

## LITTORAL ZONE SURVEY METHOD

Sections 1-16 were divided up into relatively equal sections. Each section was enlarged on a piece of paper. The procedure was changed for sections 17-37. The shoreline was divided at transition zones, and a representative sample of each zone was drawn.

The enlarged maps were used to record the backshore vegetation, the submergent & emergent vegetation, the cottages & types of docks, shoals and substrate & corresponding potential spawning areas for bass. Six depth contours were drawn for areas that were thought to be potentially good spawning areas. The types & percentages of submergent vegetation were recorded. A dotted line was drawn to show the limits of the emergent vegetation. Any wildlife sightings were included on the maps. Shoreline hardening around cottages was noted as well.

From the large maps, summaries were made on small ministry maps for easier accessibility to the information. Summary maps were made for 1) the aquatic vegetation; 2) shoals; 3) cottages and docks; 4) backshore description, substrate and corresponding potential fish spawning areas. The aquatic vegetation summary depicted the areas of dense submergent & emergent vegetation. The shoals were marked on a map with a corresponding description. The shoreline cruise map recorded all cottages and docks and the areas of highest people population density. This map also included Secchi disk readings taken at the mouths of all creeks.

The littoral zone of Morton Creek & Lyndhurst Creek was surveyed in a similar manner. The survey of Morton Creek was very general since the whole creek was much the same.

Two islands - Black Jack & Partridge - were surveyed. They were done because they seemed like the best islands for smallmouth bass spawning habitat. Of the few islands present, most were not determined to be suitable for spawning.

Areas we identified as potential bass spawning sites could be further surveyed by scuba diving. These areas may include the offshore shoals and any sections of the lake shoreline which have a rubble-gravel type substrate. These areas may have particular importance for smallmouth bass spawning habitat but it is difficult to judge the importance of the area from the surface. Areas of importance can be determined from the shoal survey descriptions and the map showing substrate types.

## 2. THE STUDY AREA

Lower Beverley Lake has a surface area of 767 hectares and a mean depth of 9.1 meters and a maximum depth of 25.9 meters. The lake historically included lake trout and white fish populations. Lake trout are now extinct as the result of a combination of water level manipulation interfering with natural lake trout recruitment, spawning habitat degradation due to siltation and aquatic weed encroachment and a dissolved oxygen and water temperature problem which precludes the availability of optimum lake trout habitat. Early angler exploitation of a fragile lake trout population probably hastened the extinction of lake trout in Lower Beverley Lake, estimated to have occurred by 1920.

The major fisheries community consists of bass with largemouth bass being the predominant species. The lake stresses consist of angler exploitation targeting largemouth bass, smallmouth bass, northern pike; commercial harvesting of quota allocation for brown bullhead, sunfish and yellow perch. Shoreline alteration has been intense in some areas with loss of bass and pike spawning habitat. Siltation and aquatic weed encroachments are suspected of impacting smallmouth bass spawning habitat and providing increased stress on guard fish and potential for egg/fry predation by sunfishes. Anglers have been catching bowfin (*Amia calva*) and this species is considered to be a recent introduction to Lower Beverley Lake. The impact that this predatory fish might have on existing fish communities is not known. Lake characteristics (spawning habitat, forage base) will favor population growth of this species.

Characteristics of Lower Beverley Lake

Water Level Fluctuation	Total Dissolved Solids (mg/l)	M.E.I. (metric)	Total Potential Yield (kg/yr)	Allowable Yield by species (kg/yr)
0.8 m	162.0	17.4	3963	LMB -199.3 SMB -988.8 N.Pike -988.8 Y.Perch-513.6

The estimated littoral zone for Lower Beverley Lake consists of 318 hectares (42%). The 44 km of shoreline is all privately owned. Shoreline development (1983) included 200 cottages and houses, 33 registered vacant lots, 13 tourist camps and 190 tent and trailer sites.

Lower Beverley Lake had been stocked with smallmouth bass up until 1979 when stocking was terminated. In the spring of 1986, 5,000 F1 Splake were stocked in the lake to provide a put-and-take fishery. This stocking will continue on an annual basis. The existence of alewife (*Alosa pseudoharengus*) could contribute towards a forage base for splake.

