DEPARTMENT of ENVIRONMENTAL SERVICES
Water Supply & Pollution Control Division - Biology Bureau

LAKE TROPHIC DATA

MORPHOMETRIC:

Lake:	WINNISQUAM, THREE ISL.	Lake Area (ha):	1725.70
Town:	LACONIA	Maximum depth (m):	53.0
County:	Belknap	Mean depth (m):	15.2
River Basin:	Merrimack	Volume (m^3):	262306500
Latitude:	43°34'43" N	Relative depth:	1.1
Longitude:	71°31'55" W	Shore configuration:	3.08
Elevation (ft):	482	Areal water load (m/yr):	33.44
Shore length (m):	45400	Flushing rate (yr^{-1}):	2.20
Watershed area (ha):	118028.7	P retention coeff.:	---
% watershed ponded:	18.7	Lake type:	natural w/dam

BIOLOGICAL:		2 March 1995	20 July 1994
DOM. PHYTOPLANKTON (% TOTAL)	#1	MELOSIRA 50%	DINOBRYON 35%
	#2	RHIZOSOLENIA 35%	TABELLARIA 25%
	#3		STAURASTRUM 15%
PHYTOPLANKTON ABUNDANCE (units/mL)			
CHLOROPHYLL-A (μg/L)			1.85
DOM. ZOOPLANKTON (% TOTAL)	#1	POLYARTHRA 25%	ACTINOPHRYS 49%
	#2	KERATELLA 18%	KERATELLA 9%
	#3	KELLICOTTIA 17%	NAUPLIUS LARVA 8%
ROTIFERS/LITER		136	63
MICROCRUSTACEA/LITER		39	44
ZOOPLANKTON ABUNDANCE (#/L)		202	216
VASCULAR PLANT ABUNDANCE			Sparse
SECCHI DISK TRANSPARENCY (m)			9.5
BOTTOM DISSOLVED OXYGEN (mg/L)		10.3	8.3
BACTERIA (E. coli, #/100 ml)	#1		
	#2		
	#3		

SUMMER THERMAL STRATIFICATION:

stratified

Depth of thermocline (m): 7.8
Hypolimnion volume (m^3) :
Anoxic volume (m^3) : None

CHEMICAL:

Lake: WINNISQUAM, THREE ISL.
Town: LACONIA

	2 March 1995		20 July 1994		
DEPTH (m)	6.0	12.0	3.0	8.5	13.0
pH (units)	6.5	6.6	7.0	6.9	6.6
A.N.C. (Alkalinity)	7.9	8.2	5.4	6.8	6.7
NITRATE NITROGEN	< 0.10	< 0.10	< 0.05		
TOTAL KJELDAHL NITROGEN	0.22	0.27	< 0.10	0.11	0.12
TOTAL PHOSPHORUS	0.006	0.010	0.013	0.010	0.013
CONDUCTIVITY (μmhos/cm)	73.6	74.7	74.9	76.6	77.3
APPARENT COLOR (cpu)	13	13	< 5	8	10
MAGNESIUM			0.72		
CALCIUM			4.3		
SODIUM			8.7		
POTASSIUM			0.64		
CHLORIDE	15	15	10		
SULFATE	5	5	5		
TN : TP	37	27			
CALCITE SATURATION INDEX			2.9		

