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A.4 Attachment B

EVALUATION OF THE RECREATIONAL FISHERY IN LAKE CANONCHET, NARRAGANSETT, RHODE ISLAND

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EVALUATION OF THE RECREATIONAL FISHERY IN LAKE CANONCHET, NARRAGANSETT, RHODE ISLAND

Prepared for the Town of Narragansett
through the Assistance to Local
Communities Program of the Rhode
Island Coastal Management Program

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SUMMARY RECOMMENDATIONS

1. Lake Canonchet contains a healthy and diverse fish population. Recreational fishing is an appropriate activity for the pond, especially if directed towards the high numbers of medium-sized panfish. An organized tournament for young people is suggested.
2. Stocking the pond for recreational fishery enhancement is unnecessary and probably undesirable.
3. The culvert which connects the two segments of the pond should be removed and a channel constructed through the dyke which will permanently connect the two segments. This will permit fish passage throughout the year providing for a greater equalization of fish populations.
4. A bridge should be constructed over the channel to permit vehicle passage into the Canonchet Farm interior from Rte. 1A. The clearance under the bridge should be great enough to permit passage of small non-motorized recreational boats.
5. The small stream which serves as the Lake Canonchet outlet to Narrow River should be examined periodically for blockages. These should be cleared to permit greater access to the pond for anadromous fish, especially in the spring of the year.
6. The pond and the surrounding road and general landscape can be made much more attractive by appropriately placed plantings of shade and flowering trees. The pond shoreline has potential as a limited use picnicking area.

INTRODUCTION

Project Background

In May 1979, at the request of the Narragansett Town Council, members of the University of Rhode Island Coastal Resources Center (CRC) met with the town council to discuss assistance that the Center might provide to the town in assessing the potential for enhancing recreational fisheries in Lake Canonchet. Through an existing 306 Coastal Resources Management grant, the Center is providing technical assistance to coastal communities (Task 4.4) with the goal of improving the management of coastal resources in conformance with the goals of the state's adopted Coastal Resources Management Program. Since Lake Canonchet is a coastal pond associated with a designated barrier beach, the town's request was fitted into the existing program. No reimbursement from the town was therefore required for the time put into the project by the Center's Resource Specialists. However, the town provided the Center with funds ($850.00) necessary to acquire sampling equipment.

Purpose of Project

Lake Canonchet is situated adjacent to and westerly of U.S. Rte. 1A in the Narragansett Pier section of the Town of Narragansett. The town beach is on the easterly side of the highway. The town is very interested in the potential of the pond for recreational and open space use as part of the town-owned Canonchet Farm complex that abuts the ponds to the west. Of particular concern is the role the pond can play in the future for recreational fishing. In this study the Coastal Resources Center has attempted to answer the following questions:

1. What species support recreational fishing in Lake Canonchet?
2. What species, including those not directly taken in recreational fishing, presently inhabit Lake Canonchet?

3. Can the existing recreational fishery of Lake Canonchet be enhanced by management techniques?
4. What are the characteristics of the lands immediately bordering on Lake Canonchet (vegetation, wetlands, etc.) and how do they relate to necessary management programs and recreational access to and use of the area?
5. What are the other potential recreational uses of Lake Canonchet?

SITE DESCRIPTION

Lake Canonchet is approximately 12 acres in size and is elongated generally in a northeasterly to southwesterly direction. It is separated into two sections by a small dirt roadway which provides access to the interior of Canonchet Farm from Rte. 1A. A culvert under the roadway provides a small waterway connection between the southern and northern sectors of the pond. The pond's single outlet is in a cove in the northwestern corner, from which a small brook flows for one-third mile through dense brush and swampy woodland to empty into the Pettaquamscutt River.

The pond is shallow, with average depths being only two to three feet. Small areas within both northern and southern sectors reach the maximum depth of eight to nine feet. Shallow areas contain significant amounts of typical fresh water pond rooted vegetation such as water lilies, pickerel weed, arrow-arum, and milfoil. Shoreline fringe areas contain cattails and common woody vegetation such as willow and sweet pepperbush. Of particular significance botanically and aesthetically is the presence of the rose mallow Hibiscus palustris along scattered portions of the shoreline. This large and beautiful pink-flowered plant is one of Rhode Island's less common shoreline plants and is usually restricted in its range to small coastal fresh and brackish pond habitats like Lake Canonchet.

