

**FISHERIES BUREAU
MONTANA FISH, WILDLIFE & PARKS**

Federal Aid Job Progress Report

Montana Statewide Fisheries Management

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**Mountain Lake Surveys and Fisheries Management Recommendations:
Rattlesnake Wilderness Lakes**

Executive Summary

The Rattlesnake National Recreation Area and Wilderness (RNRAW), considered the project area for this document, contains approximately 45 alpine and sub-alpine “mountain” lakes (> 1 acre) that lie at 5,600-7,700 ft elevation. The RNRW is located just north of Missoula at the southern extent of the Mission Mountain Range in west-central Montana on lands managed by the Lolo National Forest (Missoula Ranger District).

The RNRW consists of formally designated Wilderness in the headwaters of Rattlesnake Creek, Grant Creek, and West Fork Gold Creek, as well as bordering non-wilderness lands to the south which make up the Rattlesnake National Recreation Area. Because nearly all mountain lakes in the project area lie within the Wilderness boundary (except Farmers Lake #3), we simply refer to them as Rattlesnake Wilderness lakes.

Despite difficult access and relatively low recreational use compared with similar waters in the region, Rattlesnake Wilderness lakes are physically diverse and provide a range of recreational opportunities. All of these lakes were presumed to be historically fishless. However, trout were introduced into most of the larger waters in the 1960s -1980s. Many of these populations did not persist when stocking was discontinued after Wilderness designation. Currently, 16 of the lakes larger than one acre support trout fisheries (36%), some of which are maintained through stocking. The remaining lakes (~ 29) are not fish-bearing.

Lake Surveys

In 2006-2010, Montana Fish, Wildlife and Parks (MFWP) fisheries personnel and volunteers surveyed nearly all fish-bearing and fishless mountain lakes in the RNRAW project area to describe physical and biological characteristics. These surveys consisted of fish population assessments, amphibian searches, bathymetric mapping, water chemistry measurements, and a description of recreation sites and trail networks.

Lake surveys revealed a diverse set of lake environments ranging from high, very oligotrophic alpine waters positioned in rocky glacial cirques to sub-alpine, mesotrophic lakes bounded within forested glacial troughs. Physical measurements collected at most lakes (secchi depth, PH, conductivity, TDS and surface water temperature) reflected this diversity. Lake size and depth were also extremely variable, although most of the deepest and largest water bodies supported introduced trout populations.

Lake fisheries were comprised of three trout species: westslope cutthroat trout (*Oncorhynchus clarki lewisi*; 12 lakes), Yellowstone cutthroat trout (*O. clarki bouvieri*; 1 lake) and rainbow trout (*O. mykiss*; 3 lakes). The majority of these non-indigenous populations were self-sustaining, although three are supplemented with periodic stocking of westslope cutthroat trout to maintain fishery quality (Bull, Fly, and Gold Creek Lakes).

Species of fish and level of natural reproduction were important factors affecting trout abundance, body condition and size structure at mountain lake fisheries. Self-sustaining trout populations (stocked historically) typically displayed high rates of natural reproduction, low body condition, and truncated size structure. Body condition and relative abundance were significantly lower for self-sustaining rainbow trout relative to cutthroat trout. Currently stocked westslope cutthroat trout populations (with limited natural reproduction and managed densities) exhibited significantly greater mean lengths, maximum lengths, and body condition relative to self-sustaining populations. Stocked westslope cutthroat trout fisheries represent the best opportunities to actively manage species composition, fish density and fishery quality.

Fishless lakes comprised 64% of the water bodies > 1 acre in the RNRAW project area. Numerous other potholes, wetlands and seasonal ponds (< 1 acre) were also noted. Fishless lakes were broadly distributed across the project area and represented a diverse range of physical aquatic environments. Although fishless lakes were generally smaller, higher and shallower than fish-bearing water bodies, at least nine fishless lakes (31%) were > 12 ft deep and considered capable of supporting (over-wintering) trout populations.

