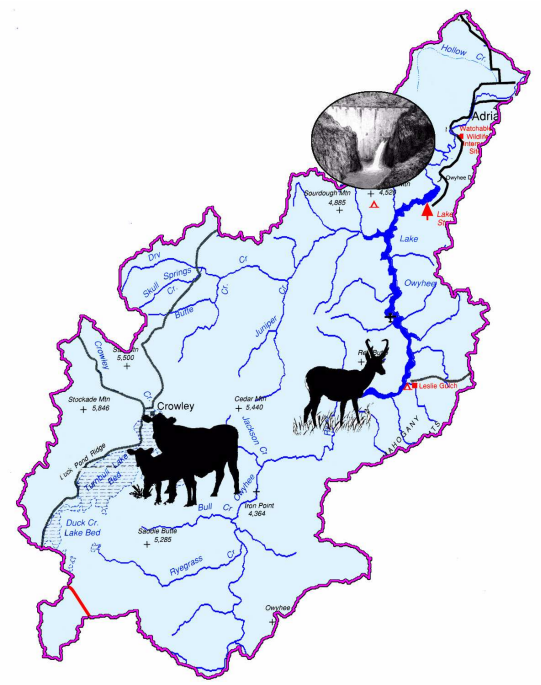

Lower Owyhee Watershed Assessment

XIV. Fish and Fish Habitat

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XIV. Fish and fish habitat

In the lower Owyhee subbasin there are both native fish and introduced species. Some of the fish are coldwater and some are warmwater. The species listed in Table 1 are those that are known to be present in the lower Owyhee subbasin.[42] Most of the fish considered to be nongame fish, fish that are not usually harvested by people, are native species.

A. Fish in the lower Owyhee subbasin

Fish in the lower Owyhee subbasin are found in the Owyhee River, in a few tributary streams, in the Owyhee Reservoir, and in stock ponds.

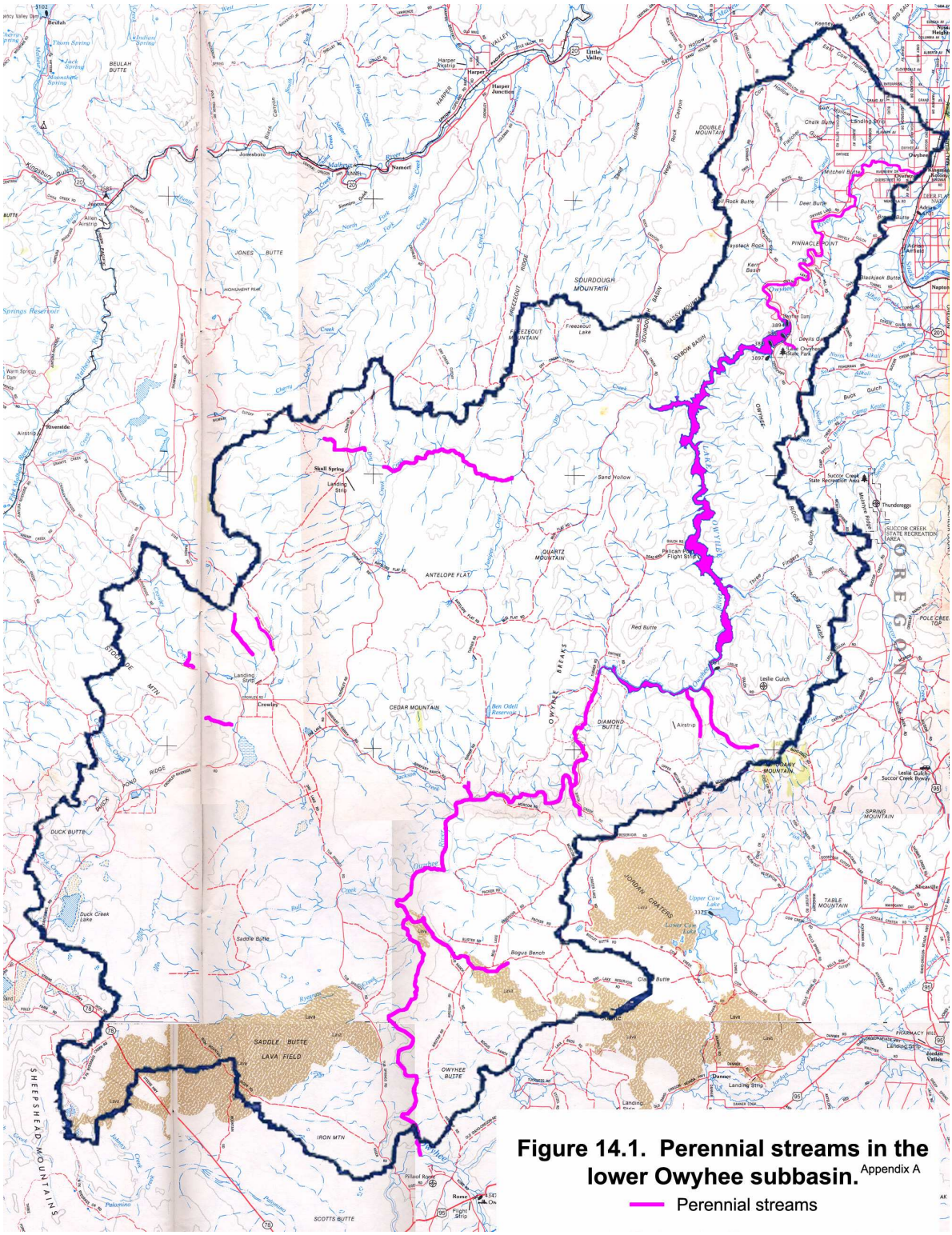
The two primary reaches of perennial streams in the lower Owyhee subbasin are the mainstem of the Owyhee River and a section of Dry Creek (Figure 14.1). In general, fish will be found in the perennial streams or their perennial reaches. The majority of the streams in the lower Owyhee subbasin are either intermittent or ephemeral. There is little data on which tributary stream reaches are intermittent and which are ephemeral. Intermittent streams have water in them for part of the year, but are dry for part of the year. Ephemeral streams carry water only immediately after rain or snow melt events. (See the hydrology component of this assessment for more discussion of perennial, intermittent, and ephemeral streams.)

Coldwater and warmwater game fish have been introduced into the reservoir, into the Owyhee River, and into stockponds. The 28-mile stretch of the Owyhee from the dam to the confluence with the Snake River contains a coldwater and warmwater fishery, the reach of coldwater fishery below the dam varies with the season.[3]

The data on the status of a species of fish is available primarily for the game fish. The information on the incidence of nongame fish is much less complete. However, a specie's preferred habitat may give an idea of where they might be found in the lower

Table 1. Fish species in the lower Owyhee subbasin

Common name	Scientific name	Temp.	Game fish
	Native fish		
	Trouts--Family Salmonidae		
Inland redband trout	*Oncorhynchus mykiss gairdneri.*	C	GF
Mountain whitefish	*Prosopium williamsoni*	C	GF
	Minnows--Family Cyprinidae		
Chiselmouth	*Acrocheilus alutaceus*		
Redside shiner	*Richardsonius balteatus balteatus*		
Longnosed dace	*Rhinichthys cataractae*		
Speckled dace	*Rhinichthys osculus*		
Northern pikeminnow	*Ptychocheilus oregonensis*		
	Suckers--Family Catostomidae		
Largescale sucker	*Catostomus macrocheilus*		
Bridgelip sucker	*Catostomus columbianus*		
	Sculpins—Family Cottidae		
Shorthead sculpin	*Cottus confusus*		
Mottled sculpin	*Cottus bairdi semicaber*		
	Non-native fish - Introduced species		
	Trouts--Family Salmonidae		
Rainbow trout	*Oncorhynchus mykiss irridus*	C	GF
Brown trout	*Salmo trutta*	C	GF
	Catfish--Family Ictaluridae		
Channel catfish	*Ictalurus punctatus*	W	GF
Brown bullheads	*Ameiurus nebulosus*	W	GF
Tadpole madtoms	*Noturus gyrinus*		GF
	Sunfish--Family Centrarchidae		
Largemouth bass	*Micropterus salmoides*	W	GF
Smallmouth bass	*Micropterus dolomieu*	W	GF
Black crappie	*Pomoxis nigromaculatus*	W	GF
Bluegill	*Lepomis macrochirus*	W	GF
Pumpkinseed	*Lepomis gibbosus*	W	GF
Warmouth	*Lepomis gulosus*		GF
	Perches--Family Percidae		
Yellow perch	*Perca flavescens*	W	GF
	Minnows--Family Cyprinidae		
Common carp	*Cyprinus carpio*		
Fathead minnow	*Pimephales promelas*		
Utah chub	*Gila atraria*		
Lahontan tui chub	*Siphateles bicolor*		
	Loach—Family Cobitidae		
Oriental Weatherfish	*Misgurnus anguillicaudatus*		



Owyhee subbasin. Native fish have adaptations to conditions present in at least part of the local habitat in the lower Owyhee subbasin river system. Most of the habitat data for fish species is from generalized data for the United States since specific information on adaptations within the lower Owyhee subbasin is not available.