During portions of the year when pond levels fall below the culvert opening, the two sections of the pond become separated. It was during one of these periods in late summer of 1979 that a noticeable difference in the water clarity was observed between the northern and southern sectors. The more opaque coloration of the southern sector water was due to an extensive bloom of single-celled plants or phytoplankton.

The land directly adjacent to the pond is made up primarily of shrub and swampy woodland on the west and northern sides, and a small strip of shrubs and young trees between the pond and road on the east and south. Dominant vegetation includes red maple, wild black cherry, willow and witch hazel. Some evidence exists of both past and recent disturbance to segments of the western shoreline. Mounded areas of soils and boulders which are now vegetated appear to have been positioned with heavy equipment in years past. Recently, there has been cutting of trees and dozer work west of the pond and inland of the shoreline associated with the development of the Canonchet Farm facility. Adjacent to the roads, litter and other dumped trash detract from otherwise pleasant surroundings. The area is habitat for numerous forms of wildlife, especially birds. Birds sited during casual observance at various times of the year include great egret, great blue heron, red winged blackbird, barn swallows, and several warblers. A red fox was observed during the winter months as he walked across the ice.

METHODS AND MATERIALS

The fish population inhabiting Lake Canonchet was surveyed by the use of a 50-foot long haul seine and a Maine-type fyke net trap of one-inch stretched mesh. The haul seine, when not used separately, was used as a leader to guide fish into the fyke net. The fyke net was deployed overnight

for a several day period in both sectors of the pond. The haul seine was used during the day in selected shallow areas with one end kept onshore while the other was moved in a wide arc from boat. All fish collected by these methods were identified as to species, and length and weight measurements were taken to determine size distribution and relative abundance of each species. One or two specimens were kept of those species that were particularly abundant or where positive field identification was difficult. All other fish were released. The species and abundance of turtles in the pond were similarly recorded. In addition to the extensive fish sampling program, interviews were conducted with area residents known to have fished the pond recently or in the past.

In order to assist in the fisheries analysis and determination of management options, various water quality and limnological characteristics were measured (see Table 1). Temperature and dissolved oxygen were measured using a Beckman Fieldlab Oxygen Analyzer Model 1008. A Corning Model 610A portable field meter was used to record pH, and calcium carbonate ($CaCO_3$) alkalinity was determined with the use of a Bausch and Lomb Spectrokit Reagent System. A bathymetric profile of the pond was determined from lead line soundings. This was an aid in the selection of trapping and seining sites. Figures 1 and 2 depict the pond bathymetry and identify sampling locations.

STUDY RESULTS AND INTERPRETATION

Lake Canonchet was identified as a fresh aquatic ecosystem, largely typical of many of Rhode Island's ponds and lakes. Zero salinities were found in both sectors of the pond. This was surprising in light of the pond's nearness to Rhode Island Sound and its association with a barrier beach. It is suspected that the pond is occasionally pulsed with salt water due to overwash of the beach and road. This occurs only during severe storms or hurricanes,

TABLE 1

VARIOUS WATER QUALITY CHARACTERISTICS MEASURED IN LAKE CANONCHET ON THREE DATES

Date	Weather Conditions	Water Temperature (°C)	Dissolved Oxygen (PPM)	pH
16 Aug. 79	sunny	23-26	7-9	6.8-7.2
31 Aug. 79	foggy	26-31	3.8-5.0	6.3-6.6
5 Mar. 80*	icy & rainy	4	9-10	6.8-7.6

