogan Subbasin Plan and its ongoing use will require periodic updates of these data provided through OBMEP in future iterations.

To summarize data management activities to date, considerable investments have been made in developing a functional database system that allows for data to be collected in the field and assimilated with a minimum of man power and repetitive analysis can be conducted at the push of a single key. However, what remains to be completed is to connect this database with the regional data repositories like Stream-net. Work at this scale is beyond our scope but we acknowledged that OBMEP will play a roll in helping the region close this gap. OBMEP generates data and provides information, knowledge and expertise to BPA, NPCC, CSMEP, the Pacific Northwest Aquatic Monitoring Partnership (PNAMP) and other established regional monitoring programs in the Columbia River basin. We will continue to provide input and products derived from our own experiences in the Okanogan. On a more local scale, OBMEP provides information to state-wide salmon recovery efforts and regional forums across the upper Columbia ESU and Columbia Cascade province. We coordinate monitoring and evaluation efforts with the Upper Columbia Regional Technical Team and with the Wenatchee subbasin RM&E program (BPA #200301700). We work to ensure that data collected from our efforts can be "rolled-up" with data from other regional populations for broader, spatial scale application.

The Okanogan River is an international watershed and the OBMEP project does not stop at international borders. We facilitate collecting seamless data by collaborating with the Okanogan Nation Alliance (ONA), who in turn facilitates collaboration with other Canadian stakeholders such as Environment Canada, the Ministry of Land, Water, and Air Protection, and the Department of Fisheries and Oceans. We developed clear guidance for the collection of all field data. To vet our standardized field protocols, the Canadian effort in the Okanogan River basin was phased in one-year after data collection began in the United States portion of the Okanogan River basin. This allowed us to assess the compatibility of our guidance documents through field testing. Within the Okanogan subbasin, our efforts are coordinated with other management agencies and stakeholder groups that are collecting information to ensure that no duplication of efforts occurs within this watershed. Data are consolidated within the OBMEP program and onto a server located at our offices and also distributed to NMFS, UCSRB, DART, and summarized into annual reports and presentations that are provided to BPA and other regional stakeholders on both sides of the border.

There have been numerous recent administrative and scientific calls for a comprehensive monitoring and evaluation program to provide consistent, region-wide information about the status of salmon populations and their response to management actions (Botkin et al. 2000, ISAB 2001, ISRP 2001). In addition, the Biological Opinion on the Federal Columbia River Power System requires the development and implementation of a coordinated monitoring and



evaluation program (NMFS 2000a). The call for developing a consistent, region-wide monitoring program has been strong and widespread. Once implemented, the OBMEP project increases our ability to conduct effective recovery planning and address a number of outstanding scientific agendas. This comprehensive monitoring program provides a scientifically robust method for evaluating the status of populations while contributing information essential for evaluating the ESU for progress toward recovery goals such as the de-listing criteria defined by the regional TRT's (NMFS 2000b). A basin-wide monitoring program also provides the means to develop and refine appropriate performance measures and standards for conservation actions, thus giving managers the information to quantitatively assess the impact that composite restoration actions have on fish populations. The actions outlined in the NMFS 2000 Biological Opinion for the the Federal Columbia River Power System (Actions 180-184, 188, 190, 191, 193, and 195-7 specifically population and habitat status monitoring for anadromous salmonids as required under Action Item 180, and elements of the habitat action effectiveness monitoring as required under Action Item 183) regarding monitoring and evaluation more relevant than ever 3 BIOP's later making projects like OBMEP more important than ever.

Statement of Work Report

Work Element Details

A: 185. Produce Pisces Status Report

Title: Periodic Status Reports for BPA
Description: The Contractor shall report on the status of milestones and deliverables in Pisces. Reports shall be completed either monthly or quarterly as determined by the BPA COTR. Additionally, when indicating a deliverable milestone as COMPLETE, the contractor shall provide metrics and the final location (latitude and longitude) prior to submitting the report to the BPA COTR.

Deliverable Specification:

| Milestone Title | Start Date | End Date | Status | Milestone Description |
|--|------------|------------|----------|-----------------------|
| A. Mar-Jun 2009 (3/1/2009 - 6/30/2009) | 7/1/2009 | 7/15/2009 | Inactive | |
| B. Jul-Sep 2009 (7/1/2009 - 9/30/2009) | 10/1/2009 | 10/15/2009 | Inactive | |
| C. Oct-Dec 2009 (10/1/2009 - 12/31/2009) | 1/1/2010 | 1/15/2010 | Inactive | |
| D. Final Jan-Feb 2010 (1/1/2010 - 2/28/2010) | 2/14/2010 | 2/28/2010 | Inactive | |

B: 132. Produce (Annual) Progress Report

Title: Produce annual report based on tasks identified within this scope of work
Description: Develop annual report that documents the elements described in and generated from items contained in this scope of work.
 Estimated Level of Effort: 0.65 FTEs.

Deliverable Specification: Report will address:
 - Primary data collection efforts
 - Infrastructure development, deployment, and serviceability (e.g., traps, weirs, video counting systems, handheld data recorders, etc.)
 - Data summaries that address the status of fish populations and habitat threats.
 - Database development (from data entry through report generation).

Data summaries/presentations should be simple and focus on the items above, like % of EMAP-selected sites sampled, efficiency of traps and counting stations, etc. Data summaries should also illustrate how the program itself is working or needing improvement. Problems are acknowledged, learned from, and shared.

Data are compiled in a format that is useful and concise and raw-data are archived for future reference and analysis then incorporated into future technical reports.



| Milestone Title | Start Date | End Date | Status | Milestone Description |
|--|------------|-----------|----------|---|
| A. Submit report for external and COTR review | 6/1/2009 | 6/30/2009 | Inactive | Use this milestone if the annual report requires external review. May be simultaneously reviewed by external parties and BPA COTR if desired. |
| B. Finalize Annual Report | 7/1/2009 | 7/31/2009 | Inactive | Integrate review feedback and comments, and obtain internal signatures if necessary. Convert the annual report to Adobe Acrobat PDF format. |
| C. Upload report in Pisces | 8/1/2009 | 8/31/2009 | Inactive | Upload report |
| Deliverable: D. Submit Final Mar 2008 to Feb 2009 Annual Report to BPA COTR for posting | | 8/31/2009 | Inactive | <i>See the Deliverable Specification above</i> |

C: 165. Produce Environmental Compliance Documentation

Title: Environmental Compliance

Description: Develop and submit permit applications for installing traps, weirs, video counting stations, gauging stations, and other necessary infrastructure for collecting biological, water quality, and physical habitat data. Receive authorization by regulatory agency to install needed infrastructure items and collect biological data related to this monitoring and evaluation effort. This work element will minimize potential negative impacts of this project.

Estimated Level of Effort: 0.13 FTEs

Deliverable Specification: Documentation and assistance to support BPA's Environmental Compliance Group (permit applications, ESA documents, etc.). Will vary based on the type of activity.