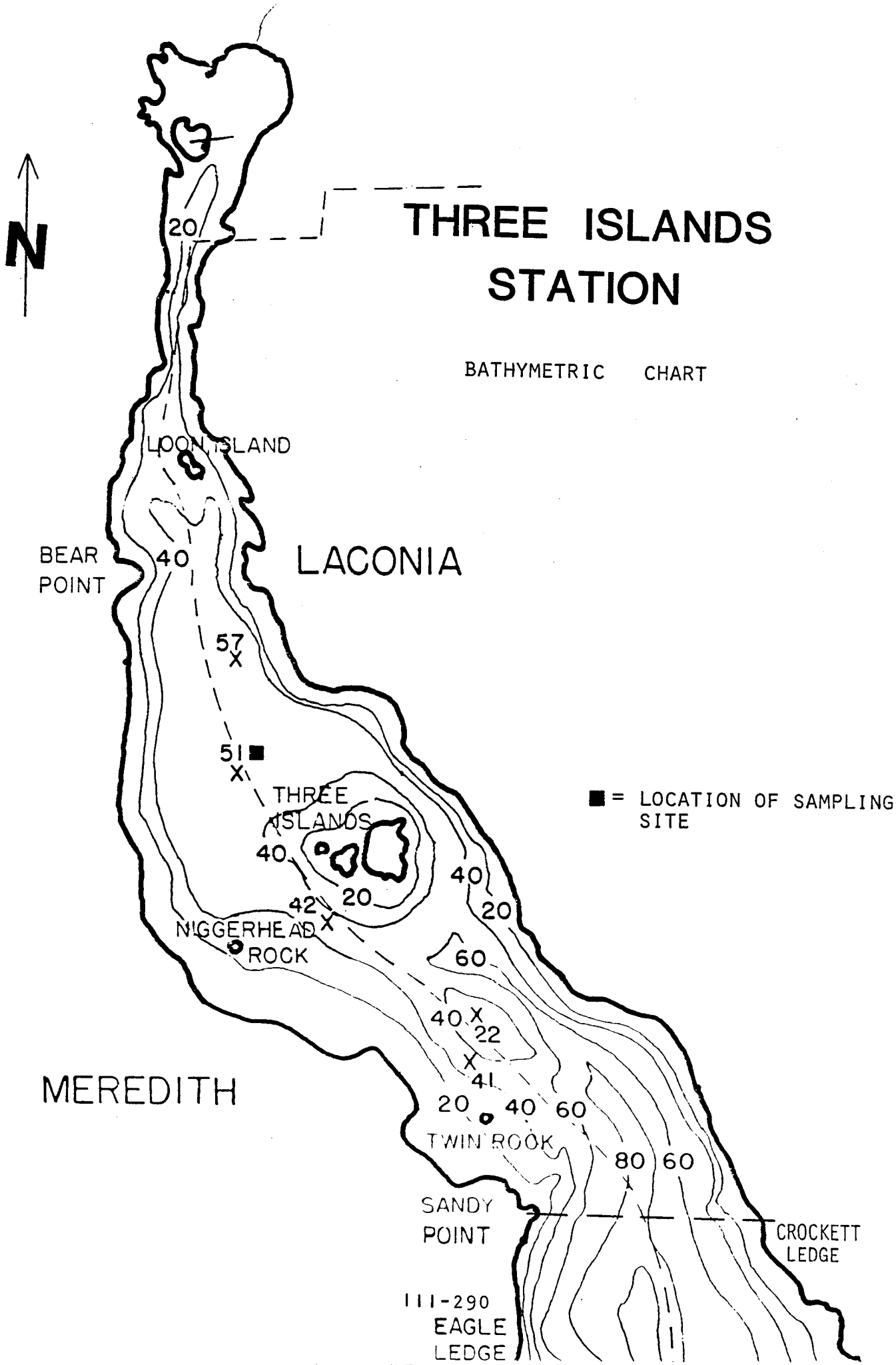
All results in mg/L unless indicated otherwise

TROPHIC CLASSIFICATION: 1994

D.O.	S.D.	PLANT	CHL	TOTAL	CLASS
0	0	0	0	0	Oligo.

COMMENTS:

1. See Mohawk station for comments.


THREE ISLANDS
STATION
BATHYMETRIC CHART
N
LOON ISLAND
BEAR
POINT
LACONIA
THREE
ISLANDS
NIGGERHEAD
ROCK
MEREDITH
TWIN ROCK
SANDY
POINT
CROCKETT
LEDGE
EAGLE
LEDGE
■ = LOCATION OF SAMPLING
SITE
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FIELD DATA SHEET

LAKE: WINNISQUAM, THREE ISL. TOWN: LACONIA
DATE: 07/20/94 WEATHER: HAZY, HOT & HUMID

	DEPTH (M)	TEMP (°C)	*DISSOLVED OXYGEN	OXYGEN SATURATION
	0.1	25.0	8.5	102 %
	1.0	24.1	8.4	99 %
	2.0	24.0	8.5	100 %
	3.0	24.0	8.5	100 %
	4.0	23.8	8.4	97 %
	5.0	23.8	8.4	97 %
	6.0	23.6	8.3	96 %
	7.0	22.5	8.3	94 %
	8.0	18.0	9.7	101 %
	9.0	16.0	10.2	103 %
	10.0	13.5	9.8	91 %
	11.0	11.8	9.0	82 %
	12.0	10.6	8.6	75 %
	13.0	10.0	8.4	74 %
	14.0	9.4	8.2	71 %
	15.0	9.0	8.4	72 %
	16.0	9.0	8.3	71 %

