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**Duck Valley Reservoirs Fish Stocking and O&M**

Annual Progress Report  
Performance Period: October 1, 2007 – September 30, 2008

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## **Abstract/Executive Summary**

*The Duck Valley Reservoirs Fish Stocking and Operations and Maintenance Project (DV Fisheries) is an ongoing resident fish program that serves to partially mitigate the loss of anadromous fish that resulted from downstream construction of the federal hydropower system. The project's goals are to enhance subsistence fishing and educational opportunities for Tribal members of the Shoshone-Paiute Tribes and provide fishing opportunities for non-Tribal members. In addition to stocking rainbow trout (*Oncorhynchus mykiss*) in Mountain View (MVR), Lake Billy Shaw (LBS), and Sheep Creek Reservoirs (SCR), the program is also designed to: maintain healthy aquatic conditions for fish growth and survival, provide superior facilities with wilderness qualities to attract non-Tribal angler use, and offer clear, consistent communication with the Tribal community about this project as well as outreach and education within the region and the local community.*

*Tasks for this performance period fall into three categories: operations and maintenance, monitoring and evaluation, and public outreach. Operation and maintenance of the three reservoirs include maintaining fences, roads, dams and all reservoir structures, feeder canals, water troughs, stock ponds, educational signs, vehicles, equipment, and restroom facilities. Monitoring and evaluation activities include creel, gillnet, wildlife, and bird surveys, water quality and reservoir structures monitoring, native vegetation planting, photo point documentation, and control of encroaching exotic vegetation. Public outreach activities include providing environmental education to school children, providing fishing reports to local newspapers and vendors, updating the website, hosting community environmental events, and fielding numerous phone calls from anglers.*

*The reservoir monitoring program focuses on water quality and fishery success. Sheep Creek Reservoir and Lake Billy Shaw had less than productive trout growth due to water quality issues including dissolved oxygen and/or turbidity. Regardless, angler fishing experience was the highest at Lake Billy Shaw. Trout in Mountain View Reservoir were in the best condition of the three reservoirs and anglers reported very good fishing there. Water quality (specifically dissolved oxygen and temperature) remain the main limiting factors in the fisheries, particularly in late August to early September.*

## **Introduction**

The Snake River Basin was estimated to have contained 79% of the stream miles suitable for chinook salmon in the Columbia River Basin (Idaho Department of Fish and Game 1985). Using the stream mile estimate, IDFG estimated that 650,000 - 1,030,000 adult chinook, 117,000 - 229,800 steelhead, and 14,400 - 57,400 sockeye were produced annually in the Snake River and its tributaries above what is now Hells Canyon Dam.

With the completion of the Federal hydropower system and the Hells Canyon Complex, anadromous salmonids were extirpated from the upper portion of the Snake River and its tributaries. In the Northwest Power and Conservation Council's (NPCC) 1994 Columbia River Basin Fish and Wildlife Program (Program), the NPCC acknowledged that "salmon and steelhead probably will never be able to return to some areas of the basin because of blockages by dams. These areas include the areas above Chief Joseph and Grand Coulee Dams, the Hells Canyon Complex and other smaller blocked areas." Subsequently, the NPCC stated that: 1) mitigation in blocked areas is appropriate where salmon and steelhead were affected by the development and operation of the hydroelectric projects and 2) to treat the Columbia River and its tributaries as a system, resident fish substitutions are reasonable for lost salmon and steelhead in areas where in-kind mitigation cannot currently occur. The document further states that, "the Council continues to support increasing resident fish populations where salmon runs cannot be rebuilt. Such substitutions have been part of the fish and wildlife program since the early 1980s" and that activities partially mitigating salmon extirpation

above Hells Canyon Dam include annually stocking “catchable and fingerling trout of the appropriate stocks in Duck Valley Indian Reservation lakes and streams” (Section 10.8C.1).

The DVIR encompasses approximately 289,820 acres on the Idaho/Nevada border. There are approximately 2,300 enrolled Tribal members. Reservation lands are located in the Bruneau and Owyhee subbasins of the Middle Snake Province. As indicated in Figure 1, the Reservation is both remote and isolated; the closest town centers are Elko, Nevada and Mountain Home, Idaho, both approximately 100 miles from the Reservation’s small town of Owyhee.

Figure 1: Location of the DVIR in relation to the Pacific Northwest



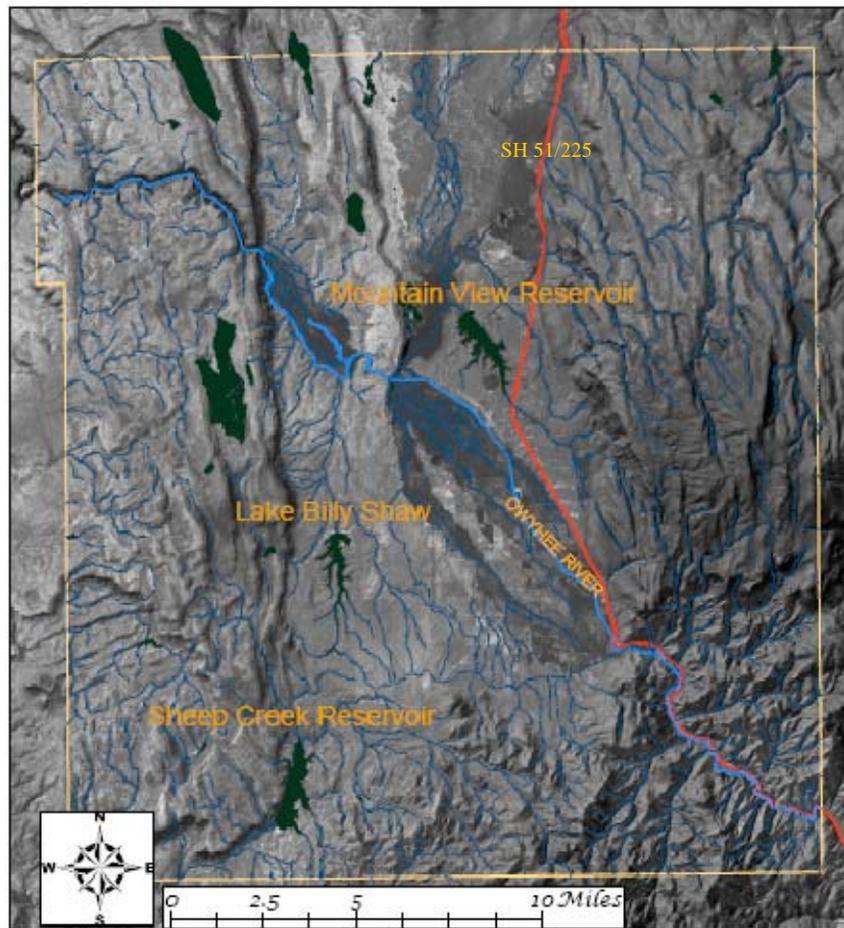
The DV Fisheries program operates and maintains three Tribal fishing reservoirs: Sheep Creek, Mountain View, and Lake Billy Shaw (Figure 2). All three water bodies are formed by earthen dams and are dependent on the irrigation system that supports local agriculture. Vegetation in the drainage basins of the reservoirs consists mainly of shrub-steppe with intermittent wetland vegetation. Typical shrub-steppe vegetation includes various forbs, sagebrush, rabbitbrush, and grasses such as Idaho fescue. The surrounding habitat

supports big game (mainly antelope), carnivores, waterfowl, migratory bird species, raptors, reptiles, and amphibians. The reservoirs are important to the DVIR in terms of providing and protecting large tracts of habitat as well as providing culturally-important fish resources to Tribal members.

Sheep Creek Reservoir (SCR) was built in the mid-1950s and is the southernmost and largest of the three. The surface area of the reservoir is 855 acres with a maximum depth of 23 feet at full pool. Sheep Creek is fed from the Highline Canal, the same irrigation canal as Lake Billy Shaw. Sheep Creek is well known throughout the western states for its highly productive trout fishery. Fly anglers commonly use a fly pattern known as the “Sheep Creek Special,” dubbed for its high success at the DVIR reservoirs.

Mountain View Reservoir (MVR) was constructed in 1969 and is the only reservoir located on the northern half of the Reservation in Idaho. The reservoir is approximately 640 acres in size with a maximum depth of 24 feet at full pool. This reservoir is well known for its crystal clear water and reliable fishing experience. Both Sheep Creek and Mountain View Reservoirs were historically stocked through USFWS funding from 1956 to 1990 (Burge and Miller, 1990).

Figure 2: Locations of the three reservoirs on the DVIR



Lake Billy Shaw Reservoir was completed in 1998 to address measures 10.8C.4 and 10.8C.7 of the NPCC’s 1994 Program and is presently operated according to the “Substitution for Anadromous Fish Losses” and “Resident Fish Losses” provisions of the NPCC’s 2000 Program. The NPCC’s June 5, 1998, letter to Chairman Paiva and Mr. Robert Lohn states that the goal of Project 1995-015-00 is “to develop, on the Duck Valley Reservation, an enclosed reservoir rainbow trout ‘put and take’ fishery at Lake Billy Shaw.”

