Dorothy and Jerry

REPORT OF LAKE LEVEL CONTROL STUDY EIGHT POINT LAKE GARFIELD TOWNSHIP, CLARE COUNTY

FOR

CLARE COUNTY BOARD OF SUPERVISORS

HARRISON, MICHIGAN

BY

R. S. SCOTT ENGINEERING CO., INC.

ALPENA, MICHIGAN

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REPORT OF LAKE LEVEL CONTROL STUDY

EIGHT POINT LAKE

GARFIELD TOWNSHIP, CLARE COUNTY

I PURPOSE

Pursuant to a petition by property owners adjacent to Eight Point Lake, Clare County, the Clare County Board of Supervisors, in February of 1965, entered into a contract for engineering services with R. S. Scott Engineering Company of Alpena, Michigan. The engineers were engaged to study the decline in the water level of Eight Point Lake, survey the lake, prepare maps and shore profiles and make recommendations as to means for establishing a permanent lake level.

II SCOPE

The Lake Level Control Study is presented as follows:

A. Plans - The plans are made up of the map and shoreline profile sheets. The map (sheet 1) was compiled from aerial photography taken in November, 1964, using stereoplotting instrumentation and selective ground survey measurement. The shoreline profiles as presented on plan sheets 2 thru 7, were taken at selected points along lake shore by a survey crew in June, 1965.

B. Report - The report contained herein is a narrative discussion of the data and findings presented on the plans, and a recommendation for means of raising and controlling the lake level together with an estimate of costs.

III DISCUSSION

A. Location

Eight Point Lake is located in Sections 19, 20, 29 and 30, T17N, R6W, Garfield Township, Clare County. Eight Point Lake is the headwaters of a watershed draining into the North Branch of the Chippewa River via Atkinson Creek. Less than one-half mile to the Southwest is the headwaters of a watershed draining to the North Branch by way of Benjamin and Devil Creeks.

B. Area Physiography

The surface formations[1] throughout Clare County are of glacial origin; all material deposited by the glaciers is termed drift.

The generalized soil map of the State[2] indicates the Soils in the Eight Point Lake area are classed as Grayling and Rubicon in accordance with the classification system of the Department of Agriculture and Michigan State Highway Department[3].

Both of the above soils represent deep deposits of sand and gravel with scattered pockets of silt, clay and boulders. Being an outwash plain deposit the surface configuration of the Grayling and Rubicon series is generally level. Both soils have excellent internal drainage characteristics.

In summary, the soil, at least in the upper strata, around Eight Point Lake is generally quite pervious and conducive to the formation of a distinct ground water table.

C. Characteristics of Eight Point Lake

1. Physical Features

As nearly could be determined from the Lake Quadrangle Map by the U. S. Geological Survey, the watershed area to Eight Point Lake is 1150 acres. At the time of the survey for this study, June, 1965, the water elevation was 1049.1 ft., U.S. Coast and Geodetic Survey Datum. The lake area was 380 acres.

2. Water Sources

Eight Point Lake has two main surface water inlets. One on the South and one on the East end of the lake. This runoff and the ground water table are the principal sources of water for the lake. A secondary source is rainfall directly onto the lake.

3. Water Losses - The two (2) main sources of water loss are:

a. Evaporation - During 1963 at the U. S. Department of Commerce Weather Bureau Stations at Lake City in Missaukee County and Lupton in Ogemaw County recorded the following evaporation losses.[4]

	Lake City	Lupton
May		3.77
June	6.19	5.19
July	6.91	5.82
August	4.24	3.95
September	3.03	2.69
October	2.62	2.21
Total	22.99"	23.63"

Although these figures represent evaporation under controlled conditions, they do indicate the approximate magnitude of yearly evaporation losses to be expected in the Eight Point Lake area. The evaporation losses become very important whenever the annual precipitation is less than the normal 29 inches per year for consecutive years. Evaporation is the main source of water loss during the summer season.

b. Surface Flow - Near the Northwest corner of the lake between the ends of North Shore Drive and West Shore Drive is a low area, serving as the natural outlet for Eight Point Lake. This outlet is located between Station 62 and 64 on sheet one of the plans. This outlet leads into a series of sizable swamps to the north and west and eventually into Atkinson Creek. The biggest loss of water from Eight Point Lake during the spring is by way of this outlet.