SECCHI DISK (m): 9.5
BOTTOM DEPTH (m): 16.7
TIME: 1200

COMMENTS:

*Dissolved oxygen values are in mg/L

DEPARTMENT of ENVIRONMENTAL SERVICES
Water Supply & Pollution Control Division - Biology Bureau

LAKE TROPHIC DATA

MORPHOMETRIC:

Lake:	WINNISQUAM, POT ISL.	Lake Area (ha):	1725.70
Town:	LACONIA	Maximum depth (m):	53.0
County:	Belknap	Mean depth (m):	15.2
River Basin:	Merrimack	Volume (m^3):	262306500
Latitude:	43°32'30" N	Relative depth:	1.1
Longitude:	71°30'40" W	Shore configuration:	3.08
Elevation (ft):	482	Areal water load (m/yr):	33.44
Shore length (m):	45400	Flushing rate (yr^{-1}):	2.20
Watershed area (ha):	118028.7	P retention coeff.:	---
% watershed ponded:	18.7	Lake type:	natural w/dam

BIOLOGICAL:		27 February 1995	20 July 1994
DOM. PHYTOPLANKTON (% TOTAL)	#1	MELOSIRA 70%	DINOBRYON 35%
	#2	RHIZOSOLENIA 15%	TABELLARIA 20%
	#3		ANABAENA 10%
PHYTOPLANKTON ABUNDANCE (units/mL)			
CHLOROPHYLL-A (μg/L)			1.64
DOM. ZOOPLANKTON (% TOTAL)	#1	KERATELLA 36%	DAPHNIA 24%
	#2	KELLICOTTIA 21%	NAUPLIUS LARVA 22%
	#3		KERATELLA 17%
ROTIFERS/LITER		26	30
MICROCRUSTACEA/LITER		11	72
ZOOPLANKTON ABUNDANCE (#/L)		39	103
VASCULAR PLANT ABUNDANCE			Sparse
SECCHI DISK TRANSPARENCY (m)			9.4
BOTTOM DISSOLVED OXYGEN (mg/L)		11.7	8.8
BACTERIA (E. coli, #/100 ml)	#1		
	#2		
	#3		

SUMMER THERMAL STRATIFICATION:

stratified

Depth of thermocline (m): 7.8
Hypolimnion volume (m^3) :
Anoxic volume (m^3) : None

CHEMICAL:

Lake: WINNISQUAM, POT ISL.
Town: LACONIA

	27 February 1995		20 July 1994		
DEPTH (m)	15.0	30.0	3.5	11.0	35.0
pH (units)	7.0	7.0	7.1	6.8	6.6
A.N.C. (Alkalinity)	7.3	7.4	7.1	7.2	7.1
NITRATE NITROGEN	< 0.10	< 0.10	0.08		
TOTAL KJELDAHL NITROGEN			< 0.10	< 0.10	0.21
TOTAL PHOSPHORUS	0.011	0.009	0.008	0.010	0.013
CONDUCTIVITY (μmhos/cm)	74.0	75.7	76.2	77.9	77.0
APPARENT COLOR (cpu)	13	13	8	8	11
MAGNESIUM			0.74		
CALCIUM			4.2		
SODIUM			8.9		
POTASSIUM			0.72		
CHLORIDE	14	15	10		
SULFATE	5	5	5		
TN : TP					
CALCITE SATURATION INDEX			2.7		

