Resident Fish Committee

Columbia Basin Fish and Wildlife Authority

Quarterly Project Implementation Review

Resident Fish Committee of the Columbia Basin Fish and Wildlife Authority Second Quarterly Program Implementation Review

May 14-15, 2003
Elkhorn Village, Idaho
Review Program

Wednesday May 14

Session 1: Habitat Enhancement and Restoration

2:00 – 2:05 p.m.	Project Review Overview
2:05 – 3:00	Project 199201000: Habitat Restoration/Enhancement Fort Hall Reservation; *Hunter Osborn, Shoshone Bannock*
3:00 – 4:00	Project 199701100: Enhance and Protect Habitat and Riparian Areas on the DVIR; *Mattie Allen, Shoshone Paiute Tribes*

Session 2: Population Assessments

4:00 – 5:00	Project 199700900: Evaluate Potential Means of Rebuilding Sturgeon Populations in the Snake River between Lower Granite and Hells Canyon Dams; *Scott Everett, Nez Perce Tribe*

Thursday May 15

Session 2: Population Assessments - Continued

8:00 - 8:05 a.m.	Project Review Overview
8:05 - 9:00	Project 199800200: Snake River Native Salmonid Assessment; *Kevin Meyer and Tony Lamansky, Idaho Department of Fish and Game*
9:00 – 10:00	Project 198709900: Dworshak Dam Impacts Assessment and Fisheries Investigation; *Eric Stark, Idaho Department of Fish and Game*
10:00 - 11:00	Project 200007900: Assess Resident Fish Stocks of the Owyhee/Bruneau Basin, DVIR; *Mattie Allen, Shoshone Paiute Tribes*

Session 3: Resident Fish Substitution

11:00 – 12:00	Project 199815600: Implement Fishery Stocking Program Consistent with Native Fish Conservation; *Guy Dodson, Shoshone Paiute Tribes*
12:00 – 1:00 p.m.	**Lunch (working lunch for ad hoc RFC Charter Workgroup)**

Session 3: Resident Fish Substitution - Continued

1:00 -2:00	Project 199501300: Resident Fish Substitution Program; *Dave Statler, Nez Perce Tribe*

Session 3: Reservoir Operations, Maintenance, and Evaluations

2:00 - 3:00	Project 199501500: Lake Billy Shaw Operations and Maintenance and Evaluation; *Mattie Allen, Shoshone Paiute Tribes*
3:00 – 4:00	Project 198740700: Dworshak Integrated Rule Curves/M&E
4:00 - 4:10	Concluding comments and identification of dates and locations for the Third Quarterly Project Implementation Review

Abstracts and Background of Projects

In alphabetical order by author's last name

Project 199501500: Lake Billy Shaw Operations and Maintenance and Evaluation

Mattie Allen, Shoshone Paiute Tribe

The purpose of the ongoing Lake Billy Shaw O&M project is to provide subsistence fishing for Tribal members and a recreational fishery for non-Tribal members. The reservoir was originally intended to support a native Redband trout fishery as partial mitigation for loss of anadromous fish due to federal hydropower facilities. The reservoir affords benefits to the ecosystem as a whole by providing new opportunities and habitat for wildlife and fish, including several avian Species of Special Concern. Operation and maintenance objectives included the completion and maintenance of perimeter fencing around the reservoir and feeder canal, road improvements, the placement of an experimental solar pump and stock water trough outside the exclosure, the enhancement and maintenance of stock water ponds outside the exclosure, native vegetation planting, photopoint documentation and monitoring, control of encroaching exotic vegetation, monitoring of water quality and reservoir structures, sign construction, and community outreach.

The Shoshone-Paiute Tribes did not receive the FY02 funding designated for this project; thus, project objectives originally proposed and scheduled for performance in 2002 may have been delayed.