B. Historical presence

1. Coldwater game fish

The construction of the Owyhee Dam ended the runs up into the Owyhee River above the dam of anadromous fish, fish that migrated to the sea and back. The completion of Brownlee Dam ended salmon runs up the Snake River into the lower Owyhee River to the Owyhee Dam. Anadromous salmon are now extinct in the lower Owyhee subbasin.

In July 1859 upstream from Jordan Creek, Louis Scholl described the Owyhee River as "abounding with salmon."[44] Chinook are known to have migrated up the Owyhee River into Nevada.[14] Steelhead are thought to have migrated up the Owyhee River into the South and East forks possibly as far as Nevada. Coho salmon have been listed in some publications as being present in the Snake River in the Ontario area and possibly in the lower Owyhee River.[42]

The Owyhee River basin supported a run of spring chinook. C. G. “Chup” Fairchild in two letters written in 1870, recalls his childhood days around the turn of the century on the family ranch near Tuscarora, Nevada. His family, along with other families in the area, would go to the South Fork Owyhee River and Indian Creek and harvest salmon for winter food. He also remembered that in some years dead salmon could be found in the diversion ditches and fields. Salmon became less abundant around 1916, but continued to return at least until 1924. They were known to use Jordan Creek and the lower end of Cow Creek in Oregon. The run of spring chinook salmon up the Owyhee River ended in 1932 with the completion of Owyhee Dam.[42]

The Snake River in the Ontario area supported a run of fall chinook, though whether these fish utilized the Owyhee River is unknown. Juvenile chinook salmon were collected from below Owyhee Dam in the mid 1950s.

The Oregon Fish Commission operated a chinook salmon hatchery on the Snake River from 1902 through 1907. The hatchery was located on Morton Island about 20 miles downstream from the mouth of the Owyhee River.[53] Upstream migration was blocked with about 1000 feet of racks in the river, with approximately 600 feet of racks in the channel between Morton Island and the Idaho shore and 400 feet of racks between the island and the Oregon shore. A second row of racks was placed about 1500 feet downstream to form a pen on the Oregon side to hold the trapped fish.

Salmon were present in the Snake River at least from July into the fall. In each year that the hatchery operated, salmon were trapped the first day when rack placement was completed. They were spawned from mid October through November. Eggs collected in 1902 were released on gravel bars downstream of the racks. From 1903 to 1905 eggs were incubated in the hatch house with river water. Swim-up fry were released into the Snake River below the facility.[54] In 1906, fry were fed until April and early May then they were released.[55]

The operation of this hatchery was difficult at best. Hatchery workers had to sandbag 1400 feet of wooden racks. The flows down the Snake River during the

summer and fall were quite variable. On many occasions the racks were destroyed or removed to allow excess flow to pass. High water usually released most if not all of the adults being held. Once the salmon were spawned problems continued. The hatchery used water directly from the river, which was heavily laden with sediment. Sediment settling out in the trays killed many eggs and fry. During extreme cold the water intake would freeze, shutting off water to the hatchery killing eggs and fry. Due to the difficulties associated with operation, the hatchery was closed and sold in 1907. Of the eggs taken in 1907, 126,000 were released back into the river and the majority (400,000) were shipped to Wallowa River hatchery to be reared and released.[55]

Prior to the 1900s, there may also have been steelhead trout and coho salmon in the lower Owyhee River.[48] Steelhead may have spawned in the upper Owyhee basin but the evidence is not conclusive. Local residents remember catching large “harvest” trout in the late fall, which might correspond to possible migration time of summer steelhead.[42] Some early scientific reports mention the existence of coho runs in the middle Snake River and possibly in the Owyhee River. No known records exist to confirm coho runs in the Owyhee River.[42]

No anadromous fish could return to the Owyhee River above the Owyhee Dam after its completion in 1932. Salmon runs up the lower Owyhee River to the dam ended with the completion of the first of the Hells Canyon complex of dams, Brownlee, on the Snake River in 1959.[11] Anadromous salmon are now extinct in the lower Owyhee subbasin. In 1969 the State Water Resources Board showed the mainstem of the Owyhee River as only having trout and warmwater game fish.[48]

In addition to the anadromous salmonids, resident game fish in the lower Owyhee subbasin consisted of inland redband trout and whitefish.[42]

2. Nongame fish

Lamprey was an anadromous fish which became extinct in the Owyhee River above the Owyhee Dam with the construction of the dam. Walter Perry recalls the water wheel at Island Ranch on the Owyhee picking up lampreys and putting them into the ditch. He says he's seen "them so thick in the field after they come up the flume that you couldn't hardly get out into the field because of them old dead eels."[43] Wally Jones of Ontario remembers the lampreys piling up at the base of the Owyhee dam right after it was built.[12]

Besides catching trout and salmon within their territory, the Tagötöka band of Northern Paiute who lived in the lower Owyhee subbasin report catching suckers.[49] Peter Skene Ogden found an Indian with a "good stock of small dried carp" on the Malheur River near Ontario.[17] Probably what he identified as carp, possibly northern pikeminnow, existed in the lower Owyhee subbasin also. On the Owyhee River in the area now covered by the reservoir, there were also bullhead catfish. James Page recalls that as soon as the line hit the water they would bite and says they "used to catch a hundred or two of them and clean and fry them."[40] By the early 1900s these could already have been an introduced specie.[20]

Of the other fish currently in the lower Owyhee subbasin, the chiselmouth, the redside shiner, the longnosed dace, the speckled dace, the northern pikeminnow, the

largescale sucker, the bridgelip sucker, the shorthead sculpin, and the mottled sculpin are probably native to the subbasin.

3. Warmwater game fish

Oregon Department of Fish and Wildlife (ODFW) considers all of the warmwater game fish in the lower Owyhee subbasin to be introduced species, although historical records indicate that bullhead catfish may already have been present. Warmwater game fish were first introduced into Owyhee Reservoir in 1933, with subsequent releases in 1934 and 1935. The species that made up these first releases were not recorded but can be derived from an inventory gathered in the 1950s and early 1960s. Species observed in the 1950s and assumed to be in the first release groups included; largemouth bass, bluegill, black crappie, and bullheads (browns or blacks). Other species may have also been stocked but did not survive into the 1950s. Yellow perch could have been in the original release or escapees from illegal introductions in Antelope Reservoir and Cow Lakes. Channel catfish were first stocked into the reservoir in 1962 and later into the river upstream in 1970. Smallmouth bass were stocked into the upper river in 1970.[42]

4. Fish eradication

Rotenone is used to poison fish since it interferes with the use of oxygen in their bodies. In 1969, the ODFW poisoned the Owyhee River upstream from the dam. It not only killed fish but also killed crawdads.[58] Anecdotal information is that there were “lots of barrels” of rotenone used.

C. Native fish

1. Game fish

Inland redband trout and whitefish, the resident coldwater game fish in the lower Owyhee subbasin, will be discussed later in more detail in the section on coldwater game fish.

