

LAKE BILLY CHINOOK
FISH MANAGEMENT PLAN

OREGON DEPARTMENT OF FISH AND WILDLIFE
OCHOCO DISTRICT
JUNE 1989

SUMMARY

MANAGEMENT DIRECTION--SELECTED OPTIONS AND ALTERNATIVES

KOKANEE. The preferred management option is to manage exclusively for wild fish; the preferred management alternative is to manage for intensive use.

RAINBOW AND BROWN TROUT. The preferred management option is to manage for wild plus hatchery fish; the preferred management alternative is to manage for basic yield.

BULL TROUT. The preferred management option is to manage exclusively for wild fish; the preferred management alternative is to manage bull trout as a featured species.

BASS. The preferred management option is to manage exclusively for wild fish; the preferred management alternative is to manage for basic yield.

CRAYFISH. The commercial crayfish fishery will continue to be managed under the existing statewide and Tribal regulations.

MANAGEMENT OBJECTIVES

1. Protect, maintain, and enhance fish habitat in Lake Billy Chinook.
2. Protect, maintain, and enhance angler access.
3. Continue to provide a diversity of angling opportunities on the lake.
4. Place added emphasis on protecting, maintaining, and enhancing the bull trout population.
5. Continue monitoring the crayfish population.
6. Implement an educational program to make the public more aware of the fishery resource and issues surrounding them.

LAKE BILLY CHINOOK

FISH MANAGEMENT PLAN

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 (ODFW). Fish management plans embody overall agency goals and objectives while providing management direction specific to individual water bodies.

This 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

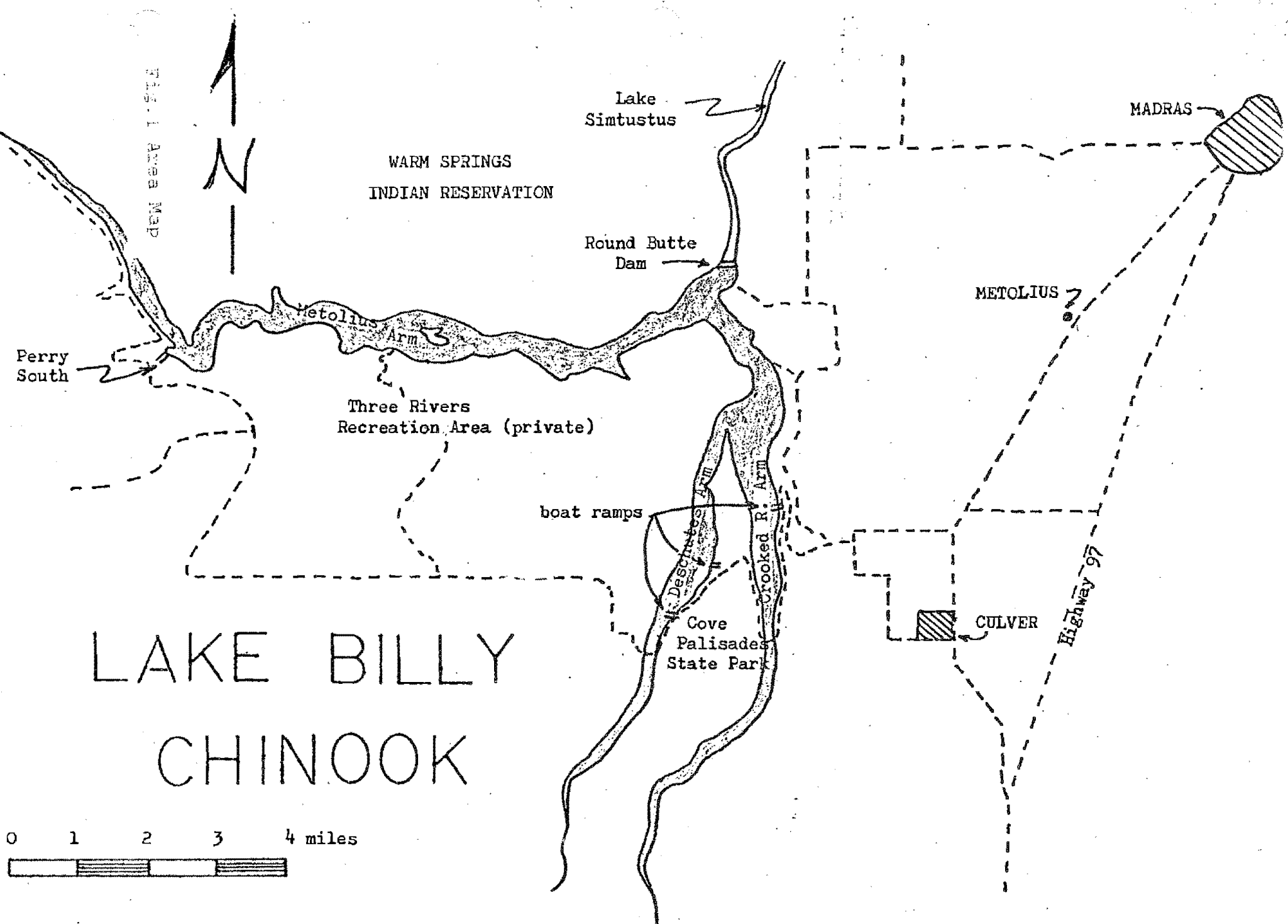
Dam on the Deschutes River. PGE operates the reservoir and adjoining facilities for electric power production.

