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SUMMARY OF 1976 LAKE SURVEY DATA
RELATING TO THE STATUS OF TROUT FISHERIES
IN LASSEN VOLCANIC NATIONAL PARK

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Originally most of Lassen's lakes were fishless, being isolated from major river drainages. However, it is possible that Manzanita, Butte and Soda lakes may have had native populations because of their direct connection to native trout streams. On the other hand, it may never be exactly known if any had fish since all waters in the park that are of an apparent size that would support fishable populations have been altered by the introduction of fishes.

In the early years stocking of fishes was haphazard with introductions being made by anglers, sheepherders, packers, settlers and other users of the backcountry. Later, in the area of Lassen Peak, stocking was a cooperative effort of the U S Forest Service and the California Department of Fish and Game. When Lassen became a National Park, fisheries management became an administrative responsibility of the National Park Service. Through requests from the Service, the California Department of Fish and Game cooperated by supplying hatchery fishes and assisted with the actual planting operations in the park (Wallis, 1976).

Unfortunately records are not complete so the exact number of lakes planted is not known. Stocking records available in the park date back to 1928 and considering the success of some plants, earlier planting levels probably were nearly the same as in 1928 and subsequent years. Except for a dozen or so lakes that were planted experimentally from time to time, forty-one lakes in the park were stocked on a more or less regular basis. In effect this meant that from 10 to 30 lakes were stocked each year on what

appears to be sort of a rotation stocking schedule from 1928 through 1971. After that time, based on newly adopted policies, the park began phasing out artificial stocking. That policy evolved from recommendations contained in what has come to be called the Leopold Report. In 1963 the Secretary of the Interior appointed a special committee of prominent scientists headed by A. Starker Leopold to study wildlife management in the National Parks. They recommended that, wherever possible, natural ecosystems should be restored to and maintained at the natural condition that existed before interference by European man. That concept was incorporated into the management policies of the National Park Service and in 1972 was being implemented through a program of gradually phasing out stocking in the National Parks. A policy was also adopted that states that fish could be stocked in the waters of National Parks only for the purpose of re-establishing endemic populations of fishes. Public concern was expressed for the impact of a no-stocking policy on the recreational fishing in California's high lakes. As a consequence the National Park Service and the California Department of Fish and Game are conducting a two-year study to determine the biological, economic and recreational impacts of a no-stocking policy as applied to the four mountain National Parks in California. During the two-year study period, stocking will continue at a level not exceeding that in 1974. Future fishery management practices will be based on an analysis of the findings of this joint investigation.

To partly support that study it was determined that at Lassen a project would be undertaken to resurvey the lakes for the purpose of determining the existing ecological conditions, including the status of trout populations. To complete the project, two fisheries biology students (Jesse Purvis and

John West) from Humbolt State University were employed during the summer of 1976. After spending two days reviewing the park fisheries files and reports of past fisheries investigations, they consulted recent aerial photographs (1973-74) and topographic maps and completed a "paper" inventory of Lassen's standing water bodies. Following that inventory they proceeded with the field surveys.

Thirty-two (32) of Lassen's lakes had undergone some study in the past and each of these was resurveyed. In addition, all of the remaining named lakes and as many un-named water bodies as time would permit were surveyed.

The survey at each of the lakes consisted of collecting data on water temperature, color, clarity, depth, bottom and shoreline type, watershed conditions and generalizations on the type in intensity of use. Also, surface area of the lake, number and size of inlets and outlets, presence or absence of spawning sites, fishing intensity, accessibility, fish predators and relative abundance of aquatic invertebrates and vegetation were noted. Fish species present, if any, were sampled with rod and reel or experimental gill net.

Lakes were chosen for gillnetting based on past fishery investigations, large size or high visitor use. Lakes that were not netted were sampled with rod and reel for one hour each, or were not sampled if the bottom could be seen and no fish were visible.

Any fish captured were identified to the specific level, measured and weighed. Stomach samples were taken from all trout species, preserved and are being analyzed at Humbolt State University.

In conjunction with the lake surveys some creel data also was collected from fishermen. A volunteer questionnaire and personal contacts with fishermen both were used.