Objective	Task
1. Protect shoreline and stream riparian areas	a. Protect 6 miles of stream
	b. Install water troughs outside fenced area
2. Plant native trees and grasses	a. Purchase trees
	b. Purchase native seed for stream banks/shoreline
	c. Monitor and evaluate newly planted trees, grasses, willows
3. Information signs	a. Purchase lumber for signs
4.	a. Monitor biological parameters in lake
	b. Monitor fishery, aquatic insects for densities, shoreline habitat

Project 199701100: Enhance and Protect Habitat and Riparian Areas on the DVIR

Mattie Allen, Shoshone Paiute Tribe

The goal of this ongoing project is to enhance, restore, and protect critical habitat, including riparian, range, wetland, and riverine habitats on the Duck Valley Indian Reservation from disturbance and degradation caused by livestock, roads, and mining in order to protect and provide clean, cool water for native fish species. More specifically, the Tribes have identified, enhanced, and protected streams, and their associated natural springs, supporting native Redband trout populations and spawning populations utilizing passive regeneration techniques (fencing and trough placement),road improvement techniques, and native

vegetation transplanting techniques. The Tribes also enhanced and maintained stock water ponds and collected range and water quality data. The Tribes have experienced support for this project by the community through outreach and educational activities, including partnerships with the Tribal Environmental Protection Program, the Western Shoshone Paiute Livestock Association, and the Owyhee Combined Schools.

The Shoshone-Paiute Tribes did not receive the FY02 funding designated for this project; thus, project objectives originally proposed and scheduled for performance in 2002 may have been delayed.

Objective	Task
1. Identify/Protect spawning areas	a. Evaluate river/streams to locate spawning areas
	b. Evaluate spawning areas for habitat condition and water quality
	c. Determine enhancement/protection needs in these areas
2. Enhance/Protect river and stream habitat	a. Gather data from Objective 1
	b. Implement enhancement/protective measures
3. Protect/rehabilitate natural springs	a. Meet with Western Shoshone Cattleman's Assc. to determine priority springs
	b. Erect exclosure fences and install water troughs
	c. Implement maintenance of work completed in 1998 (repair fence, repair water lines, etc.
4. Collect water quality and fishery data from streams, reservoirs, and Owyhee River	a. W/ Tribal EPA collect water quality data, metals testing, invertebrate sampling
	b. Collect fishery data (population estimates, length/weight, species composition, egg-parr estimates, etc)
5. Work W/ Owyhee Schools	a. Work with environmental club, teach students internet use, teach students how to collect water quality data, students aid in habitat work (planting trees, willows etc)

Project 200007900: Assess Resident Fish Stocks of the Owyhee/Bruneau Basin, DVIR

Mattie Allen, Shoshone Paiute Tribe

The genetic structure of 14 populations of putative redband trout *Oncorhynchus mykiss gairdneri* from the upper East Fork Owyhee River basin in southwest Idaho and northern Nevada was examined by means of restriction fragment length polymorphism analysis of mitochondrial DNA (mtDNA) amplified by polymerase chain reaction to identify genetic diversity and possible introgression with hatchery-produced coastal rainbow trout *O. m. irideus*. Preliminary analysis of mtdna showed that seven of the populations contained mtDNA haplotypes characteristic of redband trout and coastal rainbow trout as well as high levels of mtDNA divergence among observed haplotypes (1.02-1.93%) which could be attributed to past stocking programs. However, the preliminary data suggests that an equal number of populations, which are geographically adjacent to the introgressed populations, were genetically pure suggesting that they are isolated reproductively. The probability of an extinct population being replaced naturally through dispersal from adjacent population appears limited. Because of the presence of introgressed populations, the long-term persistence of the genetically pure populations will require the implementation of management and conservation plans that promote the protection of these populations as well as associated riparian habitat.

Objective	Task
1. Determine presence/absence and genetic purity of redband trout populations on the DVIR	a. Collect tissue samples for genetic analyses.
	b. Use results to identify pure and introgressed populations to assist in developing management plans and identifying potential broodstock sources.