Developed and managed for recreational and Tribal subsistence fishing, Lake Billy Shaw was constructed within the Billy Shaw Slough in the south central portion of the reservation, seven miles west of the town of Owyhee. Lake Billy Shaw has 17.5 miles of shoreline, a surface area of 430 acres a maximum depth of 36 feet and a mean depth of 23 feet. Approximately 76% of the reservoir surface area is at 15 feet or greater depth. Inflows to the reservoir include water diverted from the East Fork Owyhee River into the Highline canal, which is then diverted into either Sheep Creek Reservoir or Lake Billy Shaw feed canal. Recorded annual fluctuations can be highly variable (Figure 6, page 12).

The feeder canal can carry flows up to 30 cubic feet per second (cfs) without causing erosion damage. Inflows to the reservoir fluctuate drastically according to time of year, releases from the upstream Wildhorse Reservoir and upstream irrigation needs. Outflows generally include only surface spillage from the reservoir, although summer evaporation and bank seepage often exceed inflows. Escapement of fish from the reservoir is restricted by a gated outlet and drum screens with paddle wheels at the inlet.

During the Three-Step Review for Lake Billy Shaw and initial deliberations with the NPCC and BPA, however, artificial production of native redband trout and associated stocking costs for Lake Billy Shaw were included in Project 1995-006-00 titled “*Shoshone-Paiute /Shoshone-Bannock Joint Culture Facility*” as indicated in the NPCC’s May 12, 1998, Decision Memorandum. Nevertheless, the Independent Scientific Review Panel (ISRP) (ISRP 2001-3) recommended to the NPCC that Project 1995-006-00 should not move beyond Step 3 and into construction and suggested that the project sponsors did not adequately address the conditions provided in the NPCC’s Step 2 decision. Despite the ODFW, Montana Department of Fish, Wildlife, and Parks, and IDFG’s operation of artificial production programs for redband trout (Klamath Hatchery) and Yellowstone cutthroat trout *O. clarki lewisi* (Bluewater Springs, Yellowstone River, and Big Springs trout hatcheries), respectively, the ISRP (ISRP 2001-3) suggested, without references, that hatchery rearing of redband trout and Yellowstone cutthroat trout would be difficult at best, since a high proportion of these projects have not succeeded. Subsequently, the ISRP (ISRP 2001-3) suggested that non-native rainbow trout should be used to meet the production needs of the Duck Valley Indian Reservation and that those needs could be addressed by contracting with private or state aquaculture facilities in southern Idaho.

In recommending funding for Lake Billy Shaw, the NPCC included a stipulation that the Shoshone-Paiute Tribes, BPA, IDFG, Nevada Department of Wildlife, and the ODFW identify an approach that would alleviate problems (e.g., introgression with native redband trout *O. m. gairdneri*) that could arise if hatchery-reared coastal rainbow trout escaped from Lake Billy Shaw. Subsequently, negotiations among the management entities resulted in a decision to stock sterile, hatchery-reared coastal rainbow trout; however, in light of the success that the ODFW has experienced in culturing redband trout, the Shoshone-Paiute Tribes, NPCC, and BPA initiated Project 2000-079-00 titled “*Assess Resident Fish Stocks of the Owyhee/Bruneau Basin, D.V.I.R.*” to identify the genetic structure and purity of redband trout populations throughout the East Fork Owyhee River drainage. Results from this study have enabled the Shoshone-Paiute Tribes to identify populations that could serve as broodstock sources for the development of a redband trout hatchery program in Lake Billy Shaw Reservoir, as well as prioritize habitat for protection and enhancement. Until then, Lake Billy Shaw will be stocked with sterile rainbow trout using funds from this contract. Guidelines for stocking rates and size of stocked fish are dependent upon reservoir management and vary among waterbodies; however, objectives of most reservoir management programs, regardless of the fish species and location, are to provide a total catch biomass that exceeds the stocked biomass. In April 2002, the Shoshone-Paiute Tribes initiated the stocking of Lake Billy Shaw with BPA funds from the Resident Fish Stocking project (1988-156-00) with the release of 8,000 lbs. of sterile catchable sized (10-14 in.) hatchery-reared rainbow trout. Because Lake Billy Shaw is a new reservoir, it is essential in this project to continue with a long-term study of stocking density, growth, survivorship, and yield to develop guidelines that are not approximations.

Lake Billy Shaw reservoir opened October 1, 2002 as a trophy fishery. Previously, funds from BPA project 1988-156-01, Resident Fish Stocking, furnished sterile rainbow trout for Lake Billy Shaw as well as viable rainbow trout for Mountain View and Sheep Creek Reservoirs; however, in August 2003, the Resident Fish Stocking and Lake Billy Shaw O&M (BPA project 1995-015-00) projects were combined, mid-performance period. The O&M contract title changed to "Duck Valley Reservoirs Fish Stocking and O&M" (still BPA Project 1995-015-00); the contract and performance language were changed to include O&M and fish stocking for all three reservoirs, and a line item to purchase fish for all three reservoirs was added to the budget. This report reflects the above line item, title, and task changes (the Resident Fish Stocking contract was terminated at the time of the merge). The Duck Valley Reservoirs Fish Stocking and O&M project is referred to as "DV Fisheries."

### **Summary of Work by Work Element**

#### **Manage and Administer Project:**

##### *Metric and location data entered into Pisces for FY08:*

Metric and location data were entered into Pisces for applicable Work Elements in the FY08 Statement of Work. All status reports were submitted and approved.

##### *General administrative work performed:*

The director, project manager, and secretary submitted purchase orders, payment requests, and invoices. They also addressed employment issues and coordinated with the various Tribal administrative departments.

##### *Keep track of budget:*

Detailed account reports were sent by the Finance Department monthly. These reports included expenditures, transfers, and other changes. Microsoft Excel was used to compare these changes to the approved budget. This spreadsheet was used to track money expenditures and monitor remaining funds.

##### *Manage sub-contracts with fish suppliers:*

The project manager and secretary maintained communication with the two fish suppliers periodically throughout the year. The project manager developed sub-contracts, presented them to the Tribal Council for approval, and sent them to the suppliers. All contracts were approved and accepted by all parties.

##### *Timely and complete submission of invoices:*

All invoices were submitted to the Finance Department as soon as they were received. The secretary retained copies of those invoices. The project manager created monthly expenditure reports and submitted those to be sent in conjunction with the Tribal invoice to BPA.

##### *Maintain project administrative building:*

The project manager and project staff assisted the Information Technology department in maintaining network access, repairing wireless radios and antennas, and other equipment.

##### *Lease, maintain, and repair equipment:*

A bull dozer and a dump truck were leased for two months. These and other equipment were maintained and repaired as needed.

##### *Accrual estimate (year-end close):*

The project manager assisted the Finance department in developing an accrual estimate and submitted it to BPA.

*FY09 SOW/budget package submitted to BPA:*

The project manager submitted a draft FY09 SOW and budget package to BPA in late July.

Produce Environmental Compliance Documentation:

*Ensure that all environmental compliance requirements have been fulfilled:*

All environmental compliance requirements were met. This included NEPA and ESA compliance, cultural resource compliance, and obtaining necessary permits to legally perform work. No permits were required.

Outreach and Education:

*Volunteer one day environmental education to students:*

The project manager spent one afternoon explaining the fisheries project to 6<sup>th</sup> graders. He showed various species of fish, salt water and fresh water, and provided information on each species. He explained the purpose of the DV Fisheries project and importance to the community. The project manager also attended a science fair for children. He brought a collection of aquatic insects to show the children macroinvertebrate species within the region. Finally, the project manager set up a booth at a health fair promoting flyfishing as a healthy sport.

*Volunteer one day with Boy Scout Troop activities:*

The local Boy Scout Troop was inactive this year due to the Troop leader moving from the DVIR.

*Work with local media:*

The project manager and director talked with reporters from the Idaho Statesman and the Associated Press. A front page article was printed in the Idaho Statesman "Outdoors Section" (June 12, 2008) and featured the success of the three fisheries. The secretary submitted an article to the Sho-Pai News about current permit prices for fishing in the April issue.

*Provide information to anglers:*

Fishing pamphlets were updated to show 2008 regulation changes and approximately 2,500 of these pamphlets were printed and distributed to all of the Tribes' vendors. The department staff also fielded hundreds of telephone calls from anglers, updated fishing reports, and performed in person interviews with anglers.

*Participate in community gatherings:*

The department organized the annual Arbor Day celebration where they raffled prizes, barbequed, and planted trees with community members. The department also assisted with the 4<sup>th</sup> of July Pow-Wow and Rodeo as well as the Tribal "Sundance" Ceremony. All DV Fisheries employees assisted in these events. The project manager attended a Tribal health fair to promote the healthy lifestyle of fly fishing. During July, he took individuals out to the reservoirs to teach them hands-on fly fishing techniques.

*Purchase advertisement with flyfishing magazine:*

The project purchased advertisements in the bi-monthly "Northwest Flyfishing" and "Southwest Flyfishing" magazines.

*Host youth workers:*

The department hosted two summer youth workers. These youths rotated among the Department's programs so they could obtain a well-rounded work experience.

### Plant Vegetation:

#### *Collect willows, bulrushes, and tules:*

Rather than collecting willows, bulrushes, and tules, the project staff acquired and planted approximately 1,600 narrow-leaf cottonwood saplings through the Bureau of Indian Affairs' Woodland Development Grant.