2. Non-game fish

Another native fish which prefers cooler water is the shorthead sculpin. It is most often found in the fast, rocky riffles of cold headwaters or creeks.[24] Like the shorthead sculpin, the mottled sculpin prefer rubble or gravel riffles which will have well-oxygenated, clear water.[23] Both sculpins are probably present in the lower Owyhee subbasin although they have never been collected here.[41]

The speckled dace and the longnose dace also will be found in rocky riffles or runs [37,38,15] although the longnose dace isn't as selective, being found in streams or lakes that may be muddy and warm or clear and cold.[15] Both of these species of dace are probably more abundant upstream in tributaries above the lower Owyhee subbasin.[42]

Bridgelip suckers can also be found in rocky riffles but they may also be in runs over sand or silt in creeks or along lake margins.[21] They are found in the Owyhee Reservoir.[42] The chiselmouth are also found in the Owyhee Reservoir [42] although they prefer flowing pools or runs over sand and gravel in creeks.[19] They may be found in the

warmer parts of streams and rivers.[6] The largescale sucker which prefers pools and runs of rivers is also found in lakes.[22] It is not only present in the Owyhee reservoir, but also along the length of the Owyhee River.[42]

Northern pikeminnow prefer ponds, lakes, and occasionally runs.[36] They are very abundant in the Owyhee Reservoir and upstream in the Owyhee River.[42] The redside shiner prefers runs and flowing pools of water, usually over mud or sand and often near vegetation.[39] Although they are found in Owyhee Reservoir, they are probably most abundant upstream in tributaries in the lower Owyhee subbasin.[42]

3. Unknowns

There is little information on the non-game fish populations or fluctuations in populations.

How do the native non-game fish fit ecologically into the food webs in the lower Owyhee subbasin?

How do introduced fish compete for food and habitat with the native fish?

The non-native European brown trout was originally introduced partially as a predator on nongame fish populations below the Owyhee Dam. What would be the effect of eliminating non-game fish in this area?

D. Coldwater game fish

1. Redband trout

a. Distribution

Inland redband trout are native to the lower Owyhee subbasin. Inland redband trout, rainbow trout, and steelhead are all members of the same species. The populations of inland redband trout within the Owyhee basin are grouped with the inland Columbia Basin redband/steelhead group (*Oncorhynchus mykiss gairdneri*) along with other populations upstream of Hells Canyon Dam.[42]

Upstream from the Hells Canyon dams many environments are semi-arid, cold-winter deserts. The characteristics of these environments have exerted selection pressures which probably account for some of the variations observed in *Oncorhynchus mykiss gairdneri*. Redband populations are divided in the tributaries and small population sizes are associated with genetic drift and a high level of variation among populations. There are dams, extreme water temperatures, and stream reaches that dry out in the summer. These barriers limit the ability of the trout to migrate between areas and isolate breeding populations. The redband trout in the Owyhee River basin "show the warmwater tolerance that is considered to be a classic characteristic of redband trout."[18]

Within the lower Owyhee subbasin, inland redband trout are found in Dry Creek and the mainstem of the Owyhee River.[42,18] There are an estimated five miles of redband habitat in Dry Creek in perennial reaches near springs.[42]

b. Habitat and life history

The life history of the inland redband trout within the lower Owyhee subbasin has not been studied. Chris Walser of Albertson College is conducting studies of the redband trout in Jordan Creek, a tributary of the Owyhee River upstream from the lower Owyhee subbasin. Walser has conducted electro fishing, tagged trout, fitted some with transmitters, and recorded fish recapture over three years. Early results have shown that the local population of redband trout can tolerate high water temperatures; one day the temperature taken at the bottom of a pool about two feet deep was 85°F. Contrary to expectations they have found the trout more abundant where less riparian vegetation was present. Although the bigger pools had more fish, some of the smaller pools had the largest individuals. For overwintering the trout moved to beaver ponds or in fairly large deep pools.[56]

Life history of redband populations in the Blitzen and Malheur River basins studied by Hosford and Pryble indicated that inland redband trout spawn from April through July depending upon water temperature. Spawning success was greatest in streams with clean gravel and cobble substrates. Most fish mature and spawn in their third year with a few in their fourth year. Most adults die after spawning.[42]

c. Production

The abundance of inland redband trout in the Owyhee River mainstem above the reservoir is unknown.[42]

Samples of redband trout from Dry Creek have been analyzed genetically. The results indicated that the population shows little evidence of hybridization with hatchery rainbow trout.[42]

Growth of redband in the lower Owyhee subbasin has not been studied, but individuals seldom get over 10 inches in the tributaries. Trout in the Owyhee River above the dam can reach 18 inches.[42] In Jordan Creek, Chris Walser has only recaptured five redband trout a year after first tagging them. These fish had gained 2¼ ounces, about a third of the rate that trout can grow elsewhere.[56]

d. Fishery

There is little fishing directed at catching inland redband trout compared to that for hatchery rainbow trout. Some native trout are caught incidental to the harvest of hatchery trout. Fish caught are usually from 6 to 9 inches long, with few individuals over 10 inches.[42]

e. ODFW management

i. Maintaining connectivity

The populations of inland redband trout upstream of Owyhee Dam are acting as a meta-population. A meta-population is a series of populations that exchange individuals over time. The confinement of small numbers of individuals in short perennial stream reaches increases the susceptibility of these populations to catastrophic events. If small populations are lost, the habitat can be re-seeded from other nearby

populations. Maintaining the interconnectivity of redband trout populations within the Owyhee Basin is very important to their long-term genetic viability and survival.[42]

In desert watersheds the issue of water rights is a major concern. The issue of increasing water storage upstream of Owyhee Reservoir is a concern because construction of additional dams could further segment redband trout populations and destroy spawning habitat. The result could mean the isolation and eventual extinction of the small populations in the lower Owyhee subbasin.[42]

ii. Impact of stocked fish

Fishing directed toward catching redband trout is small and incidental to stocked hatchery rainbow trout and warmwater fish. Stocking hatchery rainbow trout attracts more anglers into remote areas where native fish occur. Stocking hatchery rainbow trout in areas with small native populations can be damaging.[42]

f. Unknowns

Introduced hatchery trout that can potentially interbreed with the native redband trout are still being planted in 24 stock ponds in the Owyhee subbasin in Oregon and upstream in Idaho and Nevada. Effects of stocked hatchery rainbow and redband trout upstream of waters with native redbands are unknown, but should be expected to change their genetic composition over time (see section 4 below).

What effects are the hatchery trout stocked into the lower Owyhee subbasin having on the native redband trout populations? What effects are the nonnative trout stocked into the upper basin in Idaho and Nevada having on the population of native redband trout in the Owyhee basin including the lower Owyhee subbasin area?

The effects introduced warmwater game fish have on native redband trout in the lower Owyhee subbasin are unknown.

Has there been removal of riparian vegetation which has allowed water temperatures to increase? Water impoundments can stabilize flow and decrease peak flows. Have there been increases in riparian vegetation due to flow stability from impoundments. Does the addition or elimination of riparian vegetation affect redband trout?

Are stream banks where riparian vegetation has been removed less stable and apt to flush more sediment into streams during high water events? Are stream banks where riparian vegetation has been added more stable and less apt to flush sediment into streams during high water events? How does more or less sediment in the streams affect the redband population?

What habitat limitations on the abundance of redband trout are due to natural causes? What is the natural thermal potential of streams? How does the natural thermal potential and naturally limited cold or cool water refugia affect the distribution of inland redband trout populations?

2. Mountain whitefish

a. Distribution

Historically whitefish were observed in the Owyhee River downstream of the reservoir, in the reservoir, and in the river upstream of the reservoir in the Three Forks area.[42] Ray Perkins of the Oregon Department of Fish and Wildlife (ODFW) has not seen any in the lower Owyhee subbasin in the last 16 years.[41]

b. Habitat and life history

Mountain whitefish are more common in larger stream environments. They become sexually mature at age 3 or 4 and at a length of 10 to 12 inches. Spawning occurs from October through December at water temperatures from 40°F to 45°F over gravel or gravel and rubble. They do not build nests similar to other salmonids, but rather they are broadcast spawners. Hatching occurs in March. Fry can be found near shore for several weeks but soon move offshore.[42]

c. Unknowns

There is a general lack of information on the populations of mountain whitefish in the lower Owyhee subbasin. Do they currently exist? There is no known fishing targeting this species in the lower Owyhee subbasin. Access to the river above the reservoir is limited and very difficult during the winter and spring. Some individuals are said to be caught in the lower river, but catches have not been documented. Just about everything is unknown about this species.[42]

Are smallmouth bass and channel catfish in the Owyhee River upstream of the reservoir having adverse effects on this population by predation or competition for food?