Project 199815600: Implement Fishery Stocking Program Consistent with Native Fish Conservation

Guy Dodson, Shoshone Paiute Tribe

Outdoor recreation is currently Duck Valley's primary tourism activity. Camping and fishing at Mountain view, Sheep Creek, Billy Shaw and Wildhorse reservoirs, plus the 20 mile stretch of the Owyhee River have attracted avid fishermen and recreationalists for many years. The Duck Valley fish stocking project over the past decade and a half assured our Tribes of a high quality fishery in the three reservoirs on the reservation. Camping fees during a 50 year lease on the Wildhorse Reservoir assist in management cost through customer fees. Please note that the Owyhee River is not stocked but has ample supplies of native salmonids for fishers. The Shoshone-Paiute Tribes fish-stocking program was begun in 1988 and is intended to provided a subsistence fishery for the Tribal Members. The program stocks certified disease-free catchable and fingerling sized rainbow trout in Mountain View, Sheep Creek, and Billy Shaw Reservoirs.

This project will help restore a fishery for Tribal Members that historically depended on wild salmon and steelhead in the Owyhee and Bruneau Rivers and tributaries for their culture as well as for subsistence. This project is partial substitution for the loss of anadromous fish production due to the construction and operation hydroelectric dams on the Columbia and Snake Rivers. Until anadromous fish can be returned to the Owyhee and Bruneau Rivers this project should continue indefinitely.

Our Tribes strongly disagree with CBFWA Review comments submitted in ISRP Final Review-June 7, 2002. Our reasoning is that this contract has survived the rigorous scrutiny of the scientific world for 15 years should continue to be a stand alone contract. As part of this project the Shoshone-Paiute Tribes will also receive income in the form of fees from non-tribal members who come to fish these reservoirs. Regular monitoring and evaluation of the fishery will include sampling for length/weight/condition and for signs of disease. A detailed monitoring and evaluation plan has been put in place for this project. However due to budget limitations on this project only the fishery surveys and limited water quality work can be completed. A creel survey was initiated in 1998 and we are following the monitoring and evaluation schedule for this project (as budget allows) as well as managing the budget and personnel. All biological data and stocking rates are included in the Annual Reports to Bonneville Power Administration BPA).

Objective	Task
1. Fish Stocking	a. Stock Mt. View
	b. Stock Sheep Creek Reservoir
1. Monitor fish stocking program	a. Water quality data on reservoirs
	b. Monitor fishery for disease, length/weight, condition, etc

Project 199501300: Evaluate Potential Means of Rebuilding Sturgeon Populations in the Snake River between Lower Granite and Hells Canyon Dams

Scott Everett, Nez Perce Tribe

From 1997 to 2001 white sturgeon were captured, marked, and population data were collected in the Snake and Salmon. A total of 1,785 white sturgeon were captured and tagged in the Snake River and 77 in the Salmon River. Since 1997, 25.8 percent of the tagged white sturgeon have been recaptured. Relative density of white sturgeon was highest in the free-flowing segment of the Snake River, with reduced densities of fish in Lower Granite Reservoir, and low densities the Salmon River. Differences were detected in the length frequency distributions of white sturgeon in Lower Granite Reservoir, the free-flowing Snake River and the Salmon River (Chi-Square test, $P<0.05$). The proportion of white sturgeon greater than 92 cm (total length) in the free-flowing Snake River has shown an increase of 30 percent since the 1970's. Using the Jolly-Seber model, the abundance of white sturgeon <60 cm, between Lower Granite Dam and the mouth of the Salmon River, was estimated at 2,139 fish, with a 95% confidence interval of 839-9,108. Total annual mortality rate was estimated to be 0.14 (95% confidence interval of 0.12 to 0.17).

A total of 35 white sturgeon were fitted with radio-tags during 1999-2002. The movement of these fish ranged from 53 km (33 miles) downstream to 77 km (48 miles) upstream; however, 38.8 percent of the detected movement was less than 0.8 km (0.5 mile). Both radio-tagged fish and recaptured white sturgeon in Lower Granite Reservoir appear to move more than fish in the free-flowing segment of the Snake River. No seasonal movement pattern was detected, and no movement pattern was detected for different size fish.