Planned Metrics: Are herbicides used as part of work performed under this contract?: No

| Milestone Title | Start Date | End Date | Status | Milestone Description |
|---|------------|-----------|----------|--|
| A. Receive NEPA/ESA clearance from BPA for FY2009 work | 3/1/2009 | 3/31/2009 | Inactive | Most activities have no negative impacts of endangered summer steelhead or bull trout therefore HIP BIOP should cover most activities. Extremely low likelihood of encountering bull trout, so no consultation with USFWS necessary. |
| B. Receive permits needed to complete smolt trapping work in FY2009 | 3/31/2009 | 4/30/2009 | Inactive | Receive shorelines and HPA permits |
| C. Complete/submit HPA and shorelines applications for FY2010 | 12/31/2009 | 2/28/2010 | Inactive | HPA and shoreline permits are expected to be needed only for the Smolt trapping activities Work in 2008 will be designed to help secure 2009 permits. |
| D. Submit FY2010 SOW to EC group for NEPA/ESA review | 12/31/2009 | 2/28/2010 | Inactive | Provide advance copy of SOW for completing BPA/EC requirements. |
| Deliverable: E. Applicable permits and other environmental clearances received | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

D: 156. Develop RM&E Methods and Designs

Title: Develop Picket weir trapping protocols and update smolt trapping protocols

Description: The development of the Inkaneep trap under OBMEP in 2005 and the continuation of data collection at this site requires the development of a new protocol specific to this data collection type. Once developed this protocol can be used to standardize data collection by other projects throughout the Okanogan River basin using similar equipment. The new adult fish trapping protocol will follow the same format as our previous protocols and include both a data management and analysis section. The ISEMP protocol for screw trap operations was completed in 2008 and will serve as the basis for an update to the OBMEP smolt trapping protocol in order to expand and improve our protocol that has been used since 2005 and is in need of a major revision. Once completed these protocols will be used to guide the OBMEP data collections for the next 5 years.

Level of Effort: 0.34 FTEs plus consulting time through LGL limited for a writer to compile this document.



Deliverable Specification: Both protocols will include sections for;

- Purpose
- Site selection
- Sampling duration
- Equipment list including details regarding mobilization and demobilization
- Permitting
- Detailed methodology and definitions
- QA/QC
- Data management
- Data analysis
- Literature cited

| Milestone Title | Start Date | End Date | Status | Milestone Description |
|---|------------|------------|----------|---|
| A. Develop subcontract for writing support | 3/1/2009 | 5/31/2009 | Inactive | Develop subcontract for writing support |
| B. Develop draft of smolt monitoring revision | 6/1/2009 | 12/31/2009 | Inactive | Develop draft of smolt monitoring revision |
| C. Develop draft of adult fish trapping protocol | 6/1/2009 | 12/31/2009 | Inactive | Develop draft of adult fish trapping protocol |
| D. Send out protocols for peer review by local experts | 1/1/2010 | 1/31/2010 | Inactive | Send out protocols for peer review by local experts |
| E. Edit and finalize protocols then post to web site | 2/1/2010 | 2/28/2010 | Inactive | Edit and finalize protocols then post to web site |
| Deliverable: F. New adult fish trapping protocol and revised smolt trap protocol | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

E: 157. Collect/Generate/Validate Field and Lab Data

Title: Monitoring changes in freshwater productivity using snorkel surveys and invertebrates at EMAP sites
Description: Monitoring changes in freshwater productivity using snorkel surveys and invertebrates at EMAP sites

Collect data on juvenile summer steelhead relative abundance and invertebrate community at EMAP sites located in the United States and Canada. Snorkeling surveys will all be done following established OBMEP protocols. Invertebrate data will be collected following establish and PNAMP recommended protocols. The primary use of these data will be as a response variable that relates to physical habitat changes monitored at these same sites. If we can establish that one method or the other is better suited to relating physical habitat changes to a biological response then we will focus primarily to that method in the future. There will be a high level of coordination with planners and other data collection agencies to achieve the best data available. Snorkel surveys will continue to provide presence and absence data regardless although the frequency and number of sites needed to collect these data would be far less in the future if invertebrate data show a closer link to habitat changes.

Sub-contract with ONA for sites in Canada and professional services used to pick, enumerate, and identify invertebrate samples.

Estimated Level of Effort: 0.58 FTEs.

Deliverable Specification: Based on snorkel counts, data on relative abundance, distribution, and size of juvenile summer steelhead, invertebrate community structure, correlated with habitat data at all tributary EMAP sampling locations. A technical report will be prepared comparing the advantages and disadvantages of each methodology at the end of a 5 year study (2014) and these data will be stored on the OBMEP server located at the Colville Tribes, Fish and Wildlife Department offices in Omak, WA. Yearly juvenile fish and invertebrate data will be summarized into the annual report.

Planned Metrics:

- * Primary R, M, and E Focal Area : Tributary Habitat
- * Primary R, M, and E Type : Status and Trend Monitoring
- * Secondary R, M, and E Type : Action Effectiveness Research
- * Secondary R, M, and E Focal Area : Population Status

Primary Focal Species: Steelhead - Upper Columbia River DPS

| | |
|--------------------------|---------------------------------|
| Country: Multiple | NPCC Subbasin: OKANOGAN |
| State: Multiple | HUC5 Watershed: Multiple |
| County: OKANOGAN | HUC6 Name: Multiple |



Salmonid ESUs Present: Outside legal CKUCS (Upper Columbia River Spring-run Chinook Salmon ESU) boundary (<multiple>) | Outside legal STUCR (Upper Columbia River Steelhead DPS) boundary (<multiple>) | Upper Columbia River Steelhead DPS (<multiple>)

| Milestone Title | Start Date | End Date | Status | Milestone Description |
|--|------------|------------|-----------|--|
| A. Environmental compliance requirements complete | 3/1/2009 | 6/30/2009 | Completed | On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA). |
| B. Mobilize equipment, snorkel and invertebrate training | 7/1/2009 | 7/15/2009 | Inactive | Purchase, prepare equipment, and train field staff on specific protocol applications |
| C. Snorkeling all EMAP sites | 7/15/2009 | 10/31/2009 | Inactive | Snorkeling at 50 EMAP sites (25 annual, 25 rotating panel) looking for adult and juvenile anadromous fish. |
| D. Collect invertebrate samples at all EMAP sites | 7/15/2009 | 10/31/2009 | Inactive | Invertebrate sampling at 50 EMAP sites (25 annual, 25 rotating panel) looking for adult and juvenile anadromous fish. |
| E. Demobilize, repair, and securely store all invertebrate sampling and snorkeling equipment | 10/1/2009 | 10/31/2009 | Inactive | Demobilize, repair, and store all sampling equipment. |
| Deliverable: F. Data on relative abundance of various fish and invertebrate species and at all EMAP locations | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

F: 157. Collect/Generate/Validate Field and Lab Data

Title: Okanogan River summer Chinook and steelhead smolt trapping

Description: Okanogan River summer Chinook and steelhead smolt trapping.

Collect rotary screw trap data on summer/fall Chinook smolts and juvenile summer steelhead out-migrating from the Okanogan River subbasin. Smolt trapping will be done following protocols established by the Colville Confederated Tribes as part of the OBMEP project. There will be a high level of coordination to achieve the best data available with the least impact on endangered summer steelhead. Permits will be in place prior to any instream fish collection. Sockeye salmon data is collected under cost share agreement with Chelan PUD under a separate contract.

The rotary screw trap is located along the lower portion of the Okanogan River, below most of the spawning activity in the Okanogan basin. Section 10 permit authorizes up to two traps at this location. We will only operate up to 2 traps during the months from March to July..

Estimated Level of Effort: 1.92 FTEs

Deliverable Specification: Data on abundance of out-migrating juvenile summer steelhead and summer/fall Chinook smolts will be the primary target although information on other anadromous fish species and any external marks or tags will also be collected from fish leaving the Okanogan River subbasin. Bismark brown stain for the first 50 juveniles captured each day will be used in mark-recapture estimates to develop trap efficiency estimates. Annual raw fish count data will be made available through the DART web-site and archived on the OBMEP server located at the Colville Tribes, Fish and Wildlife Department offices in Omak, WA. A technical report will be prepared annual or a section within the annual report will be dedicated to a summary of these data..