All results in mg/L unless indicated otherwise

TROPHIC CLASSIFICATION: 1994

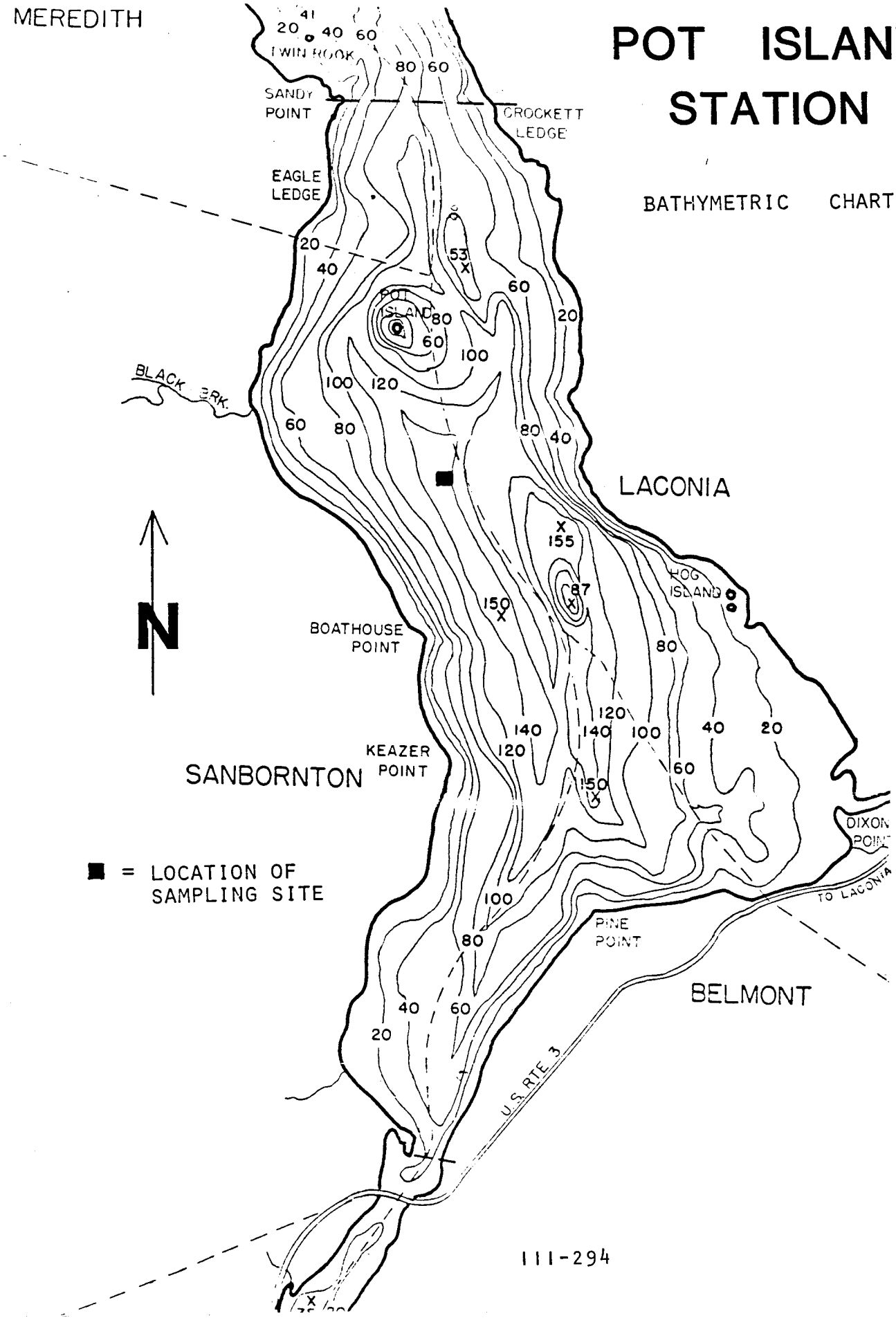
D.O.	S.D.	PLANT	CHL	TOTAL	CLASS
0	0	0	0	0	Oligo.

COMMENTS:

1. See Mohawk station for comments.

POT ISLAND STATION

BATHYMETRIC CHART



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FIELD DATA SHEET

LAKE: WINNISQUAM, POT ISL. TOWN: LACONIA
DATE: 07/20/94 WEATHER: HAZY, HOT & HUMID

	DEPTH (M)	TEMP (°C)	*DISSOLVED OXYGEN	OXYGEN SATURATION
	0.1	25.4	8.4	101 %
	1.0	24.1	8.4	99 %
	2.0	23.8	8.5	98 %
	3.0	23.7	8.5	98 %
	4.0	23.6	8.5	98 %
	5.0	23.5	8.5	98 %
	6.0	23.4	8.4	97 %
	7.0	23.0	8.5	98 %
	8.0	18.8	9.5	99 %
	9.0	16.5	10.2	103 %
	10.0	13.7	10.2	96 %
	11.0	11.5	9.4	84 %
	12.0	10.5	9.4	74 %
	13.0	9.9	9.5	81 %
	14.0	9.5	9.5	81 %
	15.0	9.0	9.6	82 %
	20.0	7.5	9.5	77 %
	25.0	7.3	9.4	77 %
	30.0	7.0	9.2	75 %
	35.0	7.0	9.2	75 %
	40.0	7.0	9.0	74 %
	45.0	7.0	8.8	71 %

