

LAKE BILLY CHINOOK
FISH MANAGEMENT PLAN

ADOPTED POLICIES AND OBJECTIVES

635-500-823 Lake Billy Chinook shall be managed for hatchery and natural production consistent with the Wild Fish Policy under the following alternatives of the Warmwater Fish Plan and Oregon's Trout Plan: kokanee - Intensive Use; rainbow and brown trout - Basic Yield; bull trout - Feature Species; bass - Basic yield. Adopted 10-10-90; ef. 10-15-90

INTRODUCTION

The need to develop fish management plans for major waters of the state is explicit in both the Fish Management and Wild Fish Management policies of the Oregon Department of Fish and Wildlife. Fish management plans embody overall agency goals and objectives while providing management direction specific to individual water bodies.

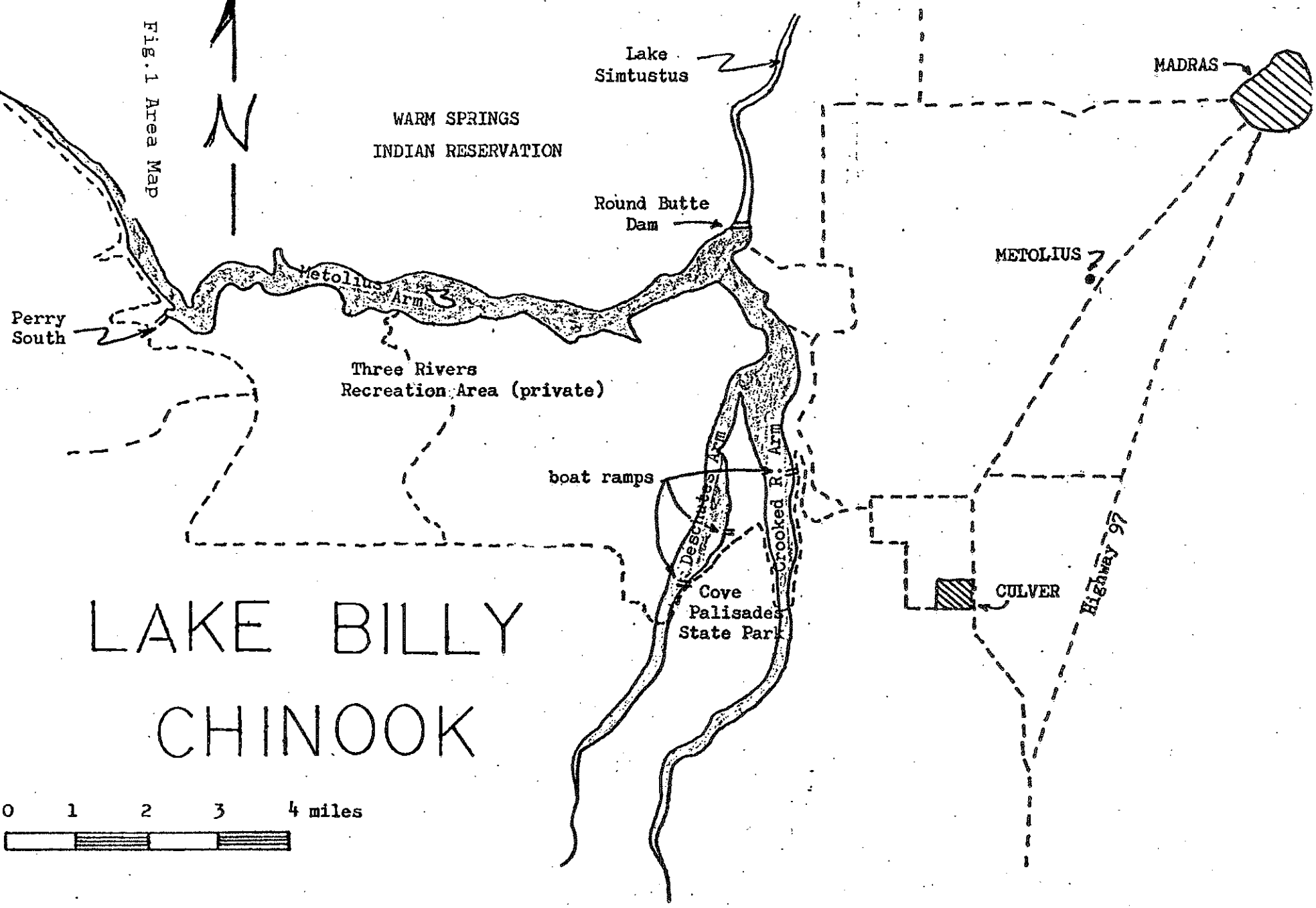
This new plan was developed with the help and concurrence of the Confederated Tribes of the Warm Springs Reservation of Oregon. ODFW shares management responsibility on the lake's Metolius arm with the Tribe. In addition, a citizen review group representing a variety of interests met periodically to review the plan as it was developed.