3. Historical stocking

Over the years the lower Owyhee subbasin or the Owyhee basin upstream have been stocked with various species of salmon and trout. Owyhee Reservoir was stocked with westslope cutthroat from Montana, kokanee (sockeye salmon), coho (silver salmon), brook trout, and Kamloops rainbow trout. The river below the Owyhee Dam was stocked with kokanee, brook trout, and rainbow trout. Crooked Creek, a tributary to the lower Owyhee River, south of Burns Junction on Hwy. 95, received Lahontan cutthroat trout from Willow Creek in the Trout Creek Mountains and from Summit Lake in Nevada. Cow Lakes received cutthroat trout of unknown origin in 1964. Starting in 1990, brown trout were introduced into the Owyhee River downstream of Owyhee Dam. Parsnip Peak Reservoir was used as a brood site for redband trout from 1979 to 1982. The trout were spawned at the reservoir and fertilized eggs were taken to Klamath Hatchery. In 1982, only one ripe adult was collected. No eggs were collected. The program was discontinued.[42]

Salmonids other than rainbow trout are no longer being stocked in the Owyhee basin in Oregon.

4. Stocking within the basin outside Oregon

There are several different species and stocks of trout currently used for stocking programs upstream within the Owyhee basin. Lake Lenore Lahontan cutthroat and Succor Creek stock of redband trout have been used in Idaho hatchery and stocking programs. In Nevada, a triploid stock of rainbow, the Tahoe stock of redband, and a strain of Lahontan cutthroat have been used within the Owyhee basin. The Duck Valley Indian Reservation has used a stock of rainbow from Hagerman National Fish Hatchery in the past and currently is using a stock of rainbow from the hatchery program at the College of Southern Idaho.[42]

5. Artificial coldwater fishery

The construction of the Owyhee Dam changed the water flow patterns in the reservoir and in the lower Owyhee River below the dam. Under natural conditions, most of the water would flow past the area in the winter and spring, and the water in the river below the reservoir became warm or hot by summer. The water in Owyhee Reservoir is deep and the bottom layers are cold. This cold water is released throughout the late spring, summer, and early fall irrigation seasons. Water released from the bottom of the reservoir flows in the river until it is diverted into irrigation ditches.

This stretch of the river has been stocked with hatchery rainbow trout and brown trout that are not native to the Owyhee River. They provide game fish for recreational fishing.

6. Hatchery rainbow trout

a. Distribution

Hatchery rainbow trout are stocked annually into the Owyhee River below the dam and into two small BLM stock watering ponds within the lower Owyhee subbasin, Littlefield stock pond in the Dry Creek basin and Dunaway stock pond south of the Dunaway pump station. Hatchery rainbow trout are in the Owyhee Reservoir and the river upstream. They originate from stocking programs in Oregon, Idaho, Nevada and the Duck Valley Indian Reservation.[42,41]

b. Habitat and life history

Rainbow trout require fast flowing oxygenated waters for breeding, but they also live in cold lakes. Most rainbow trout subspecies prefer water that is about 54°F in summer.[9]

Fingerlings (Oak Springs Stock) make up a majority of the hatchery rainbow trout stocked into the lower Owyhee subbasin in any given year. Legal sized trout (Cape Cod Stock) are occasionally used to jump-start a fishery while the fingerling trout grow or the warmwater fish populations are rebuilding.[42]

Rainbow trout generally feed close to the bottom. They eat insects, mollusks, crustaceans, fish eggs, and minnows and other small fish.[9]

c. Production

i. Owyhee River downstream of reservoir

The relative abundance of rainbow trout in the Owyhee River downstream of the dam is quite variable. In a given year it is determined by the stocking rate, the harvest rate, the spring discharge down the river, and winter survival. There appears to be a trend of increasing abundance since about 1982. Reasons for the increase are attributed to a change in the hatchery program in 1977, a decrease in the bag limit for trout streams in 1981, and possibly an increase in the number of anglers practicing catch and release. The hatchery program changed from an annual "put-and-take" program using about 10,000 legal sized rainbow from Hagerman National Fish Hatchery to an annual "put-and-grow" program using about 40,000 fingerling Oak Springs stock from Oregon Fish and Wildlife Department hatcheries. The daily bag limit prior to 1980 was 10 per day; in 1981 it changed to 5 per day. Through the 1980s and into the 1990s the number of trout caught and released has increased substantially.[42]

ii. BLM stock ponds

The relative abundance of each population at a BLM stock watering pond varies with the stocking and water conditions in a given year. The number of fish stocked into a pond varies with the size of the pond, the water year, and sometimes the road conditions. The number of fish stocked varies from about 100 to 1,000 fingerlings per pond per year. None of these rainbow trout populations reproduce consistently in the wild. Occasionally wild produced fingerlings are observed during fish inventories, but the number is very low and limited to a few ponds. Most ponds dry up or do not have enough water for fish to survive during cycles of repeated years of low precipitation.[42]

No fish are stocked in the mainstem of the Owyhee River above the dam or its tributaries in Oregon. Most hatchery fish drift into the river from the stocking programs upstream from the state line. A few might occasionally flush into the river from Oregon's stock pond reservoir stocking program.[42]

d. Survival from one year to the next.

The following size groups are used to describe the population: nine inches, twelve inches, fifteen inches and eighteen inches. The nine inch size group corresponds to the proportion of the population that was stocked the previous spring. The other size groups roughly correspond to fish that have survived one or more years in the river. These indices are used to advise anglers on the expected quality of the fishery in the future.[42]

Harvestable trout size has traditionally been six inches in length. Although it has recently changed to 8 inches, 6 inches will be used in this discussion because it was the harvestable length for most of 50 years management has occurred in this basin.[42]

i. Owyhee River downstream of reservoir

The size structure of the population of trout has changed over the years. Prior to 1983 the proportion of the sample greater than 9 inches was less than 40 percent of the fish over the legal catch length of 6 inches. During this time period there was very little

survival of fish through their first winter. After 1983 the proportion of the population greater than 9 inches increased to over 50 percent in most years. Prior to 1987, the proportion of the sample greater than 12 inches averaged 6 percent. Since 1987, the proportion of the sample greater than 12 inches averaged 39 percent. The proportion of the sample greater than 15 inches has been variable with the high percentage observed in 1991 attributed to the high stocking rates in 1989 and 1990. The proportion of the sample greater than 18 inches has averaged 2 percent.[42]

ii. BLM stock ponds

The growth rate of rainbow trout in the BLM stock ponds has not been studied.[42]

e. Fishery

i. Time of operation

- *Owyhee River downstream of reservoir*

The major hatchery rainbow trout fishery in the lower Owyhee subbasin takes place in an eight-mile reach downstream of the dam affected by the release of cold water. The angling effort peaks in the early spring just before irrigation flows are turned on and again in the fall just after irrigation flows are turned off. Fishing on the river through the summer is fairly consistent but lower than in the spring or the fall. During the winter, fishing is light, with some angling through the ice. Since the late 1970s this fishery has gained in popularity. It has a reputation of producing fair numbers of large trout. It gets a lot of publicity in the Boise fly shops and the Boise media.[42]

- *BLM stock ponds*

Angling effort at BLM ponds usually begins increasing in the late winter when roads are still frozen, but the ponds are ice-free. In the early spring when roads are soft and wet angling effort declines. As the roads dry in late spring and early summer angling effort again increases. During the heat of the summer angling effort is light. Again, in fall as temperatures decline, angling effort increases. Some say this is the best time to fish these ponds. Hometowns of anglers vary with pond location. Hunters, rockhounds, and others from a wide geographic area also fish the ponds incidental to other recreational activities.[42]

ii. ODFW Management

The ODFW manages the fisheries to provide continued opportunities for fishing to the public and to maintain certain populations of fish.