Analysis of the length-weight relationship indicated that white sturgeon in Lower Granite Reservoir had a higher relative weight factor than white sturgeon in the free-flowing Snake River. The results suggest fish are currently growing faster than fish historically inhabiting the study area, as well as other Columbia River basin white sturgeon populations.

Artificial substrate egg mats documented white sturgeon spawning in four consecutive years. A total of 49 white sturgeon eggs were recovered in the Snake River from 1999-2002, and seven from the Salmon River during 2000.

Objective	Task
1. Determine the status and characteristics (reproductive and early life history of the Snake River white sturgeon population between Hells Canyon and Lower Granite Dams, including the major tributaries (Clearwater and Salmon Rivers).	a. Identify spawning behavoir and movements of gravid females and mature males before, during, and after spawning. Identify spawning locations.
	b. Verify spawning activities, timing, and locations.
	c. Determine distribution/movements of fish, abundance of various age classes of white sturgeon per reach throughout the system and determine life history characteristics to be used in modeling population dynamics.
2. Determine habitat used for spawning and rearing of white sturgeon in the Snake River between Lower Granite and Hells Canyon dams, including major tributaries (Clearwater and Salmon Rivers).	a. Describe environmental conditions at locations where sub-adult and adult fish are captured in conjunction with task 1.a and 1.c.

3. Coordination with fisheries co-managers and funding entities and dissemination of information.	a. Attendance of regional white sturgeon technical / management meetings.
	b. Data compilation and report writing.
4. Develop an adaptive management plan.	a. Fully assess the risks associated with mitigative actions using information collected.
	b. Make recommendations for implementation of mitigative action(s).
	c. Develop an implementation, evaluation and monitoring plan.
5. Restore population to provide an annual sustainable harvest of 5 kg/ha/yr.	a. Implementation of mitigative action(s).
	b. Evaluate and monitor effectiveness of action(s) by quantifying changes in population.

Project 199800200: Snake River Native Salmonid Assessment

Kevin Meyer and Tony Lamansky, Idaho Department of Fish and Game

Native resident salmonid populations are in decline throughout much of their range. Bull trout are listed as threatened under the Endangered Species Act (ESA), and redband trout and Yellowstone cutthroat trout have been petitioned to be listed. Despite their sensitive status, quantitative investigation of the current distribution, abundance, limiting factors, and threats to persistence for native salmonids in the upper Snake River basin has been minimal for most populations. This project is a multi-phased project with overall objectives of: 1) assessing stock status, population trends, and fish habitat in the Upper Snake River Basin; 2) identifying life history and habitat needs, and limiting factors; and 3) developing, implementing, and monitoring the effectiveness of recovery and protection plans for populations at risk. To date we have visited 1,141 randomly distributed sampling sites to determine distribution and abundance of native salmonids. In 2002 we finished inventorying in southeast Idaho for Yellowstone cutthroat trout (YCT), where we found YCT present in 307 of 833 sites visited (including dry sites). Based on these results, distribution and abundance, sub-population sizes, effective population sizes, genetic purity and diversity, and factors that influence the distribution and abundance of YCT will be determined by the end of 2003.

Objective	Task
1 .Assess the current status, life history traits, limiting factors, and threats to persistence of native salmonids in the middle and upper Snake River provinces.	a. Use electrofishing and snorkeling to estimate presence/absence and abundance of salmonids at 200 sites per year.
	b. Identify, describe, and measure habitat characteristics at the fish sampling sites.
	c. Analyze the effect habitat variables have on salmonid distribution and density using logic analysis and multiple regression.
2. Compile fish and habitat data into a Basin-wide Native Salmonid Database.	a. Enter data (and quality check entry) into database, add available data from other agencies, and share data with IDFG regional managers and other agencies that they can use in GIS analysis, etc.
3. Determine genetic composition of	a. Collect and preserve fins samples from purported native salmonid

