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REPORT ON BUTTE, SNAG AND HORSESHOE LAKES

by

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INTRODUCTION

Butte, Snag and Horseshoe Lakes were investigated during August and September of 1976. During the same period several smaller lakes, including Bathtub Lake North, Bathtub Lake South, Widow Lake, Teal Lake, Hidden Lake and Bluff Lake, were investigated.

Butte, Snag and Horseshoe Lakes are all in the same drainage basin and therefore any actions taken in one of these lakes could possibly affect the conditions in one or both of the other two. At one time, it is believed, Butte and Snag Lakes might have been one large lake. Following the lava flow from Cinder Cone, this large lake was bisected, forming two smaller lakes. At present, water is believed to flow through the Fantastic Lava Beds from Snag Lake into Butte Lake.

MATERIALS AND METHODS

Two experimental gill nets were set in Butte Lake and Snag Lake on the nights of August 12 and September 2, 1976, respectively, for a period of 14 hours each. One experimental gill net was set in Horseshoe Lake on the night of September 9, 1976 for 14 hours.

Standard Lake inventories were completed during the study period on these three lakes, the lakes mentioned in the introduction, and several smaller lakes in the vicinity. These latter lakes were sampled with rod and reel for a period of approximately one hour each.

Water color, clarity, depth and temperature were determined by observation and measurement. Relative abundance of aquatic invertebrates and vegetation was estimated by the lake "surveyor". Generalizations on use, accessibility, shoreline and bottom type and watershed condition were made.

RESULTS

Specific detailed results on individual lakes are given in separate lake reports.

Rainbow trout (Salmo gairdneri), modoc suckers (Catostomus microps), and coarseraker tui chubs (Siphateles bicolor obesus) were found in Butte Lake (Table 1).

Rainbow trout, modoc suckers, coarseraker tui chubs and tahoe suckers (Catostomus tahoensis) were the species present in Snag Lake.

The fish fauna of Horseshoe Lake was composed of rainbow trout, coarseraker tui chubs and eastern brook trout (Salvelinus fontinalis).

In all three lakes, "trashfish" accounted for more than half of the entire catch, by number and biomass (Figure 1).

Spawning areas were present in the inlets of both Snag and Horseshoe Lakes. No spawning areas were seen at Butte Lake.

A small minnow-like fish was seen in Widow Lake by Jesse Purvis, who performed that survey, but none were captured and the true identity of these fish remains unknown. Time and equipment on hand did not allow for proper sampling of that lake.

An eastern brook trout taken from Bathtub Lake South by an angler was seen, but none were captured by Mr. Purvis during the inventory of that lake. No fish were seen or captured in any of the other lakes studied during the period.

Salmonid fry were abundant in Grassy Creek above Snag Lake and below Horseshoe Lake. Fry were also seen in a small inlet to Horseshoe Lake near its southwestern end.

Horseshoe and Butte Lakes were slightly lower than their "full pool" levels, but Snag Lake was approximately ten feet lower than normal. The surface area of the lake was reduced an estimated 50% by this extremely low water level.

Most of the watersheds investigated were in fairly good condition, with the exception of that around Butte Lake. Trash was abundant in the area of the shore near the campground and all along the north shore of the lake. Boating is popular at this end of the lake and human use of the water was heavy. The trail leading to Bathtub Lakes could easily be classified as a road, because it receives very heavy use and has expanded in width to twenty feet, in some places.

Snag Lake receives heavy use for a backcountry lake, and campsites are abundant around the lakeshores.

An established campground is present on the east shore of Horseshoe Lake. The trail leading to this area from Juniper Lake was once a road, and is in extremely poor condition. Gullies up to one and one half feet deep have formed along the trail from the erosive action of spring runoff and precipitation. Little corrective action is being or has been taken to remedy this eyesore.

Table 1. Number of biomass of fish caught per net night (14 hours) by species and total from Butte, Snag and Horseshoe Lakes. Percent (by number and weight) of trout in total catch. Mean weight (grams) and mean condition (K) of trout caught.