SECCHI DISK (m): 9.4 COMMENTS:
BOTTOM DEPTH (m): 48.5
TIME: 1300

*Dissolved oxygen values are in mg/L

DEPARTMENT of ENVIRONMENTAL SERVICES
Water Supply & Pollution Control Division - Biology Bureau

LAKE TROPHIC DATA

MORPHOMETRIC:

Lake:	WINNISQUAM, MOHAWK ISL.	Lake Area (ha):	1725.70
Town:	BELMONT	Maximum depth (m):	53.0
County:	Belknap	Mean depth (m):	15.2
River Basin:	Merrimack	Volume (m^3):	262306500
Latitude:	43°29'18" N	Relative depth:	1.1
Longitude:	71°31'05" W	Shore configuration:	3.08
Elevation (ft):	482	Areal water load (m/yr):	33.44
Shore length (m):	45400	Flushing rate (yr^{-1}):	2.20
Watershed area (ha):	118028.7	P retention coeff.:	---
% watershed ponded:	18.7	Lake type:	natural w/dam

BIOLOGICAL:		2 March 1995	20 July 1994
DOM. PHYTOPLANKTON (% TOTAL)	#1	MELOSIRA 85%	DINOBRYON 50%
	#2		ANABAENA 10%
	#3		COELOSPHAERIUM 10%
PHYTOPLANKTON ABUNDANCE (units/mL)			
CHLOROPHYLL-A (μg/L)			1.80
DOM. ZOOPLANKTON (% TOTAL)	#1	NAUPLIUS LARVA 27%	ASPLANCHNA 37%
	#2	LRG PERITR. CILIATE 23%	KERATELLA 14%
	#3	KERATELLA 15%	NAUPLIUS LARVA 11%
ROTIFERS/LITER		42	146
MICROCRUSTACEA/LITER		50	48
ZOOPLANKTON ABUNDANCE (#/L)		123	209
VASCULAR PLANT ABUNDANCE			Sparse
SECCHI DISK TRANSPARENCY (m)			8.5
BOTTOM DISSOLVED OXYGEN (mg/L)		8.9	2.6
BACTERIA (E. coli, #/100 ml)	#1		
	#2		
	#3		

SUMMER THERMAL STRATIFICATION:

stratified

Depth of thermocline (m): 6.9
Hypolimnion volume (m^3) :
Anoxic volume (m^3) : None

CHEMICAL:

Lake: WINNISQUAM, MOHAWK ISL.
Town: BELMONT

	2 March 1995		20 July 1994		
DEPTH (m)	6.0	12.0	2.0	6.0	11.0
pH (units)	6.8	6.5	6.9	6.9	6.3
A.N.C. (Alkalinity)	7.8	8.3	7.2	7.4	7.6
NITRATE NITROGEN	< 0.10	< 0.10	< 0.05		
TOTAL KJELDAHL NITROGEN	0.21	0.12	< 0.10	0.18	0.14
TOTAL PHOSPHORUS	0.010	0.006	0.012	0.012	0.028
CONDUCTIVITY (µmhos/cm)	75.0	77.0	77.2	77.8	79.5
APPARENT COLOR (cpu)	12	13	7	7	19
MAGNESIUM			0.74		
CALCIUM			4.2		
SODIUM			9.0		
POTASSIUM			0.71		
CHLORIDE	14	15	10		
SULFATE	5	5	5		
TN : TP	21	20			
CALCITE SATURATION INDEX			2.9		

All results in mg/L unless indicated otherwise

TROPHIC CLASSIFICATION: 1994

D.O.	S.D.	PLANT	CHL	TOTAL	CLASS
2	0	0	0	2	Oligo.

COMMENTS:

1. All three stations of this lake were previously surveyed and classified in 1980 and 1984. Mohawk Island was mesotrophic in 1980 due to a dissolved oxygen depletion in the bottom waters, which was consistent with depletions observed during the 1960's and '70's. The other two stations were oligotrophic in 1980, and all three stations were oligotrophic in 1984 and 1994.