Planned Metrics:

- * Primary R, M, and E Focal Area : Population Status
- * Primary R, M, and E Type : Status and Trend Monitoring
- * Secondary R, M, and E Type : Action Effectiveness Research
- * Secondary R, M, and E Focal Area : Tributary Habitat

Primary Focal Species: Chinook - Upper Columbia River Summer/Fall ESU | Steelhead - Upper Columbia River DPS | Sockeye - Okanogan River ESU

Country: US

State: WA

County: OKANOGAN

NPCC Subbasin: OKANOGAN

HUC5 Watershed: LOWER OKANOGAN RIVER

HUC6 Name: OKANOGAN RIVER/TALLANT CREEK

Salmonid ESUs Present: Outside legal CKUCS (Upper Columbia River Spring-run Chinook Salmon ESU) boundary (accessible) | Upper Columbia River Steelhead DPS (accessible)



| Milestone Title | Start Date | End Date | Status | Milestone Description |
|---|------------|-----------|-----------|--|
| A. Environmental compliance requirements complete | 3/1/2009 | 3/14/2009 | Completed | On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA). |
| B. Mobilize, install, and test smolt trapping equipment | 3/15/2009 | 4/1/2009 | Inactive | Mobilize, install, operate, and maintain rotary screw trapping equipment at the highway 20 bridge. Work will include training staff, installing trap, collecting fish, testing trap efficiency, maintaining or repairing equipment as needed, and removal and storage of equipment after data are collected. |
| C. Operate, maintain and collect data from smolt traps | 4/1/2009 | 7/15/2009 | Inactive | Operate and collect data from smolt traps every other day. Enumerate all smolts and bismark brown stain smolts for trapping efficiency trials. |
| D. Demobilize smolt trapping equipment and store securely | 7/15/2009 | 7/31/2009 | Inactive | Demobilize equipment (trap, trailer etc.) and store in a secure area until needed next year. |
| Deliverable: E. Raw data and summary reports related to out-migrating smolts and parr from the Okanogan River. | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

G: 157. Collect/Generate/Validate Field and Lab Data

Title: Enumerate adult salmonid using underwater video
Description: Enumerate adult salmonid using underwater video

Collect data on adult anadromous fish entering into Osoyoos Lake through the Zosel Dam fishways using video counting technology. The Zosel dam site will operate year round. Video equipment was designed and installed at Zosel Dam for this project in 2005. Additional video arrays are being installed on Nine mile Creek, Antoine Creek, and Salmon Creek. These tributary streams will be monitored for returning adult summer steelhead from March through June to the extent possible given unpredictable runoff conditions. Each of these streams is regulated upstream and therefore provide good environments for this type of monitoring. Once upstream storage has reached capacity these arrays will be shut down and removed to avoid damage during high water. This program is considered experimental in 2009 with results likely defining how we move forward in the future.

Estimated Level of Effort: 2.0 FTEs .

Deliverable Specification: We installed video cameras at Zosel Dam and select tributaries for adult enumeration in 2005. Adult salmonids along with any external marks will be enumerated at Zosel Dam along with other fish species encountered . Data will be stored on proprietary hard drives until reviewed, Numeric data will then be archived on the OBMEP server and posted to the DART web page annually. A technical report be prepared to document spring spawners annually combining data from this an other data collection tasks but fall spawning salmonid enumeration at Zosel dam along with resident fish data will be compiled into a separate technical report or section in the annual report.

Planned Metrics:
 * Primary R, M, and E Focal Area : Population Status
 * Primary R, M, and E Type : Status and Trend Monitoring
 * Secondary R, M, and E Type : Action Effectiveness Research
 * Secondary R, M, and E Focal Area : Tributary Habitat

Primary Focal Species: Steelhead - Upper Columbia River DPS

Country: US **NPCC Subbasin:** OKANOGAN

State: WA **HUC5 Watershed:** Multiple

County: OKANOGAN **HUC6 Name:** Multiple

Salmonid ESUs Present: Outside legal CKUCS (Upper Columbia River Spring-run Chinook Salmon ESU) boundary (accessible) | Upper Columbia River Steelhead DPS (accessible)



| Milestone Title | Start Date | End Date | Status | Milestone Description |
|--|------------|-----------|----------|--|
| A. Environmental compliance requirements complete | 3/1/2009 | 3/2/2009 | Inactive | On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA). |
| B. Collect data at the Zosel dam video counting station | 3/1/2009 | 2/28/2010 | Inactive | Clean, maintain, monitor, and repair video equipment at Zosel Dam video counting station to ensure a complete and accurate count of all anadromous salmonids using the Zosel Dam fishways is completed in 2009. |
| C. Install and maintain tributary video weirs on Nine mile, Antoine, and salmon Creeks | 3/1/2009 | 6/1/2009 | Inactive | Tributary video monitoring equipment will begin being installed by March 1st in the hopes that all equipment is operational no latter than March 15 as long as weather allows. It is anticipated that the months of April and May is when most summer steelhead will be observed. |
| D. Remove and store tributary video arrays | 6/1/2009 | 6/30/2009 | Inactive | Tributary video monitors will be removed once flow conditions require or the date of June 1 occurs as these devices are not intended to attempt to collect data during periods of uncontrolled spill. Equipment will be moved back to the Omak Fish and wildlife and secured in a safe place until needed next spring. |
| Deliverable: E. Data on adult anadromous fish passing our cameras | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

H: 157. Collect/Generate/Validate Field and Lab Data

Title: Steelhead enumeration in tributary streams using picket weir traps, video counts, and pit tags.

Description: Steelhead enumeration in tributary streams using picket weir traps, video counts, and pit tags.

Spring summer steelhead enumeration can be enhanced through the selective use of picket weir traps, video counting, and pit tag arrays. In the previous year, we constructed video counting equipment and pit tag arrays for Salmon, Antoine and Nine mile creeks. All of these creeks provide difficult environments for conducting spawner counts based upon redd surveys but provide excellent environments for collecting adult enumeration data using under water video. Spring counts of steelhead spawners can be done in Inkaneep Creek with a fish fence installed close to the creek mouth. The fence needs to be monitored twice daily beginning in April and running to June, depending on the run-timing. The fence will be operated daily for the three months to encompass 90 days of work.

Research, integration and deployment of pit-tag arrays into Antoine and Nine mile creeks will be the part of the video array development thus allowing a doubly redundant system to be developed that will allow for spawner escapements to be enumerated regardless of discharge or viability.

Deliverable Specification: One picket weir trap will be operated on Inkaneep Creek to enumerate O. mykiss entering the creek from Osoyoos Lake and these fish will be examined for sex, and origin. DNA and scale samples will be collected. for later evaluation.

Video arrays will be developed and tested in Antoine, Nine mile, and Salmon creeks. These arrays will be functional prior to data collection in FY09. Testing of pit-tag antennas and integration of both systems will occur prior to deployment of pit-tag antennas at these same locations but beginning with only Antoine and Nine mile creeks with the possible expansion into salmon Creek as time and resources allow.