#### *Secure plants using water jet-stinger:*

The narrow-leaf cottonwood saplings were planted along the shores of the three reservoirs using "sharp-shooter" shovels.

### Maintain Vegetation:

#### *Maintain generator at pump house for watering:*

Cummins International sent a representative down from Boise to service the pump and generator units.

#### *Water plants as needed:*

One laborer watered trees at Lake Billy Shaw at least once per week, particularly during the hot season. Pre-existing plants and trees were watered and maintained at Mountain View and Sheep Creek Reservoirs.

#### *Trim plants as needed:*

Laborers trimmed trees of dead branches during the summer months.

### Remove Vegetation:

#### *Survey reservoirs and associated streams for exotic species:*

The fish technician and several laborers spent a couple of days looking at areas around the three reservoirs for Tamarisk, knapweed, white-top, and purple loosestrife. They concentrated on areas at Lake Billy Shaw that had Tamarisk plants present in 2006 surveys (Figure 3). No exotics were identified during these surveys. At Mountain View and Sheep Creek reservoirs, the staff mapped weed patches with a GPS unit. However, due to the project manager's computer failure and loss of GIS software and data, maps were not produced at this time.

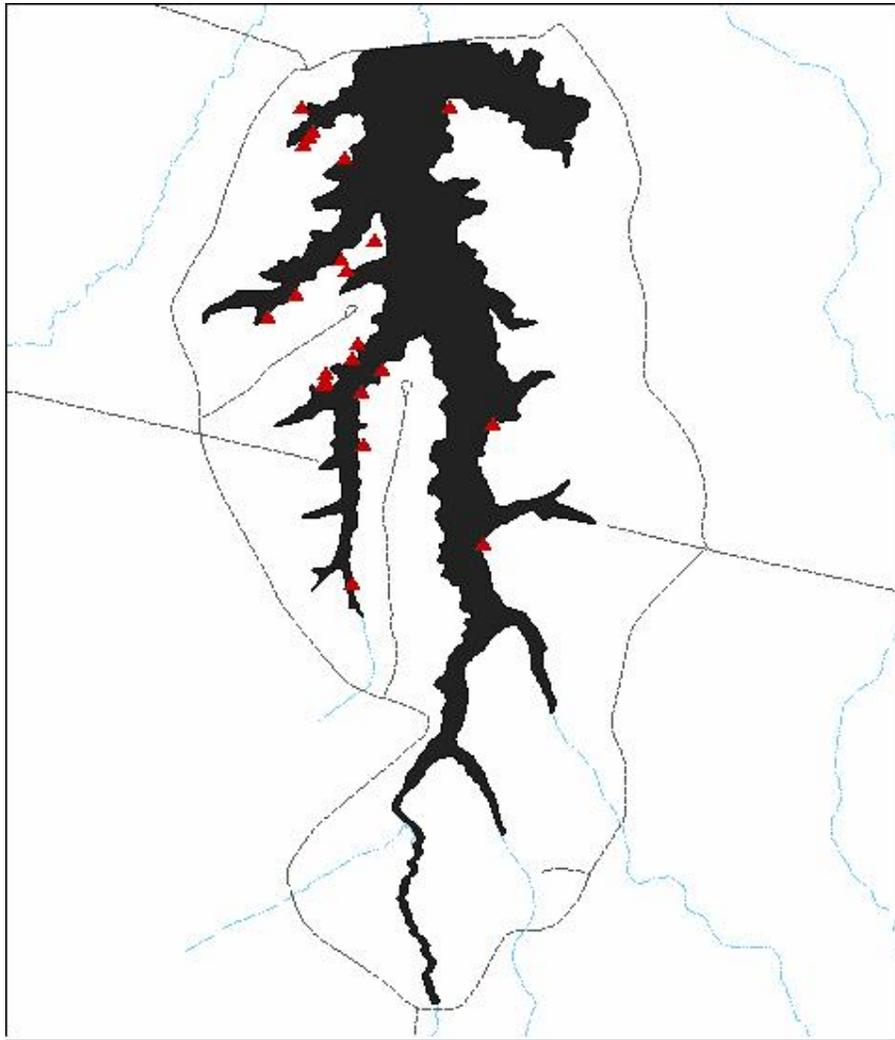
#### *Treat Tamarisk and other exotics with herbicide:*

Noxious weeds were identified at Mountain View and Sheep Creek. However, they were not treated this year due to lack of time and late identification.

#### *Remove woody vegetation from Lake Billy Shaw Dam:*

Many of the areas on the dam face were adequately bare from the previous year's vegetation removal.

*Figure 3: Tamarisk plant locations at Lake Billy Shaw in 2006*



Operate and Maintain Habitat/Passage:

*Maintain alternative water developments:*

The project staff inspected current stock ponds and access to water to look for repairs. No work was needed on these impoundments.

*Monitor and remove livestock as needed:*

The laborers occasionally spotted livestock inside the perimeter fencing due to gates being left open. They removed the livestock immediately or as soon as they could by ATV, vehicle, or by foot.

*Maintain perimeter and inlet fencing at Lake Billy Shaw:*

The perimeter fencing was surveyed several times throughout the year. Several portions of the perimeter fence were repaired. Two cattle guards were removed, cleaned, and reset by using heavy equipment.

Put and Take Fisheries (Lake Billy Shaw):

*Inspect dam and its associated structures weekly:*

Lake Billy Shaw dam was inspected every two weeks. This inspection involved checking water levels and water clarity in the piezometer wells and checking conditions of the eight toe-drains.

*Remove debris from fish screen structures:*

The work crews checked and cleaned the fish screens and paddle-wheel structures as needed. This involved multiple inspections per day during high flow seasons. The main trash rack at Highline Canal was damaged due to ice and vegetation build-up. This damage could not have been prevented as cold weather maintained high amounts of ice.

*Repair or replace paddle wheels at Boyle Creek:*

All of the paddle wheels and fish screen drums are in good operating conditions. The project staff lubricated as needed.

*Stock hatchery-reared Rainbow trout:*

The fish suppliers delivered and stocked all loads of fish in the spring and fall months (Table 1).

*Install 4 portable restrooms:*

The crew installed 4 portable toilets at LBS in the first week of April.

*Maintain 4 portable restrooms:*

The crew periodically cleaned the restrooms and replaced toilet paper supplies. They also facilitated septic pumping through the Tribal Water and Sanitation Department.

*Remove 4 portable restrooms:*

The 4 restrooms were pumped, removed, and stored for the winter. One restroom was destroyed by a wind storm in 2007. Furthermore, the privies were in used condition when purchased and are beginning to deteriorate. We will need to consider purchasing new privies in the next year or two.

*Check boat ramps and maintain as needed:*

The crew inspected boat ramps during water quality sampling as they utilized the ramps at these times. Neither repairs nor maintenance were needed.

*Maintain roads around Lake Billy Shaw:*

The local Bureau of Indian Affairs road crew graded the roads in the spring. The project staff cleaned and reset several cattleguards on access roads to Lake Billy Shaw.

*Maintain water pump at Lake Billy Shaw:*

The crew started and used the water pump and generator periodically in order to keep the equipment in operating condition. A service repair person came and serviced the Cummins/Onan pump and generator.

*Table 1: Breakdown of Rainbow trout stocked at the three reservoirs in 2008*

DATE	FISH NAME	RESERVOIR	TOTAL WT. (LBS)	LAKE WT. (LBS)	# OF FISH	# OF FISH PER 1000 GAL	# OF FISH PER ACRE	WT. WT.	SEX	CLASSIFICATION	AGE (YRS)	AGE WT.	PRICE/LB	PRICE/FISH	TOTAL AMT
April 22, 2008	BCTF	LBS	10	8	1	Y	N	1,639	S	Fingerlings	4-6"	0.02	\$6.71	\$0.11	\$11,000.00
April 22, 2008	BCTF	MVR	10	8	1	Y	N	1,639	S	Fingerlings	4-6"	0.02	\$6.71	\$0.11	\$11,000.00
April 28, 2008	BCTF	MVR	14	12	1	Y	N	3,236	S	Fingerlings	5-6"	0.02	\$6.82	\$0.11	\$22,000.00
May 6, 2008	BCTF	MVR	13.5	13	2	Y	N	8,000	F	Catchable	12-14"	1.00	\$1.80	\$1.80	\$14,400.00
May 8, 2008	BCTF	MVR	13	13.5	2	Y	N	4,000	S	Catchable	10-12"	1.00	\$2.00	\$2.00	\$8,000.00
May 8, 2008	BCTF	LBS	13	14	2	Y	N	4,000	S	Catchable	10-12"	1.00	\$2.00	\$2.00	\$8,000.00
May 9, 2008	BCTF	SCR	10	13	2	Y	N	8,000	F	Catchable	12"	1.00	\$1.80	\$1.80	\$14,400.00
September 24, 2008	BCTF	MVR	13	16	2	Y	N	8,000	F	Catchable	14"	0.55	\$1.80	\$0.99	\$14,400.00
September 20, 2007	BCTF	LBS	16	16	1	Y	N	4,000	S	Catchable	12"	0.50	\$2.00	\$1.00	\$8,000.00
October 10, 2008	CSI	MVR	7	11	1	Y	N	3,194	F	Catchable	13"	0.82	\$1.75	\$1.39	\$5,584.50
October 13, 2008	CSI	SCR	11.5	10	1	Y	N	3,301	F	Catchable	11"	0.51	\$1.75	\$0.89	\$5,776.75
October 17, 2008	CSI	SCR	10	12	2	Y	N	3,302	F	Catchable	11"	0.42	\$1.75	\$0.74	\$5,778.50
October 20, 2008	CSI	MVR	14	11	N	Y	N	3,368	F	Catchable	11"	0.42	\$1.75	\$0.74	\$5,894.00
October 24, 2008	CSI	MVR	10	11	1	Y	N	3,395	F	Catchable	12"	1.00	\$1.75	\$1.75	\$5,941.25
October 27, 2008	CSI	MVR	12	11	1	Y	N	3,301	F	Catchable	12"	1.00	\$1.75	\$1.75	\$5,776.75
October 30, 2008	CSI	MVR	13	11	1	Y	N	3,302	F	Catchable	10"	0.55	\$1.75	\$0.96	\$5,778.50