salmonids from 10-15 representative or most important streams per year.	populations for mtdna testing.
	b. Use results to identify pure and introgressed populations to assist in developing recovery and protection plans.
4. Assess whether, in the next five years, a concerted brook trout removal effort in a small stream can increase bull trout numbers to a density of 15 fish/km.	a. Participate in multi-agency effort to remove brook trout with removal-depletion electrofishing over 10 km of stream above a man-made barrier.
	b. Calculate densities of trout and removal efficiencies of brook trout to assess the recovery of native redband and bull trout and effectiveness of the removal effort.
	c. Determine age, mortality, growth, sex ratio, age-at-maturity, and fecundity of brook trout to assess the compensatory capacity of any remaining brook trout that we failed to remove.
	d. If bull trout re-introduction is implemented by the South West Native Fish Watershed Advisory Group, monitor the success of their re-establishment to bolster the existing population.

Project 199201000: Habitat Restoration/Enhancement Fort Hall Reservation

Hunter Osborn, Shoshone Bannock Tribe

Habitat enhancement, protection and monitoring was the focus of the Resident Fisheries Program during 2002. Enhancement and protection included sloping, fencing and planting willows at sites on Diggie and Spring Creeks and evergreen tree revetment placement below Broncho Bridge. In addition, many previously constructed instream structures (rock barbs and wing dams) were repaired throughout the Fort Hall Indian Reservation (Reservation).

Physical sampling during 2002 included sediment and depth measurements (SADMS) in Big Jimmy Creek and Diggie Creek. SADMS, used to track changes in channel morphology and specifically track movements of silt through Bottoms stream systems were completed for 20 strata on the 200 series and 21 strata on the 300 series of Clear Creek. Water temperature was monitored (hourly) in Spring Creek, Clear Creek, Diggie Creek, and Portneuf (Jimmy Drinks).

Biotic sampling included invertebrate sampling in the 200 and 300 series of Clear Creek and East Fork Diggie Creek. Fish population densities and biomass were sampled in Clear Creek 200 and 300 series. Sampling protocols were identical to methods used in past years. Numbers of fish in Clear Creek 300 series remained similar to 2001 but appear to be decreasing while numbers of fish in Clear Creek 200 series continue to drop to near pre project levels. Salmonid fry densities were monitored near Broncho Bridge and were similar to 2001. A telemetry project was initiated in which 32 adult trout were implanted with radio tags and their movement monitored during 2002. Mean catch rate by anglers on Bottoms streams decreased from 0.80 in 2001 to 0.35 trout per hour in 2002. Numbers of fish > 18" caught by anglers decreased from 0.19 in 2001 to 0.12 per hour in 2002.

Objective	Task
1. Ascertain areas of the Fort Hall Reservation which require restoration, enhancement, or	a. Plan yearly measurement of abiotic stream habitat variables in stream reaches, including: channel morphology, substrate composition, water chemistry.

protection activities.	
	b. Plan yearly measurement of biotic stream habitat variables in stream reaches, including: fish and invertebrate community composition, densities, and biomass.
	c. Measure abiotic stream habitat variables in stream reaches, including: channel morphology, substrate composition, water chemistry.
	d. Measure biotic stream habitat variables in stream reaches, including: fish and invertebrate community composition, densities, and biomass.
2. Increase existing juvenile and adult salmonid habitat (i.e. spawning, rearing, and object cover).	a. Evaluate habitat enhancement projects implemented in previous years to determine which methods most effectively increased salmonid biomass and usable habitat.
	b. Install and maintain structures to increase existing juvenile and adult salmonid habitat (i.e. wing dams, barbs, revetments)
3. Protect and restore riparian habitats of Reservation streams.	a. Evaluate Reservation riparian areas which require planting (willows, cottonwoods, native grasses, wetland plants).
	b. Evaluate areas of Reservation which require jack and rail exclosure fencing.
	c. Plan rest-rotation grazing schemes to protect Reservation riparian areas.
	d. Plant willows, cottonwoods, native grasses, wetland plants).
	e. Construct, repair, and maintain jack and rail exclosure fencing on selected riparian areas.
	f. Protect riparian areas through implementation of rest-rotation grazing schemes.
	g. Monitor and maintain growth and survival of willows, cottonwoods, native grasses, wetland plants.
	h. Monitor and evaluate effects of jack and rail exclosure fencing on riparian and instream habitat.
	i. Monitor and evaluate effects of rest-rotation grazing schemes on Reservation riparian areas.
4. Deter and reduce non-game fish migrations into Fort Hall Reservation.	a. Design modification/repair of permanent weir on Spring Creek and operate and maintain.
	b. Plan for removal of non-native fishes through development of fishing regulations (harvest)
	c. Evaluate effectiveness of removal of non-native fishes through creel surveys.
5. Promote Tribal fisheries management objectives in the Snake River Basin.	a. Schedule and participate in forums and meetings that affect regional use, storage, and regulation of Snake River flows to promote fisheries restoration.
	b. Plan, design, implement, and monitor and evaluate cost-share projects pertaining to Snake and Blackfoot Rivers and American Falls Reservoir habitat enhancement and management.