- Planned Metrics:**
- * Primary R, M, and E Focal Area : Tributary Habitat
 - * Primary R, M, and E Type : Status and Trend Monitoring
 - * Secondary R, M, and E Type : Uncertainties Research
 - * Secondary R, M, and E Focal Area : Population Status

Primary Focal Species: Steelhead - Upper Columbia River DPS

Country: Multiple **NPCC Subbasin:** OKANOGAN

State: Multiple **HUC5 Watershed:** Multiple

County: OKANOGAN **HUC6 Name:** Multiple

Salmonid ESUs Present: Outside legal CKUCS (Upper Columbia River Spring-run Chinook Salmon ESU) boundary (accessible) | Outside legal STUCR (Upper Columbia River Steelhead DPS) boundary (accessible) | Upper Columbia River Steelhead DPS (accessible)



| Milestone Title | Start Date | End Date | Status | Milestone Description |
|--|------------|-----------|-----------|--|
| A. Environmental compliance requirements complete | 3/1/2009 | 3/14/2009 | Completed | On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA). |
| B. Install traps, video equipment, and pit tag arrays for data collection in 2009 | 3/15/2009 | 4/1/2009 | Inactive | Existing trap will be installed at the same site as was used in 2005. No permits are needed since this trap is located in Canada on Inkaneep band property and they have sovereignty over this property. The Okanogan Nation Alliance includes the Inkaneep Band and will be closely coordinating these activities. Arrays will be installed on Salmon, Antoine, and Nine mile creeks based upon previous years scope of work deliverables which includes obtaining all necessary permits. |
| C. Operate and maintain traps and arrays as needed | 4/1/2009 | 6/30/2009 | Inactive | Inkaneep trap will be checked twice daily and fish processed immediately to minimize stress while in operation and arrays will be cleaned or maintained as needed to provide for efficient operation. |
| D. Demobilize and store equipment | 6/30/2009 | 2/28/2010 | Inactive | Inkaneep Creek trap equipment will be maintained and stored by the Okanogan Nation Alliance. Arrays will be removed from the stream and stored in a secure location at the Omak Fish and Wildlife office located in Omak, WA. |
| Deliverable: E. Enhanced data related to adult fish entering Antoine, Nine mile, Inkaneep, and Salmon creeks. | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

I: 157. Collect/Generate/Validate Field and Lab Data

Title: Conduct census redd counts for summer steelhead throughout the Okanogan River subbasin (U.S. only)

Description: Conduct census redd counts for summer steelhead throughout the Okanogan River subbasin (U.S. only)

Collect data on steelhead redds in the United States portion of the Okanogan subbasin. All spawner data for Canada will be extrapolated from Zosel Dam counts and data collected under WE G.

Estimated Level of Effort: 0.41 FTEs. This work element could include up to 60 hours of overtime for personnel working on this work element to utilize when long survey reaches or abundant redds require extra time in the field.

Subcontract with ONA for redd survey on Inkaneep Creek.



Deliverable Specification: Steelhead redd surveys will all be done following protocols established by the Colville Confederated Tribes for the OBMEP project. There will be a high level of coordination to achieve the best data available. Redd survey reaches were established after collecting data in 2005 and refined after data collection in 2006 and (Arterburn et al. 2005, Arterburn and Kistler 2006, 2007 Arterburn et al 2007). The reaches on the US portion of the Okanogan main-stem Okanogan River are:

- O1-Loop-loop Creek Rkm-26.3 downstream to Chiliwist Creek Rkm-24.4
- O2-Omak Creek Rkm-53.4 downstream to Salmon Creek Rkm-41.4
- O3-Riverside Rkm-66.1 downstream to Omak Creek Rkm-53.4
- O4-Janis Bridge Rkm-84.6 downstream to Riverside Rkm-66.1
- O5-Bonaparte Creek downstream to Janis Bridge Rkm-84.6
- O6-Confluence Rkm-119.5 downstream to Horseshoe Lake Rkm-105.6
- O7-Zosel Dam Rkm-127 downstream to Confluence Rkm-119.5

In addition to the mainstem reference areas, the following tributaries will be surveyed over their entire length that is accessible to anadromous fish, provided permissions from landowners can be secured. From the confluence upstream to the known anadromous barrier on:

- Similkameen River located at Enloe Dam Rkm-14.6
- Bonaparte Creek located at Bonaparte Falls Rkm-1.6
- Tonasket Creek located at Tonasket Falls Rkm-3.5

The following creeks are limited by private property permission issues:

- Tunk Creek is only accessible upstream of the confluence for 0.2km
- Nine Mile Creek is only accessible up stream of the confluence for 1.7km

Historically developed reference reaches will be surveyed on Omak Creek below Mission Falls as follows:

- OM-1 Confluence up stream to Lower Columbia River Rd bridge Rkm-2.0
- OM-2 Lower end of EMAP site#19 Rkm-5.3 to Mission Falls Rkm-9.0

Above Mission Falls randomly selected 1 kilometer reaches relating to the EMAP sampling sites will be used and include:

- OM-12 Jim Creek Bridge Rkm-29.4 up stream to EMAP site 12 Rkm-30.4
- OM-48 lower end of EMAP site 48 Rkm-26.8 up stream to Stapaloo Creek Rkm-27.8
- OM-366 lower end of EMAP site 366 Rkm-21.5 up stream to the Dutch Anderson Bridge Rkm-22.5
- OM-361 above Mission Falls Rkm-10.75 up stream to EMAP site 361 Rkm-11.75

Other tribal efforts will provide monitoring of steelhead redds in Stapaloo Creek and these data will be shared. Other tributaries such as Loop-loop, and Salmon creeks will be included in the future if passage issues allow sufficient water for fish to access these creeks.

These data will be archived on the OBMEP server located at the Colville Tribes, Fish and Wildlife Department offices in Omak, WA. These data will be included as part of a spring spawner technical report that will be produced annually.

Planned Metrics:

- * Primary R, M, and E Focal Area : Population Status
- * Primary R, M, and E Type : Status and Trend Monitoring
- * Secondary R, M, and E Type : Action Effectiveness Research
- * Secondary R, M, and E Focal Area : Tributary Habitat

Primary Focal Species:

Steelhead - Upper Columbia River DPS

Country:

US

NPCC Subbasin:

OKANOGAN

State:

WA

HUC5 Watershed:

Multiple

County:

OKANOGAN

HUC6 Name:

Multiple

Salmonid ESUs Present:

Outside legal CKUCS (Upper Columbia River Spring-run Chinook Salmon ESU) boundary (accessible) | Upper Columbia River Steelhead DPS (accessible)



| Milestone Title | Start Date | End Date | Status | Milestone Description |
|--|------------|------------|-----------|--|
| A. Environmental compliance requirements complete | 3/1/2009 | 3/14/2009 | Completed | On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA). |
| B. Mobilize equipment and conduct first pass main-stem redd counts | 3/15/2009 | 4/1/2009 | Inactive | Dates for surveys established from redd survey efforts conducted in previous years as part of this project. |
| C. Conduct second pass main-stem redd counts | 4/1/2009 | 4/15/2009 | Inactive | Dates for surveys established from redd survey efforts conducted in previous years as part of this project. |
| D. Conduct third pass main-stem redd counts | 4/15/2009 | 4/30/2009 | Inactive | Dates for surveys established from redd survey efforts conducted in previous years as part of this project. |
| E. Conduct tributary redd surveys and demobilize equipment | 5/1/2009 | 7/15/2009 | Inactive | Dates for surveys established from redd survey efforts conducted in previous years as part of this project |
| Deliverable: F. Spawner abundance, timing, and distribution data for summer steelhead | | 10/15/2009 | Inactive | <i>See the Deliverable Specification above</i> |

J: 157. Collect/Generate/Validate Field and Lab Data

Title: Collect water quality data for all EMAP tributary sites

Description: Water quality data will be collected at 22 tributary EMAP sites in the US as mainstem sites along the Okanogan and Similkameen Rivers are already covered as part of ongoing sampling conducted by Washington Department of Ecology. Data will be collected following OBMEP protocols and Dissolved oxygen, Turbidity, Ph, Conductivity readings will be taken at each site 3 times per month.