- *Owyhee River downstream of reservoir*

The rainbow trout fishery below the dam is managed under the ODFW “Basic Yield” option of the Trout Management Plan. The current regulation (2006) is 5 fish daily bag limit and the possession limit is two daily bag limits with no more than one fish over 20 inches long.[42]

Maintaining the quality of the fishery is dependent upon maintaining the relative abundance and structure of this population. Many factors affect these two attributes.

The stock type and stocking rate can be major factors determining the abundance. Fish survival through spring flood flows, the angling pressure, and the survival over the winter affect the structure of the population. Recruitment of fingerlings into the fishery is a primary goal. This appears to be occurring when the proportion of the sampled fish greater than 9 inches is 50 percent or more. If the proportion greater than 9 inches is significantly higher or lower than 50 percent for more than one year an investigation should be undertaken to determine the causes.[42]

Operation of the reservoir and natural flooding can affect this population. The abrupt changes in flow downstream of the dam can be very disruptive to the population. Flows can vary greatly during the spring. Historically flows varied from less than 10 cubic feet per second (cfs) to over 2,000 cfs, back down to 300 cfs then up to 4,000 cfs in one month. In late October the flows were shut off. Winter flows down the river are a combination of leakage and some releases from the dam by the irrigation district. These winter flows had an average 15 cfs at the USGS gage downstream of the dam (USGS River Data.)[42] Currently the irrigation district tries to maintain a 30 cfs minimum flow.

Requests for additional flows from Owyhee Reservoir could affect the hatchery rainbow trout. There could be flooding releases requested from Owyhee Dam at times when the extra flow would flush out trout from this area into areas less hospitable for trout. The impact of any additional flow request on the trout populations in the lower Owyhee River will depend upon the amount of water requested and when the water will be released.[42]

- *BLM stock ponds*

Each pond is stocked annually or when conditions permit. The pond rainbow trout fisheries are managed under the ODFW “Basic Yield” option of the Trout Management Plan with the same daily and possession limits stated above.[42]

Trout abundance, population size structure, and growth varies from year to year and from pond to pond. The fisheries on individual ponds are small, but in the aggregate they provide opportunities over a wide geographic area where there are few angling opportunities of any kind.[42]

f. Unknown factors

The social impact of the growth in the human population in the Boise metropolitan area is affecting the fishery. At present Idaho anglers are estimated to comprise most of the fishing on the river. A great many of these anglers are asking the ODFW department for more restrictive regulations, specifically to outlaw the use of bait.[42] The impacts of the recreational fishery are discussed further in recreation component of this assessment.

7. Hatchery brown trout

Brown trout are a native of Northern Europe and the British Isles. They were introduced into North America in the early 1800s.

a. Distribution

Browns were first introduced into the lower Owyhee subbasin in 1990. They were introduced to provide a quality or trophy trout fishery and to see if they might work as a large predator on nongame fish populations. The nongame fish periodically spill through the dam and move in from downstream areas and the Snake River.[42]

Brown trout are found in the Owyhee River downstream of Owyhee Dam. There are no perennial tributaries of the Owyhee River downstream of the dam.[42] Brown trout are favored by the artificial collection of cold water in the Owyhee Dam and its subsequent release during the warmer part of the year.

b. Habitat and life history

Brown trout prefer cold, well-oxygenated waters, especially large streams. The availability of cover is important to brown trout. They are more likely to be found where there are submerged rocks, undercut banks, and overhanging vegetation.[2]

Brown trout can mature at age two (8 inches in length). They spawn in the fall. They prefer to spawn in small gravel substrate streams as do most other trout, but can use other habitats such as rocky shelves along lake shores. They have been observed spawning in the Owyhee River on several gravel bars near the Tunnel in 1994 and 1995.[42]

Brown trout are thought to do better than other trout species in slower, warmer waters. They have also been observed actively feeding in slush ice. They probably have a wider thermal range of activity than do most other trout species.[42,59]

Brown trout are active feeders. They are most active near dawn and dusk and after dark in streams. They are carnivorous and eat a wide range of organisms. The diet of brown trout includes aquatic and terrestrial insects and their larvae, crustaceans (especially crayfish), mollusks, salamanders, frogs, rodents, and fish. Other fish generally do not play a prominent part in the diet of brown trout under 12 inches in length.[42]

c. Production

The abundance of brown trout has gradually increased since its introduction in 1990. During the first years after introduction the principal objective was to establish a population in the river. From 1990 to 1992 both fingerling and legal sized brown trout were stocked into the river. In 1992 the fingerling program was discontinued. In 1993 the legal stocking program was cut back to 3000 legals every other year. After 1997 the population have been self sustaining with some stocking continuing until at least 2000.[42]

d. Fishery

Fishing for brown trout occurs concurrently with fishing for rainbow trout. The angling effort peaks twice, once in the early spring just before the reservoir starts spilling flood flows or irrigation flows are turned on and again in the fall just after irrigation flows are turned off. Fishing effort through the summer is fairly consistent but much lower than in the spring or fall. There is very little angling in the winter after the river freezes over.[42]

Since 1990 the number of anglers targeting brown trout has increased. This fishery attracts a lot of anglers from the Boise-Nampa-Caldwell area in Idaho. Status of fishing conditions is posted on all of the information boards in the fly shops.[42]

Brown trout of all sizes are being caught. There appears to be no dominate size group in the catch. Most anglers can not target the larger individuals.[42]

The brown trout fishery and management program is well developed. Currently the brown trout are being managed under the "Trophy or Quality " option in Oregon's Trout Management Plan. Regulations are release unharmed.[42]

The average fish size has increased. Since this fishery is under a catch and release regulation it was expected to produce large fish since all fish are returned unharmed to the river and continue to grow. Brown trout growth appears to be equal to or slightly better than that of hatchery rainbows.[42] The abundance of the brown trout population has increased and appears to be only slightly less abundant than the hatchery rainbow trout population.[42]

The fishery is very popular and fishing has increased over time.[42]

The ODFW has the same concerns in trying to maintain this fishery as for the hatchery rainbow trout fishery. Operation of the reservoir or natural flooding can affect this population in the same fashion as mentioned above for rainbow trout.[42]

e. Unknown factors

What impacts will very large (24^+ inches or 5^+ pounds) brown trout have on the recruitment of rainbow trout?

The social impact of the growth in the human population is affecting the fishery. At present (2006) Idaho residents are estimated to comprise the majority of the effort on the river. The anglers are beginning to request special angling regulations for this river reach. The fishery is gaining a reputation outside the local area. Anglers are being attracted from other areas of the country. The potential impacts of increased use of this artificial recreational fishery are unknown.

What impacts are brown trout having on the native amphibians?

What would the impacts be on other salmonid species if this species were flushed downstream by a major flood event? Could it pass downstream over the Hells Canyon complex of dams? Would the brown trout also go upstream on the Boise and Payette Rivers?

E. Warmwater gamefish

1. Background

Like the artificial coldwater fishery below Owyhee Dam facilitated by the construction of the dam, the warmwater fishery in Owyhee Reservoir was created by the construction of the dam. A layer of warmwater develops on top of the cold water in the reservoir each year. The warmwater gamefish are all introduced species, although

there is a possibility that there were carp and bullhead catfish in the region before their introduction into the reservoir.

The warmwater fishery on Owyhee Reservoir is by far the largest fishery in the lower Owyhee subbasin in terms of the number of anglers and angler hours per year. The fishery on the reservoir prior to 1957 was very different from the fishery today. Boat access was limited to small boats that could be launched from shore near road access points or larger boats that could be launched near the power house by a boat crane. This limited the number of boats that could reach distant areas of the reservoir. In 1958 the first ramp was built near the powerhouse. Subsequent ramps were built at the Cherry Creek Resort, at Owyhee State Park, Owyhee Day-Use-Area, and at Leslie Gulch. Bank angling access has always and continues to be restricted to areas around limited road access points. These access points include the road around the east side of the reservoir and the roads into Cherry Creek, Dry Creek Arm, Pelican Point, Leslie Gulch, and towards Watson. There is also a road to the river at Birch Creek Ranch, just upstream of the reservoir. The road into Pelican Point has not been improved in years.[42] The dirt roads into the Dry Creek Arm and into Watson are precarious.