4. Causes of Lake Level Fluctuations: - On a ground water lake such as Eight Point, the lake levels are directly dependent on the amount of rainfall. During long periods of above average rainfall such as the early 1950's water is stored in the ground. However, since 1955 at the Weather Bureau Station in Alpena, there has been a deficiency from the mean precipitation of about 35 inches. During these periods of sparse rainfall the ground water is depleted. Since the water loss due to evaporation and underground flow are changed little, continued low precipitation has an obvious effect on lowering the lake level.

The cause of lake level fluctuations, therefore, is nothing more than the hydrologic cycle, dependent on such uncontrollable factors as temperature, wind and precipitation.

5. Summary of Part C:

Lake Area - 380 acres (June, 1965)

Eight Point Lake Watershed - 1150 Acres

Lake Elevation 1049.1 - June 1965

Sources of Water for Lake

1. Primary

   a. Ground Water
   b. Surface Runoff from South and East

2. Secondary

   Precipitation on Lake (29" per year)

Water Losses

1. Outlet to Atkinson Creek

2. Evaporation 23" per year (average)

D. Control of Lake Level

To raise Eight Point Lake 1.3 feet from present level will require approximately 600 acre feet or 200,000,000 gallons of water. This figure also includes inundating the ground surrounding the lake.

The only feasible method of lake control appears to be construction of an earth dam on the outlet to Atkinson Creek. (See Sheet 1 of Plans for location.) Over the past several years, daily lake level readings have been taken by Mrs. Ethel Heath. A study of these records furnished the

Engineers indicates that the maximum fluctuation of the water level amounted to a little over one foot during any one year. The highest levels were consistently recorded in late spring with a gradual decline until early winter with subsequent winter snow and ice melt starting a gradual rise. A dam as proposed would be for the purpose of impounding some water now lost during late spring. Retention of these spring waters would not prevent the natural decline during the late summer, but would serve to keep the water surface from dropping to excessively low levels.

IV RECOMMENDATIONS

A. Lake Level

It is recommended that the lake level be permanently established at a level of 1050.4 feet, U. S. Coast and Geodetic Survey Datum. This level would closely approximate the permanent vegetation line and would be 1.3 feet above the level of mid-June, 1965. Achieving this level in the Spring would mean that, in an average year, the level would decline by autumn to about the level of mid-June, 1965. It was the observation of the Engineers that this would permit operation of motor powered craft in practically all parts of the lake for the majority of the resort season.

It is not recommended that the lake be raised more than the 1.3 feet stated above. To raise the lake higher could be detrimental to some low cottages, particularly on the East side of the Lake. Damage from higher water could also result to any future bituminous surfacing

which might be applied to East Eight Point Lake Road, especially just north of South Shore Drive.

B. Proposed Construction

1. It is recommended that the lake level be controlled by means of a earth dam located along the natural shoreline as shown on Sheet 1 of the plans. From the aspects of both utility and economy, it is recommended that the structure be of earth and rock fill with a battery of elliptically shaped culverts for overflow. The culverts should be set so as to act as spillways whenever the water surface begins to exceed the permanent lake elevation.

2. It is further recommended that the channels for the two inlets be cleaned for several hundred feet prior to the discharge point into the lake. This is for the purpose of insuring that all available spring surface water will actually be introduced into the lake rather than being retained in the swamps to evaporate during the summer without any benefit to the lake proper.

V. ESTIMATED COSTS

The Estimated Cost of the proposed control structure and channel cleanout can be broken down as follows:

A.	Engineering Surveys and Design		$1,500.00
B.	Construction		
	1. Earth Fill for Dam	$2,000.00	
	2. Elliptical Corrugated Metal Pipe and End Sections (in Place)	1,800.00	
	3. Cobble for Slope & Channel Protection	1,500.00	
	4. Channel Cleanout (Outlet)	500.00	
	5. Channel Cleanout (Inlets)	1,500.00	
	6. Sodding	600.00	
			$7,900.00
C.	Contingencies		1,100.00
	Total		$10,500.00

Additionally, $500.00 per year should be considered for maintenance of the structure and channels.

VI. SUMMARY

The Clare County Board of Supervisors authorized this study to determine the reasons for the decline of the water level of Eight Point Lake together with possible means and costs for permanently raising the water to a more desirable level.

Eight Point Lake is located in a sandy glacial outwash deposit, has two inlets and the ground water table as its main sources of water.

It is recommended that the lake surface be established at an elevation of 1050.4 ft. or 1.3 ft. above the June, 1965 level.