Estimated level of effort: 1.37 FTEs

This work element will not begin until the 2010 water year as data collection was suspended in FY08 due to limited funding.

Deliverable Specification: No deliverable will be completed in 2009. Data collection will resume for the 2010 water year and summarized in the 2010 annual report.

Planned Metrics:

- * Primary R, M, and E Focal Area : Tributary Habitat
- * Primary R, M, and E Type : Status and Trend Monitoring
- * Secondary R, M, and E Type : Action Effectiveness Research
- * Secondary R, M, and E Focal Area : Population Status

Primary Focal Species: Steelhead - Upper Columbia River DPS

Country: US **NPCC Subbasin:** OKANOGAN

State: WA **HUC5 Watershed:** Multiple

County: OKANOGAN **HUC6 Name:** Multiple

Salmonid ESUs Present: Outside legal CKUCS (Upper Columbia River Spring-run Chinook Salmon ESU) boundary (<multiple>) | Upper Columbia River Steelhead DPS (<multiple>)

| Milestone Title | Start Date | End Date | Status | Milestone Description |
|--|------------|-----------|-----------|--|
| A. Environmental compliance requirements complete | 3/1/2009 | 9/30/2009 | Completed | On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA). |
| B. Reinitiate collection of water quality data at US tributary EMAP sites | 10/1/2009 | 2/28/2010 | Inactive | This work element was suspended in 2008 due to lack of funding. We will begin collecting water quality data again beginning with the 2010 water year. This part of the OBMEP program will be reassessed and updated through WE-D prior to restarting data collection. |
| Deliverable: C. Water quality data collected for five months of the 2010 water year | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

K: 157. Collect/Generate/Validate Field and Lab Data

Title: Monitor threats to salmonid habitats at up to 50 sites



Description: Monitor threats to salmonid habitats at up to 50 sites.

Physical habitat data will be collected under pre-established protocols at 25 annual and 25 rotating randomly selected sampling sites that follow an EMAP rotating panel design. All panel sites will likely require monumenting prior to the physical habitat surveys after a five year period (site verification and monumenting for annual sites began in 2004 with documenting of sites scheduled to be completed by the end of this field season).

Subcontract with ONA for 16 sites located in Canada.
Estimated Level of Effort: 1.22 FTEs.

Deliverable Specification: Physical habitat data will be collected at 50 (25 annual panel, 25 rotating panel) including 34 sites in the United States and 16 sites in Canada using Trimble GPS data loggers. All physical habitat data collected at each sampling site will follow established OBMEP protocols. Information will be collected pertaining to presence and composition of large woody debris; riparian vegetation structure; canopy cover; human disturbance; substrate composition; embeddedness; side channel habitat; stream channel habitat types (pool, riffle, glide, etc.) and channel widths and depths. Physical habitat data from all 50 sampling sites will be archived on the OBMEP server located at the Colville Tribe's Fish and Wildlife office in Omak, WA, and forwarded to NMFS. A technical report will be completed in 2009 and thereafter for each five years of data using EDT models to synthesize these data. Once completed this technical report will be posted to BPA and OBMEP web sites.

Planned Metrics:
* Primary R, M, and E Focal Area : Tributary Habitat
* Primary R, M, and E Type : Status and Trend Monitoring
* Secondary R, M, and E Type : Action Effectiveness Research

Primary Focal Species: Chinook - Upper Columbia River Summer/Fall ESU | Sockeye - Okanogan River ESU | Steelhead - Upper Columbia River DPS

Country: Multiple **NPCC Subbasin:** OKANOGAN

State: Multiple **HUC5 Watershed:** Multiple

County: OKANOGAN **HUC6 Name:** Multiple

Salmonid ESUs Present: Outside legal CKUCS (Upper Columbia River Spring-run Chinook Salmon ESU) boundary (<multiple>) | Outside legal STUCR (Upper Columbia River Steelhead DPS) boundary (<multiple>) | Upper Columbia River Steelhead DPS (<multiple>)

| Milestone Title | Start Date | End Date | Status | Milestone Description |
|--|------------|------------|-----------|--|
| A. Environmental compliance requirements complete | 3/1/2009 | 6/30/2009 | Completed | On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA). |
| B. Physical Habitat Surveys of about 20 sites | 7/1/2009 | 7/31/2009 | Inactive | Collection of physical habitat data under pre-established regionally accepted protocols at sites 1-20 |
| C. Physical Habitat Surveys of about 20 sites | 8/1/2009 | 8/31/2009 | Inactive | Collection of physical habitat data under pre-established regionally accepted protocols at sites 21-40 |
| D. Physical Habitat Surveys of about 10 sites | 9/1/2009 | 10/30/2009 | Inactive | Collection of physical habitat data under pre-established regionally accepted protocols at sites 41-50 |
| Deliverable: E. Physical habitat data from 50 sites | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

L: 157. Collect/Generate/Validate Field and Lab Data

Title: Operate & maintain 6 real-time discharge, temperature gauging stations in Okanogan subbasin

Description: Operate & maintain 6 real-time discharge, temperature gauging stations in Okanogan subbasin

Real-time data collection at gauging stations is critical to fisheries and regulatory agencies. The Okanogan River watershed has several tributaries where water quantity and temperature are limiting for fish populations. By expanding the existing suite of gauging station sites, considerable additional data can be collected with on-going operation and proper maintenance.

Estimated Level of Effort: 0.14 FTEs plus sub-contracts with USGS for U.S. gauging stations and ONA for Canadian effort through Environment Canada.



Deliverable Specification: Collect, verify, and post discharge, and temperature data at DOE, USGS, and Environment Canada real-time gauging stations throughout the Okanogan Basin using satellite up links. This project provides support for both real time discharge and water temperature data through Environment Canada at Inkaneep Creek, and Shuttleworth Creek, and real-time water temperature data at USGS stations located along the Okanogan River mainstem at Oroville, Tonasket, and Malott, WA. The USGS gauging station located on Nine mile Creek is solely funded through this effort.

These data are accessible through the following web-sites;

- USGS: <http://waterdata.usgs.gov/wa/nwis/rt>
- Environment Canada: <http://scitech.pyr.ec.gc.ca/waterweb/selectProvince.asp>
- DOE: <http://fortress.wa.gov/ecy/wrx/wrx/flows/station.asp?sta=498070>

A technical report that evaluated these data was prepared in 2007 and the next technical report relating to discharge is scheduled to be prepared in 2012. Temperature data is being archived and a specific temperature technical report will be prepared as time allows due to the massive amount of information that is being collected annually. we hope to complete this effort in 2009 and each 5 years thereafter combining data from this and other work elements

- Planned Metrics:**
- * Primary R, M, and E Focal Area : Tributary Habitat
 - * Primary R, M, and E Type : Status and Trend Monitoring
 - * Secondary R, M, and E Type : Action Effectiveness Research
 - * Secondary R, M, and E Focal Area : Population Status

Primary Focal Species: Steelhead - Upper Columbia River DPS | Chinook - Upper Columbia River Spring ESU | Chinook - Upper Columbia River Summer/Fall ESU | Sockeye - Okanogan River ESU | Lamprey, Pacific | Trout, Rainbow | Whitefish, Mountain

Country: Multiple **NPCC Subbasin:** OKANOGAN
State: Multiple **HUC5 Watershed:** Multiple
County: OKANOGAN **HUC6 Name:** Multiple