After the construction of boat ramps, Owyhee Reservoir became a very popular recreational site. From 1935 to the late 1950s the reservoir was about the only major large reservoir warmwater fishery for southeastern Oregon and southwestern Idaho. Beginning with the completion of Brownlee Dam in 1957 other large reservoirs began to attract anglers. Reservoirs like Brownlee Reservoir have easier access for both Oregon and Idaho residents. Idaho residents do not have to purchase a nonresident license at Brownlee Reservoir, and there are better catfish and trout populations.[42]

2. Status

There are four major warmwater gamefish populations in the lower Owyhee subbasin: black crappie, largemouth bass, smallmouth bass, and channel catfish. Several other species are present but support only minor fisheries: yellow perch, brown bullhead, warmouth, and bluegill. Very little fish life history information specific to this subbasin has been collected.

3. Black crappie

a. Distribution

Black crappie were probably introduced into Owyhee Reservoir after the completion of Owyhee Dam in 1933. They are the most common gamefish species in the reservoir. During the spring, summer and early fall they appear to be well distributed throughout the reservoir at a depth of 15 feet or less. During the winter they tend to school in deeper (30 to 50 feet) parts of the reservoir.[42] Population of crappie depend on natural reproduction. They are not stocked.

Black crappie are found in Owyhee Reservoir and in the river both upstream and downstream of the reservoir. In the past, crappies were found as far upstream of the reservoir as Birch Creek. During the drought years from 1987 to 1994 they extended their distribution upstream several miles.[42]

b. Habitat and life history

Black crappie are found in lakes, ponds and pools of streams. They usually prefer to reside among vegetation over either a mud or sand bottom. They also prefer clear water.[35]

Crappie spawn in the spring when the water temperature reaches 66°F to 68°F which occurs during late June and early July in the lower Owyhee subbasin. Males construct their nests on hard substrate among cobble and boulders in protected shallows along the shore and in coves. In Lake Owyhee crappies are known to spawn in the areas around the Elbow, Three Finger Gulch, and Doe Island. They also spawn in conjunction with largemouth bass in the Pelican Point area. When spawning is complete the females move back to deeper water to recover. The males continue to guard the nest and the fry after they hatch. The amount time from nest construction to fry dispersion varies with water temperature from 4 days to 3 weeks.[42]

c. Productivity

Relative abundance of black crappie is variable and follows a boom and bust cycle. Years with high crappie abundance are usually followed by years with very low abundances. Good examples of this phenomenon occurred in 1966 and 1967, 1979 and 1980, and 1982 and 1983.[42] The reasons for high or low crappie abundance in the reservoir are complicated and have not been studied in the Owyhee Reservoir. Large variations in the water elevations between years due to differences in precipitation affects both human uses of the reservoir and fish reproduction, survival, and growth.[42]

d. Size structure

The crappie size structure is almost as variable as its abundance. The population has been consistently dominated by individuals less than 8 inches in length, although there are years when about half of the individuals are above 8 inches.[42]

e. Growth

Growth of crappie in Owyhee Reservoir is about average for the area and latitude. On average, "stock size", 5 inches, is reached in the second year. "Quality" size, 8 inches, is reached in the third year. "Preferred size", 10 inches, is reached in the sixth year. "Memorable", 12 inch, and "trophy", 15 inch, sizes might be reached after the eighth year. Crappie over 12 inches are very rare.[42]

f. Fishery

The fishery on Owyhee Reservoir begins as the water warms up in the early spring and peaks in late April through early July. Fishing declines during the hot part of the summer. In the fall, especially during hunting seasons, fishing increases but not to spring peak levels. Fishing over the winter is very light.[42]

Anglers primarily use boats in pursuit of crappies in Owyhee Reservoir. Boat angling is concentrated in the lower half of the reservoir, from Pelican Point to the dam. Bank fishing is concentrated around road access points, with most occurring from the dam to the resort.[42]

Crappie fishing has attracted most of the angling effort on the reservoir. Over the years the proportion of the anglers pursuing other species has increased. The most recent information indicates crappie still attract the largest proportion of the anglers.[42]

In most years large proportions of the crappies caught are kept. The size of harvested crappie varies from year to year based on the size available and the abundance. The majority of the harvest is composed of 8 to 10 inch crappie. There appears to be no trends toward smaller or larger fish sizes in the catch.[42]

g. ODFW management

The projected increase in population growth in the Treasure Valley is expected to increase the demand for recreation including crappie angling.[42]

Crappie abundance has varied over the years from relatively scarce to abundant. Individuals less than 8 inches in length have consistently dominated the population size structure. Larger individuals are rare. Crappie attracts more anglers, but the amount of effort directed toward bass and occasionally catfish can approach the crappie fishery. The crappie catch has apparently declined, but the variation is large enough that it is difficult to determine if the change is significant.[42]

Current management of this population is for “Basic Yield” under the Warmwater Fish Management Plan. The characteristics of this option are a wide range of available sizes, angler determined catch and release, and variable catch rates.[42]

Other states have tried more restrictive bag limits and size limits to increase the biomass in the harvest. These regulations have shown promise in some water bodies. If these regulations are to be considered on Owyhee Reservoir, a better understanding of the cyclic nature of this population would be necessary.[42]

4. Largemouth bass

a. Distribution

Largemouth bass are found in Owyhee Reservoir and in Dunaway Pond in the Lower Owyhee subbasin. They occasionally are found in the Owyhee River downstream of the dam. They are assumed to be part of the initial group of warmwater fish introduced into Owyhee Reservoir after the completion of the dam. Dunaway Pond south of Nyssa has had largemouth bass since the early 1960s. It is not known whether the ODFW or some other entity introduced largemouth bass into the pond.[42]

b. Habitat and life history

Largemouth bass inhabit clear, vegetated lakes and ponds. They prefer quiet water and over-grown banks.[30]

Largemouth bass spawn in the spring when the water temperature is between 60°F and 75°F. In the lower Owyhee subbasin spawning usually occurs from late April through early July, with the peak occurring in late May and early June. Nests can be found near shore or in coves which tend to warm up first in the spring. Nests tend to be in 1 to 4 feet of water. Bass tend to nest in groups with spacing between nests

averaging about 6 feet.[10] In the reservoir they spawn from Dry Creek upstream to the hot springs south of Leslie Gulch.[42]

Males build the nest. A male courts one or more females to spawn with him. Most successful nests contain between 5,000 and 43,000 eggs. Once the eggs are laid the female leaves. She may spawn with another male or retreat to deeper water to recover. The male guards the nest. He continuously fans the nest keeping the eggs silt free and guaranteeing that the eggs are in constant contact with freshwater.[10]

Time to hatching varies with water temperature. Fry are usually free swimming 10 days after hatching. They must start eating within about 6 days after becoming free swimming or they die.[10]

The diet of largemouth bass is variable with age, season and water body. They changeover to a fish diet when they reach about 2 to 4 inches in length.[42] In addition to feeding on fish, adult bass are known to eat crayfish and frogs.[30]

c. Relative abundance

Since 1986, relative abundance of largemouth bass in the Owyhee Reservoir has been variable. Local anglers characterize the population in the late 1970s as being more abundant, specifically with many larger individuals than now exist. A combination of effects from the high water years in the early 1980s and the drought in the late 1980s and early 1990s combined with increased mortality associated with increased angling probably left the reservoir with many weak year classes and a largemouth bass population with a much lower abundance.[42] Low water years result in rapid water draw down making spawning success more difficult.

The population in Dunaway Pond has been sampled for largemouth bass only twice and fell within the range of values observed at Owyhee Reservoir.[42]

d. Size structure

Individual largemouth bass less than 12 inches in length have dominated the population in Owyhee Reservoir with a couple years when individuals over 12 inches made up at least half of the population.[42] Individuals less than 12 inches in length also dominated the population in Dunaway Pond.[42]

e. Growth

The growth expressed by the population of largemouth bass in Owyhee Reservoir appears to be about average for water bodies of this region. Largemouth start to be harvested at 8 inches in their third summer. "Quality size", 12 inches, is reached on average in their fourth summer. Largemouth bass reach 15 inches on average in the sixth summer. "Memorable size", 20 inches, is reached in their ninth summer. "Trophy size", 25 inches, is seldom reached.