*30-40 mg $CaCO_3$ ℓ^{-1} or soft water characteristics

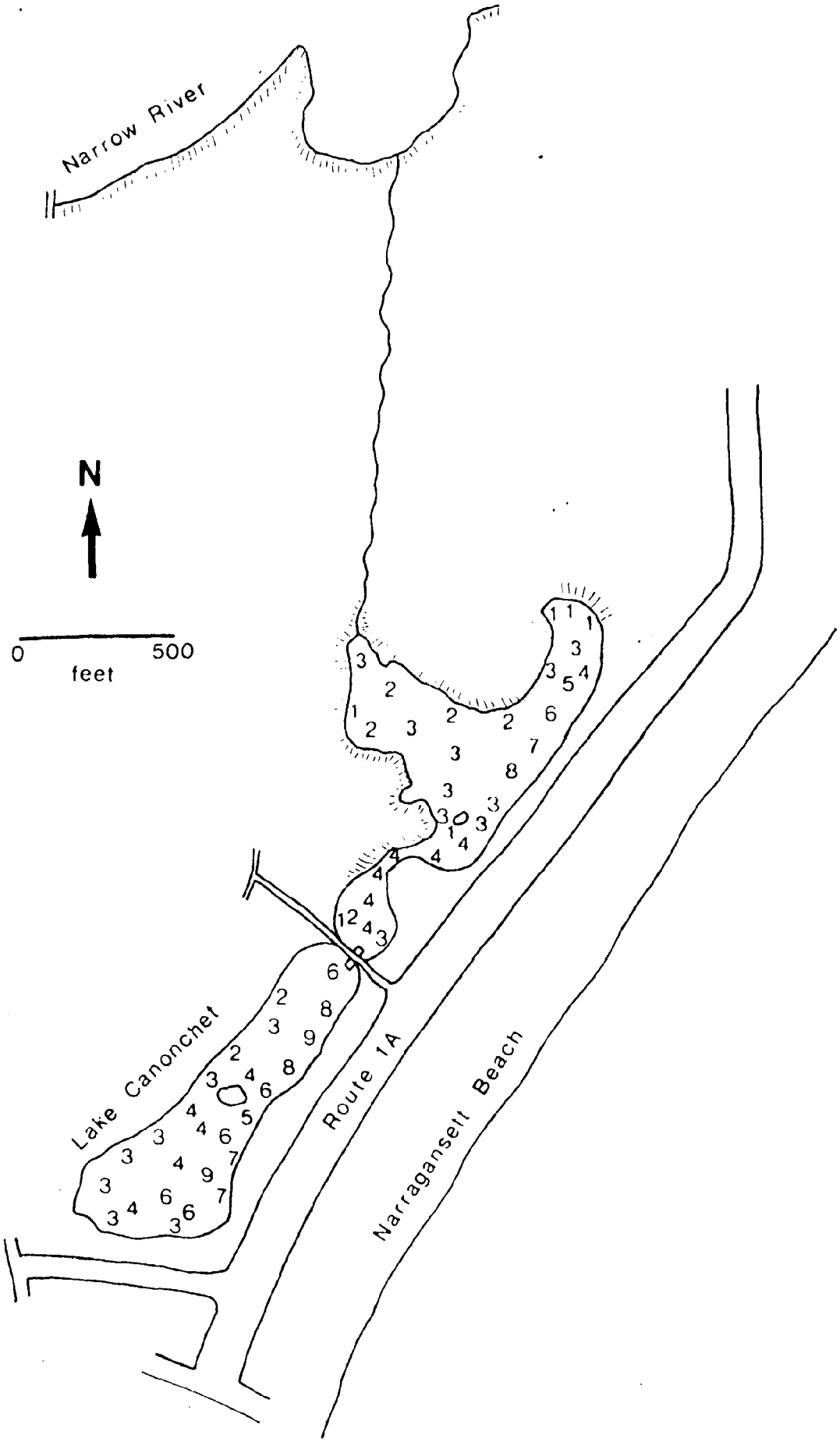

Figure 1. Bathymetry of Lake Canonchet (in feet) May 19, 1979.