Salmonid ESUs Present: Outside legal CKUCS (Upper Columbia River Spring-run Chinook Salmon ESU) boundary (<multiple>) | Outside legal STUCR (Upper Columbia River Steelhead DPS) boundary (<multiple>) | Upper Columbia River Steelhead DPS (<multiple>)

| Milestone Title | Start Date | End Date | Status | Milestone Description |
|---|------------|-----------|-----------|--|
| A. Environmental compliance requirements complete | 3/1/2009 | 3/2/2009 | Completed | On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA). |
| B. Develop agreements with Environment Canada and USGS to operate and maintain gauging stations | 3/1/2009 | 2/28/2010 | Inactive | Develop the contract or agreements to operate, maintain, and post water quality gauging data for both temperature and discharge in the Okanogan drainage. |
| C. Collect and post data collected at DOE, Environment Canada and USGS gauging stations | 3/1/2009 | 2/28/2010 | Inactive | Collect and post data collected at DOE, Environment Canada, and USGS gauging stations throughout the Okanogan River basin |
| Deliverable: D. Web accessible data for discharge and temperature | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

M: 157. Collect/Generate/Validate Field and Lab Data

Title: Collect continuous water temperature data from 38 tributary EMAP sites
Description: Collect continuous water temperature data from 38 tributary EMAP sites

Water temperature is a critical limiting factor identified for the Okanogan River, therefore, it is important to understand temperature as it relates to anadromous fish throughout the Okanogan River basin. To properly measure changes in temperature over time requires highly detailed continuous temperature monitoring. The use of electronic technology allows continuous monitoring of water temperature at a multitude of sites both technically and economically practical. Data will be collected from 38 tributary EMAP sites with 16 located in Canada and 22 located in the United States. Temperature monitoring for the mainstem Okanogan River within the US will occur only at stream gauging stations under the previous work element.

Subcontract with ONA for data from 16 sites in Canada
 Estimated Level of Effort: 0.5FTEs.



Deliverable Specification: Temperature data will be collected continuously (once per hour) from October 1, 2008 to September 30, 2009 at the annual and year-5 panel, tributary EMAP locations and at USGS sites along the Okanogan River main-stem. Then in October of 2009, data loggers will be moved to the year-1 panel sites. Data loggers will be monitored and downloaded once per 3 months. The original 50 EMAP sites were reduced after reviewing long-term data sets collected along the Okanogan River main-stem (2004 annual report). These data showed that little additional information would be gained by collecting this data at multiple sites along the main-stem beyond what has been collected at already established monitoring sites. Temperature data is being archived and a specific temperature technical report will be prepared as time allows due to the massive amount of information that is being collected annually. We hope to complete this effort in 2009 and each 5 years thereafter combining data from this and other work elements.

Planned Metrics:

- * Primary R, M, and E Focal Area : Tributary Habitat
- * Primary R, M, and E Type : Status and Trend Monitoring
- * Secondary R, M, and E Type : Action Effectiveness Research
- * Secondary R, M, and E Focal Area : Population Status

Primary Focal Species: Steelhead - Upper Columbia River DPS | Sockeye - Okanogan River ESU | Chinook - Upper Columbia River Summer/Fall ESU | Chinook - Upper Columbia River Spring ESU | Trout, Rainbow | Whitefish, Mountain

Country: Multiple **NPCC Subbasin:** OKANOGAN

State: Multiple **HUC5 Watershed:** Multiple

County: OKANOGAN **HUC6 Name:** Multiple

Salmonid ESUs Present: Outside legal CKUCS (Upper Columbia River Spring-run Chinook Salmon ESU) boundary (<multiple>) | Outside legal STUCR (Upper Columbia River Steelhead DPS) boundary (<multiple>) | Upper Columbia River Steelhead DPS (<multiple>)

| Milestone Title | Start Date | End Date | Status | Milestone Description |
|--|------------|------------|-----------|---|
| A. Environmental compliance requirements complete | 3/1/2009 | 3/2/2009 | Completed | On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA). |
| B. Download data from January 2009 to present | 3/1/2009 | 3/31/2009 | Inactive | Data will be downloaded from electronic data logger once every quarter to protect against data lost from equipment malfunction or loss. |
| C. Download data from April 2009 to present | 6/1/2009 | 6/30/2009 | Inactive | Data will be downloaded from electronic data logger once every quarter to protect against data lost from equipment malfunction or loss. |
| D. Download data from July 2009 to present and relocate panel sites | 10/1/2009 | 10/31/2009 | Inactive | Data will be downloaded from electronic data logger once every quarter to protect against data lost from equipment malfunction or loss. Water temperature data is collected for a water year that begins in October and ends in October for each year. Rotating panel sites will be relocated at this time. |
| E. Download data from October 2009 to present | 2/1/2010 | 2/28/2010 | Inactive | Data will be downloaded from electronic data logger once every quarter to protect against data lost from equipment malfunction or loss. Winter data collection is contingent on weather and ice condition at each site. |
| Deliverable: F. Continuous water temperature data from 38 tributary EMAP sites. | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

N: 157. Collect/Generate/Validate Field and Lab Data

Title: Address known data gaps in the Okanogan Basin (Predator Study)

Description: Predation from abundant smallmouth bass in the Okanogan River represents perhaps a major mortality issue for recovery of anadromous fish stocks. This work element would be to develop a study to quantify the impact predators such as pike-minnow and smallmouth bass are having on juvenile salmonids. The first year of this study would be used to develop the experimental design and define this study. Actual data collection would occur in 2010 and continue for an appropriate time frame to account for inter annual variation.

Level of effort: 0.31FTEs Consultant will be hired to help perform the experimental design work, provide statistical support, and write-up methodologies for implementation.

Deliverable Specification: A statistically viable experiment will be designed using work recently completed by WDFW in the Yakima Basin as a model. The primary goals are to evaluate the annual salmonid consumption within the Okanogan River basin from both avian and piscivorous predation. This study design will be written in a way that will allow the Colville Tribes to begin collecting data within the next year and provide final conclusions within 5 years.

Planned Metrics:

- * Primary R, M, and E Focal Area : Predation
- * Primary R, M, and E Type : Uncertainties Research
- * Secondary R, M, and E Type : Status and Trend Monitoring
- * Secondary R, M, and E Focal Area : Population Status

Primary Focal Species: Chinook - Upper Columbia River Summer/Fall ESU | Sockeye - Okanogan River ESU | Steelhead - Upper Columbia River DPS | Lamprey, Pacific | Bass, Smallmouth | Trout, Rainbow | Pikeminnow, Northern

Country: US **NPCC Subbasin:** OKANOGAN



State: WA **HUC5 Watershed:** OKANOGAN RIVER/OMAK CREEK
County: OKANOGAN **HUC6 Name:** OKANOGAN RIVER/WANACUT CREEK
Salmonid ESUs Present: Outside legal CKUCS (Upper Columbia River Spring-run Chinook Salmon ESU) boundary (accessible) | Upper Columbia River Steelhead DPS (accessible)

| Milestone Title | Start Date | End Date | Status | Milestone Description |
|--|------------|-----------|-----------|--|
| A. Environmental compliance requirements complete | 3/1/2009 | 2/28/2010 | Completed | On-the-ground work associated with this work element cannot proceed until this milestone is complete. Milestone is complete when final documentation is received from BPA environmental compliance staff (completion can be based on pre-existing environmental documentation from BPA). |
| B. Hire a qualified contractor and complete a subcontract for this work | 3/1/2009 | 8/31/2009 | Inactive | Prepare and submit a competitive request for proposals and select a subcontractor to assist with this work. |
| C. Develop study design | 9/1/2009 | 1/1/2010 | Inactive | Colville biologists will work closely with the selected subcontractor to develop a study design that can be implemented next year. |
| D. Purchase necessary equipment to allow study to be implemented beginning in the spring of 2010 | 1/1/2010 | 2/28/2010 | Inactive | Purchase equipment and supplies needed to conduct the study design next year. |
| Deliverable: E. Study design methodology | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

O: 119. Manage and Administer Projects

Title: Manage Projects: produce invoices, accrual estimates, develop contracts, etc.
Description: Manage Projects: produce invoices, accrual estimates, develop contracts, etc.

