

FISH MANAGEMENT PLAN

PRINEVILLE RESERVOIR

INTRODUCTION

Prineville Reservoir is a Bureau of Reclamation (BOR) on-stream multi-purpose reservoir on the Crooked River in Crook County, approximately 17 miles south of Prineville (Fig. 1). The project was authorized by Congress in 1956 with functions including irrigation, flood control and industrial water. Recreation and downstream fish and wildlife benefits were not included as project functions. Water impounding began December 12, 1960 and the reservoir became functional during the winter of 1960-61. No upstream fish passage was provided.

Various agencies are involved in the reservoir operation. Ochoco Irrigation District, under BOR guidelines, operates the water control structure, thus controlling reservoir pool level as well as stream flow below the reservoir. Prineville Reservoir State Park is managed and maintained by State Parks. Crook County maintains two boat ramps on the reservoir. The Department of Fish and Wildlife manages the fish resources of the reservoir and has entered into an agreement with BOR and Crook County to manage an 18 square mile area adjacent to the upper one-third of the reservoir for waterfowl, big game and other wildlife.

Prineville Reservoir is heavily used by recreationists. The 1983 BOR Recreation and Wildlife Summary indicated that the reservoir was used by 285,031 anglers, hunters, boaters, swimmers and campers.

In October 1986, the Oregon Fish and Wildlife Commission accepted the Department's recommendation to manage Prineville Reservoir for hatchery trout and wild bass and brown bullheads.

HABITAT

Description

Inundated lands were primarily moderately steep, juniper-covered canyons. Some irrigated hay land was adjacent to the river. River temperatures were excessively high and flows were extremely low during the summer months.

Much of the upper one-half of the reservoir bottom consists of mud flats. Heavy annual silt loads into the reservoir continue to build up shallow flats generally devoid of vegetation or suitable habitat structure. Rocky shoreline areas are oftentimes covered with a layer of sediment. Willow thickets are located along the high water line in a few locations. The lower portion of the reservoir is characterized by steep, rocky shorelines and deeper water. However, some shallow cove areas do occur. Shoreline vegetation is minimal.

Maximum surface area of the reservoir is 3,010 acres and the minimum is 2,300 acres. Maximum depth is 230 feet with an annual drawdown of 25 to 30 feet. The elevation at full pool is 3,235 feet above mean sea level. There are 36.0 miles of shoreline, of which 34.5 are in public ownership.