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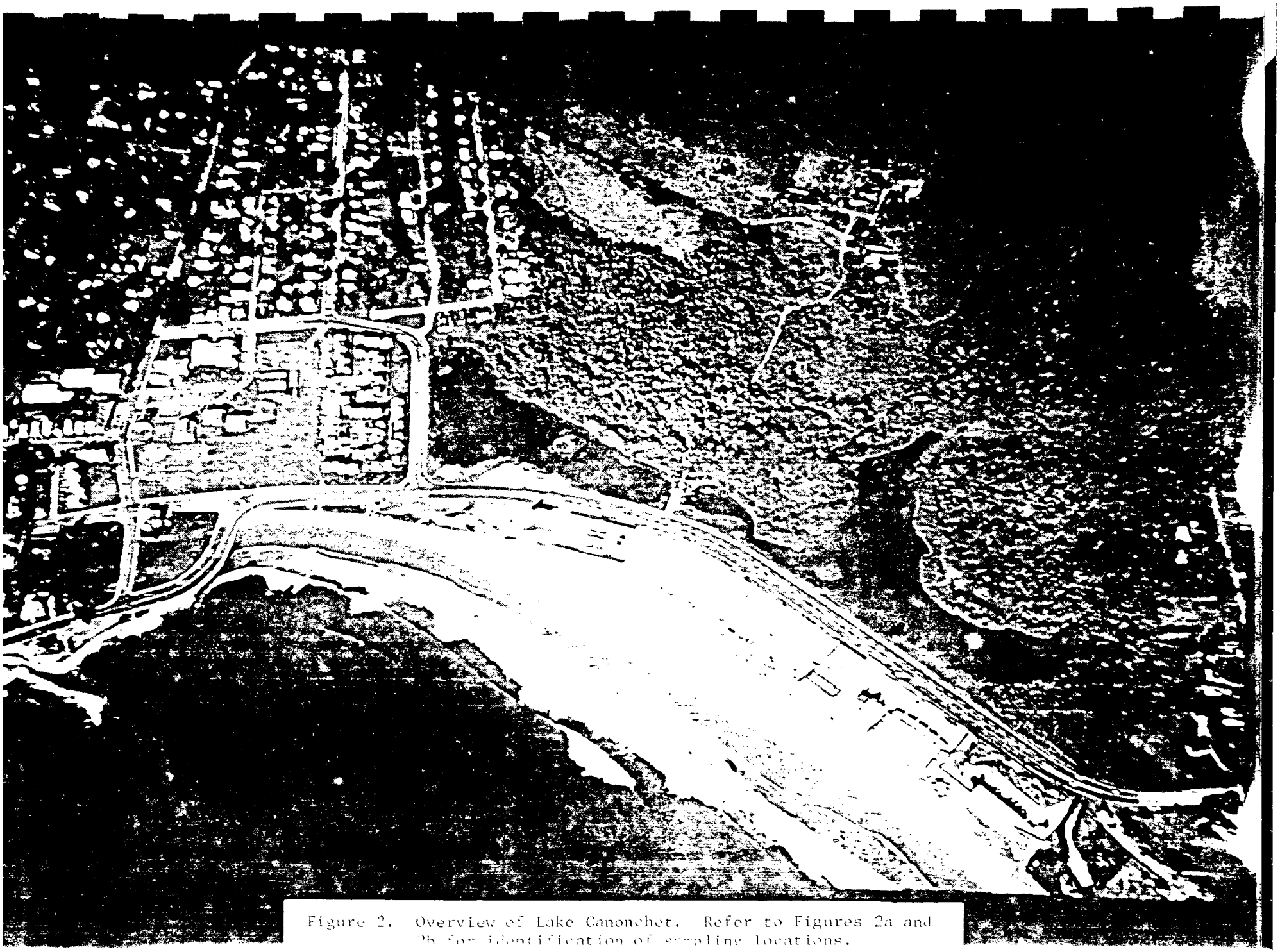

Figure 2. Overview of Lake Canonchet. Refer to Figures 2a and 2b for identification of sampling locations.

