TROOP LAKE SURVEY REPORT

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INTRODUCTION

"Troop Lake" or "Sinkhole Lake" is a small unnamed lake in T2N, R1E, sections 19 & 30 on the Chugach National Forest, situated 3/4 miles due east of M.P. 10.9, Seward Highway at an elevation of 865' (FIGURE 1). The lake's surface area is approximately 40-45 acres and has a drainage area of 120-140 acres. An unnamed outlet stream flows from the south end of the lake for approximately 2 miles before entering Grouse Creek. A natural debris jam exists at the lake outlet which may be a barrier to fish egress. The lake has no inlet streams but mountain runoff maintains and possibly spring upwellings maintain flows at the outlet.

Access to the lake is provided by a large pull-out on the east side of the Seward Highway (M.P. 10.9) and a primitive trail leading to the railroad. From the railroad no defined trail exists. In 1977 the lake was stocked by ADF&G - Sportfish Division with 11,500 silver salmon fry. Local Seward residents report catching 12-14" silvers in the mid 80's, however anglers fishing the lake the past few years have reported no fish being caught. Several Seward residents have inquired whether the lake would be restocked. The small lakes crew of the U.S.F.S. surveyed Troop Lake to sample the fish population and acquire some basic bathymetric information. This report summarizes the survey and discusses potential future management of this lake.

FISH SAMPLING

On June 18, 1991 eight minnow traps baited with salt cured salmon roe were set among submerged woody debris along the northwest shore of the lake. In addition, two variable mesh gill nets were set in 10'-30' and 20'-40' of water, respectively. No fish were caught over a 24 hour period, however dragon-fly nymphs and small leeches were found in all minnow traps with freshwater shrimp and small snails attached to the nets.

BATHYMETRIC MEASUREMENTS

A rough bathymetric map was developed using an inflatable raft, oars, and a non-recording depth-finder. The procedure was that one person rowed a consistent pace while the other person recorded the depth at 10 second intervals. Although the length of the transect could not be measured, we hoped to have evenly spaced readings across each transect. Depths were measured using the above procedure on 8 parallel transects across the lake. A bathymetric contour map was developed with an X indicating the maximum depth recorded along each transect (FIGURE 2). While this bathymetric map is rather crude, 3 conclusions were apparent from the survey: 1) Maximum depth is slightly over 50'; 2) The lake bottom slopes rapidly from the east and west shorelines to 30', with a more gradually sloping midsection from 30-50'; 3) An abundance of submerged large woody debris exists in litoral areas.

DISCUSSION

The lake has supported silvers in the past, but this survey and no recent reports of fish being caught by anglers, indicate that fish from the initial stocking are no longer present. Since there are no inlet streams to the lake for spawning, it is doubtful that landlocked silvers could be self sustaining. The small outlet stream may provide some spawning habitat if the log jam is not a migration barrier. An abundance of submerged woody debris and overhanging vegetation along the shoreline, plus an ample supply of macroinvertebrates, indicates that a healthy population of fish could be sustained through a regular stocking schedule. Winter run off into the lake is probably minimal due to the lack of inlet streams, but depths to 50' should insure that winter dissolved oxygen levels will be sufficient to overwinter fish.

FUTURE MANAGEMENT

Based on habitat conditions and a growing local community interest, pursuing a future stocked rainbow trout or land-locked coho salmon fishery in Troop Lake appears to be justified. Two considerations that need to be addressed in future management of the lake are land status and railroad right-of-way for access. The lake is within a state selected tract of land due for transfer in the mid 1990's. Due to the community interest, the Forest Service supports developing a fishery in the lake, but because of land status, Forest Service involvement would be on a cooperative basis with ADF&G. A similar situation occured on nearby Vagt Lake which was within a Forest Service land selection transferred to the state in the mid 1980's. Since then, trail maintenance has been done by the Seward Boy Scouts and other users. Vagt Lake continues to be stocked annually with rainbow trout raised at the Fort Richardson Hatchery by the Seward Boy Scouts and the Forest Service fisheries staff. The success of cooperative efforts to maintain an annual stocking program and access to Vagt Lake, suggests that a similar cooperative effort could develop and maintain a fishery on Troop Lake.

The issue of a railroad right-of-way for a trail crossing was discussed with the Alaska Railroad in July 1992. The Forest Service has recieved a permit application for public crossing with the turn around time expected to be 2 weeks after filing the permit. Due to the land status issue, ARR suggested that either the Forest Service apply for the permit, transferable to the state upon a land exchange, or that ADF&G apply directly. ARR would provide specifications for a crossing structure which would be constructed by the permittee or cooperator, with maintenance done by ARR and billed to the permittee.

Local anglers are extremely interested in restablishing a sportfishery in the lake to the extent of inquiring whether they could purchase fry from a state hatchery. There is interest in stocking the lake at the earliest possible date with either rainbow trout or coho salmon. Interest in re-establishing coho salmon is greater since there are no lakes on the Chugach National Forests with land-locked silvers. Local anglers and the Seward Boy Scouts have offered to transport fish when they become available for stocking. Once there is a committment for stocking, the same groups have made a committment to brush out an access trail.