Project 198709900: Dworshak Dam Impacts Assessment and Fisheries Investigation

Eric Stark, Idaho Department of Fish and Game

Off-site strobe light testing was first conducted in 1997 on Spirit Lake and Lake Pend Oreille on wild, free ranging kokanee *Oncorhynchus nerka* and again in 1998 on Lake Pend Oreille. In 1997, kokanee avoided the strobe lights for the entire night and remained an average of 30 to136 m away from the lights in waters with Secchi transparencies from 2.8 to 17.5 m (Maiolie et al. 2001). In 1998, lights were found to be even more effective during the winter (the season of highest entrainment losses) when water clarity was higher. Density of kokanee within 30 m of the lights dropped 72% to 100%. Both changes were statistically significant ($p<0.001$) at three different flash rates.

On-site testing at Dworshak Dam was first conducted between December 2001 and January 2002. During these tests a set of nine strobe lights flashing at a rate of 360 flashes/min were placed near the intake of an operating 90 mW turbine, and densities of fish were monitored with a split beam echosounder. Mean densities dropped 88%, which was statistically significant ($p = 0.009$). Between April 22nd and May 15th, 2002, we progressed to preliminary testing of strobe light effectiveness at deterring kokanee in front of an operating reservoir outlet. Mean densities dropped from an average of 253 fish/ha when no lights were present to 87 fish/ha when the strobe lights were turned on. This decline in densities was not significant ($p = 0.207$), however a 66% decline is still a promising reduction in fish density.

During all test periods there appeared to be no tendency for fish to habituate to the lights during the night. These results indicate that strobe lights may be effective at reducing kokanee entrainment through both the turbine intakes and reservoir outlets at Dworshak Dam. Currently, strobe light testing is being conducted at the intakes to the reservoir's outlets.

Entrainment sampling was also conducted with split-beam hydroacoustics a minimum of one day per month for a continuous 24 h period. The highest entrainment rates occurred at night, with lower discharges, and shallower intake depths. Behavioral analyses also revealed fish swam 'at will' in front of the intakes and chose to move into the turbine intakes rather than the previous hypothesis that fish were 'pulled' in unwilling by high velocity water.

Standardized hydroacoustic sampling is also conducted monthly to determine kokanee densities in the forebay of Dworshak Reservoir (near intakes) as a measure of susceptability to entrainment and to determine seasonal distribution patterns. Forebay density surveys have revealed low kokanee densities and therefore low susceptability to entrainment in July and August during higher discharge. During the winter of 2002-2003, forebay kokanee densities were very low, as little as one tenth of the 2001-2002 densities, and actually decreased throughout the winter.

A reservoir-wide hydroacoustic survey is performed each summer to estimate an overall population abundance. We estimated a total of approximately 2,476,000 kokanee (90% CI +/- 15.4%) in Dworshak Reservoir in early July 2002, down from about 3,150,000 in 2001. Lastly, kokanee spawner counts are conducted on or near September 25th each year to provide an additional index of abundance. Counts in four select tributary streams reached 25,014 fish in 2002 compared to only 5778 fish in 2001. This years data more closely fits the normal relationship between spawner counts and adult kokanee abundance in the reservoir.

