Responses to ISRP comments for Monitoring and Evaluation Proposal # 29033
On behalf of the Colville Confederated Tribes

1. *Please include a response providing a detailed monitoring plan that can be reviewed for scientific accuracy and precision. The "Proposal objectives, tasks, and methods" section is too brief to allow complete scientific review. A specific plan for each task needs to be described in addition to an overall plan.*

    - Objectives should include detailed plans for site selection including data collection protocols. Selection of sites must include a probabilistic (statistical) sampling procedure in order to make statistical references to larger areas. Consider using "Oregon Plan" being developed for implementation in the John Day as a model.

    - The specific sample areas, methods, and sampling frequency and intensity (i.e., how many samples of what type where and when) and data collection protocols need to be specified or referenced for each of the objectives. The relationship between aerial surveys of spawning areas and ground spawning surveys should be clarified.

Response: **Please refer to the revised and attached, Okanogan Basin Monitoring and Evaluation Plan.**

In summary, this response we have attempted to address all of the questions and points posed by the ISRP to the best of our ability, and importantly, within our current capability. It should be reiterated that the Upper Columbia region has a long history of unmet mitigation and as such, suffers from a significant lack of operational infrastructure compared to most other Provinces. Some elements of the M&E program are specifically designed to mitigate this reality and make possible the long-term viability of fish and wildlife recovery in the region. Therefore, while the majority of general components of the program are defined and detailed in the original proposal, we have now significantly refined and expanded within this response. We also recognize that some elements remain approximate at this time because of this lack of infrastructure and capacity (most notably, an adequate funding foundation). We now refer the ISRP to the 4 general objectives and the 32 subtask where we have identified the process to finalize all remaining M&E details. Our expectation is that these details will constitute a minor effort that will be enabled immediately upon funding (October 2002) and concluded within the first two months of the program.

Additionally, since receiving the preliminary ISRP comments, we have expended tremendous effort in providing this information with little or no funding and/or support infrastructure. The CCT remain committed to conducting the best possible science and

M&E in support of fish and wildlife recovery and under this plan will provide critical baseline and project specific information for a host of recovery and management activities throughout the Okanogan Basin.

Specific OBMEP elements:

This response and the OBMEP attachment, addresses several comments by the ISRP concerning our proposal submission (ISRP 2002). Specifically, we now provide detail identifying how the following will be accomplished:

1. Systematically survey areas outside traditional spawner reaches to cover potential spawning areas;
2. Include detailed data collection protocols;
3. Site selection approach;
4. Development of a probabilistic (statistical) sampling procedure.
5. Refined objectives, goals and testable hypothesis statements
6. Identify key production study streams
7. Natural Production: Develop and implement methods of detecting indices of increasing natural production, as well as methods of detecting a realized increase in natural production, with specified statistical power.

Specific research, monitoring, and evaluation subbasin summary that will be addressed by this proposal include:

1. Need to revalidate chinook spawning information using improved technology (GIS) and subsequently reassess escapement goals and spawner/recruitment goals based on improved spawning ground data. This would provide improved population status information.
2. Need to validate and/or establish expanded index areas for spring chinook to ensure they are appropriate measures of productivity potential.
3. Need to determine the number of adults and smolts needed to fully seed current and future (post improvements) spring/summer/fall chinook, sockeye and steelhead habitat.
4. Need to determine life history and movement patterns of salmon and steelhead within the Okanogan Subbasin, including assessment of adult holding areas, juvenile rearing areas, thermal profiling, and juvenile migration patterns between Wells and Zosel dams, as well as monitor (passively) additional Columbia River mainstem passage, ocean survival and harvest level as they relate to Upper Columbia River populations and Okanogan subbasin subpopulations in specific.
5. Need to monitor all populations by examining trends and develop modeling and monitoring “tools” to determine out-of-basin impacts to Okanogan Basin stocks and subpopulations.

Expected outcomes include evaluations of:

- Impacts on natural production of targeted stocks;
- Ecological impacts on nontarget stocks;
- Identification of factors determining success or failure for each program.
- Relative survival between different experimental groups of hatchery fish and between hatchery fish and wild conspecifics.

2. The response should include a letter of support from the NMFS Science Center and the TRT staff for the final proposal.