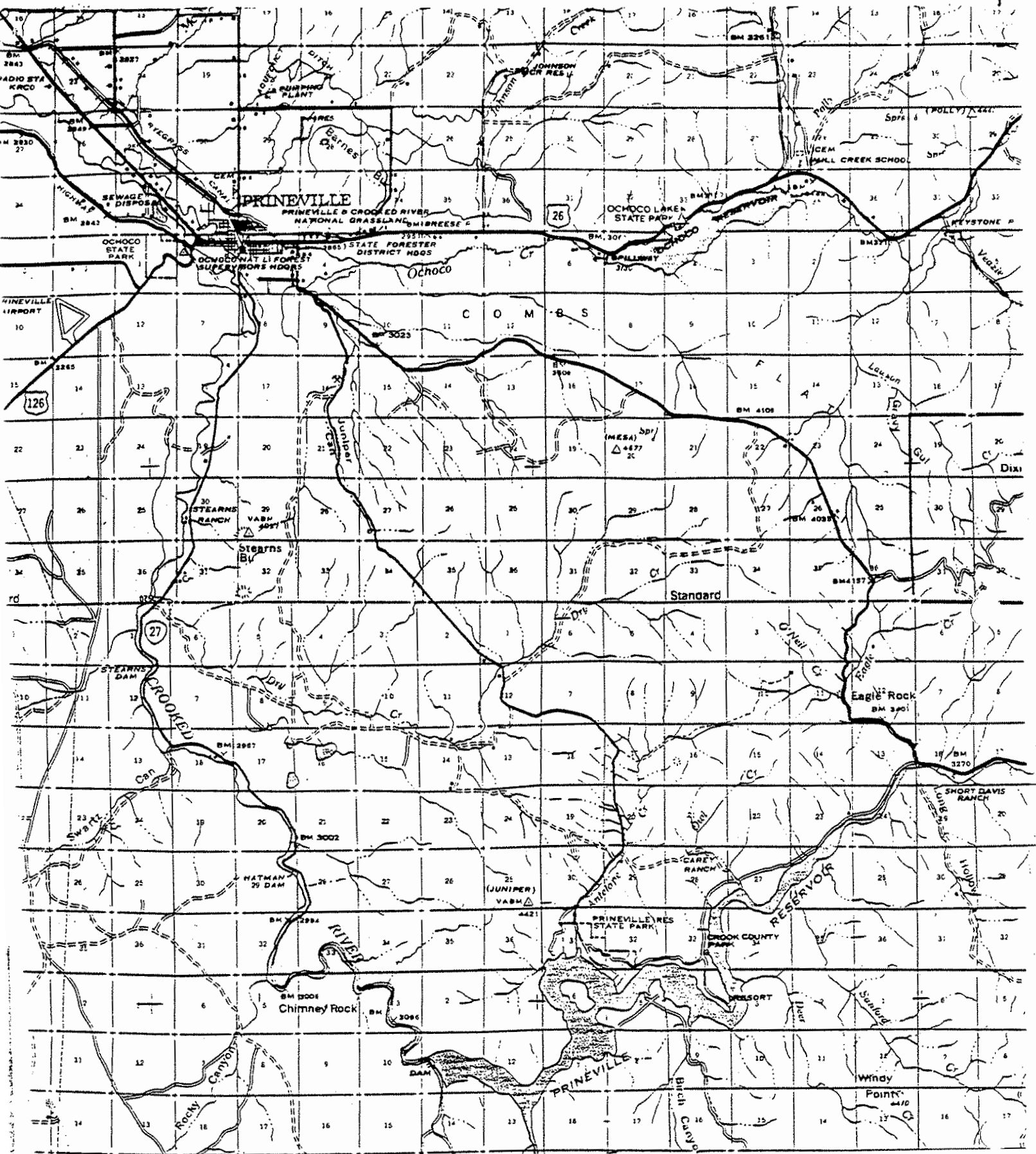


Figure 1. Prineville Reservoir Vicinity Map

The total storage capacity of the reservoir is 155,000 acre-feet (a.f.), consisting of 153,000 a.f. of active storage and 2,000 a.f. of dead or inactive storage. As authorized by Congress and currently operated, 93,000 a.f. of the active capacity are allocated for the exclusive use of irrigation and 60,000 a.f. are allocated for the joint use of irrigation and flood control. In addition to irrigation and flood control releases, minimum flows of 10 cfs are maintained whenever possible for fish and wildlife purposes in the Crooked River below the reservoir. Presently, 70,300 a.f. of space are under contract with the remaining 82,700 a.f. of active space still uncommitted.

During the late 1970's public hearings were held in an effort to assign some of the unallocated space to fish, wildlife and recreation. The recommended plan which developed is: 51,000 a.f. for reservoir recreation, fish and wildlife; 3,700 a.f. to increase the minimum downstream flow; 95,300 a.f. for irrigation; and 3,000 a.f. for domestic, municipal and industrial water supplies. The space assigned for joint flood control use would remain at 60,000 a.f. The recommended minimum stream flows below the reservoir would be changed from the present 10 cfs to 75 cfs, or 35 cfs whenever first-of-the-month reservoir storage is 95,000 a.f. or less. To date, the recommended changes have not been approved by Congress.

The current operating schedule demands that 60,000 a.f. of space must be evacuated prior to November 15 and, unless storing for a flood, remain evacuated until February 15. Recent weather patterns in the watershed have required substantial dumping of water during October and early November to meet the flood control requirements.