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 (Fig.1). 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.

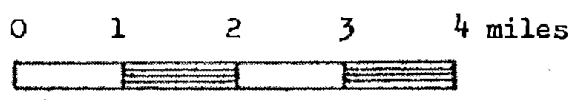
Several small tributary streams, found mostly along the Metolius arm, empty into the reservoir but are of very little consequence. The majority of the adjacent lands are in federal, state and tribal ownership. Federal lands, managed by the Bureau of Land Management, Crooked River National Grassland,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



LAKE BILLY CHINOOK



Game Fishes

Kokanee. Nine game fish species are found in Lake Billy Chinook (Table 1). Of these, kokanee is by far the most abundant and widely distributed game fish in the reservoir. Kokanee mature and spawn after three or 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 area 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 12 inches or more in length,

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>	
Coarcescale 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>

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 bass far outnumber largemouth bass (~50:1), and is the second most abundant game fish in the reservoir. The bass populations 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 generally limited 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 consists of trout under 12 inches. Larger fish are occasionally taken.

Bull trout inhabit the lake, but are less abundant than rainbow and brown trout. Though present in all three arms, they are predominantly found in the Metolius arm. A study begun in 1985 has shed some light on important aspects of bull trout life history in the Metolius River and Lake Billy Chinook. Adult bull trout spawn during the fall in several cold water tributaries to the Metolius River. After

tributaries and the mainstem before emigrating to the reservoir. Once in the lake, bull trout are capable of sustaining fast growth rates; ranging from 3 to 7 inches per year. In 1989, an angler targeting on bull trout caught a 34-inch, 23-pound 2-ounce fish in the Metolius arm. This fish established a new 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 in the 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 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 until 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

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: largescale and bridgelip. 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 are found throughout the lake. In the past, a few roach (tui chubs) have appeared in fish samples collected by the Department, but none have been seen in recent years. Apparently, they have never been present in the reservoir 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

1983 and 1988 suggest that the crayfish population has remained fairly stable in recent years in the face of an intense commercial fishery.

Interspecific Relationships

Interrelationships among fishes are a concern anytime two or more species inhabit the same waterbody. Concerns are generally of two sorts. One focuses on competition for such basic needs as food and space, while the other deals with predation. These concerns become amplified when the discussion involves warmwater and coldwater fishes.

The exact relationships of coldwater, warmwater and nongame fishes 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. Non game species are probably preyed on by basses when those species occupy the same habitats. The importance of non game fishes as prey is unknown.

Even less is known about the relationship of bass and trout. Information from fish sampling programs in recent years indicates that there is minimal overlap among these species

Habitat Quality

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 as 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

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 light penetration and 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

Kokanee are abundant and widely distributed. 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 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 trout are most adapted to lotic environments. 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 does not provide optimum conditions for bass. Smallmouth bass are 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. No study has ever attempted to identify factors limiting bass.

FISHERY MANAGEMENT

Regulations. Except for the Metolius Arm, Lake Billy Chinook is open to year-round angling. The Metolius Arm is open from March 1 to October 31 each year to accommodate Tribal concerns relative to their lands. Management on the Metolius Arm is coordinated with the Tribe, and anglers must have both 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). The limit was reduced to curtail the harvest of bull trout. A special bonus bag also allows anglers to take up to 25 kokanee per day. The general statewide catch and length limits apply to bass.

Stocking. Lake Billy Chinook is presently receiving varying numbers of spring chinook and about 15,000 yearling rainbow or brown trout annually from the Opal Springs Hatchery, owned and operated by the Deschutes Valley Water District (DVWD).