Response: Direct contact with NMFS, the UCSRB RTT, WDFW and others has been made I order to solicit support for this program. All respondents have pledged strong support for the program and are all part of the ongoing review of this program. We will continue to provide written documentation of that support to ISRP, CBFWA, NPPC and BPA

The OBMEP is a coordinated plan. The objectives have been developed in consultation with NMFS science center and TRT staff. Each element has been categorized as either Tier 1, 2 or 3, according to the NMFS Monitoring and Evaluation designations and review by NMFS is underway. The Upper Columbia Salmon Recovery Board's Regional Technical Team, in conjunction with the NMFS TRT, is working to develop an Upper Columbia Salmon Recovery Productivity and Habitat Assessment Plan (RTT, draft 2002). The OBMEP is the most developed subbasin plan to date and has identified a significant number of detailed objectives, null hypothesis statements, methods and statistical design parameters that will be used to guide development of five other subbasins in the Upper Columbia ESU, Province and Region. The Washington Department of Fish and Wildlife has provided site specific objectives for the Chilliwist Pond Acclimation project and other high priority M&E needs. Finally, as specific elements of the Mid-Columbia Habitat Conservation Plan are defined, the Hatchery Committee, MIPT will integrate activities, as applicable, into the OBMEP.

3. What is the relationship of the present proposal to Project #1991000501?

Response: The OBMEP project supports the need to have the "best available" scientific information accessible to the BPA, fisheries community, decision-makers, and public by analyzing historical tagging data to investigate smolt outmigration dynamics, salmonid life histories and productivity, and providing real-time analysis to monitor outmigration timing for use in water management and fish operations of the hydrosystem.

The OBMEP will explore possible relationships between juvenile survival and adult returns with river flows, abundance of hatchery stocks, pulsing, ocean conditions, and ambient river conditions. Specified elements and budget allow for the OBMEP and its Monitoring Implementation Program Team (MIPT) to access these regional data to incorporate into the program objectives and analyses. The OBMEP will reciprocally provide data to Dr. John R. Skalski and UW staff to consult on a frequent basis and in

consultation on final OBMEP design elements, statistical design, and implementation strategies. Elements of products provided by previous efforts under the 1991000501 project are incorporated into the existing design for this proposal.

Attachment 1.

Okanogan Basin
Monitoring and Evaluation Program

Developed by
The Confederated Tribes of the Colville Reservation

March 15, 2002

Prepared in support of NPPC proposal # 2903

Overview

The Okanogan Basin Monitoring and Evaluation Program (OBMEP) is designed to provide a coordinated, long-term, comprehensive monitoring and evaluation plan for salmon and steelhead natural production programs in the Okanogan Basin. Development of the OBMEP was necessary to develop standardized collection of baseline information and to reduce M&E program redundancy, reduce overall expenditures, and reduce management inconsistency between individual programs and proposals in the basin. It is a cooperative program, involving needs defined by state, local and federal entities, regional recovery planning and local watershed efforts, and will serve as an overall framework for program monitoring efforts in the basin and for interpretation and synthesis of results.

Salmon and steelhead natural production programs have been proposed in the Okanogan Basin as an effort to increase natural production and harvest opportunity of salmon and steelhead using a mix of supplementation/acclimation, natural broodstock development and reestablishment, kelt reconditioning and habitat improvements. Several production programs have been fully developed and are the focus of the proposed OBMEP monitoring for 2003 – 2005. These programs include: re-establishment of steelhead natural broodstock, kelt reconditioning, selective harvest, reintroduction of spring chinook into historical areas and redistribution of summer/fall chinook into historical areas (BPA proposals 29013; 29050; 29040; 29042)

Each program will be monitored in terms of natural production, harvest, genetics and ecological interactions. Rigorous statistically designed monitoring and evaluation activities within each of these areas will guide project adaptive management and provide critical information for regional enhancement efforts.

Oversight

The OBMEP contains specific design elements and budget to form the Monitoring Implementation Program Team (MIPT), much the same as that formed for the Yakima Klickitat Fisheries Project. Members from the Upper Columbia Salmon Recovery Board (UCSRB), Confederated Colville Tribes, the Yakama Nation, WDFW, DOE, USFWS, NMFS and other professional biologists etc. will make up the MIPT. This will ensure coordination within the regional efforts such as the NMFS TRT and the Upper Columbia RTT. It is through the MIPT that we will seek to finalize elements of the OBMEP, and provide a forum for annual review and adaptive management. This group will provide oversight and approval of all elements, and ultimately, finalization of this plan.