Several amphibian and reptile species were documented at Rattlesnake Wilderness lakes. The two most common amphibian species were the Columbia spotted frog (*Rana luteiventris*) and long-toed salamander (*Ambystoma macrodactylum krausei*). Columbia spotted frogs were common or abundant along the perimeter of nearly half (47%) of all lakes and fish populations appeared to have limited impact on the abundance or distribution of this species. Although not quantified, Columbia spotted frog adult, juvenile, larval densities appeared most closely related to the amount of emergent aquatic vegetation, lakeshore habitat and the timing of our lake surveys. In contrast, the density and likely the distribution of long-toed salamanders did appear

to be inhibited by the presence of fish in mountain lakes. Although 15 fish-bearing lakes were surveyed, long-toed salamanders were documented at only one. Surprisingly, long-toed salamanders were not observed at many of the larger fishless lakes, but dense congregations of larvae were documented at smaller wetlands and ponds throughout the project area. Western and common garter snakes were the only reptiles observed during lake surveys. These species were common along lakeshores, apparently because amphibians and fish are important dietary components.

Access was an important factor contributing to the range of recreational opportunities at Rattlesnake Wilderness lakes, as most are remote and require 8-10 miles of non-motorized travel to access them from various USFS trailheads. However, the presence of fish in lakes had an obvious impact on the location of maintained routes and the relative amount of use. More than 65% of fish-bearing lakes (11 of 16) were accessible by established trails, while less than 25% of fishless lakes (7 of 29) were accessible by designated trails or distinguishable routes. None of the lakes in the project area were directly accessible via roads or routes open to motorized travel.

Angling pressure and overall recreational use at Rattlesnake Wilderness lakes was low when compared with other mountain lakes in western Montana and was very low relative to nearby valley floor lakes and rivers. However, modest human disturbance and evidence of long-term use was visible at most fish-bearing lakes (73%). This included established campsites, fire pits, trails around the lake perimeter, and infrequent human refuse. Evidence of recreational use and disturbance was minimal at fishless lakes, with only a few exceptions (e.g., Upper and Lower Twin Lakes).

Biological, Social and Administrative Considerations for Mountain Lake Management

Recommended management strategies and objectives were developed for each lake and each sub-basin (management unit) based on collective lake survey results, pertinent biological and social considerations, and current MFWP management philosophies. Key biological and social considerations in mountain lake management include: (A) providing a diversity of recreational opportunities and fishery qualities, (B) preserving the integrity of natural aquatic systems, (C) minimizing impacts to native fish populations, (D) land management designation and regulations, and (E) levels/patterns of recreational use. MFWP's lake management guidelines and priorities for the area essentially reflect these considerations.

The complex interaction of land management and fisheries management makes coordination among State and Federal resource managers essential, particularly in designated Wilderness. Although management objectives and mandates may conflict, MFWP and USFS managers have worked to develop a reasonable balance between fishery management and wilderness integrity through the *AFWA/USFS/BLM Agreement* (2006) and the *Cooperative Agreement for Fish, Wildlife, and Habitat Management on National Forest Wilderness Lands in Montana* (USFS & MFWP 2008). Mountain lake fisheries and aquatic resource management in Wilderness areas on National Forest system lands are important components of these agreements.

MFWP management philosophies for mountain lakes in the RNRAW project area stress: (1) providing diverse opportunities for anglers and recreationists, (2) maintaining fishless waters to sustain ecological integrity and natural processes, (3) promoting native fish where possible, (4) stocking fish only where required to meet fisheries objectives, (5) managing individual lakes in the context of the overall watershed and management unit, and (6) practicing adaptive lake management as new information and tools become available.

