

Lassen Volcanic National Park
Mineral, California 96063

M22

May 19, 1965

Memorandum

To: Regional Director, Western Region
From: Superintendent, Lassen Volcanic
Subject: Evaluation of Dr. DeWitt's Lake Survey

In reference to Mr. Myer's memorandum, dated May 11, 1965 we have reviewed Dr. DeWitt's final report, "Summary of Principal Findings and Management and Research Possibilities," and find it adequate in regard to fulfilling requirements of Contract Number 14-10-0434-1434.

His recommendations for additional studies and the implementation of specific management practices have been thoroughly reviewed and in reference to the same, we offer the following comments.

In light of the surveys completed, we feel additional studies of Grassy Creek and other referred to lake tributaries, are warranted, thus providing the most effective management for these waters. Resources Study Proposal, LAVO-N-3, Lakes and Streams, submitted on April 17, 1965, will adequately include these additional investigations.

We believe that Dr. DeWitt's recommendations for additional research, relevant to the effects of parasites on trout mortality in Snag Lake, are valid. However, in view of the relative remoteness of the lake, with resultant light fishing pressure, we feel that this project would best be deferred until other higher priority research is completed.

While it is recognized that Juniper Lake is not presently providing and adequate fishing resource, we cannot concur in the introduction of exotic kokanee (salmon) or lake trout, for obvious reasons. It is apparent that even though Rainbow Trout comprise only 1% of the total fish population, present growth rates indicate that increased stocking is feasible. We would recommend, as an interim solution, to increase the stocking rate of Rainbow Trout in an effort to attain an equitable balance between population and growth rate.

We appreciate this opportunity to comment on the fisheries surveys undertaken at the Park. These investigations have provided essential information and invaluable assistance in carrying out an effective fisheries management program. We hope that additional research funds will be forthcoming to continue necessary resource studies.

Sgd/Don S. Squire

~~R. D. Moore~~
acting Superintendent

cc; _____
CRO
CHRON
Bunney
File

QEB:an In Duplicate
4/90

LASSEN VOLCANIC NATIONAL PARK
LAKE SURVEY PROJECT*

Summary of Principal Findings and Management and
Research Possibilities
April, 1965

Horseshoe Lake - Generally, Horseshoe Lake is physically and chemically suited for trout and it supports a fairly large population of these fish. Besides rainbow and eastern brook trout, tui chub are present. The numbers of chub are substantial, but not excessive. Tui Chub are an important food of the larger trout. Other trout foods are fairly abundant.

The eastern brook trout are maintained entirely by natural reproduction which takes place largely in the lake's outlet, Grassy Creek, and while there probably is some reproduction of rainbow trout they apparently are being maintained primarily by stocking.

Growth rates of the trout are satisfactory. Angling success is satisfactory. Eastern brook trout constitute about 80% of the trout catch.

The present stocking rates of rainbow trout may be justified on some grounds and are satisfactory for present fishing pressures. However, even at present rates of stocking of rainbow trout it is expected that eastern brook trout, naturally produced, will continue to make up the bulk of the trout catch in the lake. Overfishing or adverse changes in the condition of Grassy Creek where they are mainly produced could alter this situation. Aerial stocking in the shallow and weedy and instead of in the deep center of the lake probably would reduce immediate predation of newly stocked fingerlings by larger trout.

*Based on reports completed under Contract No. 14-10-0434-1434, June 19, 1963) between Humboldt State College and the National Park Service

Studies to determine more precisely the role Grassy Creek and the lake's other tributaries play in maintaining trout populations in the lake probably are needed. The need for continued stocking of rainbow trout should be evaluated in light of the relative contribution of natural reproduction and stocking to the harvest of these trout. Perhaps rainbow trout produced in Grassy Creek make up the bulk of these trout being harvested and stocking may not be making an important contribution. Surveillance of the balance between the numbers of trout and the competitor species, tui chub, should be more or less continuous over the years as it is possible that the numbers of competitors will soon become excessive.

Snag Lake

Snag Lake is physically and chemically suitable for rainbow trout, at least during the summer. Summer water temperatures may be too high for eastern brook trout as they appear to leave the lake almost entirely and move into Grassy Creek, its cool main tributary, early in the summer. At the present population level rainbow trout growth rates are good in the lake.

Besides trout the lake contains tui chub and Tahoe sucker. No species is excessively abundant in the lake and the numbers of trout are so small that the lake is not popular among trout anglers. However, fishing pressure is light partly because of the remoteness of the lake.

The present fish population is maintained entirely by natural reproduction unless some rainbow stocked in Horseshoe Lake move downstream in Grassy Creek to Snag Lake. There may be spawning areas enough in

Grassy Creek to provide for the natural maintenance of fairly good populations of rainbow and eastern brook trout in the lake.