Overall Program Goal

The primary goal of this project is to provide a Tier 2 monitoring program for evaluating spring, summer/fall chinook and steelhead production programs within the Okanogan

River subbasin. Production program-specific Tier 1 monitoring is also included where appropriate.

Background and Justification

Information on the programs background and justification of need have been provided in the original BPA proposal submission #2903 and therefore are not included here.

Objectives

1. Adult salmonid enumeration at Wells: Estimate the total number of adult salmonids returning to the Okanogan Basin by species, including return of externally marked fish.

2. Adult salmonid enumeration and at Omak Creek trap and Zosel dams: Estimate the total number of adult salmonids returning to the upper Okanogan and Similkameen and Canada.

3. Juvenile salmonid population surveys: Determine the spatial distribution and relative abundance of salmonids throughout the Okanogan basin to guide recovery planning and broodstock and kelt programs.

4. Juvenile salmonid micro-habitat utilization: Estimate baseline microhabitat utilization of juvenile salmon. Future deviations in use will suggest carrying capacity problems.

5. Hatchery juvenile marking: Estimate hatchery smolt survival to Wells, Rock Island and McNary and Bonneville dams using PIT-tags, and smolt-to-adult survival using CWTs.

6. Spawning ground surveys (redd counts): Monitor spatiotemporal redd distribution in the Okanogan basin and collect carcass data.

7. Natural Spawning Observations: Characterize wild fish reproductive behavior (adults & precocials) to serve as a baseline for future analysis of behavior of hatchery fish.

8. Steelhead kelt gamete quality monitoring: Estimate sex-specific fertility, in-hatchery mortality, incidence of monstrosities and fry emergence timing from a subsample of eggs.

9. Scale analysis: Determine age and stock composition of juvenile and adult salmonid stocks in the Okanogan Basin

10. Fish health monitoring: Monitor the disease status of Chilliwist, Ellesford, Beaver Creek, Omak Creek and other sites as appropriate, and determine incidence of pathogens in wild populations

11. Out-of-basin environmental monitoring: Obtain and utilize information regarding mainstem and marine environmental and harvest-related impacts on all Okanogan Basin anadromous salmonids.
12. Out-of-basin harvest monitoring: Estimate group- and stock-specific harvest of hatchery and wild anadromous salmonids outside of the Okanogan Subbasin.

13. In-basin harvest: Estimate group- and stock-specific harvest of hatchery and wild anadromous salmonids within the Okanogan subbasins. Selective fishing gear efficiency also.

14. Okanogan Basin habitat inventory & analysis: Collect data on existing and historical fish populations, habitat and passage conditions throughout the basin for eventual use in the modeling runs that will generate initial enhancement plans. (under BPA Proposal # 29037)

15. Monitor life history, growth patterns, disease, and release timing at acclimation facilities (coordinating BPA proposals 29013; 29050; 29040; 29042, 29041 and 29013).

Sampling Design

The OBMEP will utilize two types of site selection depending on the objective: probabilistic random sampling or pre-determined (fixed station).

Most objectives will utilize the Environmental Monitoring and Assessment Program (EMAP) survey design developed for the Oregon Plan (Firman and Jacobs, in press; Stevens and Olsen, 1999). The Environmental Monitoring and Assessment Program (EMAP) was put forward by the United States Environmental Protection Agency (US EPA) to address the need for consistent sampling of environmental conditions over large scales (Overton et al., 1990, Messer et al., 1991). This type of design is described in detail in Firman and Jacobs (in press). The design will utilize geographic information systems (GIS) to draw spatially balanced, overlapping survey sites for the variety of Tier 2 monitoring needed for the interrelated salmon and steelhead production programs.

For certain objectives, monitoring will also occur at pre-determined sites, fixed station sites such as Wells Dam, Zosel Dam and at pre-determined weir and screw trap locations to incorporate the specialized forms of data produced at these facilities.