Put and Take Fisheries (Sheep Creek Reservoir):

*Determine source of turbidity and development of mitigation plan:*

The project manager researched several environmental subcontractors to help facilitate a turbidity study determining the cause and the nature of the high turbidity at Sheep Creek Reservoir. The company, Brown and Caldwell, was hired to facilitate this study. During the initial investigative study, the project staff and staff from Brown and Caldwell collected random samples of soil surrounding the reservoir and water from the reservoir itself. Analysis indicated that the soils on the western bluff adjacent to the reservoir were identical to those soil particulates that were causing the high turbidity. The main particulate involved is a clay particle known as smectite. This particle is sub-micron in size and easily stays animated in solution through light agitation and through molecular vibration. Due to these characteristics, the smectite stays in suspension in Sheep Creek through wind/wave action, motor boat activity, and molecular vibration.

After the turbidity problem was identified and analyzed. Brown and Caldwell began working on potential mitigation alternatives. Several options were identified: exclusion of livestock to promote riparian protection to the reservoir; increased riparian buffer by vegetation planting; and addition of flocculants to promote precipitation of the smectite particles. Brown and Caldwell staff continued their study by researching several flocculants and water chemistry interaction. By performing simple laboratory studies using water from Sheep Creek and varying concentrations of two different flocculants Brown and Caldwell identified the concentration and type of flocculent to use. Their identification was based on the effectiveness of the flocculent, the most cost-efficient to implement, and the least effectual on other water quality parameters such as pH, dissolved oxygen, and temperature.

The next stage of the mitigation study will be to look at the effectiveness of the flocculent at two larger scales. One will be a simple water trough test in Sheep Creek to understand the effectiveness in realistic settings and environmental conditions. The other scale size will be to block off a small bay within Sheep Creek and treat that bay. These two studies were not initiated due to the lack of time left in the field season and the lack of additional funds. They will be conducted during the FY09 field season. Prior to these two studies beginning, the crew and project manager will collect depth and geographic data at random sites across the reservoir to build a bathymetric profile of the reservoir. This data will help estimate total water volume in the reservoir so that appropriate concentrations of flocculent may be applied. This work will be completed by the end of April 2009.

*Stock Sheep Creek Reservoir with hatchery-reared Rainbow trout:*

The fish suppliers delivered and stocked all loads of fish in the spring and fall months (Table 1). One fish supplier was delayed by several weeks in the fall because of low water flows to their hatchery.

*Maintain Campgrounds:*

The project staff repaired and re-roofed six campsite ramadas. They maintained the restrooms, installed shop-made toilet paper holders, and brushed the campsites to minimize fire hazards, improve the camping areas, reduce places for snakes to hide, and improve overall aesthetics.

Put and Take Fisheries (Mountain View Reservoir):

*Stock Mountain View Reservoir with hatchery-reared Rainbow trout:*

The fish suppliers delivered and stocked all loads of fish in the spring and fall months (Table 1). One fish supplier was delayed by several weeks in the fall because of low water flows to their hatchery.

*Maintain Campgrounds:*

The project staff removed brush and picked up trash at camping areas. They replaced a water pump that supplies water to the various camping sites. They watered lawns established in the arbor and adjacent to the handicap-accessible restroom.

Collect/Generate/Validate Field and Lab Data:

*Take photo-points of LBS shoreline and canal to monitor annual changes:*

No photopoints were collected this year due to new fisheries technician and loss of GPS coordinates.

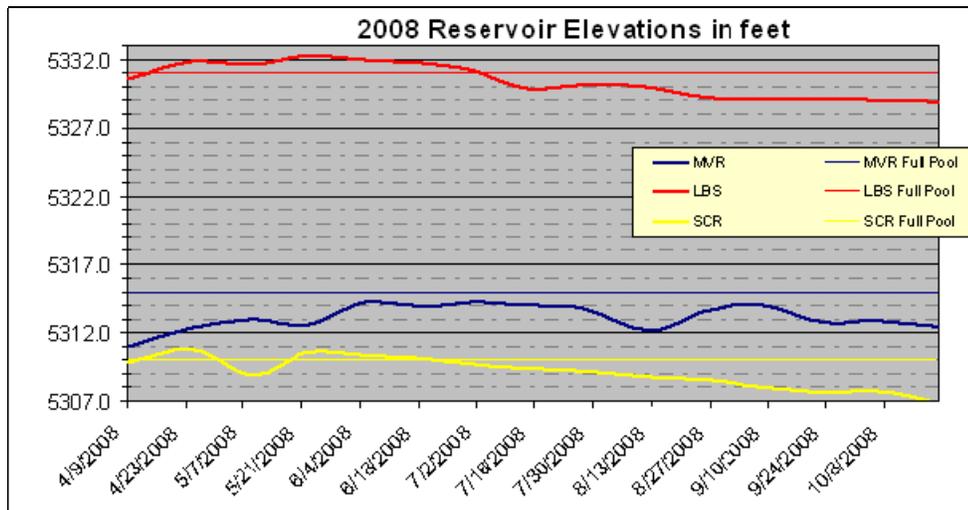
*Take GPS locations of plants:*

No GPS map was created this year because of no significant changes in plant density.

*Record piezometer, toe-drain, and water levels at LBS:*

The fish technician and crew recorded piezometer, toe-drain, and water levels every two-weeks. Figure 6 shows changes in water levels at all three reservoirs. Typically, spring water refills each reservoir to just over full pool status. Over the next several months the water slowly seeps or evaporates, reducing the overall amount of water in each reservoir. During the fall months, the irrigation district may divert additional (but not always sufficient) water into the reservoirs before winter freeze-over. Mountain View did not reach the full pool level this year.

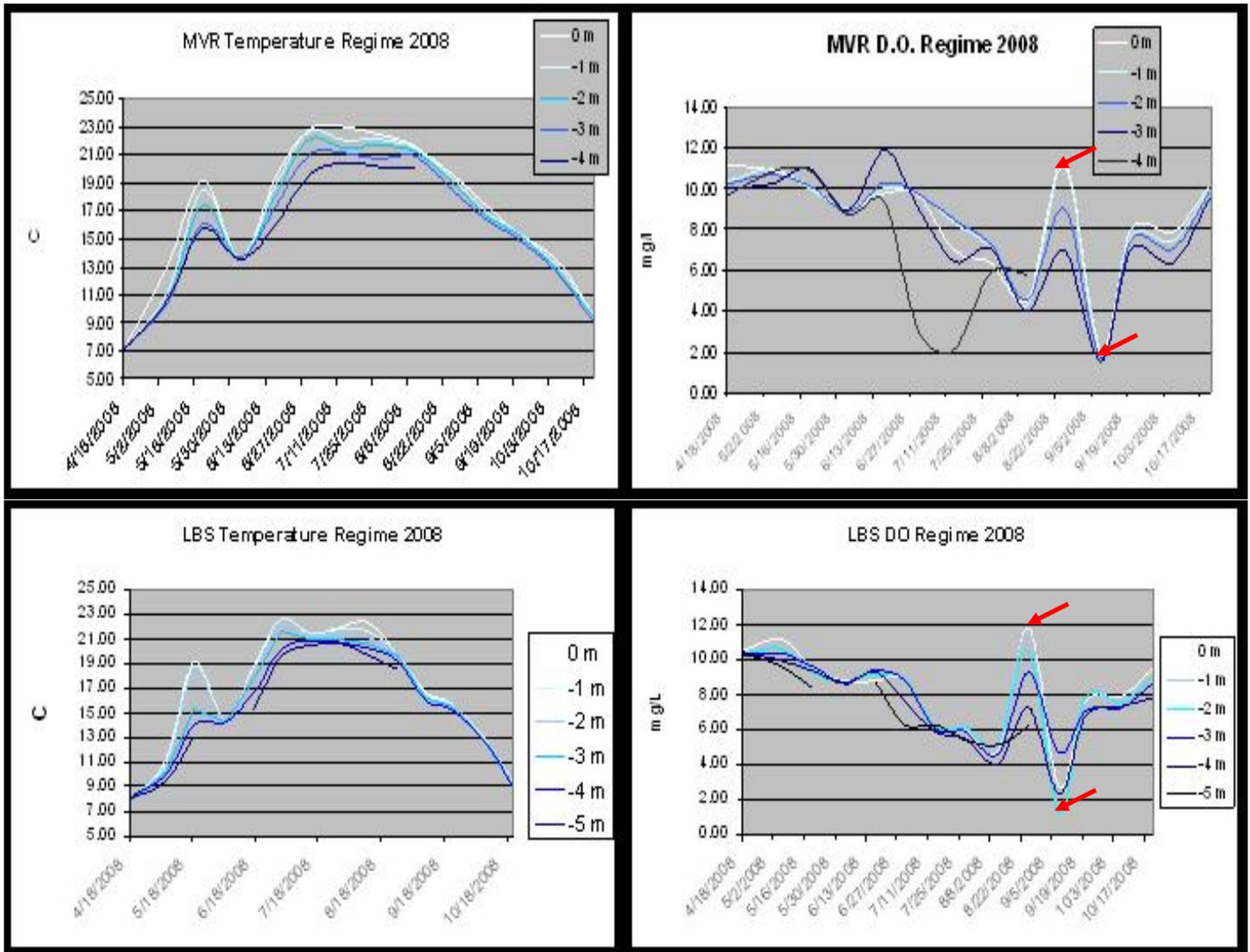
Figure 6: Changes in water levels over time 2008