Objective	Task
1. Increase the kokanee population to 30 to 50 adults/ha by reducing entrainment losses. This can be accomplished if annual survival rate for each year class of kokanee can be increased to 50%.	a. Implementation of new hydroacoustic technology.

	b. If strobe light testing proves suitable for implementation, then design an implementation plan for FY 2003.
	c. Plan research to examine the effect of strobe lights on species other than kokanee FY 2003.
	d. Planning and design of Clearwater Subbasin Plan with Nez Perce Tribe (FY 2000).
	e. If a stable kokanee population is attainable then design a predator management plan within confines of the Subbasin Plan.
	f. Test split-beam hydroacoustic gear for its ability to monitoring kokanee entrainment.
	g. When available apply new technology and techniques to maximize monitoring efficiency and data interpretation.
	h. Floating dock structure will be tested during high flows for stability and to insure lights do not drift or hit trash racks.
	i. Start phase two of strobe light testing. Purchase additional strobe lights and generator, install wiring, modify existing research platform, and fabricate winch stantions for lifting additional lights.
	j. Two sets of lights and hydroacoustic equipment will be installed on floating research platform in front of one intake during initial testing.
	k. Map water velocities in front of each turbine intake, reservoir outlets, and forebay.
	l. Test strobe lights in front of multiple turbine intakes or reservoir outlets.
	m. Compile hydroacoustic results and evaluate entrainment losses to compare test results.
	n. Monitor the kokanee population in Dworshak reservoir and calculate survival rates to evaluate the population effect of entrainment losses using hydroacoustics and trawling.
	o. Relate changes in survival rates to dam operation and flow year.
	p. Conduct kokanee spawner counts in tributary streams.

Project 198740700: Dworshak Integrated Rule Curves/M&E

Dave Statler, Nez Perce Tribe

Development of reservoir-specific biological/integrated rule curve models to aid in the assessment of alternative operational strategies is regional in scope. Pursuant to the National Marine Fisheries Service's 2000 Biological Opinion (BIOP) for Operation of the Federal Columbia River Power System (FCRPS), Dworshak Reservoir is relied upon heavily for flow augmentation and water temperature management. The NOAA Fisheries' Regional Forum (Technical Management Team, Implementation Team, etc.) is central to implementation of BIOP operations, including operations of Dworshak Reservoir. An assessment model for Dworshak Reservoir is needed for the Nez Perce Tribe to have meaningful input to this process. Integrated operational criteria are needed to address a wide variety of needs, within the primary flood control and BIOP constraints.

Pursuant to funded project objectives, an initial Dworshak Rule Curve Evaluation Model has been developed. Follow-up model development needs have been identified; however FY 2002 was the close-out year for the project. Also in accordance with funded project objectives, integrated operational criteria have been collaboratively developed and have been institutionalized in several forums, including the Northwest Power Planning and Conservation Council's 2003 Mainstem Amendments. Lack of funding to actively participate in the BIOP Regional Forum limits effective implementation of the adopted integrated criteria.

Objective	Task
1. Refine the Dworshak Rule Curve Evaluation Model (DRCEM) based on recommendations from Barber and Juul (2001).	a. follow-up on modeling and data issues identified by Barber and Juul (2001)
	b. Identify data needs based on what is currently known regarding limiting factors and other conditions specific to Dworshak reservoir
	c. Identify and develop additional subroutines needed for effective biological assessments.
2. Identify and update appropriate integrated Dworshak operations (Integrated Rule Curve)	a. Use regional hydrologic modeling resources to simulate the effect of an additional 20-foot annual summer drawdown of the Dworshak pool.
	b. Analyze how the resultant reservoir pool elevations effect other uses and needs by comparison with individual operational rule curve criteria.
	c. Continue to coordinate with management and regulatory agencies regarding appropriate integrated operations.
3. Institute appropriate integrated operations.	a. Promote recognition and adoption of appropriate integrated operations through participation in NMFS's Regional Forum (TMT, IT).
4. Develop a comprehensive long-term monitoring and evaluation plan for Dworshak Reservoir.	a. Coordinate with federal, state, and private entities associated with data collection activities on Dworshak Reservoir to identify short- and long-term monitoring and evaluation data needs.
	b. Compile the data needs identified in Task a. to develop a coordinated and comprehensive monitoring and evaluation plan with appropriate entities.
	c. Identify a strategy to implement the comprehensive monitoring and evaluation plan.