Juvenile, Spawning, and Habitat Monitoring –50 randomly selected 1-km stream reach sites within the basin will be chosen using the EMAP process. The sampling universe will be 5th order and smaller stream from the 1:100k EPA River Reach file. Sample size is based on the minimum number of sites necessary to quantify current conditions (status) and detect trends in conditions over time. Juvenile salmonid sampling will determine the current distribution and abundance of juveniles in the basin and trends in distribution and abundance of salmonids over time. Spawner

sampling in conjunction with other adult enumeration sampling will determine the current abundance (status, ±40%) and distribution of adult chinook and steelhead and allow assessment of abundance and distribution change over time.

Sampling Frequency

In order to account for status and trend estimates, the EMAP rotating panel design was incorporated to design sampling frequency. Under this plan, one group of sites is visited in the first year, another group of sites is visited in the second year, and a third group of sites is visited in the third year. In the fourth year, the first group of sites is sampled again. Some overlap between the three sets of sites is incorporated and a group of sites, which is repeated every year, is included. Under this regime, more of the habitat is sampled than would be possible if the all the same sites were repeated every year (Firman and Jacobs, in press; Stevens and Olsen, 1999). Information collected at Wells and Zosel Dam, and at the traps and weirs, due to its specialized nature will be done on an annual basis.

Objective, Tasks, and Methods

Although the project entails four fundamental objectives, there are sub-objectives which we have termed tasks to accommodate the structure of this document. These 37 sub-objectives and associated hypotheses/assumptions are summarized in the table below. Every sub-objective will result in one or more of the following: a BPA report, a paper in a refereed journal, a complete monitoring procedure including functional facilities and analytical techniques.	
OBJ.	**Task, Hypothesis/Assumption, and Method**
1	**Objective: Natural Production**: Determine if there is statistically significant difference in the abundance, survival, timing and life history characteristics of spring chinook, summer/fall spring chinook, and steelhead in the Okanogan basin as a result of implementation of natural production programs as measured by: • adult escapement, (redd counts, aerial survey, dam counts,, prespawning mortality survey and estimates) • smolt yield to determine smolts per spawner as a function of spawner density, • adults per smolts, and • trends in statistics over time periods that define the productivity and capacity within a climatological and or ecological regime.
1.a	**Task:** Adult salmonid enumeration: Estimate the total number of adult spring chinook, summer/fall chinook, and summer steelhead returning to the Okanogan Basin **Tier:** 2 **Null hypothesis:** There is no significant difference in the number of salmonids passing Wells Dam over time **Alt. Hypothesis:** The number of salmonids passing at Wells Dam increases over time

	Rationale: To estimate passage and timing of jacks and adults at Wells Dam, and secondarily at McNary, Bonneville, and John Day for spring and fall chinook and steelhead), including passage of externally marked fish, and to collect biotic and abiotic data for each run **Study site selection:** Pre-determined site (Wells Dam) **Methods:** Monitor passage videographically and with PIT tag-detectors. All CWT salmonids will be electronically diverted to a holding tank and interrogated with a hand-held CWT detector and a PIT-tag detector. In the run-timing predictions, generalized least squares is used to estimate run-timing estimates weighted to take into account both historical run-timing patterns and historical passage numbers. This weighted least squares pattern recognition program also used feedback loops to account for intra- and interannual variations. Detailed descriptions of the algorithm and program output can be found in DOE/BP-35885-11. This project makes extensive use of tagging data collected and stored by the Pacific States Marine Fisheries Commission (PSMFC) and the Fish Passage Center (FPC). Data from these primary data centers are retrieved, summarized, analyzed, and displayed for public access in the second-tier data center managed by the University of Washington (UW). Creel surveys will also be conducted at Chief Joseph tailrace area and in mainstem Okanogan for tribal and recreational fisheries.
1. b	**Task:** Adult salmonid enumeration: Monitor escapement of hatchery and wild origin salmonids to the upper Okanogan subbasin. Enumerate by origin all species of migratory fish captured at the adult traps and weirs. **Tier:** 2 **Null hypothesis:** There is no significant difference in the number of salmonids returning to Omak Creek and Zosel Dam over time **Alt. Hypothesis:** The number of salmonids returning to Omak Creek and Zosel Dam increases over time **Rationale:** To estimate abundance and timing of spring chinook at Zosel Dam and at Omak Creek weir and of steelhead at Omak Creek weir, including passage of externally marked fish, and to collect life history data for each run **Study site selection:** Pre-determined site (Zosel Dam; Omak Creek weir near mouth) **Methods:** Construct and operate an adult fish weir and trap near the mouth of Omak Creek and the mouth of the e Okanogan River. The weir and associated trapping structure will capture all upstream and downstream migrant adult salmonids. During the baseline data collection phase of the project, all steelhead captured will be bio-sampled before their release upstream from the weir. The adult weir and traps will be operated daily during the