Fish Production Limitations

Geology of the reservoir tributaries results in heavy silt loads entering Prineville Reservoir. Much of the watershed above the reservoir, and Bear Creek in particular, contains montmorillinite clay which stays in suspension for several years. Eroding streambanks also contribute heavy loads to the reservoir during the spring run-off period. As a result, the reservoir is muddy during the spring months. Clays remain suspended year-round at depths greater than 25 feet. Such turbidity tends to limit production of benthic organisms.

We are not sure whether zooplankton is being produced within the suspended clay layer. Sampling from May to September 1985 showed an average of 14,400 organisms per cubic meter with (55% cyclops, 47% Daphnia). The 14,400 organisms per cubic meter compares with observations of Suttle Lake at 34,100, Paulina Lake at 33,300, North Twin Lake at 37,800, and East Lake at 29,400 during the same months a few years ago.

Bass spawning success is oftentimes hampered by adverse water temperatures. Cold weather, combined with chilling winds, can cause water temperatures too cold to allow for good spawning success. Increased wave action created by strong winds along shallow shoreline areas are also detrimental to bass spawning. The growing season for zero-age (young of one year) bass is short, and winter conditions severe. Bass successfully spawned and reared during the summer are subject to heavy over-winter mortality.

Bass habitat is presently degrading. Siltation is covering rocky areas, stumps and other previously used habitat. Organic structure such as stumps are rotting and decreasing in quantity and quality. Extensive habitat work is needed to maintain or improve structure, primarily for largemouth bass.

The annual drawdown exposes shallow areas, and as a result, food production in such areas is greatly reduced. The drawdown also reduces available living space. Abrupt spring drawdowns will occasionally expose bass nests.

FISH POPULATION

Rainbow trout fingerlings have been stocked annually since the project was completed. Lahontan cutthroat trout fingerlings have been stocked annually since about 1979. Up to 400,000 rainbow fingerlings and 250,000 cutthroat fingerlings were stocked each year. Beginning in 1986, stocking of rainbow will be reduced to about 170,000 fingerlings annually. However, they will be released at a larger size and later in the spring than in the past. Releases of Lahontan cutthroat will be discontinued altogether after 1986.

Various trout species and strains have been released over the past years including Oak Springs rainbow, Eagle Lake rainbow and steelhead. Release schemes have also included variations in time of release, size at release, marked fish and unmarked fish.

Marked rainbow fingerling released into the reservoir during the late 1960's and early 1970's indicated the following:

1. Virtually all trout caught are hatchery produced. There is little natural production.
2. Spring releases of large fingerling have been more successful than late spring releases of smaller fish.
3. Fall releases of both large and small fingerling have shown inconsistent results.
4. Trout growth is good until a length of 12-14 inches is reached. Few rainbow exceed 14 inches.
5. Size of fish at release is far more important than strain of fish.
6. Rainbow released into the reservoir make up a major portion of the trout caught in Crooked River below the dam.

One release of marked steelhead was made in October 1967 when hatchery rainbow fingerling were unavailable. Most moved out of the reservoir when the reservoir spilled in the spring of 1969. Eagle Lake rainbow were released in 1974 to see if they would be a better competitor. No significant changes were detected.

Lahontan cutthroat fingerling were stocked in conjunction with rainbow fingerling in 1979. Being recognized as one of the most predatory of all the trouts, it was hoped they would do well and provide a fishery when rainbow

angling was slow. Results have been mixed. Growth, survival and catchability have been acceptable; however many anglers are dissatisfied with the cutthroat body condition and fighting ability. Cutthroat releases will be discontinued after 1986.

Outbreaks of Lernaea are widespread in some years during the late summer and early fall months. In September, 1984 in the upper portion of the reservoir 90.7% of the rainbow and 95.5% of the cutthroat were infected with Lernaea while in the lower portion of the reservoir 68.3% of the rainbow and 57.1% of the cutthroat were infected. In addition most trout are infested with tapeworms.