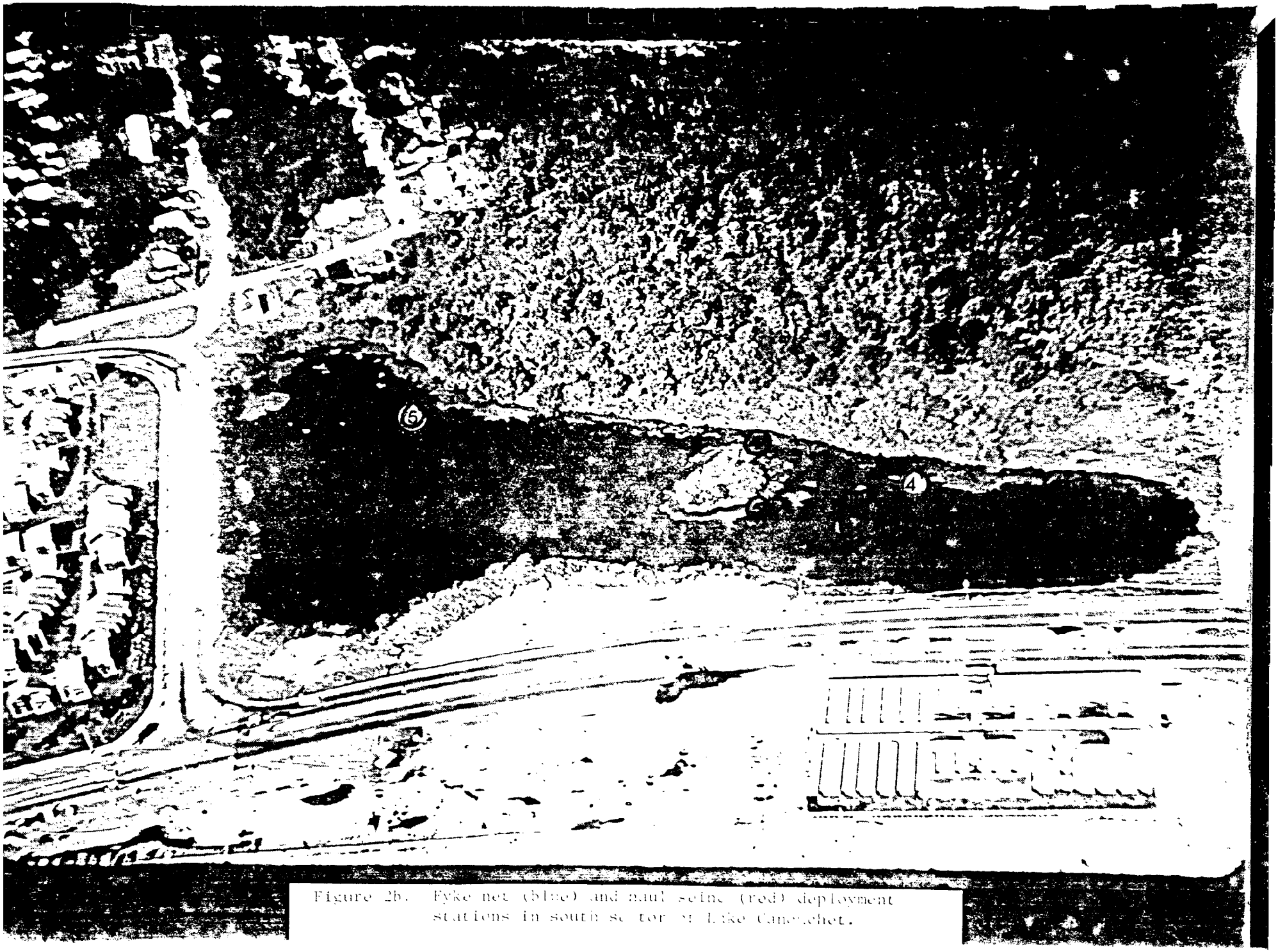

Figure 2b. Fyke net (blue) and haul seine (red) deployment stations in south sector of Lake Canarchet.

and the pond would gradually return to a totally fresh water regime. In addition to the zero salinity measurements, the emergent and semi-emergent vegetation was typical of a fresh water pond environment.

After five haul seines and eight overnight periods of fyke net deployment, a total of nine species of fish and two species of turtles were captured. Table 2 identifies each captured species, the primary capture location, and the relative abundance of each species. Table 3 provides length and weight data on selected fish species.

The most abundant species in the two ponds is the pumpkinseed. These fish were captured in all sampling areas. They were found to be very healthy in both ponds, and the relationship between the length and the weight of the fish was identical in both ponds, indicating similar growth patterns and ample availability of food. Very few ectoparasites were observed on these fish, which is not the case in many Rhode Island ponds. The bluegill, a larger, more robust close relative of the pumpkinseed, was found in ample but far less abundant quantities.

A sizeable population of largemouth bass and chain pickerel was also found. Although the pickerel were not captured or observed in the south pond, its presence there is expected. Both of these species are common fresh water pond inhabitants. Compared to the robust appearance of the bluegills and pumpkinseed, the bass and pickerel appeared to be somewhat stunted. This would indicate that a limited food supply exists for these highly predatory fish. Not captured or observed at all was the yellow perch Perca flavescens, which is among the more common fresh water fishes. Lake Canonchet would appear capable of supporting this fish.

TABLE 2

Relative abundance of fishes in the north and south portions of Lake Canonchet and the location of capture or most frequent sightings. Abundance estimates are based on seine and fyke net collections, sightings, and fishermen interviews.