OVERVIEW

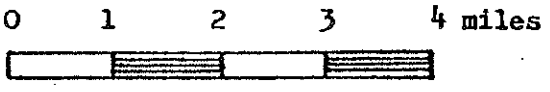
Lake Billy Chinook was created in 1964 when Portland General Electric Company (PGE) completed construction of Round Butte Dam on the Deschutes River. PGE operates the reservoir and adjoining facilities for electric power production. Situated approximately 8 miles southwest of the city of Madras, the lake has three arms formed by the Metolius, Deschutes, and Crooked rivers with respective lengths of 12, 8.5, and 6 miles. Maximum depth of the reservoir is 415 feet with 60% or more of it deeper than 100 feet. The reservoir covers almost 4,000 surface acres and has a storage capacity of 525,022 acre feet.

Several small tributary streams, found mostly along the Metolius arm, empty into the reservoir but are of very little consequence. A majority of the adjacent lands are in federal, state and tribal ownership. Federal lands, managed by the Bureau of Land Management, Crooked River National Grassland, and Deschutes National Forest, are found along all three arms of the reservoir. Oregon State Parks operates the Cove Palisades State Park which borders

Fig. 1 Area Map



LAKE BILLY CHINOOK



portions of the Crooked River and Deschutes River arms. Tribal ownership occurs only on the Metolius River arm.

Privately owned lands are found exclusively along the Metolius arm. Included is an extensive marina and a number of private dwellings and docks.

FISH RESOURCES AND HABITATS

Game Fishes

Kokanee. Nine game fish species are found in Lake Billy Chinook (Table 1). Of these, kokanee are by far the most abundant and widely distributed game fish species in the reservoir. Kokanee mature and spawn after four growing seasons in the reservoir. They move into all three river systems to spawn. In the Metolius River, kokanee are found spawning as far up as the headwaters and tributaries. Steelhead Falls and an impassable dam just above Opal Springs mark the uppermost spawning limits in the Deschutes and Crooked rivers, respectively. Spawning generally occurs in September and the eggs hatch in mid-winter. The young emerge from the gravel during late winter and move directly to the lake.

In Lake Billy Chinook, kokanee lead a mostly pelagic existence, filling the massive open water void of the reservoir. They feed primarily on zooplankton. The reservoir population appears to be characterized by dominant year classes which occur every few years, giving rise to occasional boom years in the sport fishery. Kokanee enter the sport fishery during their third growing season at about 6-8 inches in length. Growth rates vary; and, as a result, the size of spawning adults varies from year to year. In some years, spawners average about 12 inches or more in length, while in other years the average is much less. In 1984, the average size of spawning adults in the Metolius River was only about 9 inches.

Bass. Smallmouth and largemouth bass are distributed throughout Lake Billy Chinook. Both associate with inshore areas and avoid the lake's deeper, open water. Smallmouth far outnumber largemouth bass (~50:1), and next to kokanee are probably the second most abundant game fish in the reservoir. The bass population seems to be characterized by the presence of dominant year classes and, for reasons that are unclear, an apparent lack of many fish over 12 inches.

Trout. Rainbow and brown trout are present in the reservoir; however, they are limited for the most part to the upper reaches of each arm. Trout originate in all three major rivers and move downstream into the reservoir. A majority of the trout harvested by anglers are under 12 inches. Larger fish are occasionally taken.

Table 1. List of fish species found in Lake Billy Chinook, Oregon.