Improving fishery quality/diversity and preserving natural ecological integrity were the major biological objectives identified for mountain lakes management in the project area. Although seemingly conflicting, both objectives are achievable at the sub-basin scale and, in some situations, concurrently at the same lake. The impacts of introducing fish into historically fishless lakes have raised concern for a range of indigenous species and communities. With limited information, MFWP has addressed these concerns by stocking responsibly (i.e., species, location, density) and incorporating a physically diverse and geographically dispersed range of fishless waters into lake management plans. Maintaining ecological integrity also includes conserving native fish species in stream networks associated with lakes. Wild, non-indigenous trout populations in lakes serve as a continual headwater source of emigrants which may hybridize and compete with native fish populations, particularly bull trout and westslope cutthroat trout.

Management of Lakes and Lake Fisheries in the RNRAW Project Area

Rattlesnake Wilderness lakes were divided into three management units based on their geographic and hydrologic location: Gold Creek, Rattlesnake Creek and Grant Creek. The descriptions and management approaches for these units combine information from fishless lakes with historical data, recent survey information, and management strategies for individual fish-bearing lakes and associated stream networks.

Mountain lakes in the Gold Creek Management Unit are relatively accessible and are actively managed as quality westslope cutthroat trout fisheries. Three of the lakes (Bull, Fly, Gold Creek Lakes) have a long history of stocking and are still supported by scheduled plants every 5-7 years. Boulder Lake was planted prior to 2001, but stocking was discontinued since consistent natural reproduction was observed in our surveys. We generally propose to continue existing management practices to maintain these fisheries in the future. Lakes in this management unit support higher angler use relative to the other two units. This can be attributed to their close proximity to the USFS road system and trailheads, as well as the excellent westslope cutthroat trout fisheries that the lakes provide.

The three lakes included in the MFWP fish planting program are stocked exclusively with age-0 westslope cutthroat trout (M012 hatchery strain) as it is currently considered the only appropriate species for stocking in the project area. Alternative species will be evaluated in the future as new hatchery strains (particularly sterile stocks) are developed.

The Rattlesnake Creek Management Unit contains the majority of lakes in the RNRAW project area (37), including numerous fishless (25) and fish-bearing (12) waters. Lakes in this unit are

generally difficult to access and receive light recreational use, regardless of fishery status. Although many of these lakes were stocked historically and some maintain self-sustaining fish populations, no stocking has occurred in the Rattlesnake Management Unit for more than 25 years.

Mountain lakes in the Rattlesnake Management Unit exhibit a range of morphological and ecological conditions, including those which have been modified by levees and water control structures constructed at the lake outlets (10 lakes). Dams and other infrastructure require periodic maintenance and typically result in exaggerated annual water level fluctuations. Water level instability results in an obvious lakeshore “varial” zone which is not conducive to growth of aquatic or terrestrial vegetation, and significantly limits productivity and littoral habitat quality of many lakes in this unit. Management of outlet structures to minimize unnatural water level fluctuations is recommended at these lakes.

Fish-bearing lakes are widely distributed across the headwaters of Rattlesnake creek, and all support self-sustaining *Onchorhynchus* populations of westslope cutthroat trout (8 lakes), Yellowstone cutthroat trout (1 lake) or rainbow trout (3 lakes) that were established in the mid-1900s. Trout abundance, size structure and condition vary among populations.

Overall, we propose to maintain the current management status of lakes in the Rattlesnake Creek Management Unit, but changes in species composition may be warranted at some lakes. Regular stocking is considered unnecessary given the number and distribution of self-sustaining fisheries in the area, as well as the low level of angler use. However, conversion of rainbow trout fisheries to westslope cutthroat trout at Big, McKinley, and Sheridan Lakes may be warranted to improve the quality of these fisheries and enhance genetic compatibility with native populations downstream.

The Grant Creek Management Unit contains only three small fishless lakes that receive very little recreational use. Although Grant Creek Lake #1 (Rankin Lake) is likely capable of supporting a trout fishery, there are no records of stocking or fish presence. We do not recommend fish stocking or any changes in management for lakes in this unit.