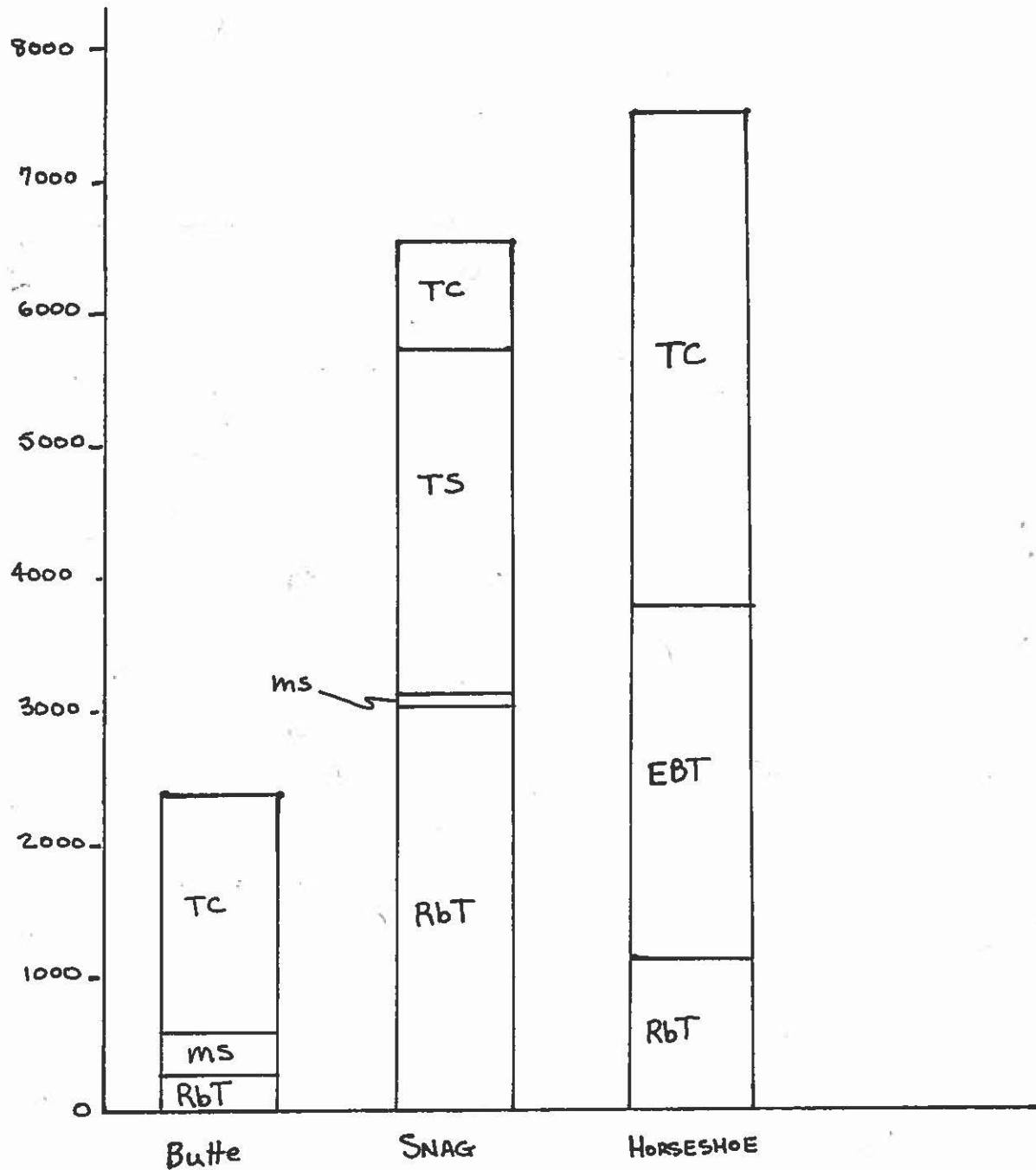
	<u>BUTTE</u>	<u>SNAG</u>	<u>HORSESHOE</u>
# RbT./net night	2.5	10.5	2.0
biomass RbT/ net night	256.4	3001.9	1104.9
mean wt. RbT	102.6	285.9	552.5
mean K RbT	1.08	1.03	1.17
# EbT/net night	----	----	15.0
biomass EbT/ net night	----	----	2630.8
mean wt. EbT	----	----	175.4
mean K EbT	----	----	1.12
# TC / net night	41.5	8.0	36.0
biomass TC/ net night	1781.3	596.5	3748.6
# MS / net night	5.5	4.0	----
biomass MS/ net night	300.5	28.7	----
# TS/ net night	----	32.5	----
biomass TS/ net night	----	2671.8	----
# fish / net night	49.5	55.0	53.0
Biomass fish/ net night	2338.2	6499.8	7484.3
% (by #) trout/ net night	5.1	19.1	32.1
% (by wt.) trout/ net night	11.0	46.2	49.9

Figure 1. Biomass Relationships
of fish population samples from
Butte, Snag, and Horseshoe Lakes.

Biomass (grams) of fish
captured per net night.

KEY

RbT- Rainbow Trout
EBT- Eastern Brook Trout
MS- Modoc Sucker
TS- Tahoe Sucker
TC- Tui chub



Bald eagles (Haliaeetus leucocephalus) and great blue herons (Ardea herodias) were seen at Snag Lake. It is not known whether these birds nest in the area. No nests were seen during the study period.

The only mammalian fish predator seen in the area was a river otter (Lutra canadensis) seen at Snag Lake by Alan Denniston following the study period.