	migration period. All adults captured will be tagged with individually numbered anchor tags prior to release upstream of the weir to conduct a mark recapture estimate of abundance in the case of upstream weir failure, and to estimate repetitive spawners. The same information will also be recorded for spring chinook at Zosel Dam.
1.c	**Task:** Life history information: Determine selected adult life history patterns production and hatchery salmon and steelhead escaping into the Okanogan basin. Estimate age structure of adult wild and hatchery origin escaping to adult traps. Estimate temporal distribution of adult wild and hatchery origin escaping to adult traps. Estimate selected morphometric characteristics, including mean fork length and mean weight, of adult wild and hatchery origin; escaping to adult traps. **Tier:** 2 **Null hypothesis:** There is no statistically significant difference between hatchery origin and natural production fish life histories **Alt. Hypothesis:** Difference is statistically significant. **Site selection:** Fixed site **Methods:** Migration timing, fork length to the nearest centimeter, weight to the nearest kilogram, and sex ratio will be collected from adults captured at the adult migrant trapping facilities. Age structure of migrants will be determined by taking scale samples. Age analysis will be completed by methods described by Borgerson (1992).
1.d	**Task:** Juvenile salmon and steelhead microhabitat utilization: Monitor microhabitat utilization of juvenile spring chinook, summer/fall chinook and steelhead. Future deviations in use will suggest carrying capacity problems **Tier:** 2 **Hypothesis:** There will be no change in the incidence of baseline microhabitats as a function of egg deposition and spawning escapement. **Rationale:** Estimate the baseline microhabitat utilization patterns of juvenile salmon and steelhead. Even if supplementation were perfect, producing smolts and adults identical to wild fish in every way, the project could fail if existing production actually represented the carrying capacity of the Okanogan Subbasin. A post-supplementation change in patterns of microhabitat use is one of the indices that will be used to monitor "carrying capacity constraints". **Site Selection:** EMAP **Methods:** Under excessive densities, a significant proportion of juvenile might be displaced into sub-optimal microhabitats. Accordingly, we will monitor the relative incidence of parr in "typical" (baseline) and "atypical" microhabitats as a function of estimated egg deposition

	and spawning escapement. Snorkel survey teams will mark the location of spring chinook focal positions and measure associated physical parameters.
1.e	**Task:** Production juvenile marking: Estimate production spring chinook, summer/fall chinook, and steelhead smolt survival to Wells Dam & mainstem dams using PIT-tags, and smolt-to-adult survival using CWTs. **Tier:** 2 **Hypothesis:** H_0: Survival of production-reared fish equals survival of hatchery reared fish. **Rationale:** To evaluate production in terms of relative smolt survival to Wells, McNary and John Day using PIT tags, and relative smolt-to-adult survival (to Roza Dam) using multiple body-implanted CWT's, and colored elastomer in multiple body locations denoting treatment replicates. **Site selection:** Pre-determined (Wells, Zosel Dams; weirs and screw traps) **Methods:** Rotary screw traps will be located at the downstream extent of Omak Creek and outside of Bonaparte, Tonasket and Ellesford ponds, a weir will be located near the mouth of the Okanogan River. Rotary screw trap monitoring of smolts will follow methods developed in the Grande Ronde River subbasin (Keefe et al. 1998). This work in the Grande Ronde basin is designed to determine early life-history strategies of spring chinook and steelhead. This Grande Ronde River work has established the presence of both spring and autumn migration peaks of smolts emigrating from rearing and spawning habitats. To estimate differences in smolt survival by species and acclimation site, we will PIT-tag, ad-clip &/or CWT (snout) enough to detect survival differences at Wells Dam with specified power (α=.05 β=.1). 150,000 spring chinook CWT at Ellesford acclimation; 20% CWT summer/fall chinook at Bonaparte and Tonasket ponds acclimation (minimum of 100,000 total); 100% CWT steelhead released from Omak Creek acclimation. All species and locations of release will be tagged uniquely. A subsample of fish coded-wire tagged (20%) will be PIT –tagged. Returning adults will be interrogated at Wells, using hand-held CWT detectors and PIT tag detection to determine smolt-to-adult survival by group. We will use the PTAGIS data system to monitor PIT-tagged fish detected at Columbia River Facilities. Migration timing and survival to Columbia River dams will be estimated using an expansion factor method based on flow regimes at dam facilities (Jonasson et al. 2001). CWT also retrieved at Zosel Dam, weir on Omak Creek and screw traps. Power for smolt-to-adult survival estimates is the same as for smolt survival. Statistical analysis by ANOVA. Detailed methods used to complete the analysis are described in Kiefer et al. (2001a).