Species	Common Name	Pond	Abundance	Station captured or observed*	
				Fyke	Seine
Lepomis gibbosus	Pumpkinseed	N	A	1,2,3	1,2
		S	A	4,5	3,4,5
Enneacanthus obesus	Banded sunfish	N	R	3	1,2
		S	R	---	4,5
Lepomis macrochirus	Bluegill	N	C	1,2,3	2
		S	C	4,5	4
Micropterus salmoides	Large mouth bass	N	C	1,2	---
		S	C	---	3
Morone americana	White perch	N	R	2,3	---
		S	N/C	---	---
Alosa pseudoharengus	Alewife	N	C	2,3	---
		S	C	5	3
Anguilla rostrata	American eel	N	C	2,3	---
		S	C	4	---
Notemigonus crysoleucas	Golden shiner	N	R	2	---
		S	A	5	---
Esox niger	Chain pickerel	N	C	2,3	---
		S	N/C	---	---
Chrysemys picta	Painted turtle	N	C	1,2,3	2
		S	C	4,5	4,5
Chelydra serpentina	Snapping turtle	N	R	2,3	---
		S	R	5	---

N = North Pond S = South Pond A = Abundant C = Common

R = Rare N/C = Not captured or observed

*Refer to Figures 2a and 2b.

The presence of the alewife, eel, and white perch was not unsuspected but is significant nonetheless. Both the alewife (or "buckeye") and the white perch are anadromous fish, spending most of their life in the sea but migrating up streams to fresh water ponds and lakes to spawn. The young enter the sea in the fall of the year. In some cases populations become landlocked and spend their entire life cycle in fresh water. They tend to become quite stunted under those conditions, however. The American eel reverses this migrating procedure by maturing in a fresh water system and travelling to the sea to spawn. Brief interviews with fishermen have indicated that the white perch used to be plentiful in the pond in the 1950's. It is apparently rare now. The alewife run this year consisted of three and four year olds--the three year old fish were found primarily in the south pond while the four year olds were in North Pond. This observation is of no significance other than to say the younger fish were able to swim through the culvert in the spring. Much of the rest of the year this would not be possible due to low water and rooted vegetation. All migratory species, regardless of the numbers inhabiting Lake Canonchet, enter and exit through the small stream which discharges into Pettaquamscutt Cove (Narrow River) to the northwest.

The golden shiner was found in unexpectedly large numbers in South Pond. This species may have been introduced through its use by fishermen as bait for the native fishes. The large size of some individuals captured indicate that they have been present in the pond for many years. This has been substantiated by an interview with one fisherman who remembers them in Lake Canonchet from as long ago as 1945. It is interesting to note that the shiners were captured only in the southern end of the south pond and rarely in the northern end of the north pond. While their range in each sector

TABLE 3

LENGTHS AND WEIGHTS OF SOME FISHES COLLECTED FROM LAKE CANONCHET BY SEINE AND FYKE NET

Species	Common Name	Pond	Length (cm) Mean	Length (cm) Range	Weight (g) Mean	Weight (g) Range	Sample size
Lepomis gibbosus	Pumpkinseed	N	14.0	9.2-17.4	68	18-118	57
		S	14.1	7.9-16.2	72	9-116	128
Lepomis macrochirus	Bluegill	N	17.4	15.6-19.1	103	83-122	2
		S	16.6	15.8-18.8	120	99-171	7
Enneacanthus obesus	Banded sunfish	N	9.8	4.0-14.3	44	*- 66	7
		S	5.7	3.5-10.2	10	*- 21	6
Alosa pseudoharengus	Alewife	N	26.2	23.5-28.9	246	170-335	6
		S	17.9	17.0-19.2	62	51- 74	11
Notemigonus crysoleucas	Golden shiner	N	15.0	---	53	---	1
		S	14.8	12.9-19.8	51	30-128	61
Morone americana	White perch	N	12.7	24.9-27.7	50	270-330	6
		S	not collected				

*low range limit undetermined

certainly overlaps with that of the pumpkinseed and bluegills, there does appear to be some segregation. There are many more in the south pond and the average size is too large for bait for fishermen or as forage for predators. The young of the year, however, provide good forage for bass, pickerel, and white perch. Large snapping turtles and numerous painted turtles inhabit Lake Canonchet as well.