Common name	Scientific name
<u>Game fishes</u>	
Deschutes rainbow trout	<u>Oncorhynchus mykiss</u>
Bull trout	<u>Salvelinus confluentus</u>
Brown trout	<u>Salmo trutta</u>
Kokanee	<u>Oncorhynchus nerka</u>
Chinook salmon	<u>Oncorhynchus tshawytscha</u>
Largemouth bass	<u>Micropterus salmoides</u>
Smallmouth bass	<u>Micropterus dolomieu</u>
Black crappie	<u>Pomoxis nigromaculatus</u>
Mountain whitefish	<u>Prosopium willamsoni</u>
<u>Nongame fishes</u>	
Coarsescale sucker	<u>Catostomus macrocheilus</u>
Bridgelip sucker	<u>Catostomus columbianus</u>
Northern squawfish	<u>Ptychocheilus oregonensis</u>
Chiselmouth	<u>Acrocheilus alutaceus</u>
Sculpin	<u>Cottus spp.</u>
Dace	<u>Rhinichthys spp.</u>
Goldfish	<u>Carassius auratus</u>

Bull trout inhabit the lake, but are fewer in number compared to rainbow and brown trout. Though present in all three arms, they are predominantly found in the Metolius arm. In 1985 a study was initiated to learn more about bull trout in the Metolius River and Lake Billy Chinook. To date, the study has shed some light on important aspects of bull trout life history. Adult bull trout spawn during the fall in several cold water tributaries of the Metolius River. After hatching, the young appear to spend 2-3 years in these tributaries and the mainstem before emigrating to the reservoir. Once in the lake, bull trout are capable of sustaining fast growth rates. Growth rates have ranged from about 3 to 7 inches per year for fish tagged and recaptured in the lake since 1985. In 1989, an angler targeting on bull trout caught a 34-inch, 23-pound 2-ounce bull trout in the Metolius arm, a state record.

Chinook Salmon. Also present in the lake is a remnant, landlocked population of chinook salmon. Little is known about these fish. A few chinook up to 18 pounds are taken by sport anglers each year in the lake and Deschutes River below Steelhead Falls. Prior to construction of Pelton and Round Butte dams, a wild run of spring chinook migrated annually into the Metolius River to spawn. PGE continued to pass returning spring and fall chinook adults over Round Butte Dam during and after the dam's construction phase. Between 400 and 600 salmon were moved over the dam each year. However, this activity was discontinued after 1966. The Metolius River and possibly the Deschutes River below Steelhead Falls are considered the most likely spawning locations for chinook salmon today..

Whitefish and Crappie. Mountain whitefish and black crappie are the only other game fish species in the lake. Whitefish are abundant in the upper reaches of all three arms. A small and inconsequential population of black crappie exists in the upper portion of the Crooked River arm.

Nongame Fishes

Suckers are the most abundant of several nongame fish species found in Lake Billy Chinook (Table 1). Two species of suckers inhabit the reservoir, the largescale sucker and bridgelip sucker. Largescale suckers grow to lengths of 20 inches or more in the lake. Bridgelip suckers are considerably smaller, but much more numerous. Both species are widespread throughout the lake.

Northern squawfish and chiselmouth are also abundant and found throughout the lake. In the past, a few roach have appeared in fish samples collected by the department, but none have been seen in recent years. Apparently, they have never been present in significant numbers.

Small dace and sculpins also exist in the lake. Their presence goes almost unnoticed when considered along with the other nongame fish species. Goldfish are also found in the Crooked River arm.

Crayfish

Crayfish are abundant in all three arms of Lake Billy Chinook. Data on this species were collected in department sampling programs carried out in 1983 and again in 1988. From the information collected, it appears the crayfish population has remained fairly stable in face of an intense commercial fishery.

Interspecific Relationships

Interrelationships among fishes are always a concern anytime two or more species inhabit the same waterbody. Concerns are generally of two sorts. One focuses on the competitive nature between fishes for such basic needs as food and space, while the other deals with predation, one fish eating another. These concerns become amplified when the discussion involves species from various groups of fishes, i.e. warmwater fish vs. coldwater fish, coldwater fish vs. nongame fish, etc.