Growth of bass from Dunaway Pond has not been studied.

f. Fishery

Fishing for largemouth bass in Owyhee Reservoir is very popular with anglers from Oregon and Idaho. The bass fishery on this reservoir is dominated by boat

angling. Very little of the bank effort on this reservoir is directed toward either bass species. Angler effort targeting largemouth bass usually increases in the early spring. It peaks in May and June. It declines through the summer. It increases slightly in the fall and is very low through the winter.

The bass fishery on Dunaway Pond is popular with local residents from the Nyssa area. The amount of fishing is quite small. Fishing directed toward bass begins to increase in the spring with a peak in the late spring. It then drops off in summer. This pond is favored by local families and kids.[42]

The number of largemouth bass kept is a very small part of the total catch on Owyhee reservoir. This is in part because there were so few large bass available and because anglers are voluntarily releasing most bass they catch. On Owyhee Reservoir, most of the bass kept were between 10 and 14 inches long. At Dunaway Pond very few of the bass are kept because they are not large enough to satisfy anglers.[42]

g. ODFW management

Since 1986 the abundance of largemouth bass in Owyhee Reservoir has been variable. Local anglers have reported that the abundance and size of largemouth bass has declined since the 1970s. It has started to rebound some in the last few years. Individuals less than 12 inches have dominated the size structure of the population. The annual mortality rate appears to be very high in some years. The fishery has grown in popularity since the mid 1970s. The catch rate remains high but the harvest rate is very low due to angler choice.[42]

Current management of the largemouth bass population in Owyhee Reservoir and Dunaway Pond is for “Basic Yield” under the ODFW Warmwater Fish Management Plan. The characteristics of this option are a wide range of available sizes, optional catch and release, and variable catch rates.[42]

Future management of this species may include changing regulations that may take advantage of largemouth’s piscivorous (fish eating) nature and a growing population of Lahontan tui chubs. These chubs have the reproductive potential to over populate the reservoir and affect other fisheries.[42]

Regulation changes may include increasing the length limit. This would hopefully increase the survival of bass into large sizes where they are better predators. The success of any such change in regulations would depend upon the natural mortality rates of bass. If natural mortality is high, then most of the bass saved by the regulation would probably die. If the mortality rates stayed low then there is a chance that an increase in the size structure of the population could occur.[42]

Very little information is known about the population of largemouth bass in Dunaway Pond. More basic information about the dynamics of this population should be gathered before changes in the current management scheme are undertaken.[42]

h. Unknowns

The effect of Lahontan tui chubs in the Owyhee Reservoir is unknown. They may favor bass populations.

The effect of rapid human population growth in southwest Idaho is unknown.

The effect of future demands for salmon flush flows is unknown. How much water and when it is released could depress the largemouth bass spawning and population.

5. Smallmouth bass

a. Distribution

Smallmouth bass are found in Owyhee Reservoir, Owyhee River above and below the reservoir, and sometimes in Dry Creek. Smallmouth bass were first introduced into the river upstream of the reservoir in 1970. Bass in the lower 10 miles of the river most likely moved up from the Snake River or spilled through the Owyhee Dam.[42]

b. Habitat and life history

Smallmouth bass prefer the shallow rocky area of lakes or the gravel-bottomed runs of clear, cool flowing streams or flowing pools of rivers.[31] They are relatively intolerant of pollution but are more adaptable to changes in water conditions than most trout species.[47]

The diet of smallmouth bass varies with their size, prey size, and prey availability. Juveniles tend to prey on insects but fish and crawfish start entering their diet. As adults their diet is primarily crawfish and fish, with some insects.[47,4,7]

Smallmouth bass spawn in the spring. In the reservoir they spawn primarily in May and June. In 1992 during the drought they were being caught off their nest in late March. Spawning takes place throughout the reservoir, but is concentrated from the Dry Creek Arm upstream to Leslie Gulch. Spawning in the river is thought to take place slightly later than in the reservoir.[42]

Males start moving into shallower water when water temperatures start exceeding 50°F.[4] Males construct their nest in protected shallows away from current and wave action.[7] Nests are usually located on sand, gravel or rubble near structures in 10 to 15 feet of water.[4] Nests constructed in rivers tend to be in shallower water.[7] They tend to avoid substrates with silts and clays.[7] Each male may build several nests before spawning in one.[4,7]

Males may spawn with one or more females in one nest. Females will spawn with more than one male, once done they move to deeper water to recover. Males guard the nest and the fry until they disperse. The amount of time from egg deposit to fry dispersal varies with water temperature from one to four weeks.[4,7]

c. Relative abundance

The number of smallmouth bass in the Owyhee Reservoir has been gradually increasing since their introduction and appears to have stabilized. Since 1989 they have composed 12 to 26 percent of the bass numbers in the reservoir.[42]

As in the reservoir, smallmouth abundance in the Owyhee River upstream of reservoir has increased since their introduction in 1970. In 1988 when a comparative

study was conducted, the average relative abundance in the river was twice that in the reservoir.[42]

Natural mortality can be very high some years.[42]

d. Size structure

Individuals between 7 and 11 inches have consistently dominated the size structure of smallmouth bass in Owyhee Reservoir. Few individuals greater than 14 inches and no individuals greater than 17 inches have been observed during the spring inventory. Anglers occasionally catch larger individuals, but none have been verified.[42]

Smallmouth in the Owyhee River upstream of the reservoir have been sampled only once with electrofishing gear, in 1988. Very few of the fish in the sample were over 11 inches. Anglers describe the river population as numerous, but dominated by smaller individuals. One angler snorkeled several pools and noted that larger individuals are present, but clouds of smaller individuals never let the lure get down to the larger ones.[42]

e. Growth

The growth rates for smallmouth bass in Owyhee Reservoir are slightly above average for populations at this latitude. They tend to grow faster than other populations in the Snake River. Growth rates of bass in the Owyhee River have not been studied.[42]

f. Fishery

Smallmouths began making up part of the fish that were caught and kept from the reservoir in the early 1980s. In 1988 they composed about 20 percent of the harvested bass. The smallmouth fishery in the reservoir is a part of the “bass” fishery. Anglers do not distinguish between the two species of bass. Angler possession (creel) data from the reservoir indicate that the catch rate has probably increased.[42]

Anglers began learning about bass in the Owyhee River in the late 1970s. The fishery has a reputation of producing many small fish. The fishery in the river is gaining in popularity as much as the remoteness and lack of access will allow. Access to the river above the reservoir is very limited by geographical features.[42]

g. Size at harvest

The majority of the smallmouths harvested in Owyhee Reservoir are less than 12 inches in length. This coincides with inventory information which indicated there were few fish over 11 inches. Anecdotal information indicates that few fish over 12 inches are caught from the river as well.[42]

h. ODFW management

The fishery in the reservoir is part of the “bass” fishery. The reservoir bass fishery is depressed compared to anecdotal evidence from local anglers.[42]

Current management of this population is for “Basic Yield” under the Warmwater Fish Management Plan. The characteristics of this option are: a wide range of available sizes, optional catch and release, and variable catch rates.[42]

High natural mortality in some years appears to be the primary limiting factor for the reservoir population of smallmouth bass. Very little mortality is thought to be associated with angler harvest. The high natural mortality may be associated with low abundance and a high hooking rate that stresses a large portion of the population.[42]

Looking into the future, changes in reservoir operation could become another major limiting factor. Large water level fluctuations in the May and June to flush salmon smolts in the Columbia River could decrease smallmouth reproduction.[42]

6. Channel Catfish

a. Distribution

Channel catfish were first introduced into the Owyhee Reservoir in 1962. They were introduced into the upper Owyhee River near Rome in 1970. Catfish are found in Owyhee Reservoir and in the Owyhee River upstream to Rome. They are also in the lowest 10 miles of the Owyhee River. Individuals in the lower 10 miles of the river are migrants from the Snake River and from spill out of the reservoir.[42]

b. Habitat and life history

Channel catfish thrive in a diversity of environments: small rivers, large rivers, reservoirs, natural lakes, and ponds. They prefer clean, well oxygenated water.[5,27]

This species is omnivorous. Young individuals tend to eat aquatic insects. Although older individuals feed primarily on small fish, crayfish, clams and snails, they will eat most anything that is available. This includes insects, crabs, algae, tree seeds, frogs, bullheads, and suckers. They predominately use their barbels (whiskers) and taste to find food at night or in cloudy, muddy or stained water. In clear water habitats they tend to use sight to find food more than do other catfishes. This species primarily feeds on the bottom of lakes and reservoir, but some individuals, especially younger ones, will feed at the surface.[42,5,27]

Spawning occurs from late spring into summer when the water temperature is between 75°F and 85°F. In Owyhee Reservoir this occurs from late May to early July. Spawning takes place in secluded semidark sites. Males build the nests in holes, under undercut banks, log jams, and rocks. After spawning is complete females leave the nest to recover while the male guards the nest. Hatching takes place in 5 to 10 days at water temperatures from 60°F to 82°F. The male probably broods the young.[42]

c. Relative abundance

The catfish can and probably do move freely between the upper river and the reservoir. The majority of the information on channel catfish was collected in the reservoir.