Project 199501300: Resident Fish Substitution Program

Tod Sween, Nez Perce Tribe

The purpose of the program is to provide substitute resident fisheries to partially mitigate for the loss of anadromous fisheries due to the construction and operation of Dworshak Dam on the North Fork Clearwater River. The goal of the Resident Fish Substitution Program is to provide an annual harvest of 4,750 kg of resident fish. During the 2002 season existing pond fisheries contributed an estimated harvest of 3,540 kg (74.5% of project goal). The NPT operates substitute resident fisheries in three ponds located in the Clearwater River subbasin. Past project accomplishments include completion of emergency repairs

at Talmaks Reservoir and renovation work at Mud Springs Reservoir, both in the Craig Mountain area of North Central Idaho, and construction of the new Tunnel Pond facility near Orofino, Idaho. Fishing effort and harvest are estimated through fishery surveys consisting of observed harvest rates. Regular monitoring of water quality parameters and collection of physical pond data are conducted. These data are used to assess aquatic environmental health and to determine optimal stocking densities. Efforts to improve pond water quality continue through promoting implementation of watershed best management plans (BMPs).

Objective	Task
1. Incorporate new resident fisheries within the Nez Perce Reservation in order to achieve 4750 kg of resident fish harvest annually to mitigate in part for loss of anadromous fishing opportunities.	a. Monitor temperature, oxygen, specific conductivity, pH, nitrogen loading, alkalinity, and depth to evaluate water quality and habitat at new fisheries.
	b. Develop individual fishery management and stocking plan to provide maximum return to harvest based on the existing carrying capacity and environmental conditions/ limitations of the fishery.
	c. Monitor and evaluate effects of watershed use on water quality and habitat quantity. Assess fisheries response to land use practices (grazing, logging, agricultural) in the watershed and gauge implemented best management practices (BMPs).
2. Develop new resident fisheries within the Nez Perce Reservation to provide 4750 kg of resident fish annually for harvest to mitigate in part for loss of anadromous fishing opportunities.	a. Conduct site feasibility studies. Identify potential sites for development. Collect environmental and cultural information needed to assess site suitability, develop engineering designs, and compile NEPA documentation.
	b. Phased construction of new fisheries in accordance with the site feasibility and design studies.
3. Conduct periodic operations to maintain pond sites and fishery stocks.	a. Conduct site maintenance to maintain structural integrity of the dams and pond sites, assure access, and maintain habitat quality to maximize potential carrying capacity and fish harvest.
	b. Perform periodic stocking of fish to maintain fisheries.
4. Manage and monitor the pond habitat and fish at existing facilities to support the annual harvest goal of 4750 kg of resident salmonids	a. a. Monitor temperature, oxygen, specific conductivity, pH, nitrogen loading, alkalinity, and depth to evaluate water quality and habitat at new fisheries.
	b. Monitor and evaluate effects of watershed use on water quality and habitat quantity. Assess fisheries response to land use practices (grazing, logging, and agricultural) in the watershed and gauge implemented best management practices (BMPs).

	c. Monitor fish growth and condition, reflecting health of the fish.
5. Manage and monitor fisheries at existing resident fish pond facilities to provide 4750 kg of resident salmonids annually.	a. Monitor harvest
	b. Evaluate and refine individual fishery management and stocking plans based on fish health, growth, condition (Task d), and harvest information (Task e) to maximize fish growth, condition, and harvest.