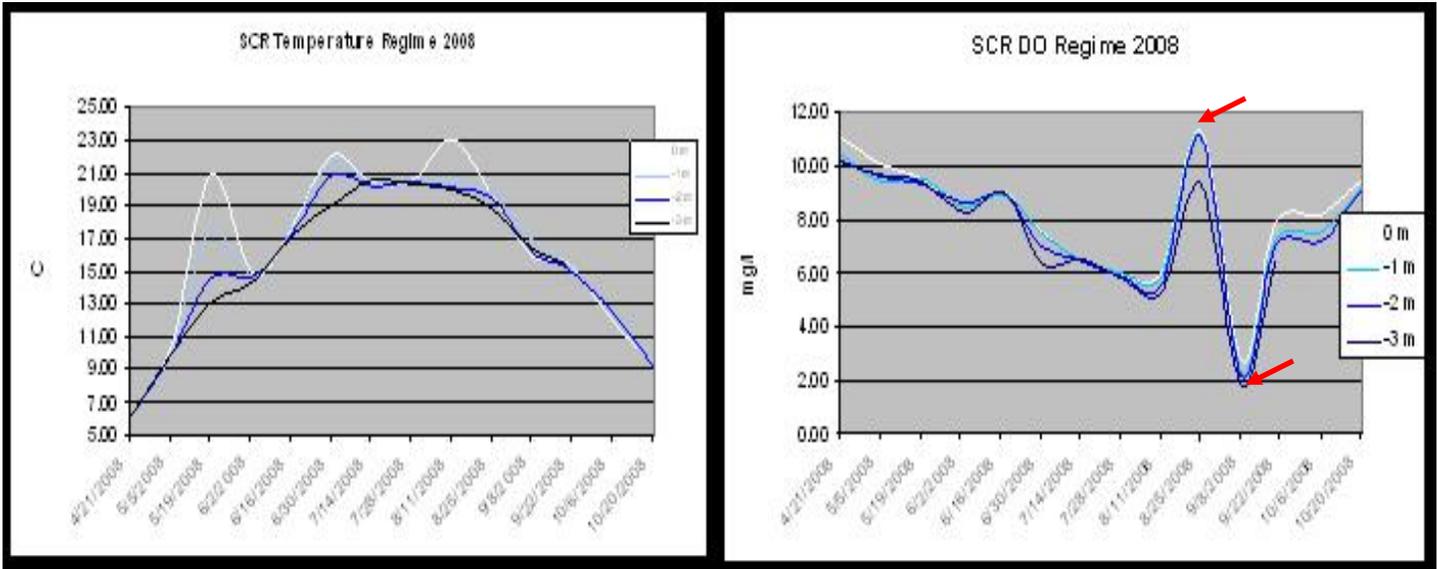


*Monitor water quality at reservoirs:*

The fish technician and laborers sampled water quality every two weeks using an YSI 6600 multi-parameter sonde and 650 MDS data logger. The primary characters sampled were dissolved oxygen, temperature, pH, turbidity, and chlorophyll-a. Dissolved oxygen and temperature are the two main limiting factors of rainbow trout in the three reservoirs. Optimal levels of oxygen range between 7 and 9 mg/l and the incipient lethal limit is at 3 mg/l although temperature can have a large effect on these parameters. Optimal temperature range for rainbow trout is between 12 and 18 C and the upper and lower lethal limits are 0 and 25 C, respectively. Temperature directly influences how dissolved oxygen levels affect rainbow trout. As temperature increases, water loses its ability to retain dissolved oxygen in solution. In addition, trout metabolic processes increase with temperature and greater dissolved oxygen levels are needed thus limiting trout growth, condition, and survival even further (Raleigh et al. 1984). Dissolved oxygen concentrations and temperatures are shown in the following six charts.

Figure 7 (a,b,c): 2008 temperatures and dissolved oxygen for the three reservoirs (Note: Red arrow [ ← ] indicates periods where data collection was in error).





In the three reservoirs, the temperature patterns were similar to previous years in that temperature steadily increases from winter to mid-summer and begins decreasing in late summer. Dissolved oxygen also followed a normal pattern with increasing stratification going into summer. However, from late August to early September extreme data indicates that there may have been an error in calibrating the probe. The extremely high levels are very difficult to obtain naturally and the extremely low levels would have resulted in a major fish kill. There was no evidence of a fish kill but catch rates decreased dramatically during this period indicating that the trout were stressed. It is common to have lower oxygen levels during these periods. However, the project manager inspected the YSI meter and found an air bubble under the permeable membrane and believes that the extreme dissolved oxygen recordings were in error from mid-August to mid-September (see red arrows).

*Record high detail water quality:*

The fisheries technician and the crew assisted the local Tribal Environmental Protection Program (TEPP) in June with detailed water quality sampling and analysis (US Bureau of Reclamation). The data collected and analyzed is summarized in table 2.

Table 2: Summarized water quality data from TEPP

SHOSHONE-PAIUTE TRIBES Environmental Protection Program													Jul-08	
SAMPLE SITE	Sample ID	Date Sampled	Time Sampled	Temp C	SAMPLE SITE	Ca mg/L	K mg/L	Na mg/L	Cl mg/L	Mg mg/L	NH3 mg/L	NO3/NO2 mg/L	TKN mg/L	
SCO102	Sheep Creek Reservoir Near Dam	6/23/08	10:00	19.5	SCO102	26.3	3.9	13.5	6.9	7.4	0.02	< 0.01	0.74	
SCO100	Sheep Creek Reservoir Nr Middle	6/23/08	10:30	20	SCO100	24.6	3.6	13.4	6.7	7.3	0.01	< 0.01	0.68	
SCO101	Sheep Creek Reservoir Near Inlet	6/23/08	11:00	19.7	SCO101	23.2	2.1	9.2	4.5	5.8	0.01	< 0.01	0.61	
BSO102	Billy Shaw Reservoir Near Dam	6/23/08	12:30	18.9	BSO102	20.5	4.5	9.8	4.6	4.9	0.01	< 0.01	0.68	
BSO101	Billy Shaw Reservoir Near Middle	6/23/08	13:45	20.5	BSO101	20.8	4.5	10	4.8	5	0.02	< 0.01	0.93	
BSO100	Billy Shaw Reservoir Near Inlet	6/23/08	13:15	19.5	BSO100	20.9	4.5	10	4.7	5	0.01	< 0.01	0.7	
MVO102	Mountain View Reservoir Near Dam	6/23/08	14:25	22.5	MVO102	21.3	2.9	9.2	5.5	4.6	0.02	< 0.01	0.58	
MVO101	Mountain View Reservoir @ Middle	6/23/08	15:00	21	MVO101	21.2	2.9	9.1	5.5	4.5	0.02	< 0.01	0.62	
MVO100	Mountain View Reservoir Nr Inlet	6/23/08	15:30	21.4	MVO100	17.6	1.9	7.3	4	3.9	0.02	< 0.01	0.58	
BLANK		6/23/08			BLANK	< 0.2	< 0.2	< 0.2	< 0.4	< 0.1	< 0.01	< 0.01	< 0.03	
SAMPLE SITE	Sample ID	Ortho-P mg/L	T-Phos mg/L	Alka mg/L	HCO3 mg/L	CO3 mg/L	Hardn mg/L	SiO2 mg/L	SO4 mg/L	TDS SUM mg/L	SS mg/L	Lab Turb NTU	Field Turb NTU	
SCO102	Sheep Creek Reservoir Near Dam	< 0.003	< 0.01	109	122	5.24	96	9.2	8.4	143	3	< 1	1	
SCO100	Sheep Creek Reservoir Nr Middle	< 0.003	0.019	105	112	7.62	91	8	8.2	137	2	9	1	
SCO101	Sheep Creek Reservoir Near Inlet	0.013	0.058	88.8	82	12.9	82	17	6.4	123	4	2	2	
BSO102	Billy Shaw Reservoir Near Dam	0.03	0.101	77.1	94	0	71	16.4	11.1	120	8	22	19	
BSO101	Billy Shaw Reservoir Near Middle	0.035	0.12	77.1	94	0	73	16.9	11.3	121	9	22	19	
BSO100	Billy Shaw Reservoir Near Inlet	0.034	0.086	76.3	93	0	73	16.6	11.3	120	7	21	19	
MVO102	Mountain View Reservoir Near Dam	< 0.003	0.018	76.2	90	1.43	72	7.1	9.9	108	2	1	< 1	
MVO101	Mountain View Reservoir @ Middle	< 0.003	0.02	76.2	90	1.43	71	7.4	9.8	108	4	1	< 1	
MVO100	Mountain View Reservoir Nr Inlet	0.006	0.022	63.9	44	16.7	60	4.7	7.3	86.3	2	1	1	
BLANK		< 0.003	< 0.01	0.82	1	0		< 0.1	< 0.5		< 1	< 1		
SAMPLE SITE	Sample ID	Field EC uS/cm	Lab EC uS/cm	D.O. mg/L	Lab pH SU	Field pH SU	Fecal ct/100m	E. coli ct/100mL	ORP mV	Hg ug/L	Chl mg/m3	BP mm Hg		
SCO102	Sheep Creek Reservoir Near Dam	243	243	9.8	8.7	8.62	< 2	< 2	172	< 0.2	6.9	630		
SCO100	Sheep Creek Reservoir Nr Middle	234	230	10.3	8.9	8.94	< 2	< 2	158	< 0.2	6.7	631		
SCO101	Sheep Creek Reservoir Near Inlet	188	177	14.4	9.3	9.46	2	2	136	< 0.2	4.5	634		
BSO102	Billy Shaw Reservoir Near Dam	186	185	9.4	8.2	8.49	< 2	< 2	127	< 0.2	4.6	632		
BSO101	Billy Shaw Reservoir Near Middle	190	188	8.9	8.2	8.42	2	2	71	< 0.2	4.8	630		
BSO100	Billy Shaw Reservoir Near Inlet	188	185	9.5	8.2	8.34	< 2	< 2	106	< 0.2	4.7	631		
MVO102	Mountain View Reservoir Near Dam	186	184	9.3	8.6	8.73	< 2	< 2	79	< 0.2	5.5	630		
MVO101	Mountain View Reservoir @ Middle	184	181	9.5	8.6	8.76	2	2	84	< 0.2	5.5	632		
MVO100	Mountain View Reservoir Nr Inlet	154	150	12.9	9.7	9.7	< 2	< 2	55	< 0.2	4	631		
BLANK			< 2		5.6		< 2	< 2		< 0.2	< 0.4			