The relative abundance of the channel catfish population in Owyhee Reservoir has increased since their introduction in 1962. The river portion of the population is thought to have increased in relative abundance over the same time period.

In 1988 there were twenty sites along the Owyhee River and in Owyhee Reservoir that were sampled for channel catfish. Their relative abundance was greatest

just upstream of the reservoir near Birch Creek. They were also found at both sites sampled near Rome. In Owyhee Reservoir channel catfish less than 16 inches in length have dominated the population.[42]

d. Growth

The growth rates of the channel catfish in Owyhee Reservoir and in the Owyhee River have not been studied.[42]

e. Fishery

The major channel catfish fishery in the lower Owyhee subbasin is located in Owyhee Reservoir. Most catfish fishing is concentrated at the head of the reservoir. Angling effort begins to increase when the weather warms in spring. It usually peaks in late spring through early summer. During the heat of the summer it declines. Again in the fall as temperatures cool and hunting seasons take place it increases.

The fishery in the reservoir has been growing in popularity since it began in the early 1970s. The amount of fishing for channel catfish has increased with the increase in its abundance. In years when the reservoir is full and access to the head of the reservoir is good, effort can be quite large.[42]

There is a very limited fishery in the river upstream of the reservoir. This fishery is limited by access to the river. Access to the river is available at few points. Very little harvest information is available on the river fishery in the river.[42]

Channel catfish taken from Owyhee Reservoir from 10 to 16 inches in length dominate the size at harvest. Very little of the harvest is of fish over 16 inches or under 10 inches in length.[42]

f. ODFW management

This species is currently managed under the “basic yield” option in the Warmwater Fish Management Plan. Placing a bag and/or size limit on catfish might not produce predictable or measurable changes in the future.[42]

g. Unknowns

The interactions of the different warmwater fish are unknown. What effect does an increase in the catfish population have on the native warmwater fishes? What effect does it have on the other warmwater game fish? What fish does it compete with for food and habitat?

7. Warmwater gamefish not discussed above

The other species of introduced gamefish in the Owyhee Reservoir are perch, bluegill, brown bullhead, warmouth, pumpkinseed, and tadpole madtoms. They have much smaller fisheries.

The yellow perch can inhabit either fresh or brackish water and is found in salt lakes. They are most commonly found in clear water near vegetation either in beds of weeds or under overhanging trees or bushes.[33,57]

The brown bullhead is native to eastern North America and the Mississippi River basin. It inhabits pools and sluggish runs over soft substrates in creeks and rivers. It may also be found in impoundments, ponds, and lakes. Although it rarely enters brackish water, it can tolerate high carbon dioxide, low oxygen concentrations, and high temperatures. It has been observed to bury itself in mud to escape adverse environmental conditions.[20]

The bluegill are native of the great lakes and Mississippi River basin. They are found frequently in lakes, ponds, reservoirs, and sluggish streams. They are noted for seeking out underwater vegetation for cover.[29,1]

The pumpkinseed is native to the eastern United States. They prefer vegetated warmwater ponds, lakes, and quiet pools of streams. They use weed patches or logs for cover and stay close to shore.[28,45]

The warmouth is native to the central and eastern United States drainages. They live over mud in ponds, lakes, and quiet water areas of streams with vegetation.[46]

The tadpole madtom is native to eastern North America and the Mississippi River basin. They inhabit lakes and rock, mud, or detritus bottomed pools of creeks and rivers.[32]

F. Non-native, nongame fish

Non-native, nongame fish were introduced into the lower Owyhee subbasin intentionally to provide a source of protein for human consumption or accidentally as bait in the pursuit of game fish. They were also introduced as forage for game fish.[42]

1. Common carp

The common carp is native of Europe and Asia. It tolerates a wide variety of conditions and has been introduced around the word. It prefers large bodies of water with slow flowing or standing water over soft, vegetative sediments. Common carp thrive in large turbid rivers.[13,8]

Carp were introduced into the Snake River and/or adjacent ponds as a food fish around the turn of the century. They have spread up and down the Snake River and into the Owyhee River. They are very abundant in Owyhee Reservoir.[42]

Common carp are omnivorous and will eat almost anything including water plants, insects, crustaceans, seeds, or even dead fish. Since they feed by grubbing in sediments, the adults uproot and destroy submerged aquatic vegetation. They can cause serious damage to duck and native fish populations. They have attributes that allow them to invade and dominate new ecosystems with serious effects on the ecosystem and native fauna.[13,8]

Have carp altered or are they altering the ecology of the Owyhee River in the lower Owyhee subbasin? What effects are they having on the remaining populations of native fish?

2. Lahontan tui chub

The Lahontan tui chub is another invasive fish in the Owyhee Reservoir with the potential to over populate the reservoir. Since tui chub inhabit lakes and quiet, vegetated, mud or sand-bottomed pools and are native to other areas of the Columbia River drainage and of the Great Basin,[26] they are well adapted to the conditions of the Owyhee Reservoir.

They were originally introduced into Wildhorse Reservoir upstream in Nevada. They escaped downstream. Attempts to poison them failed. At least in high water years chub continue to escape and are now present in the Owyhee Reservoir.[42]

The ODFW is considering ways to manage the largemouth bass, a piscivorous (fish eating) fish, to try to control the Lahontan tui chub population.[42]

3. Introduced fish in the lower Owyhee subbasin below the dam.

Several Utah chub have been found in the lower drain ditches in the Owyhee basin.[42] The Utah chub is adapted to a myriad of environmental conditions. Its habitat ranges from irrigation ditches to lakes to alkaline springs. It is often found in vegetation over mud or sand. It is found in the upper Snake River Basin in Idaho.[25,52,51]

Utah chub are omnivorous and can become so common that they create pressure on other fish populations through intense competition for food and space.[52] Eradication programs to reduce numbers have had no effect, the chub population easily bounces back.[51]

The fathead minnow inhabits muddy pools in streams and is also found in ponds and small lakes. It tolerates high turbidity, high temperatures, and poorly oxygenated water. It can also live in intermittent streams.[16,34]

Fathead minnow populations exist throughout the Treasure Valley. They can be found in many of the irrigation and drain ditches in the lower Owyhee River basin. They are popular as live bait and could be escapees from the aquarium trade. They have also been introduced into several ponds in the Treasure Valley as forage for bass and catfish.[42]

The oriental weatherfish is a native of Asia. They live in rivers, lakes, or ponds but prefer muddy bottoms of streams and ponds.[50] Several individuals have been found in the lower drain ditches in the Owyhee basin. They are most likely escapees from the aquarium trade.[42]

G. Other considerations

There have been no studies of the interactions between the species of fish in the lower Owyhee subbasin. Little is known about the distribution of many species within the lower Owyhee subbasin.

Mercury contamination of fish in the lower Owyhee subbasin is discussed in the water quality component of this assessment as are the associated health limits recommended for fish consumption from the subbasin.

There are discussions about whether or not flows in the lower Snake River should be augmented to improve conditions for the seaward migration of juvenile salmon and steelhead which enter the Snake River below the Hells Canyon complex of dams.[3] This is a political and social policy decision outside the scope of this assessment.

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