MANAGEMENT CONSIDERATIONS AND RECOMMENDATIONS

Lake Canonchet's abundant stocks of pan-sized pumpkinseed and bluegills can provide an important recreational activity for youngsters in the summer. An organized pumpkinseed/bluegill fishing tournament through the summer parks program would provide older children with healthy recreation while some of the younger participants may be introduced to recreational fishing in an instructive and exciting way. At the same time a program of this type would serve to crop these stocks and reduce competition for the more desirable largemouth bass, white perch and pickerel. Avoidance of these latter species in the recreational program would be possible with proper gear selection. Although some fishing presently occurs in the pond for bass and pickerel, the fishing pressure is light and probably can continue at this same level indefinitely. However, a large increase in effort aimed specifically at bass and pickerel could foreseeably deplete these stocks rather quickly. For this reason, any organized fishing effort as part of the Canonchet Farm program should be limited to pumpkinseed and bluegill, the most abundant of the fish inhabitants, and the ones most resilient to a rapid population depletion.

Stocking the lake with trout or other salmonids is not recommended. The August temperatures in both ponds were higher than the upper lethal limits for salmonids and the low dissolved oxygen after four days of fog was too low for these fishes. Likewise, there appears to be no necessity at this time

to make other direct alterations to existing fish stocks for the purpose of management.

The dyke separating the two pond sections should be opened up. At the present time connection is made only through a concrete culvert which is above pond water levels during a large portion of the year. Opening the dyke and removing the culvert would provide access for the bass and pickerel in North Pond to the abundant shiners in South Pond. The channel thus formed should be deep enough to allow water transfer and fish passage even during the dry seasons, and should preferably be dug to match existing bottom depths in the south pond which is five to six feet deep. A permanent bridge could be made of timbers which would provide a rustic appearance and would allow for emergency or service vehicle access to the Canonchet Farm interior. Bridge underclearance should be high enough and wide enough to permit passage of non-motorized recreational boats if this type of use is to be promoted. A height of six feet and a width of twenty feet would be highly desirable. Shallow, gravelly areas adjacent to the bridge and channel should be retained wherever possible, as they are important spawning substrate and nesting habitat for largemouth bass.

A better connection between the two ponds is also likely to increase the amount of phytoplankton in North Pond. South Pond presently has more nutrients and supports fairly heavy blooms. Some of this spills into the southern tip of North Pond, adjacent to the dyke and culvert. It remains to be seen just how much mixing between the two sides would occur if the connection were enlarged and made permanent. Since a fairly narrow (but also relatively deep) channel still would separate the two main basins, it is possible that the southern basin could be more eutrophic than the northern basin even with a larger connection between the two ponds. It is also possible that sufficient

exchange would occur for a phytoplankton bloom in the northern basin also. Unless the nutrient levels in the southern basin were to markedly increase due to extraneous causes, the existing levels of phytoplankton should not be cause for alarm in either pond. Oxygen depletion to catastrophic conditions is apparently precluded by the shallowness of the pond and by a frequent on-shore breeze which allows for rapid mixing of an apparent minimum level of approximately 4 ppm dissolved oxygen. This is surmised from our observations and from the fact that fish kills in the summer in South Pond have been very infrequent.

The discharge stream at the northwest corner of North Pond passes through a dense shrub and woodland prior to emptying into a tidal marsh on Pettaquamscutt Cove. This stream should be examined periodically to see if it has become partially blocked with brush or trash. Removing such blockages may improve the value of the pond for the alewife and white perch.

The general appearance of the area around Lake Canonchet can be improved. In addition to the debris and trash which makes the roadside and the shore of the pond unattractive, one gets a feeling of barrenness, of hot concrete roads and asphalt, and no way to escape the burning sun. Only the natural greenery seen on the western shore of the pond provides some visual relief.

The eastern shore of the pond and the road with its median strip can be made more attractive if several shade trees were planted at appropriate locations such as at the southeast and northeast corners of the pond, on both sides of the entrance road near the suggested bridge, and along the Route 1A median strip which separates north and south bound traffic. Shade trees, perhaps several showy flowering trees such as cherry or flowering crab, attractive lawns with a few picnic tables along the pond shoreline would improve

the pond's and the general area's appearance immensely. A more visually attractive setting will also enhance the desired recreational uses for the pond.

Although parking in the area by beach patrons is a problem on high use days such as weekends and holidays, parking is adequate a large proportion of time. It is during these periods of lower use activity by beach patrons that fishing or other recreational users of the pond would apt to be attracted. Parking for fishermen or picnickers would therefore likely be easily accommodated in the existing bathing pavilion lot or in the present small overflow parking area on the east side of south pond. This small parking area could also be used as the site from which some organized recreational activity could be conducted. This could include the fishing tournaments mentioned previously or perhaps as the starting point for paddleboat excursions around the pond.

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