*Monitor fisheries at all reservoirs:*

Fish populations were monitored through length and weight indices. Length and weight data on rainbow trout were collected through gill netting and creel surveys. Three 24-hour gillnet samples were taken in the spring and the fall at both SCR and LBS. Gill net samples were collected to supplement the creel data at SCR while gill net samples are the sole method of collecting fish data at LBS. At MVR there is sufficient angler harvest to obtain adequate numbers of fish for analysis and therefore gillnet sampling is not necessary.

Figure 9a: Length frequencies by percent of trout at LBS

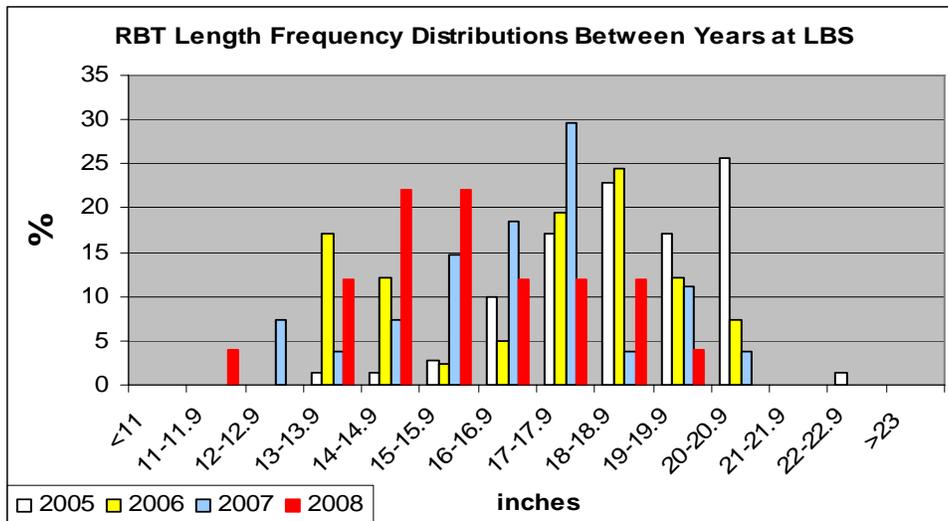


Figure 9b: Relative weight (Wr) and length regression for 2008 and 2007

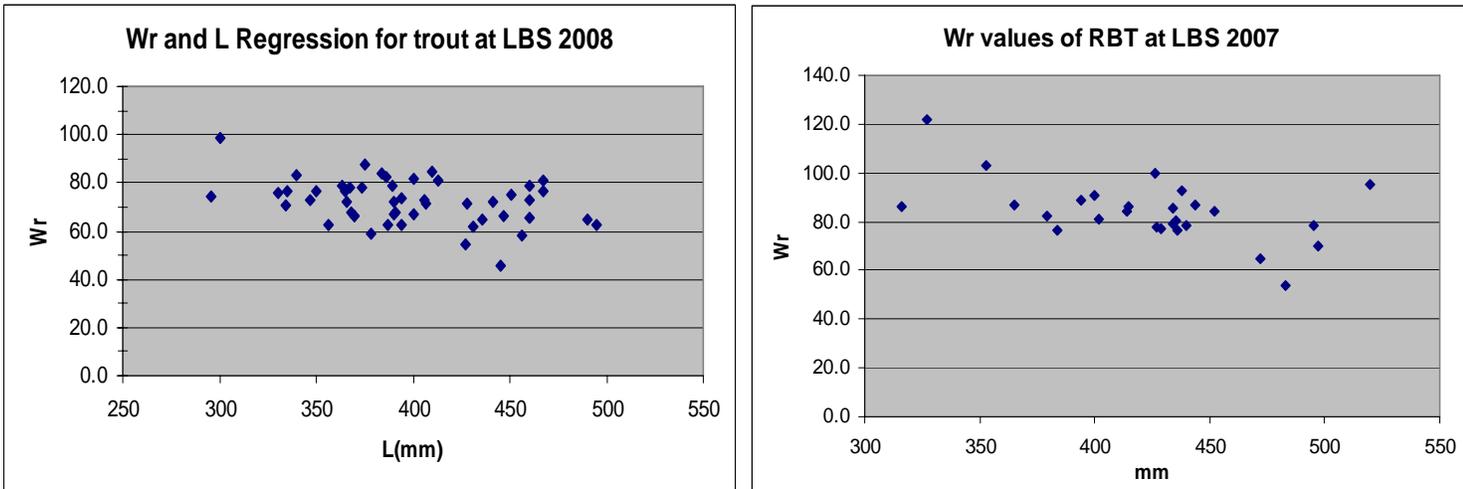
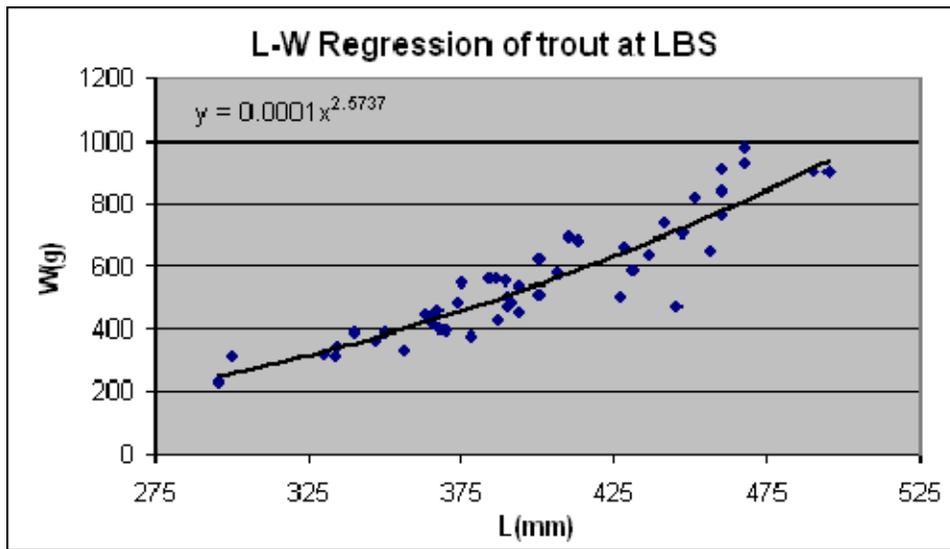


Figure 9c: Length-weight regression of trout at LBS in 2008



In Lake Billy Shaw, the length frequencies show that the trout in the reservoir are not attaining 20+ inch ranges. This is still thought to be a function of intraspecific competition. However, this year the relative weight (Wr) values for the population as whole decreased (figure 9b). This suggests that the fish are in slightly poorer condition than they were in 2007. During August and September, the dissolved oxygen levels may have become low as catch rates dropped. Wildhorse Reservoir, adjacent to the DVIR, experienced a fish kill for the second consecutive year. The decrease in Wr may indicate stressful environmental conditions. The exponential value in the L-W regression (2.5737) also suggests that the fish become less rotund as they become longer. This too indicates poor growth. In 2008, we reduced the number of trout stocked into Lake Billy Shaw from 20,000 lbs in past years to 10,000 lbs. in 2008. Because the reservoir is the smallest of the three and little harvest occurs there, we hope that the reduction in number of trout stocked will result in greater numbers of trout attaining the 20+ inch range. Increases in trout condition and larger fish should be evident by 2009. If this is not the case, then management options may include further reductions in stocking amounts and/or future research and implementation of oxygenation systems to increase dissolved oxygen in critical times. Consultation with other professionals may also be warranted.