DISCUSSION

Fish population composition of Butte, Snag and Horseshoe Lakes is interesting not only because of its diversity, but because of the nature of the differences between the three lakes. The farther up the drainage basin, the greater the percentage of game fish species in the population (s). I do not know the reason for this difference in population composition, but can only speculate. The lowest lake in the drainage, Butte Lake, may act as a "holding pool" for trashfish species. Because of the great abundance of trashfish, heavy composition for food probably occurs and trout evidently lose out to the heartier tui chubs.

I believe that low water level in Snag Lake may account for the greater abundance of sucker type fish in this lake. Normally these fish are found in slow moving or stagnant waters loaded with organic debris and bottom vegetation. Snag Lake fits this description well, aquatic vegetation choked the entire south half of the lake. Food was abundant for these fish at one end of the lake, and the other end provided fair habitat and food for game fish species. Water temperatures in this lake were fairly high, and this is also conducive to sucker populations. These conditions, except high water temperatures, are also good for trout populations.

A problem occurred in identification of the two sucker species found. Hubbell (1960) identified suckers from Butte Lake as tahoe suckers. Mr. Purvis and I both identified them as modoc suckers and tahoe suckers. We do not know whether we have made an error in identification, whether Hubbell has made one, or whether species composition has changed within the past 15 years. These two species are very closely related and only one physical feature is used to distinguish between them. An error could have easily been made by anyone.

I am hesitant to recommend any possible management changes to solve the "trashfish problem" in these lakes. Chemical treatment, popular in the recent past, could bring on public outcry and dissent from the ever increasing number of environmentally conscious wilderness visitors. Removal of these fish by anglers would probably act so slowly that it would tend to increase the health of the population.

Draining or active netting of these lakes is not feasible. Introduction of selective predators or predatory agents, if any exist, would be difficult and require serious study beforehand. All three lakes in the drainage would have to be treated simultaneously, including the streams feeding them. If treatment was the only alternative, which it is not, the effects would be widespread and effect entire ecosystems, not just specific areas. Obviously avian and mammalian fauna dependent on fish would be effected.

Personally I do not feel that this "problem" warrants any treatment. I recommend that the fisheries of these lakes be left in their present condition. Angling will remain fair to poor, but the broad and far reaching effects of any treatment will be avoided.

The population of small fish seen in Widow Lake should be identified. A sample of these fish could easily be taken in minnow traps, but other methods do exist. Active netting with seines, or even scoop nets and electroshocking are some of the other alternative methods.

The brook trout population in Bathtub Lake South is probably not too dense, but if a sample is desired, a gill net could be placed by one man and yield a good estimate of relative abundance.

Spawning conditions in Grassy Creek were excellent, as was the overall condition of this spring-fed stream. I feel that a detailed inventory of larger streams in the park is necessary to complete the picture of fishery and aquatic resources of the park. I will discuss this in detail in the report summarizing this summers' study.

I feel that the quality of the environment in this area is degraded enough to warrant separate discussion of possible remedies to problems and potential problems.

The litter problem at Butte Lake, although serious, is to be expected because of the type and intensity of use in this area. However, I do not believe that because a problem is anticipated it should be condoned. Some effort is made by protection and maintenance personnel to remove trash, but the seriousness of scope of the effort obviously does not have much effect on the problem. I recommend that the personnel there intensify their efforts in cleanup of the area. Although the potential for similar problems exists at other areas (ie: Horseshoe, Juniper and Manzanita Lakes), the problem is not as serious as these.

Heavy human use of the Butte Lake area could lead to deterioration of water quality. I recommend that fecal coliform bacteria levels be monitored in the heavy use area during the season.

Campsites at all lakes in the area less than 100 feet from the high water level should be removed. This problem is most serious at Snag Lake where designated sites should be established soon.

The final, most blatant, and potentially serious problem in the area is the condition of the trails. The Horseshoe Lake trail is in extremely poor condition and will rapidly deteriorate unless corrective action is taken immediately. An attempt was made by the Horseshoe Lake ranger to slow the erosion process on the trail, but it is obvious, to me, that this task is too difficult and extensive for one man to accomplish feasibly.

This is not the only trail that is in poor condition in this area. The trail to Rainbow Lake from Snag Lake is also in poor condition and apparently routine trail maintenance has been overlooked here. All of these problems could be easily solved by an efficient crew of trail workers. I believe that these problems stem from intolerable neglect on the part of the trail crew. I consider such neglect intolerable because these trails are in heavily used areas and could lead to potential visitor injury.

LITERATURE CITED

- Hubbell, P. M. 1960. A Study of General Ecological Conditions in a Group of Lakes in Lassen Volcanic National Park, 1960. Unpublished Masters Thesis, Humboldt State College. 46 pps.