The most feasible means of raising and maintaining a permanently higher water level is construction of an earth dam near the northwest corner of the lake across the outlet to Atkinson Creek.

It is also recommended that the two inlet channels be cleaned out to bring additional runoff into the lake.

The estimated cost for the structure and channel cleanouts, including design, is $10,500.00. An estimated $500.00 per year would be necessary for maintenance.

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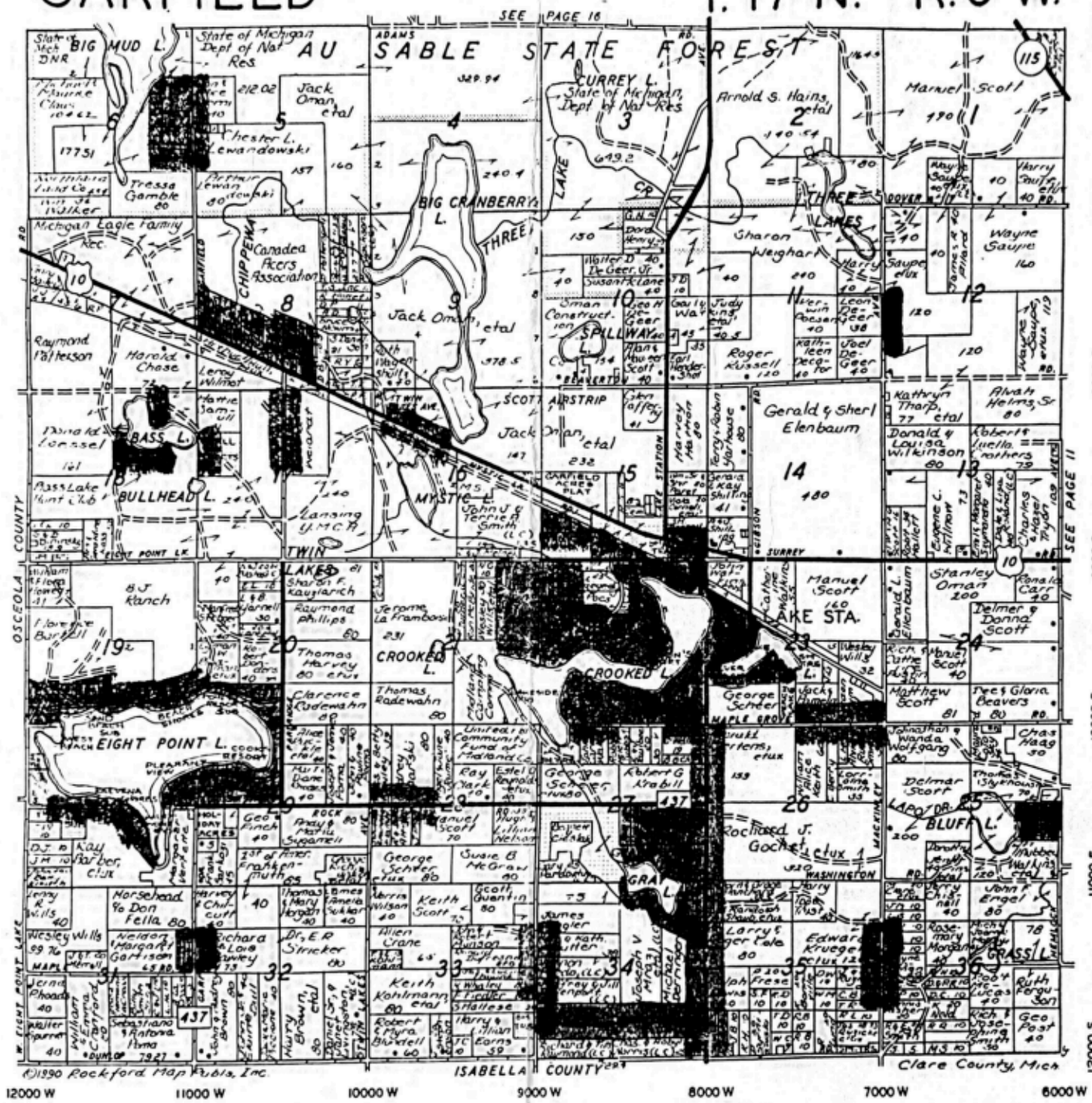
GARFIELD T. 17 N. – R. 6 W.



approx. 2321 acres

"REPRODUCED WITH PERMISSION OF ROCKFORD MAP PUBLISHERS, INC."

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