RESULTS

From the aerial photographs (1973-74 precipitation was 30% above normal) they identified 274 standing bodies of water. Of this number, 162 were visited during the summer and 31 were found dry, so 131 lakes were surveyed. Of the 65 named lakes in the park, 37 had previously been stocked with trout (does not include the four still being stocked). 17 Lakes were found to contain fish populations and 15 of the 17 contained trout. Finally, 7 lakes apparently have self-reproducing trout populations, 4 had only marginal conditions for natural reproduction and in 6 it was determined that spawning was lacking and that existing trout populations consisted entirely of stocked fish.

The trout caught in gill nets and by angling ranged in length from 4.4 inches to 20.7 inches and from 0.7 ounce to 5.6 pounds. The smallest was taken from Ridge Lake and the largest from Manzanita Lake.

Data from creel census pretty much supports the survey findings. All fish were taken from lakes that the survey determined had fish and size range of fish caught by anglers compared to that taken in gill nets. However, catch per unit effort data from the creel census is not very reliable because of the small sample size; a total of 44 reports were received, the most from one lake (Manzanita) was 13, but for several lakes only one report was available. The data available and the experience of the investigators does indicate that the easiest lake to fish is Terrace and the most difficult is Manzanita.

Discussion

The current status of trout populations in the park can probably best be summarized by briefly discussing the seven lakes which now have self-reproducing trout populations.

Dream Lake. This reservoir has a good population of rainbow trout but can never be a significant fishery because of its small size. An intensive use study and creel census should be completed for this water to determine if fishing restrictions are necessary to perpetuate this fishery.

Hat Lake. Another small one -- almost could be considered a wide part of the stream. Eastern Brooks are the principal fish here. The fishery has declined in recent years. West believes that food was a major limiting factor, but does not discount losses from fish moving downstream over the dissipator under the road and not being able to return, as well as heavy fishing pressure due to the lakes close proximity to the park road.

Horseshoe Lake. This is one of Lassen's best fisheries. This lake has been studied probably more than any other in the park. It has been gill netted at three different times and the results are possibly indicative of what is happening to the fish population.

Wallis(1959) A 23 hr gill net set yielded: 20%RB,40%EB,40% Chub
Everest(1963) 17 sets, 12.5 hrs ea. yielded: 4%RB,12%EB, 84% Chub
West & Purvis(1976) 2 sets, 14 hrs ea. Yielded: 4%RB,33%EB,62% Chub

Eastern Brook were last stocked in 1946 and rainbows in 1965. This seems to indicate that stocking rainbows did little to increase the trout population, in fact it seems to have caused an increase in the chub population which might be explained as indicating that the larger trout are feeding on the introduced fingerlings and are not holding down the chub population.

Admittedly, our data is rather limited but this possibility cannot be discounted in any future management planning for this lake.

Manzanita Lake. This is the big fish lake in the park but is extremely difficult to fish. From creel census data it required almost four hours per fish but most were large fish. Of 72 reported caught, 60 were over 14 inches.

Gill netting at two different times shows a change in dominance from Brown trout to Rainbow, which may be related to past stocking practices.

Hubbell(1961) 51 gill net sets yielded 84%BN, 12%RB, 1%EB, 3%Bullheads
West & Purvis (1976) 2-14 hr gill net sets yielded 26%BN, 69%RB, 2% Shiner

Hubbell believed substantial stocking should be continued because natural reproduction was inadequate to provide good fishing. West disagrees - He believes that stocking does little for angler success or trout population density in this lake. He feels that most stocked fish are consumed by the large trout.

Ridge Lake. Appears to have a well balanced population of Eastern Brooks. It was last stocked in 1965. Size of fish taken ranged from less than six inches to thirteen inches but the lake is small so cannot support a large population. This is indicated by gill netting overnight only yielding sixteen fish.

Snag Lake. Has a limited population of eastern brook and rainbows which are probably totally self-reproducing since stocking was discontinued in 1957. Factors possibly limiting population size are oxygen depletion in winter, parasites and summer temperatures limiting distribution of eastern brooks. (Everest, 1963; West and Purvis, 1976)

Terrace Lake. Contains a relatively large population of Eastern Brook trout and probably is overpopulated. West has recommended that fishing be encouraged to possibly improve fish size and condition.

In general, the lake survey, past investigations and stocking histories all seem to indicate that the lakes in the park are not extremely significant as natural trout waters.

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