### 3. METHODS

The Lower Beverley Lake creel survey was designed using the CREESYS microcomputer creel survey package in order to standardize field methods and provide consistency in computer analysis of data generated by field work. The creel design would provide enhanced opportunity for more consistent trend-through-time analysis. The program package

## CONTENTS

### SUMMARY OF AREAS SURVEYED

- #1: 2 weedy bays, very good for largemouth bass spawning sections of 1, very good for smallmouth bass spawning; no cottages
- #2: Very good for smallmouth bass spawning; no cottages
- #3: Good largemouth bass spawning, 1 weedy bay, few cottages present
- #4: Not good spawning habitat due to beaches & narrow littoral zone
- #5: Not good spawning habitat due to a large number of cottages and a large percentage of bedrock substrate
- #6: Very good largemouth bass spawning - large weedy bay, few cottages, sandy. Fair smallmouth bass - not much good habitat; many cottages; siltation & weeds encroaching
- #7: Insignificant for spawning due to many cottages & boat traffic
- #8: Very good largemouth bass spawning, large weedy bay, few cottages. Fair smallmouth bass spawning: 1st section of 8, many cottages, encroaching weeds, narrow littoral zone
- #9: Very good smallmouth bass spawning: short point bay - sandy, gravelly substrate; not many cottages
- #10: Good smallmouth bass spawning: narrow littoral zone, large section, not many cottages
- #11: Good largemouth bass spawning: weedy bays, but many cottages. Fair smallmouth bass spawning: very small section- 15-20%
- #12: Very good largemouth bass spawning: not many cottages, extensive littoral zone
- #13: Very good largemouth bass spawning: weedy, mucky, few cottages
- #14: Very good largemouth bass spawning: extensive littoral zone, few cottages
- #15: Fair largemouth bass spawning: 50%, many cottages & docks. Insignificant for spawning: many cottages; narrow littoral zone
- #16: Insignificant for spawning: many cottages & docks
- #17: Very good largemouth bass spawning: mucky, no cottages, weedy. Fair smallmouth bass spawning: weeds encroaching; siltation occurring
- #18: Very good largemouth bass spawning: extensive littoral zone, few cottages, dense vegetation, mucky substrate
- #19: Sections have potential for smallmouth bass spawning: weeds aren't dense, many cottages
- #20: Very good largemouth bass spawning: few cottages, dense weeds, extensive littoral zone
- #21: Potential for smallmouth bass spawning: narrow littoral zone, rubble substrate
- #22: Good largemouth bass spawning, nursery & forage habitat; extensive littoral zone, dense weeds
- #23: Same as 21
- #24: Good largemouth spawning, nursery & forage habitat; no cottages, mucky substrate
- #25: Good smallmouth bass spawning: gravel, rubble substrate, no cottages, sparse submergent vegetation
- #26: Sections good for both smallmouth and largemouth bass: weedy bays (large-mouth bass), rubble substrate (smallmouth bass)
- #27: Good largemouth bass spawning, nursery & forage habitat; extensive littoral zone, dense vegetation
- #28: Good smallmouth bass spawning: rubble & gravel substrate, no cottages. Good largemouth bass spawning: few sections, weedy, mucky bays
- #29: Very good largemouth bass spawning: littoral zone extensive, no cottages, mucky
- #30: Good largemouth bass spawning: dense weedy bay. Good smallmouth bass spawning: rubble substrate
- #31: Good largemouth bass spawning: extensive littoral zone, no cottages

- #32: Potentially good for smallmouth bass spawning; weeds encroaching, rubble & gravel substrate, no cottages, sunfish nests
- #33: Potentially good largemouth bass spawning: extensive littoral zone, weedy, few cottages
- #34: Good smallmouth bass spawning: rubble substrate, few cottages, weeds encroaching, siltation, some areas less weeds, therefore - better
- #35: Good for largemouth bass spawning: dense vegetation, mucky substrate
- #36: Good for smallmouth bass spawning: many cottages, good rubble substrate, weeds encroaching. Weedy bays good for largemouth bass spawning
- #37: Good for largemouth bass spawning: extensive littoral zone, dense, weedy bay.

Lyndhurst Creek: good for largemouth bass & pike spawning - mucky substrate, few cottages, extensive littoral zone

Morton Creek: good for largemouth bass & pike spawning - mucky substrate, few cottages, extensive littoral zone

We surveyed 2 islands - Partridge & Black Jack - that looked potentially good for spawning.