A number of factors, probably including unfavorable winter conditions, parasites, and high water temperatures are holding trout populations at the present low level.

Perhaps little can be done to improve natural production of trout in the lake, but a reduction of the incidence of trout parasites might help. The principal problem parasite seems to be a tapeworm whose intermediate host is a fish. The deliberate control of this parasite will not be possible until it is identified precisely, its hosts determined, and unknown features of its life history worked out. Research on the effects of this and possibly other parasites on trout mortality, growth, and reproduction might be rewarding.

Adverse winter conditions in Snag Lake may be partly responsible for holding down the size of its trout population and before a complete explanation of the productivity of the lake is possible studies of winter conditions should be carried out. The stocking of even large numbers of small hatchery trout to improve fishing for larger trout might not be feasible because of frequently severe winter conditions.

Grassy Creek (The tributary connecting Horseshoe and Snag Lakes)

Grassy Creek is a small stream with a strong flow of cool water. Generally all summer conditions in the stream are favorable for trout. It is a very good spawning and nursery area for both Snag and Horseshoe Lakes and the main source of rainbow trout for Snag Lake and brook trout for Horseshoe Lake appears to be the creek. Considerable numbers of age-group 0, 1, and 11 brook trout and rainbow trout were present in the

creek in the summer of 1963, No tui chub were seen, but the Tahoe sucker apparently spawns in the creek between Snag Lake and the first upsteam barrier.

The creek is subjected to fairly heavy angling pressure in the summer. Apparently the trout population can stand present levels of harvest and still contribute adequately to the eastern brook trout fishery of Horseshoe Lake. For the protection of late spawning rainbow trout and fall-spawning brook trout angling should be permitted only between the first of June and the last of September.

Studies of the utilization of Grassy Creek for spawning of trout from Horseshoe and Snag Lakes would make possible definitive conclusions regarding the importance of the creek in this respect. A determination needs to be made of what the capacity of the creek is for providing spawning and nursery grounds for additional fish. Other studies of the contribution of young fish from the creek to each lake would make possible a complete evaluation of the importance of the creek and the need for continual stocking of hatchery rainbow trout in Horseshoe Lake or a resumption of it in Snag Lake. Perhaps the rainbow trout fishery in Horseshoe Lake is now being maintained largely by natural production in the creek and the cost of stocking may not be commensurate with the contribution to the harvest of trout being realized from it. On the other hand, the creek may not be producing enough rainbow trout to maintain the population in Snag Lake at a suitable level and some stocking may thus be called for.

Juniper Lake

During the summer Juniper Lake is chemically and physically suitable for trout. Winter conditions too should be suitable because of the general purity and the depth of the water. Winter stagnation would not be expected. However, it appears that lethal conditions can develop, at least in places, in the lake as evidenced by the apparent fish kill between the summers of 1963 and 1964. While there is no direct evidence of it the development of such conditions possibly could be related to volcanic activity.

Observed conditions indicate that the lake is relatively infertile and that production is low. Occasional blooms of plankton plants and animals occur, but the amount of bottom food organisms is small.

The fishes present are rainbow trout, redbreast dace, and tui chub. Apparently no species has been abundant in recent years. Moreover, a considerable reduction in the number of trout took place sometime between the summers of 1963 and 1964 due to unknown causes. At the present population levels fish growth rates are satisfactory.

Generally speaking, trout fishing is poor in Juniper Lake even though it is readily accessible and attractive in appearance. The trout population probably is being maintained entirely by stocking since there does not appear to be any suitable spawning areas available. If rainbow trout remain the only game fish in the lake, fishing will have to be maintained by periodic seeding. Based on observed growth rates the lake has the capacity for increased numbers of stocked trout.

Perhaps because of low basic productivity Juniper Lake will never become a great producer of game fishes, but it is possible that the in-

troduction of certain new species of fishes would increase fish production by facilitating greater utilization of the food that is available. The main source of food is open water plankton, yet the game species (rainbow trout) present is not primarily a plankton feeder. The introduction of an open water plankton feeder such as the kokanee (salmon), Oncorhynchus nerka kennerlyi, might result in better food utilization, provide additional fishing, and at the same time provide a new source of food for rainbow trout which would prey on them. Kokanee probably would need to be maintained by periodic stocking, but since fry can be stocked, the maintenance of them by this means might be inexpensive.

Lake trout, Salvelinus namaycush, which might maintain themselves naturally in the lake since they are lake spawners, might also be a good addition to the fauna if kokanee are stocked. In many lakes kokanee serve as a main food stem of larger carnivorous species such as the lake trout. Both kokanee and lake trout are popular game fishes.

The low productivity of Juniper Lake probably could be explained by studies of limiting chemical nutrients in the lake, but the information obtained might not provide a basis for an economically feasible solution of this fundamental problem.