Troop Lake

6. Sinkhole Lake

A fisheries habitat survey of Sinkhole Lake located on the Chugach National Forest was conducted on July 21, 1976, by John Wenger, Wildlife Technician, U.S. Forest Service, and Ted McHenry, Alaska Department of Fish and Game, Sport Fish Division, Biologist, Seward and two assistants. The lake is located in T2N., R1E., S.M. on U.S.G.S. Quadrangle map, Seward (A-7) approximately 1/4 mile east of the 11 Mile Seward Highway milepost. The lake is also marked with a surface elevation of 865 feet.

(1) Methods and Materials

Office

Prior to field work, the latest serial photographs were obtained from the U.S.F.S. office at Seward. Xerox copies were produced from these and used in the field to locate reference points and to plot survey data.

Field

In the field, physical, chemical, and biological data were secured at several stations on the lake. Physical measurements of the lake topography, air temperature, water temperature, bottom composition, water color light penetration, and locations and abundance of possible spawning areas were noted. Maximum depths and depths at selected locations were plotted on the lake drawings so that contours could be drawn and approximate volumes determined (see ADF&G report).

Chemical measurements were taken using the Hach DR Engineers Water Analysis Laboratory. All measurements were taken at or near the surface.

Biological samples of bental invertebrates were collected near shore. Observations for aquatic vegetation were made. A small inflatable raft was used to transport personnel and equipment around the lake.

(2) Results and Discussion

This natural lake is located in a low forest covered mountain area at an elevation of 865 feet. It appears to be spring-fed having no inlets. The watershed area is less than 1 square mile (640 acres). Access to the lake is over land with the shortest distance coming directly away from the railroad. Future U.S.F.S. timber sales plan on a haul road passing or ending a half-mile from the lake. The lake is presently remote but future timber sales will undoubtedly affect the access along with planned fishery development.

The lake is surrounded predominately by spruce, interspersed with hemlock growing on a moderate slope on the west and fairly steep on the east. Due to this steepness and the fact that large trees are at the lake's edge, shore travel is fairly difficult.

Although the lake is spring-fed, there appears to be no great fluctuations of the water level. The only outlet is on the south side of the lake, flowing into Grouse Creek. It has a steep gradient making upstream migration of fish impossible. The stream is small with considerable debris and probably would not be used for rearing or spawning. The lake itself has considerable gravel for spawning of salmonids, it should be ample and suitable. The lake has an abundant food supply for rearing fish.

Table I presents the physical characteristics of the lake and Table II presents the physical measurements obtained.

Table I

Physical Characteristics of Sinkhole Lake

Area	23 Acres
Maximum Length	2650 Feet
Maximum Width	500 Feet
Length of Shoreline	1.12 Miles
Shoreline Development Ratio	1:1.6*

*The ratio of shoreline length (L) to circumference of a circle of area (A). The limiting factor is 1, for a circular lake. In all other lakes, higher development ratios are found.

Table II

Physical Measurements of Sinkhole Lake on July 21, 1976

Time	1300 Hours
Weather	Cloudy with L. Rain
Wind	Calm
Air Temperature	65° F
Lake Water Temperature	62° F
Outlet Water Temperature	62° F
Water Color	Very clear
Light Penetration	21 feet
Bottom Composition	10% gravel, 10% rubble, 80% silt
Water Level	Appears fairly stable
Lake Bottom Vegetation	Very sparse
Outlet Discharge	.66 cfs

The chemical composition of the water is presented in Table III.

Table III

Water Analysis of Sinkhole Lake on July 21, 1976

Chemical	Surface	Outlet
Dissolved Oxygen	11	12
Carbon Dioxide	5	5
Hydrogen - ion (ph)	7.0	7.0
Turbidity	Clear	Clear

The invertebrate and insect population is shown in Table IV.

Table IV

Invertebrates and Insects Found in Sinkhole Lake on July 21, 1976

Invertebrate and Insects	Abundance
Freshwater shrimp	Very abundant
Copepods	Very abundant
Dragonfly nymphs	Abundant
Cladocerans	Abundant
Freshwater leeches	Unknown

Three 50' variable-mesh gill nets and 6 minnow traps were set throughout the lake between 1400, July 21 and 1000, July 22, 1976. No fish were captured and there was no evidence of fish life in the lake system.

Other observations of wildlife signs at the lake indicate a normal population of typical game and non-game species for this habitat type. There were no signs of beaver using the lake.

It appears from the data obtained by Wenger and McHenry that the physical, chemical, and biological characteristics of Sinkhole Lake indicate that this lake could be developed into a salmonid fishery. The lake has an abundant food source and the depth is sufficient to allow good overwinter survival. Future timber harvest development will provide close access to the lake.

Recommendations

(1) It is recommended that Sinkhole Lake be included in the Snow River Management Unit Plan. Also mutual cooperation and communication needs to continue between the Forest Service and ADF&G.

(2) It is recommended that coho salmon (Oncorynchus kisutch) smolts be planted and reared in the lake. The fish stock will be supplied by ADF&G.

(3) It is recommended that, if feasible, the stocking of this lake be a wildlife project of YCC FY 77.