This task will be on-going to better track progress of individual tasks, products, and expenses and to help facilitate numerous sub-contacts that help produce deliverables for the scope of work. Cost includes office expenses for all employees both directly and indirectly associated with this SOW.

In addition to covering to development of reporting documents such as invoices, budgets, and this document. Additional tasks associated with providing office space and facilities is included. Tasks associated with building maintenance, construction, leasing of new, or improvements made to existing facilities are included to cover the needs of this project and the people that it supports. he construction, maintenance, and improvements to our office facilities

Estimated Level of Effort: 0.83 FTE's

Deliverable Specification: BPA Project Administration Requirements (Includes Contract Package (SOW, budget, and property inventory), Metrics and Locations Report, Financial Income Report, and Accrual Reports. All of the above components need to be completed by the due date.

Invoices, accrual estimates, SOW package, purchase orders, employee records etc. - Maintain files to include copies of sub-contracts, hours by staff, purchase orders for necessary items. Complete processing of accounts payable, invoices, employee hiring packets, and subcontracts as needed to complete tasks identified in this scope of work. Produce accrual estimates and other financial tasks requested by BPA. Provide SOW and budget to BPA for next year's work. Provide metrics information to BPA as requested.

| Milestone Title | Start Date | End Date | Status | Milestone Description |
|--|------------|-----------|----------|--|
| A. Keep accurate records and support of data acquisition work elements | 3/1/2009 | 2/28/2010 | Inactive | Administrative and clerical support for this project. |
| B. Accrual - Submit September estimate to BPA | 8/20/2009 | 9/20/2009 | Inactive | Provide BPA with an estimate of contract work that will occur prior to September 30 but will not be billed until October 1 or later. Generally, this should be done by September 10. |
| C. Provide BPA with 2008 SOW, budget, etc. | 11/15/2009 | 12/1/2009 | Inactive | 90 days in advance of contract end date. |
| Deliverable: D. Deliverables as stipulated by BPA | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

P: 189. Regional Coordination

Title: Project coordination/public outreach



Description: Project coordination/public outreach

OBMEP was developed under a regional Monitoring and Evaluation scheme involving coordination with multiple entities to ensure that all M&E efforts are compatible throughout the Columbia Basin and the region. The Okanogan subbasin is a trans-boundary watershed and therefore coordination with Canadian entities will be necessary. Coordination with multiple entities will be necessary as region-wide M&E efforts continue to evolve.

The experimental design for OBMEP utilizes an EMAP approach developed by the EPA. Under this sampling design, 150 sampling sites (90 U.S., 60 Canadian) are randomly selected throughout the Okanogan watershed. As many of these sites fall within areas of private ownership, landowners must be contacted (public outreach) and access granted before field crews can conduct surveys. In years 2004, 2005, 2006, 2007, & 2008 landowners were contacted and permission granted as necessary to access the annual and panel sites surveyed. Landowners will continue to be contacted in year 2009 to secure access to this year's panel sites or any replacement sites necessitated by changes in landowner or permission status on other sites.

Subcontract with ONA to provide support as needed in Canada
Estimated Level of Effort: 0.44FTEs

Deliverable Specification: OBMEP biologists will contact and coordinate directly with other entities performing M&E related activities within the region to ensure compatibility with other regional M&E and salmon recovery efforts. Private landowners will also be contacted under this task so that OBMEP field personnel may gain access to EMAP sampling sites. Landowner contacts and other coordination activities will be documented as part of the annual reporting WE.

| Milestone Title | Start Date | End Date | Status | Milestone Description |
|--|------------|-----------|----------|--|
| A. Attend Regional Coordination Meetings | 3/1/2009 | 2/28/2010 | Inactive | Conduct coordination with regional M&E entities. We anticipate at least two meetings per month. Regular attendance at Upper Columbia Regional Technical Team Meetings, Upper Columbia Annual Pre-season Field Coordination Meeting attendance, Occasional travel to attendance to meetings of the Pacific Northwest Aquatic Monitoring Partnership (most meetings will be monitored via conference call), Within basin coordination meeting with Okanogan Nation alliance and other agencies as needed but at least quarterly. |
| B. Contact landowners for rotating panel to be sampled in 2009 | 3/1/2009 | 6/30/2009 | Inactive | Contact private landowners to secure or maintain permission for EMAP sampling sites. |
| Deliverable: C. Coordination efforts will be described in the Annual Report | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

Q: 161. Disseminate Raw/Summary Data and Results

Title: Support of OBMEP web site and workshop/conference attendance

Description: Support of OBMEP web site and workshop/conference attendance

Workshops and conferences are periodically held by the Upper Columbia Salmon Recovery Board, American Fisheries Society, EPA, PNAMP, and other entities within the Columbia Basin. These workshops and conferences offer an important forum for information exchange between fisheries scientists. OBMEP biologists will attend these events only when requested to give formal presentations about OBMEP in an attempt to disseminate data collected. The dissemination of data to interested parties will primarily be done through the use of web based efforts.

In 2009, the Upper Columbia salmon Recovery Board will host an ESU wide data analysis workshop to provide a mechanism for knowledge transfer from R,M&E scientists and field practitioners to plan, policy, and habitat implementation people as part of the Upper Columbia salmon recover plans adaptive management framework. This project will play an integral role in this workshop through planning, presentations, and financial support.

Subcontract with summit environmental for data compilation and data infrastructure presentations.
Estimated Level of Effort: 0.23 FTEs.

Deliverable Specification: Professional presentations, dissemination of raw data to interested parties, Additionally, OBMEP biologist will prepare and post material at our web-site and make several presentations at the 2009 Upper Columbia Data analysis workshop scheduled for November.

Primary Focal Species: Steelhead - Upper Columbia River DPS



| Milestone Title | Start Date | End Date | Status | Milestone Description |
|---|------------|-----------|----------|---|
| A. Develop content, post data, and reports on OBMEP web-site | 3/1/2009 | 2/28/2010 | Inactive | Develop, maintain, and update the OBMEP web-site based on current activities of the OBMEP project. |
| B. Attend RTT, Bilateral Okanogan workshop, and other regional R,M&E meetings | 3/1/2009 | 2/28/2010 | Inactive | Participate in regional forums on R, M&E including involvement with the Upper Columbia RTT monitoring and evaluation subcommittee, bilateral working group annual meeting to communicate with agencies in Canada. Attend and present information at the 2009 Upper Columbia Salmon Recovery Boards Analysis Workshop |
| C. Attend practitioner's workshops for PNAMP and other PNAMP meetings | 3/1/2009 | 2/28/2010 | Inactive | PNAMP is the regional coordination group for R, M&E activities in the Pacific Northwest. It is important to maintain an active roll with this group to maintain compatibility between programs collecting data and people attempting to roll-up data to a larger scale. The practitioner workshops bring together other project managers to share information and solutions to common problems or issues. |
| Deliverable: D. Presentations at conferences, updated OBMEP website | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

R: 160. Create/Manage/Maintain Database

Title: Manage, maintain, and expand the OBMEP database
Description: Manage, maintain, and expand the OBMEP database

To summarize data management activities to date, a database for this project has been in development since late 2005 to support ongoing collection of field data in the Okanogan basin and conduct limited status and trend analysis. The sampling protocols have mostly been defined but many data analysis questions remain for future development. Input routines have been completed and some output queries built but more work is needed especially in regards to automating the reporting of information in 2009.