Partridge Island: good for smallmouth bass spawning - good rubble, gravel substrate, no cottages  
northwest side good for largemouth bass spawning - dense weeds, mucky substrate, no cottages

Black Jack: mostly good smallmouth bass spawning - gravel, rubble substrate, narrow littoral zone, many cottages

Note: No actual bass nests were observed, so the location & quality of the spawning sites is subjective. It is based on the number of cottages present, substrate, vegetation & size of the area.

Sections for Improvement due to siltation & weed encroachment: #6, #17, #28 #32, #34

Most areas that have been labelled as good potential largemouth bass spawning habitat are also important for Northern pike spawning habitat.

KEY:

- submergent
- emergent
- none

Structures:

- : cottages
- ▣: boat house
- ⊞: dock

- 1.- sf - steel frame
- 2.- wd - wooden dock
- 3.- fd- floating dock

SUBSTRATE:

- † :muck
- # :silt
- ⋄ :clay
- :sand
- △ :gravel
- ▣ :rubble
- :boulder
- ⊞ :bedrock

XX : bar: stabilization  
 √ : transition zone

Wildlife:

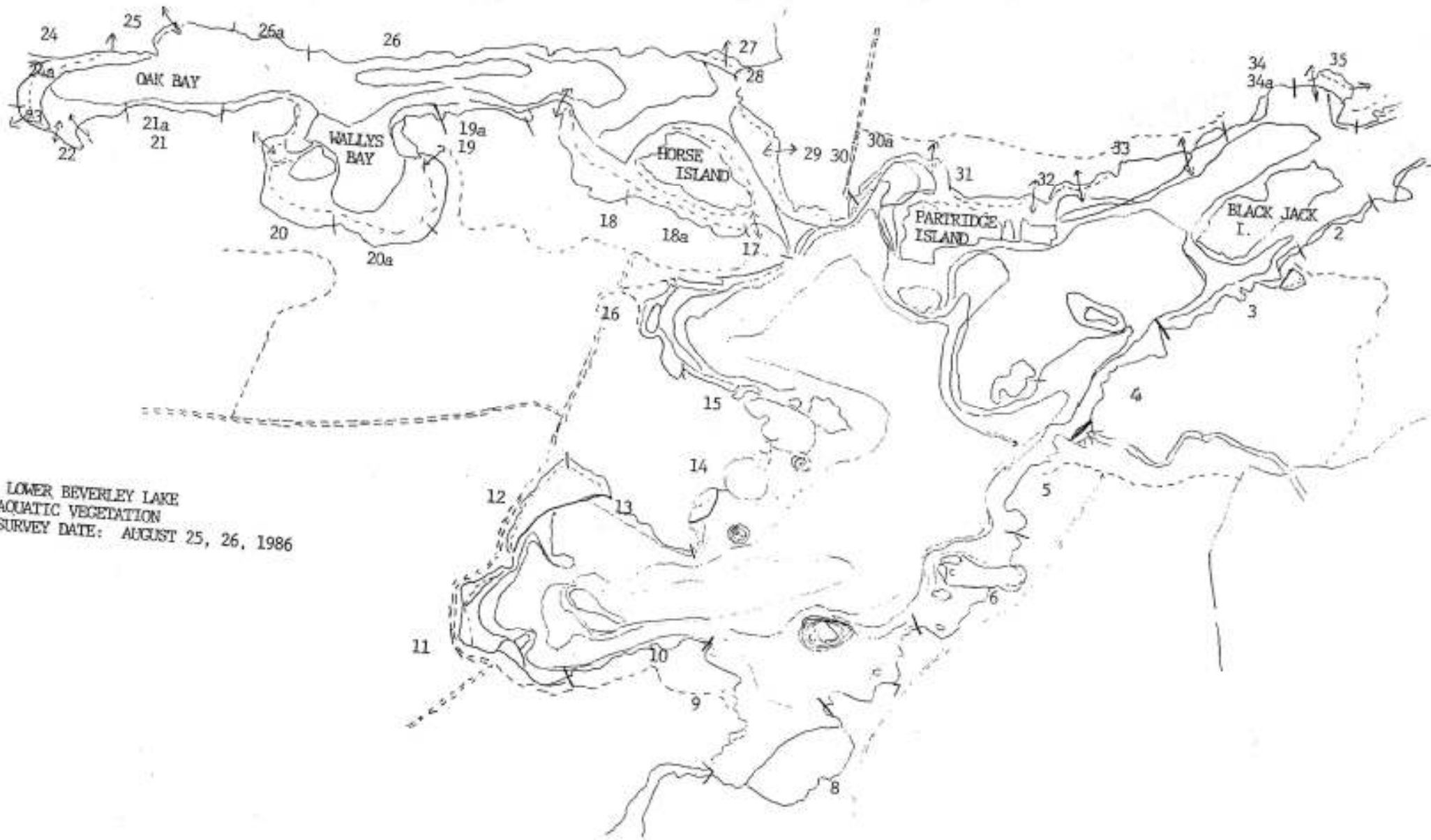
T : turtle  
BF : bullfrog  
CH : blue heron  
OS : osprey  
D : ducks