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.

Crayfish. Crayfish are an abundant resource in Lake Billy Chinook. As a consequence, they are intensively commercially harvested. Lake Billy Chinook annually provides about 40% of the statewide harvest. In 1987, over 150,000 pounds of crayfish were landed from the reservoir. In 1988 the figure was about 78,000 pounds. The size limit(statewide) on commercially harvested crayfish was increased in 1988 and may be part of the reason for the reduced landings compared to the previous year. Several years under the new regulation will be needed to determine its full effect on the crayfish population and commercial fishery in the lake.

Non-Indian sport and commercial crayfishermen are allowed to fish in the Crooked River and Deschutes River arms. In 1987 the Tribe began issuing a limited number of permits to tribal members allowing them the opportunity to commercially fish in the Metolius arm. The Tribe's commercial crayfish regulations are similar to those of the state.

Probably the greatest concern with the commercial crayfish fishery has come from the crayfishermen themselves. In recent years the number of commercial crayfishermen has increased, leading to what can best be described as 'territorial' disputes among the fishermen themselves. The Department currently does not regulate the number of

Access. Public access to the lake is provided by the Cove Palisades State Park and the Deschutes National 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 anglers using the lake during 'off' seasons of the year. All season or low water boat ramps and

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, interspecies 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.

MANAGEMENT DIRECTION

Selected Options and Alternatives

Selected management options and alternatives are given individually for the primary game fish species. During the development of this plan there was agreement among those involved regarding preferred options and alternatives for managing the various fish resources. As a consequence, displaying a range of management options and alternatives was deemed unnecessary.

- 1) Kokanee. The preferred management option for kokanee is to manage exclusively for wild fish.

Natural reproduction is more than adequate to provide a substantial fishery in the lake.

The preferred management alternative for kokanee is to manage for intensive use. Lake Billy Chinook attracts intensive angler use because of the lake's popularity as a good kokanee fishery. The lake can support a year-round fishery on kokanee; however, inclement weather precludes much use during the winter period. In most years, kokanee are abundant. In some years, they are overly abundant. Hence the liberal bag limit that encourages intensive use.

2) Rainbow and Brown Trout. The preferred management option for rainbow and brown trout is to manage for wild plus hatchery fish. The emphasis here will still be to insure that the wild population is not altered or reduced. Wild rainbow and brown trout originate in all three rivers. Though the Department has no plans to release hatchery trout into the reservoir, this option was selected to recognize the annual release of legal-size hatchery fish into the Crooked River from Opal Springs Hatchery, approximately 1/4 mile above the lake. It is assumed that many of these fish reach the lake and are caught by anglers. Deschutes stock rainbow and/or brown trout are the selected stock to be used. These releases are not expected to have significant effects on the wild population.

The preferred management alternative is to manage rainbow and brown trout for basic yield. The trout fishery in Billy Chinook is generally consumptive in nature and relies almost entirely on natural productivity; no special regulations are necessary.

3) Bull Trout. The preferred management option for bull trout is to manage exclusively for wild fish. The emphasis here is again to protect the integrity of the wild population.

The preferred management alternative is to manage bull trout as a featured species. This alternative was selected because of the unique opportunity anglers have to catch relatively large bull trout in Lake Billy Chinook compared to most other places in the state. In addition, the species has gained special attention with regard to possible "candidate species" status.

The population in Billy Chinook appears to be healthy and may even be improving, while elsewhere in the state some bull trout populations are declining. A growing number of anglers are coming to the lake to specifically fish for bull trout. Special regulations may be required to maintain the existing character of the population. The need for such regulations should

4) Bass. The preferred management option for bass is to manage for wild fish only. In Oregon, there is generally little need for hatchery-reared warmwater fish other than the initial need for establishing fish populations. The bass population is obviously well established in Lake Billy Chinook.

The preferred management alternative is to manage bass on a basic yield basis. General statewide regulations will apply. There has been an interest among certain bass clubs to manage bass on a 'quality' basis instead. However, it is felt that quality management is not a viable alternative at this time because the lake has been incapable of producing substantial numbers of mid- to large-sized bass (a general guideline for the 'quality' alternative). There appears to be little opportunity to increase bass size through regulation changes. Further study is necessary to determine whether management on a 'quality' basis could be achieved.

5) Crayfish. The commercial crayfish fishery will continue to be managed under the existing statewide and Tribal regulations.