1.f	**Task:** Spawning ground surveys (redd counts): Monitor spatial and temporal redd distribution in the Okanogan Subbasin (spring chinook, summer/fall chinook, steelhead), and collect carcass data. **:** Estimate mean number of fish per redd **Tier :** 2 **Null Hypothesis:** There is no significant difference between redd counts over time. **Alt. Hypothesis:** Redd counts increase over time. **Rationale:** To describe spatial and temporal redd distribution for spring chinook, summer /fall chinook and steelhead, and to collect demographic data from carcasses. **Site selection:** EMAP **Methods: Comprehensive s**pawning surveys will be conducted by foot and/or boat surveys at the EMAP study sites within the geographic range for each species. Redds are individually marked during each survey and carcasses are sampled for marks and to collect data on egg retention, age (analysis of scale samples), sex, and length. Snorkel observation or visual observation from the streambank, will be used to determine the incidence of hatchery and wild fish spawning together.
1.g	**Task:** Natural Spawning Observations: Characterize wild salmonid reproductive behavior (adults and precocials) to serve as a baseline for future comparisons between production & wild reproductive behavior. **Tier:** 2 **Hypothesis: None (baseline data)** **Rationale:** Detailed observations will allow scientists to characterize typical wild spring chinook reproductive behavior to serve as a baseline for evaluations of hatchery fish behavior. **Site Selection:** EMAP **Methods:** Before returns of hatchery adults, field activities will focus on observation and description of naturally spawning spring chinook in the upper Okanogan basin Rivers. Knowledge of natural variation (within-year and between-year) in behavioral repertoires and the frequency of individual behaviors provide the basis for a power analysis of future studies to detect hatchery/wild differences in reproductive behavior. The presence and behavior of precocial males associated with spawning females is also recorded.
1.h	**Task:** Scale analysis: Determine age and stock composition of juvenile and adult salmonid stocks in the Okanogan basin. **Tier:** 2 **Hypothesis:** H_0: Production activities will not change the age structure of target stocks.

	Rationale: To determine age and stock composition of juvenile and adult salmonid stocks in the Okanogan Subbasin. Age structure of naturally produced salmon and steelhead will be monitored to ensure that the age structure does not change as the result of supplementation. **Site Selection:** Pre-selected; EMAP **Methods:** We will collect scales from carcasses, from harvest, at Zosel and Wells Dams. We will determine age distribution by scale analysis. Genetic data needs to be analyzed on a brood year basis, and the age structure of the population is itself an important genetic characteristic. Thus, aging the broodstock scales samples collected at the time of trapping will provide a baseline and be used to augment the biochemical genetic data. We will use scale analysis to determine the proportion of hatchery vs. production. Scales will be randomly collected at Wells, Zosel, and at weir and screw traps. Estimates of the proportion of production and wild smolts will be applied to the estimated smolt out migration. Adult scales will be collected at the broodstock Wells to estimate the proportion of hatchery/wild escapement. Estimates of the proportion of hatchery and wild adults will be applied to estimate adult returns.
1.i.	**Task:** Fish health monitoring: Monitor the disease status of production juveniles and broodstock, and determine pre-supplementation incidence of pathogens in wild salmonids in the Okanogan **Tier :** 2 **Null Hypothesis:** Disease related mortalities will not change over time **Rationale:** There are two objectives to this element: to monitor the physiological health and disease status of production fish in the Yakima basin (both juveniles and adult broodstock), and to establish a baseline data set describing existing levels of pathogens in wild salmonids prior to introduction of production fish. **Methods:** Methodologies for in facility and acclimation site monitoring are presented in other BPA proposals (see previously referenced).
1.k	**Task:** Out-of-basin environmental monitoring: Obtain and utilize information regarding mainstem and marine environmental and harvest-related impacts on all Yakima anadromous salmonids. **Tier:** 1 **Hypothesis:** None--information gathering **Rationale:** To obtain and utilize information from outside sources, regarding environmental and harvest-related impacts on all anadromous salmonids occurring outside the Okanogan Subbasin.