Tree Types:

PW - white pine  
HE - hemlock  
CE - white cedar  
BW - white birch  
MH - hard maple  
MR - red maple  
AB - black ash  
EW - white elm  
OR - red oak  
BD - basswood  
MS - silver maple  
PO - poplar

## SHOAL DESCRIPTIONS

- 1) Small shoal - substrate muck, light siltation on shoal, algae covered
- 2) Small shoals - group of 3 - substrate muck, light siltation on shoal, algae covered
- 3) Large shoals - 2 - substrate - gravel covered with silt, dense weeds encroaching along edge of shoals
- 4) Large shoals - 3 - substrate - sand covered with heavy silt around edges, algae covered
- 5) Large shoal - substrate bedrock & gravel, medium siltation, algae covered
- 6) Small shoal - substrate clay changing to sand further from the shoal, light siltation
- 7) Small shoal - substrate gravel and rubble, heavy siltation
- 8) Large shoal - substrate bedrock and sand, light siltation
- 9) Large shoal - consisting of boulders and rubble, substrate - gravel and sand
- 10) Small shoal - bedrock with gravel and rubble substrate, light siltation
- 11) Large shoal - substrate unknown - water depth greater than sounding pole - possibly gravel and rubble substrate as in shallower depth
- 12) Large rock pile - substrate - sand-covered with 2-3 of silt, submergent weeds, dense
- 13) Large shoal - substrate unknown - too deep, light siltation on shoal, weed encroaching
- 14) Large shoal - substrate - bedrock covered with 3-4 of muck, weeds dense
- 15) Small shoal - bedrock substrate covered with muck, weeds dense
- 16) Island surrounded by small shoal, substrate - bedrock with some gravel & sand on west side of island. Siltation heavy around shoals, weeds encroaching
- 17) Island surrounded by small shoals, substrate - bedrock and sand - siltation heavy, dense weeds.
- 18) Large shoal - substrate unknown - too deep, light siltation on shoal
- 19, 20, 21) Group of large shoals with smaller shoals surrounding them, substrate - bedrock with clay, heavy siltation, dense weeds
- 22) Large shoal surrounded by boulders; substrate - bedrock with gravel & clay, weeds encroaching
- 23) Small group of shoals in shallow water; substrate - bedrock & sand, weeds sparse
- 24) Large shoal - substrate - sand & clay over bedrock, siltation is occurring, and weeds are encroaching
- 25) Clay & gravel substrate - weeds encroaching, dense weeds surround it
- 26) Clay substrate surrounding shoal, light siltation
- 27) Group of shoals, clay substrate surround it, weeds encroaching but not densely
- 28, 29) Weeds encroaching 29 - weeds dense, gravel substrate close to shoal, farther out is clay; heavy siltation, 28) substrate all clay
- 30) Long shoal - clay substrate, siltation occurring & weeds encroaching
- 32) Small shoal  $\tau$  clay substrate around perimeter, further out muck substrate  $\tau$  weeds encroaching
- 33) Substrate indeterminate due to very deep water surrounding shoal
- 34) Very small, water very deep on all sides, hence substrate indeterminate



LOWER BEVERLEY LAKE  
AQUATIC VEGETATION  
SURVEY DATE: AUGUST 25, 26, 1986