Figure 10a: Length frequency histogram at MVR in 2008

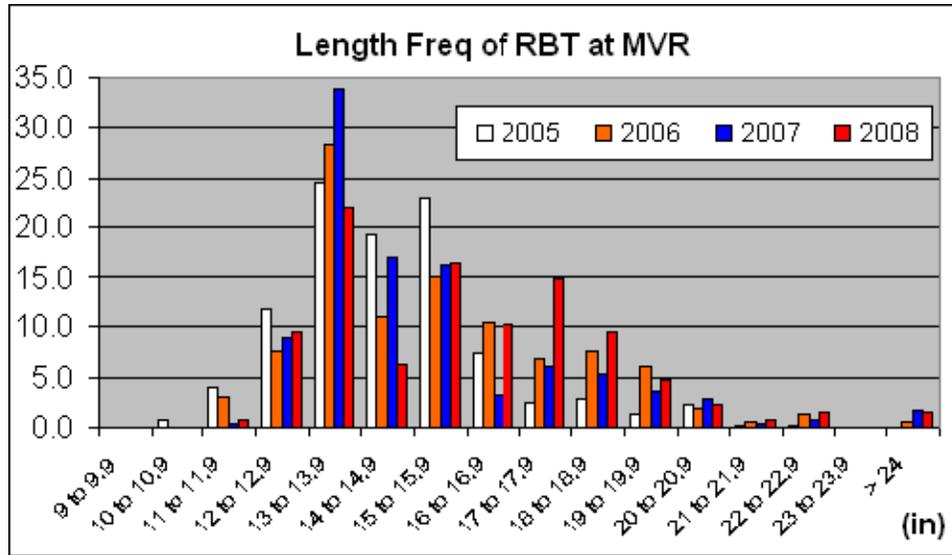


Figure 10b: Relative weight values by length at MVR

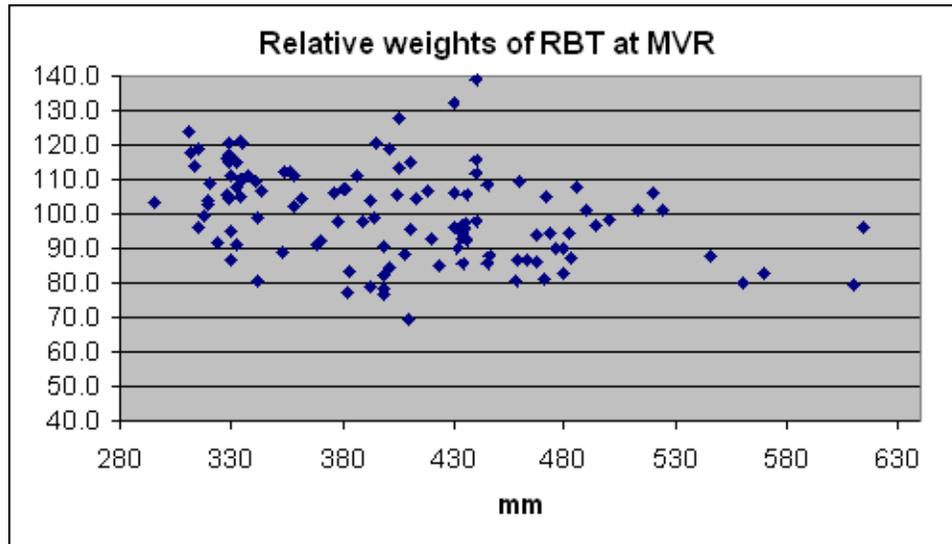
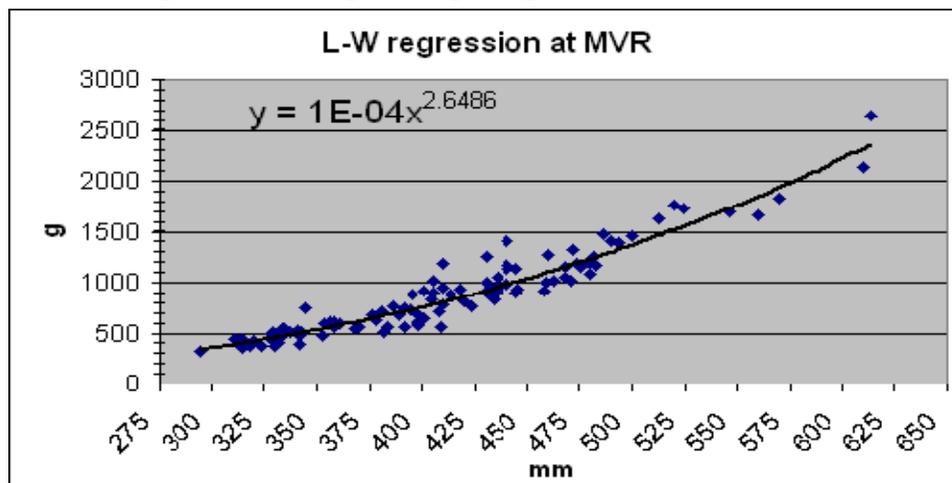


Figure 10c: Length-Weight regression of trout at MVR



In Mountain View, the  $W_r$  values are showing that the population as a whole is doing well. There is a wide range of  $W_r$  values but the overall message is that trout in all length groups are in good or above good condition ( $>80$ ). The length frequency is showing that as a fishery, approximately 45% of the trout in 2008 were longer than 16 inches and 6% were greater than 20 inches. In general, the trout in Mountain View seem to be doing very well. We hope to continue current management to maintain this excellent fishery.