The extent to which coldwater, warmwater and nongame fishes compete with each other in Lake Billy Chinook is unclear. Nongame fish such as suckers and squawfish undoubtedly compete with the lake's game fishes. However, the degree to which they compete is not considered at this time a serious detriment to trout and other game fish populations in the lake.

Even less is known about the interrelationship between bass and trout. Information from fish sampling programs carried out on the lake in recent years indicates that there is minimal overlap among these species and probably little cause for concern.

Habitat Quality

Lake Billy Chinook provides a suitable environment for a number of fish species. However, the lake is better suited for some species than it is for others. This is demonstrated by the fact that some species are much more abundant and widely distributed in the lake than are other species. For example, kokanee are highly abundant and widely distributed while rainbow trout are much less numerous and found primarily in the very upper reaches of each arm. Most of the lake is deep with vertical rock walls and steep rocky sides below the surface. These conditions offer a good environment for kokanee which are adapted to a more pelagic existence.

Rainbow and brown trout are restricted to shallower areas of the lake located in the upper reaches of each arm, in association with incoming flows from the three rivers. These native trout appear to be adapted more to lotic environments and have apparently not been able to make a successful transition to the mostly deep, standing water environment of Lake Billy Chinook. Bull trout have done well in the lake and appear to use more of it than rainbow and brown trout. They are most numerous in the Metolius arm.

The lake also provides a suitable home for bass even though it does not provide optimum conditions. Smallmouth bass appear to be best suited for the conditions based on the overwhelming ratio of smallmouths to largemouths. A lack of shoal areas, suitable spawning habitat, juvenile rearing cover, and an adequate supply of forage fish, may be factors limiting the bass population in Lake Billy Chinook.

Water quality is generally good in the reservoir. Surface temperatures in the summertime remain mostly below 70 F and have rarely exceeded 75 F. Normally, a well defined thermocline begins at about 20-25 feet during the summer months. Kokanee are not necessarily confined to the thermocline during this period. Dissolved oxygen levels both above and below the thermocline are more than adequate for salmonids; hence, it is not uncommon to find kokanee near the surface as well as in deeper water.

Limnological studies conducted from 1961 to 1965 revealed that the Metolius and Crooked rivers contribute about twice the amount of flow to the lake than the Deschutes. The Metolius runs considerably cooler than the Deschutes and Crooked rivers during the summer, resulting in a weaker stratification in the upper Metolius arm than in other portions of the lake. The Crooked River is also much more turbid than the other two rivers, particularly during late winter and spring. In addition, Crooked River is the most alkaline, and the Metolius the least alkaline.

Lake Billy Chinook is a good example where a permanent epilimnion exists during the summer stratification period (~May 1-September 30). Water is drawn exclusively from the hypolimnion for hydroelectric purposes. Nutrients collect and remain trapped in the upper layers of the lake throughout the summer, giving rise to substantial filamentous algae blooms.

Surveys conducted from 1985 to 1988 indicate that zooplankton production in the lake is variable from year to year. In addition, plankton densities appear to be consistently higher in the Metolius arm than in the Crooked River and Deschutes River arms. As a consequence, kokanee

production and growth appear to be best in the Metolius arm. One theory behind the reason for lower plankton densities in the Crooked River and Deschutes River arms is that both rivers carry more nutrients into the lake than does the Metolius River, resulting in algae blooms of a greater magnitude that in turn limit zooplankton production.

PGE is required by their operating license to maintain the reservoir within one foot of full pool during the period between June 15 and September 15 each year for recreational purposes. The company may lower the reservoir as much as 85 feet during the winter period. However, PGE usually does not draft the reservoir more than 10 feet except in situations where energy demand is high. The effect on the lake's fish populations is probably minor under these normal operating circumstances.

FISHERY MANAGEMENT

Current Management

Regulations. Except for the Metolius Arm, Lake Billy Chinook is open to year-round angling. The Metolius Arm is open only from March 1 to October 31 each year to accommodate concerns expressed by the Confederated Tribes of the Warm Springs with trespass on tribal lands. Management on the Metolius Arm is coordinated with the Tribe. Anglers must have an Oregon angling license and a tribal fishing permit to fish in the Metolius arm.