	Methods: The method entails communicating (telephone, E-mail and occasional face-to-face meetings) with various state and federal agencies, other research programs, hatcheries, and university researchers and collecting information regarding out of basin environmental and harvest-related impacts on anadromous stocks.
2	**Objective: Harvest**: Determine if there is a statistically significant increase in the harvest in harvest of targeted stocks.
2.a	**Task:** Out-of-basin harvest monitoring: Estimate group- and stock-specific harvest of hatchery and wild anadromous salmonids outside of the Okanogan Subbasin. **Hypothesis:** H_0: Supplementation will not increase out-of-basin harvest. **Rationale:** To develop a database to track the contribution of target stocks to out-of-basin fisheries. **Methods:** Coordinate with agencies responsible for harvest management (WDFW, ODFW, USFWS, CRITFIC, etc.) to estimate the harvest of target stocks.
2.b	**Task:** In-basin harvest: Estimate group- and stock-specific harvest of hatchery and wild anadromous salmonids within the Okanogan Subbasin. **Tier: 2** **Hypothesis:** H_0: Supplementation will not increase harvest in the Yakima Subbasin. **Rationale:** To develop a database to track the contribution of target stocks to in-basin fisheries. **Site selection:** EMAP **Methods:** Monitor tribal subsistence and sport fisheries in the Okanogan rivers at designated locations. Fish will be interrogated for various marks. This information will be used along with other adult contribution data (i.e. broodstock, dam counts, spawner ground surveys) to determine overall project success.
3.	**Objective: Genetics**: Determine if there are significant pre- & post-supplementation genetic changes in targeted stocks as reflected by changes in extinction risk, within-stock genetic variability, between-stock genetic variability, and domestication.
3.a	**Task:** DNA data collection and analysis: Begin DNA microsatellite baselines of all chinook and steelhead stocks for monitoring within- and between population genetic variability. **Tier:** 2 **Null Hypothesis:** There will be no significant differences between stock genetics over time **Rationale:** Continued genetic monitoring via DNA microsatellites is needed for genetic monitoring, reproductive success monitoring, and possibly other monitoring areas as well

	such a domestication selection analysis. **Methods:** Tissues from salmon will be analyzed and archived according to protocols being refined at the WDFW Genetics Lab. Approximately 12 variable loci will be analyzed from fry exiting the acclimation ponds, and from adults sampled at Zosel and Wells Dam prior to being released for natural spawning (analysis may begin at a later date).

Data Management:

All OBMEP data will be held within the OBMEP data archive system. This system will consist of standardized Access/Excel database formats and will be compatible with other industry and BPA structures. Data will be unrestricted and available to all resource management agencies and subbains planners. It will remain in the OBMEP program until delivery to BPA, the Upper Columbia RTT, CBFWA and other basin database systems such as StreamNet, IBIS, SSHIAP etc. The MIPT chair (Colville Tribal representative) will be responsible for oversight and QA/QC standards with day-day administration and maintenance by the MIPT database manager.

Hard copies of reports, field notes, and archive samples etc. will also be held under the direction of the MIPT.

A project web site will be developed and maintained allowing OBMEP program staff to enter and archive data elements. This site will be password protected, while providing an additional portal into publicly accessible sections. An FTP transfer protocol and secure site will also be developed for interim data access and transfer.

Facilities and Equipment

All facilities and equipment will be sited, maintained and under the general management of the Confederated Colville Tribes Fish and Wildlife Program. Mr. Joe Peone, Director of the Fish and Wildlife Program, will have overall responsibility for the implementation and management of the OBMEP.

Literature Cited:

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