Figure 11a: Length frequency histogram at SCR

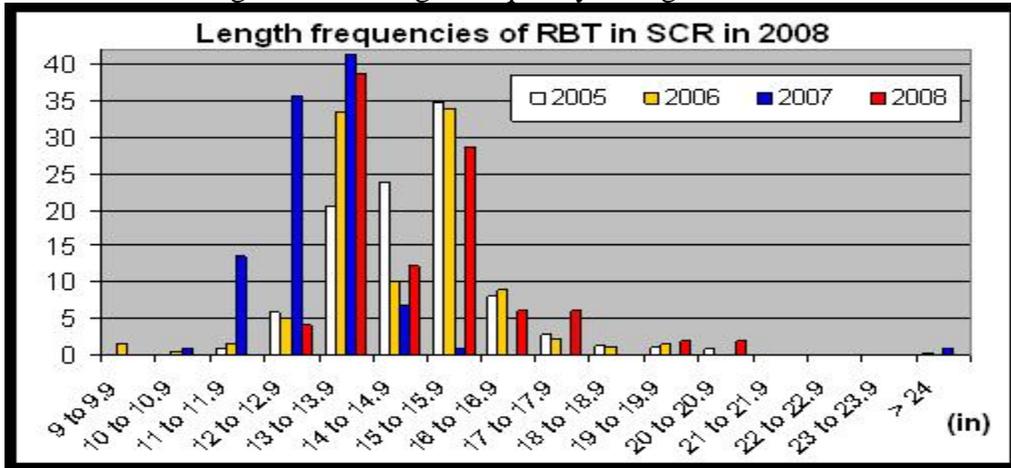


Figure 11b: Relative weight values by length at SCR for 2008 and 2005

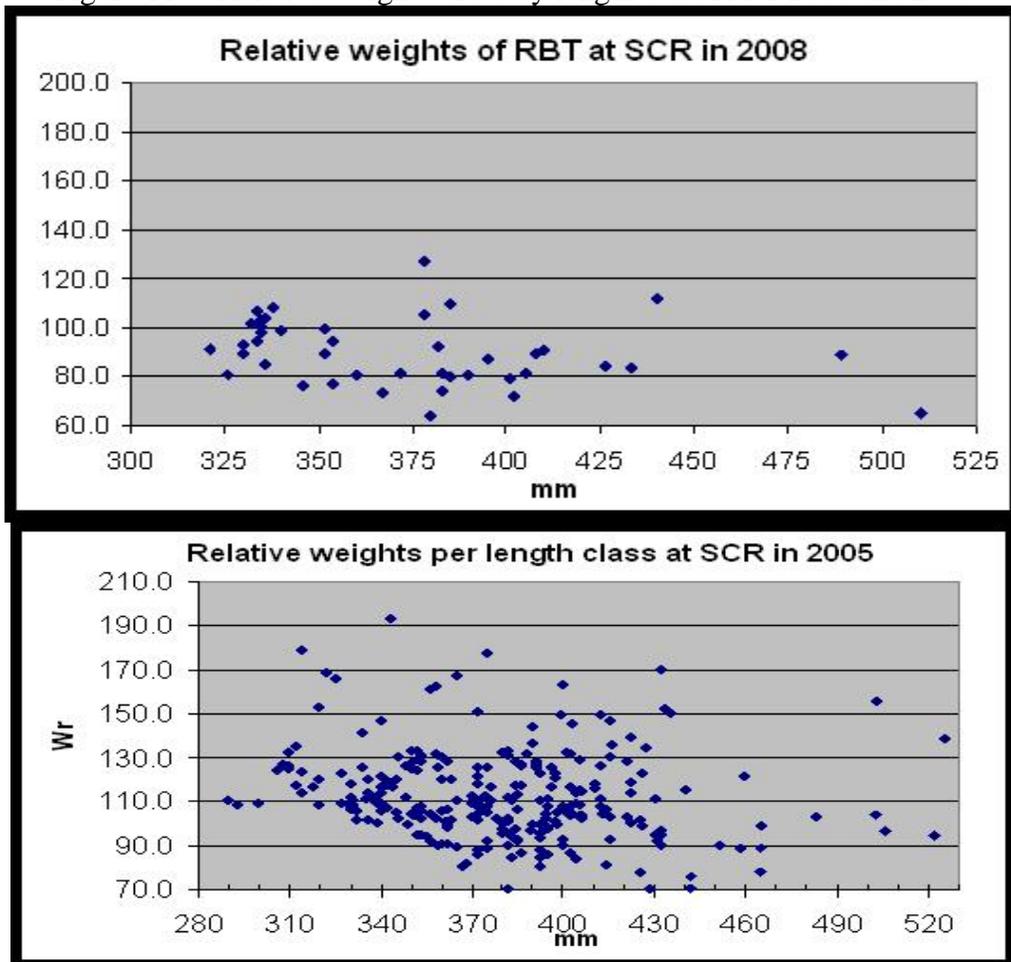
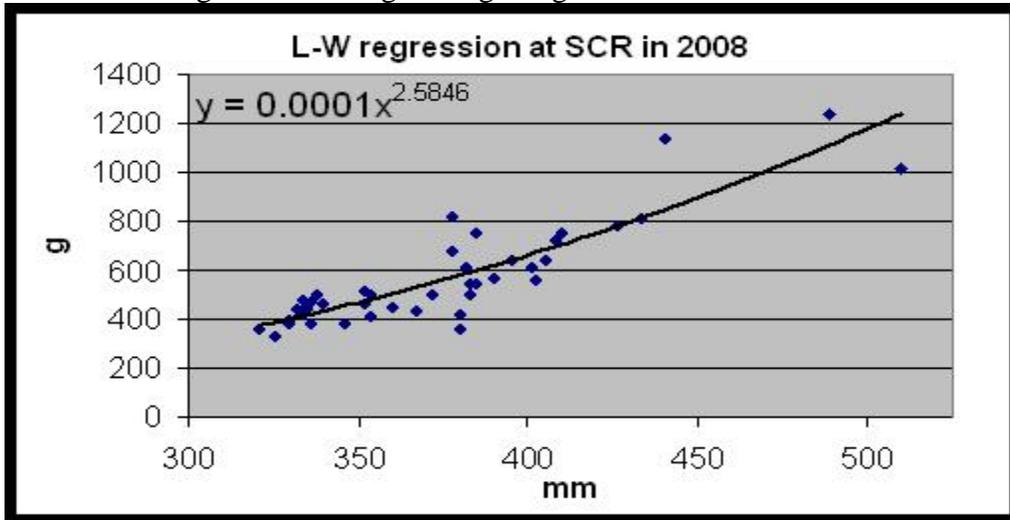


Figure 11c: Length-weight regression of trout at SCR



In 2008 the Wr values for Sheep Creek were mostly around 80, indicating that trout condition is below optimal. Wr is a value that compares fish weights of fish of the same species at the same length, grown in optimal conditions. A fish with a Wr value of 100 indicates that the fish is in optimal condition. In 2005, these Wr values were usually above 100 indicating that the fish were in much better condition and might be attributed to an abundance of a food source and excellent environmental conditions. Since the spike in turbidity in Sheep Creek during the spring of 2005, the condition of the trout has decreased significantly. The length-weight regression exponent also shows that the fish become less rotund when they grow in length. One positive note with Sheep Creek is that more fish were caught in the 19 to 21 inch ranges than in previous years. Trout in these lengths were not even present in 2007. We expect the trout in Sheep Creek Reservoir to become healthier by the fall of 2009 as the reduction in turbidity will allow trout to forage more effectively.

Table 3: Creel data summary and averages for 2007

2007

Reservoir	Count of Angler Days	Total Estimated Effort	Estimated Harvest	Fishing experience rating
LBS	1060	5495.3	7	3.37
MVR	2151	8615.4	3285	3.09
SCR	447	1849.4	490	2.43
State	% State	Learning_Pathway	Number of Anglers	
California	5.63	Been Here Before	933	
Foreign Country	0.10	DVIR Website	11	
Idaho	71.77	Family Member	16	
Nevada	14.35	Friend	53	
Oregon	3.98	Magazine		
Other State	1.55	Advertisement	9	
Utah	1.75	Newspaper Article	1	
Washington	0.87	Other	2	
		Sporting Good Store	6	

Table 4: Creel data summary and averages for 2008

2008

Reservoir	Count of Angler Days	Total Estimated Effort	Estimated Harvest	Fishing experience rating
LBS	764	4446.9	12	2.92
MVR	1816	8131.2	2030	2.61
SCR	151	713.1	265	2.46
State	% State			
California		5.93		
Foreign Country		0.00		
Idaho		76.55		
Nevada		9.93		
Oregon		2.62		
Other State		1.24		
Utah		1.38		
Washington		2.34		

During the 2008 fishing season, the total amount of angler days and effort for each reservoir decreased significantly from 2007 (Tables 3 and 4), and was most likely due to high fuel costs. As fuel reached prices up to \$5.00 per gallon during the season many anglers may not have been as willing to make the long drive to the Reservation. Idaho residents made up a greater percentage of visitors in 2008 than in 2007 which might be because they had less distance to drive. We hope to minimize the effect of increasing fuel costs by looking at fishing permit costs and implementing package deals. We will request these changes from the Tribal Council in early 2009. During the 2008 season, the creel clerks used a creel form from 2006 to record their data. They did not record data on where anglers heard about the fishing at DVIR and the fishing experience rating was different than the 2007 season. In 2007, the experience ratings were broken down as: 1) Very Poor; 2) Poor; 3) Fair; 4) Good; and 5) Excellent. In 2008, the experience ratings were broken down as: 1) Bad; 2) Fair; 3) Good; 4) Very Good; and 5) Excellent. Despite this discrepancy, anglers at both MVR and LBS in both years report their fishing experience between fair and good with LBS being the higher rated fishery. SCR was rated between poor and fair in 2007 and between fair and good in 2008, an increase in rating. This is plausible as anglers had more success in catch rates and harvest rates in 2008 than 2007, despite the lesser number of angler days. Sheep Creek was the lowest rated reservoir in both years.

Produce Plan:

*Work with regional biologists and CBFWA to update plans:*

No Resident Fish Committee meetings were held. The project manager attended meetings of the Upper Snake River Tribes Foundation and met with other fisheries professionals regarding fisheries related issues. He discussed his current project and potential projects with representatives from the Burns Paiute and Shoshone-Bannock Tribes whom are on the Resident Fish Committee.

Produce Pisces Status Report:

Quarterly status reports for the fiscal year were completed and submitted to BPA.

Produce Annual Report:

*Submit draft of FY08 annual report to BPA for review:*

The FY08 annual report rough draft was worked on and completed in February.

*Finalize FY07 annual report and post on BPA's website:*

The finalized version of the FY07 annual report was submitted and posted on BPA's website.

### **References:**

- Anderson, R.O. and R.M. Neumann. 1996. Length, weight, and associated structural indices. Pages 454-463 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2<sup>nd</sup> edition. American Fisheries Society, Bethesda, Maryland.
- Bookhout, T.A., Editor. 1996. Research and management techniques for wildlife and habitats. Fifth ed., rev. The Wildlife Society, Bethesda, Md. 740pp.
- Burge, H.L. and W. H. Miller. 1993. Fishery Management on the Duck Valley Indian Reservation, Shoshone-Paiute Tribe. USFWS 1992 Annual Report. 12 pp.
- Cooperrider, A.Y., R.J. Boyd, and H.R. Stuart, eds. 1986. Inventory and monitoring of wildlife habitat. U.S. Dept. Inter., Bur. Land Manage. Service Center, Co. xviii, 858pp.
- Kerner, D.A. and M.E. Gagnon. 2007. Sheep Creek Reservoir initial turbidity analysis: Duck Valley Indian Reservation, Owyhee, Nevada. Brown and Caldwell, Boise Office.
- Ney, J.J. 1999. Practical Use of Biological Statistics. Pages 171-172 in C.C. Kohler and W.A. Hubert, editors. Inland fisheries management in North America, 2<sup>nd</sup> edition. American Fisheries Society, Bethesda, Maryland.
- Northwest Power Planning Council. 1994-1995. Columbia River Basin Fish and Wildlife Program. Council document 94-55 and 95-20.
- Northwest Power Planning Council. 2000. Columbia River Basin Fish and Wildlife Program. Council document 2000-19.
- Raleigh, R. F., T. Hickman, R. C. Solomon, and P. C. Nelson. 1984. Habitat Suitability Information: Rainbow trout. U.S. Fish Wildl Serv. FWS/OBS-82/10.60. 64 pp.