Beginning in 1988, the trout catch limit on Lake Billy Chinook was reduced to 5 per day (6-inch minimum length; no more than 1 over 20 inches). Prior to 1988, the catch limit was 10 per day. The limit was lowered as a means of reducing the harvest of smaller sized bull trout. A special bonus bag regulation is also in effect that allows anglers to take up to 25 kokanee per day. The general statewide catch and length limits apply to bass.

Stocking. The Dechutes Valley Water District is required to release a minimum of 1,000 trout (3 per pound) annually.

Rainbow fingerlings were stocked annually from 1964 to 1975 by the Oregon Game Commission. The Disease Ceratomyxosis is considered to have been a major factor limiting the success of those releases.

In 1970-71 the Game Commission also released small kokanee fingerlings into the lake. By then, however, kokanee were well on their way toward establishing a population in the lake as a result of kokanee escaping downstream from an existing population in Suttle Lake and a sockeye run. The Game Commission also released about 10,000 excess summer

steelhead smolts in 1966 and 13,000 Atlantic salmon fingerlings in 1973. While the Game Commission was releasing rainbow, the Fish Commission was also releasing coho salmon into the lake. From 1962-64 about 3 million young coho were released to evaluate downstream passage facilities associated with Round Butte and Pelton dams.

Bass and crappie were never stocked into the reservoir. Bass most likely entered the lake from Prineville Reservoir via the Crooked River. Crappie are present in many private farm ponds in the area and may have been introduced into Billy Chinook from irrigation runoff water.

Besides the stocking of juvenile fish, returning adult salmon and steelhead were passed over the dam and released into the lake also. From 1963-1966, approximately 400-600 chinook salmon and 250-430 summer steelhead were passed annually over Round Butte dam. Later, during the 1971, 1972 and 1973 run years, 925, 291 and 50 excess hatchery adult summer steelhead, respectively, were passed.

Access. Public access to the lake is provided by the Cove Palisades State Park and the Deschutes Nation Forest Sisters Ranger District). The State Park maintains three day-use areas and two campgrounds on the Crooked River and Deschutes River arms. Each day-use area also has a boat ramp. The National Forest maintains a campground and boat ramp at Camp Perry south on the upper Metolius Arm.

During the warmer months of the year, recreational use of the lake is high. Swimming, boating, angling and water-skiing are the primary recreational activities. Day-use estimates for the State Park in 1987 and 1988 were 521,535 and 447,924 visitors, respectively. These estimates do not include overnight campers at the State Park and National Forest campgrounds or patrons of private facilities on the lake. Many visitors and campers are anglers.

Most of the angling is done from boats. Access for bank angling is limited by the steep terrain surrounding the lake. Prior to opening the Crooked River and Deschutes River arms several years ago to year-round angling, boat launch facilities on both arms were adequate for spring-summer-fall use. However, with year-round angling there has been an increase in angling using the lake during 'off' seasons of the year. All season or low water boat ramps and docks are needed to accommodate year-round angling. Year-round angling has also raised the need for increased maintenance on State Park facilities associated with the boat launch sites.

Opportunities to Change Management

The current fish management program at Lake Billy Chinook provides a diverse sport fishery. Anglers come to the lake to fish for kokanee, bass, and trout. Opportunities to change management are somewhat limited, however. The popularity of the existing fisheries, particularly the kokanee fishery, preclude any need to change management emphasis at this time. In recent years, the bass and bull trout fisheries have also increased in popularity.

Another reason that might preclude a major shift in management emphasis is the consideration given to existing management programs on adjacent water bodies such as the Metolius and Deschutes rivers. Management changes on Lake Billy Chinook need to be consistent with management programs on adjoining water bodies. Currently, there is no apparent conflict among these programs.

The Warm Springs Confederated Tribes has proposed a feasibility study that would examine downstream passage, intersperse competition, habitat availability and the effects of disease associated with returning anadromous fish to the upper Deschutes basin.

A comprehensive land use plan for the lake is needed. Land use matters until now have generally been handled on an individual basis with little attention given to their cumulative impacts on the reservoir. Of particular concern is the amount of private development associated with the Metolius arm. Past development there has been detrimental to fish habitat and has reduced public angling access.