Largemouth and smallmouth bass were released into the reservoir shortly after reservoir completion. The bass populations, since the initial releases, have been sustained entirely from natural reproduction. Bass reproduction is highly variable, resulting in a wide range of strengths of successive year classes.

Largemouth bass are found mostly in the upper one-half of the reservoir while smallmouth bass are common throughout the reservoir. The shallower mud flat areas, creek mouths, natural coves with stumps and other underwater structures are preferred by the largemouths. Smallmouth bass prefer rocky shorelines and outcroppings and deeper water. An adequate, but not overly abundant, supply of forage fishes is available to both bass species.

The variable spawning success, and subsequent variations in year class strengths, is reflected in the bass fishery. As year classes with poor survival move through the fishery the absence of certain size bass is very obvious.

A large population of brown bullheads is present in the reservoir and appears to be increasing in abundance. The bullheads average 8-10 inches long, with specimens up to 18 inches having been recorded. The majority of the population appears to be located in the shallower upper end of the reservoir; however, they are common throughout. During the past several years extremely large schools of young-of-the-year bullheads have been observed in the shallow areas. It appears the bullheads are over-populating and becoming stunted.

Roughfish populations include squawfish, chiselmouth, bridgelip sucker, coarsescale sucker, sculpin and dace. Realizing that trout and bass are not caught well by gillnets in the reservoir, 90-95% of the experimental gillnet catches consist of roughfish. The effect of a high roughfish population on game species within the reservoir is not clearly understood.

FISHERY

Prineville Reservoir is open to year-round angling. Angler use is heavy. A 1983 BOR report indicates that about 285,031 recreation use days were expended during the year. It is estimated that in excess of 50% of the recreationists were anglers.

Trout anglers catch trout generally throughout the year. Spring catches usually consist of 10-12 inch trout. Yearling trout normally enter the

fishery in the fall when they reach 6-8 inches. Trolling and bank angling are both popular. Ice fishing is popular during those years when the ice that forms is thick enough.

The largemouth and smallmouth populations have provided a good fishery throughout the history of the reservoir. Bass angling pressure is relatively heavy from late April through September, and appears to be increasing some each year. Fluctuations in year-class sizes, however, provide some variation in yearly angler success. In recent year, smallmouth bass have normally made up the majority of the bass angler's catch. Because of concerns regarding overharvesting the bass population, a 10-inch minimum length on bass was put in effect on the reservoir in 1983.

Several bass tournaments are held on the reservoir each year. Incomplete tournament data indicates that since 1979 an average of 1,080 tournament angler hours were expended annually.

The large population of brown bullheads attracts relatively large numbers of anglers. A good fishery occurs at night during the late spring and summer months in the upper one-third of the reservoir. Composition of angler use in 1985 was 40% for trout, 27% for bullheads, 22% for "anything" and 11% for bass.

DISCUSSION

Thousands of angling recreation days are generated annually at Prineville Reservoir. Trout anglers catch trout generally throughout the year. Bass angling pressure is heavy from late April through September and a good brown bullhead fishery occurs at night during the late spring and summer months.

However, there are some significant limitations. Suspended clays remain year-round in water over 25 feet in depth and are undoubtedly blanketing some benthic production. Zooplankton production is below that of several other eastern Oregon waters. The annual drawdown of 25-30 feet exposes shallow food producing areas. Roughfish (primarily coarctate suckers and chiselmouth) make up 90-95% of the annual inventory net catches and are supplying an unknown degree of competition to the game fish populations.

Prineville Reservoir is probably the best "two-story" fishery (trout and warmwater) in the state, but we have a substantial amount of work yet to do if a management alternative is selected that goes beyond managing for trout, bass and brown bullheads.

RECOMMENDATION

Management Option: Manage Prineville Reservoir for wild trout and wild bass and brown bullheads.