Data auditing is an important step in our QA/QC efforts and should occur annually as part of the maintenance of a database system. Our efforts are closely linked to the ISEMP project and work that NOAA Fisheries and the Upper Columbia Salmon Recovery Boards are undertaking to roll data up to larger scales. Migration of data to larger scales will hopefully occur through these other efforts rather than directly from OBMEP.

Subcontract with Summit Environmental to provide the primary technical resources for development and auditing, and database development; the Colville Tribes are responsible for data inclusion from data collection work elements for this work element.

Estimated Level of Effort: 0.33FTEs.

Deliverable Specification: Input and manipulation of data from 2004, 2005, 2006, 2007, 2008, and 2009 field collection and critical historical data identified by the Colville Tribes and other agencies working in the Okanogan sub-basin into the developed database. In addition, the primary OBMEP database will require modifications, updating, and auditing to maintain the integrity of the database and effectively assimilate collected data.

On-going operational maintenance is required because most computer systems and technology evolve and so must this database to keep pace. Enhanced automated reporting routines will help to fulfill technical reporting needs into the future as well as annual reporting work element needs.

The OBMEP data are currently secured at two other locations. We have a copy of our database being held by Summit Environmental in Vernon, BC and another held with the Upper Columbia Salmon Recovery Board located in Wenatchee, WA. In the future we plan to upload our data into the STEM data bank being developed as part of the ISEMP project which will be located at Monte Lake, WA because once this happens all these data will become web accessible.



| Milestone Title | Start Date | End Date | Status | Milestone Description |
|---|------------|------------|----------|---|
| A. Training and support | 3/1/2009 | 2/28/2010 | Inactive | Training and support of CCT staff in the proper application of OBMEP field protocols, use of database tools, hand-held data collectors (Trimble), and data migration from web sites and to data archives. |
| B. Modify and update database as needed | 3/1/2009 | 2/28/2010 | Inactive | Databases are not simply created they evolve and over time we need to adjust and change our database to meet constantly changing needs. |
| C. Develop customized output routines | 3/1/2009 | 2/28/2010 | Inactive | Queries need to be written before useful data can be extracted from the database. Additionally databases have the ability of automating reports but these will need to be developed to ensure they meet the needs of a wide variety of users. |
| D. Audit existing data contain within the OBMEP database | 12/1/2009 | 12/31/2009 | Inactive | Data auditing allows us to ensure that data remains stable and valid. The OBMEP database is also maintained under proper quality control and assurance guidelines. |
| Deliverable: E. Input of this years data, plus modification and auditing of our existing database architecture | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

S: 162. Analyze/Interpret Data

Title: Analyze collected and historical data on habitat, biological, and water quality parameters

Description: Analyze collected and historical data on habitat, biological, and water quality parameters

Data gathered by the Colville Confederated Tribe and other agencies and individuals working in the Okanogan Basin will be synthesized and interpreted to confirm that all crucial data is being collected and that we will be able to draw conclusions from these data once a long-term data set is established. Additional analysis will occur as part of the annual report writing task as necessary. Trend analysis will be incorporated after year 5 (2010) of this project therefore the design work must begin in 2009 for this to occur. Automation work on database functions will be coupled to analytical routines wherever possible in order to minimize calculation errors. Statistical analysis will be developed using existing data and database structure.

Estimated Level of Effort: 0.31 FTEs

Deliverable Specification: We will gather data on habitat, water quality, and anadromous fish as defined in our protocols. We will then synthesize/summarize our collected data along with data gathered by other agencies into usable summary tables and graphs. We will work with the EPA to analyze, interpret, and statistically test our collected data and then adapt these findings into our program as we apply data reduction strategies. After the 2010 data are collected and compiled, status and trend analysis will begin (NMFS recommends minimum of 12 years of data for this analysis). We plan to focus our synthesis and analysis efforts on technical reports for Spring Spawner, Temperature data, Changes in habitat threats, and smolt out migrations in 2009.

Planned Metrics:

- * Primary R, M, and E Focal Area : Population Status
- * Primary R, M, and E Type : Status and Trend Monitoring
- * Secondary R, M, and E Type : Action Effectiveness Research
- * Secondary R, M, and E Focal Area : Tributary Habitat

Primary Focal Species: Steelhead - Upper Columbia River DPS | Trout, Rainbow

| Milestone Title | Start Date | End Date | Status | Milestone Description |
|---|------------|-----------|----------|---|
| A. Analyze and interpret data | 8/1/2009 | 2/28/2010 | Inactive | Synthesize data collected to summarize results in tables and graphs, interpret results, and run statistical analysis. |
| Deliverable: B. Data summaries of habitat, biological and water quality parameters | | 2/28/2010 | Inactive | <i>See the Deliverable Specification above</i> |

T: 156. Develop RM&E Methods and Designs

Title: EDT assessment and reports



Description:

Conduct an EDT analysis throughout the Okanogan River basin using empirical data collected under the OBMEP project. Use historical reaches and compare WAGS from the subbasin planning assessment done in 2000 with an updated version using only empirical data to determine the feasibility to utilize the EDT model to conduct status and trend analysis. Expand the reach breaks used in the original EDT assessment to allow for much higher resolution in the future and populate each of the reaches with empirical data collected under OBMEP. Cross check EMAP sites to ensure that all reach breaks have at least one data collection point fully contained within it and if necessary adjust panel 5 to accommodate necessary sites. This will assure a stratification by EDT and geomorphic reach is nested with our randomized sampling design. All methods will be catalogued and archived within a report so that future status and trend analysis can be compared directly.

Deliverable Specification:

The Colville Tribes will hire ICF Jones and Stokes (formerly Mobrand Biometrics) to conduct a full EDT assessment of the Okanogan River basin. This work will also include a status and trend assessment comparing our current data to that provided during subbasin planning, conduct another EDT analysis using new high resolution reach breaks, and report preparation. of findings and protocols for future duplication.

| Milestone Title | Start Date | End Date | Status | Milestone Description |
|---|------------|------------|----------|--|
| Deliverable: A. EDT assessment and reports | | | Inactive | <i>See the Deliverable Specification above</i> |
| B. Prepare and sign contracts | 3/1/2009 | 4/30/2009 | Inactive | The Colville Tribes will prepare a subcontract with ICF Jones and Stokes to complete this task. |
| C. Upload current OBMEP data | 5/1/2009 | 6/30/2009 | Inactive | The Colville Tribes will work cooperatively with ICF Jones and Stokes to upload physical habitat, water quality and biological data needed for all EDT input fields. |
| D. Conduct historic verses current EDT comparison | 6/1/2009 | 6/30/2009 | Inactive | ICF Jones and stokes will develop methodologies for comparing EDT output between years using the 2002 EDT assessment used for subbasin planning that the contractor has on file to a new assessment based upon OBMEP data. |
| E. Conduct EDT assessment based upon new reach breaks | 7/1/2009 | 7/31/2009 | Inactive | The contractor will run a new analysis using new OBMEP data and a stream reach layer already developed by the Colville Tribes. |
| F. Complete analysis reports and protocol document | 8/1/2009 | 10/31/2009 | Inactive | A report outlining the key findings of these EDT assessment comparisons will be written by the contractor along with a protocol for how these assessment comparisons can be duplicated in future years in order to assess changes over time. |