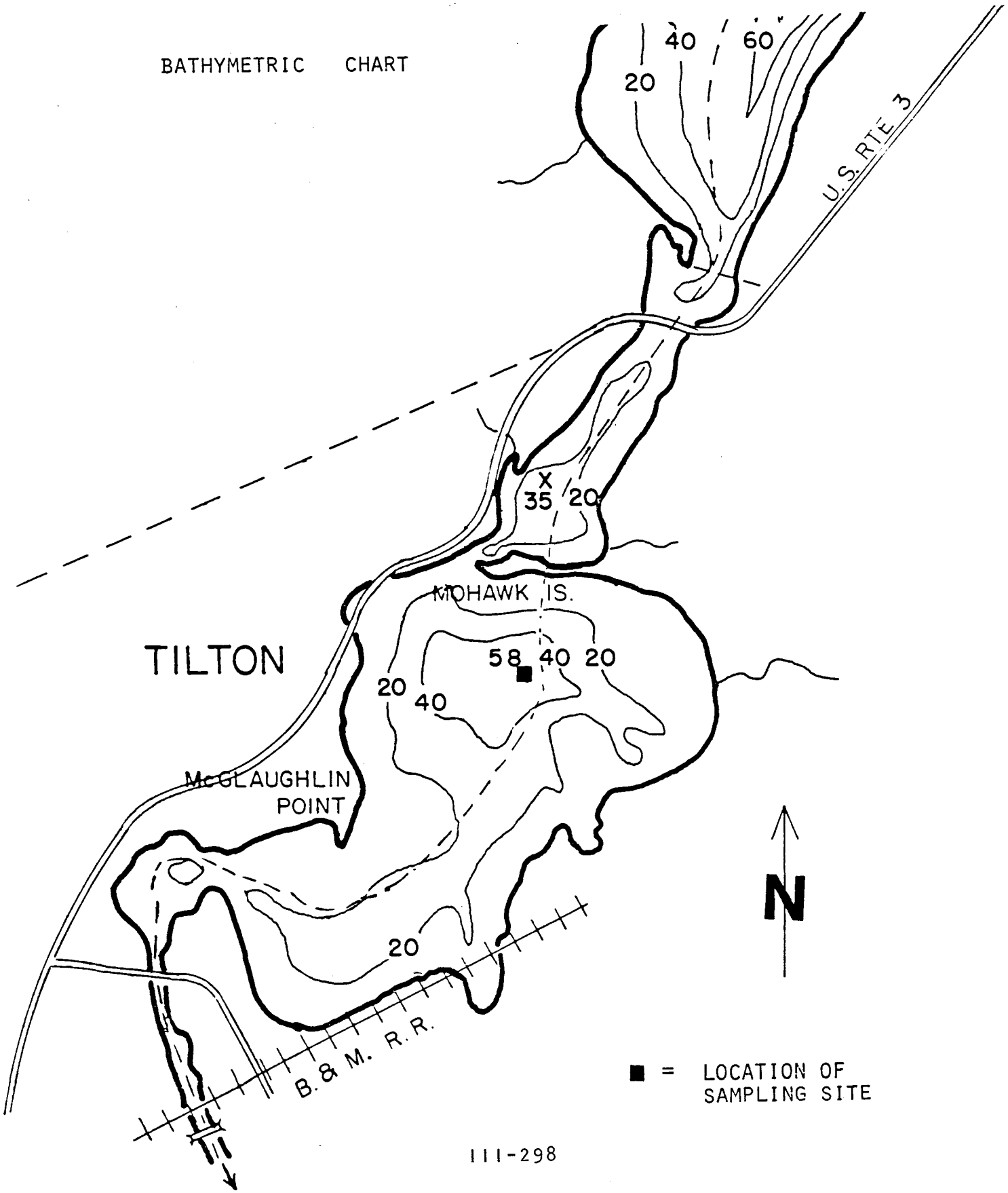
2. The three stations have participated in DES' Volunteer Lake Assessment Program since 1987. Water quality has been relatively stable (and excellent) during this time with some stations showing improving trends for certain parameters.

3. This lake suffered nuisance blue-green algal blooms during the 1960's and 70's due to city sewage discharges. The discharge was diverted out of the lake in 1979 and the blooms stopped immediately. By 1984 the dissolved oxygen depletions at Mohawk Island had been alleviated.

4. On a less optimistic note, the exotic species of milfoil was discovered in the lower end of Winnisquam in the early 1990's. Luxuriant growths occur at Jay's Marina, Sunray Shores and Mallard's Landing. An attempt to control this growth with herbicides was initially thwarted because of a public water intake but that issue was resolved and a future treatment may occur.

MOHAWK ISLAND STATION

BATHYMETRIC CHART



FIELD DATA SHEET

LAKE: WINNISQUAM, MOHAWK ISL. TOWN: BELMONT
DATE: 07/20/94 WEATHER: HAZY, HOT & HUMID

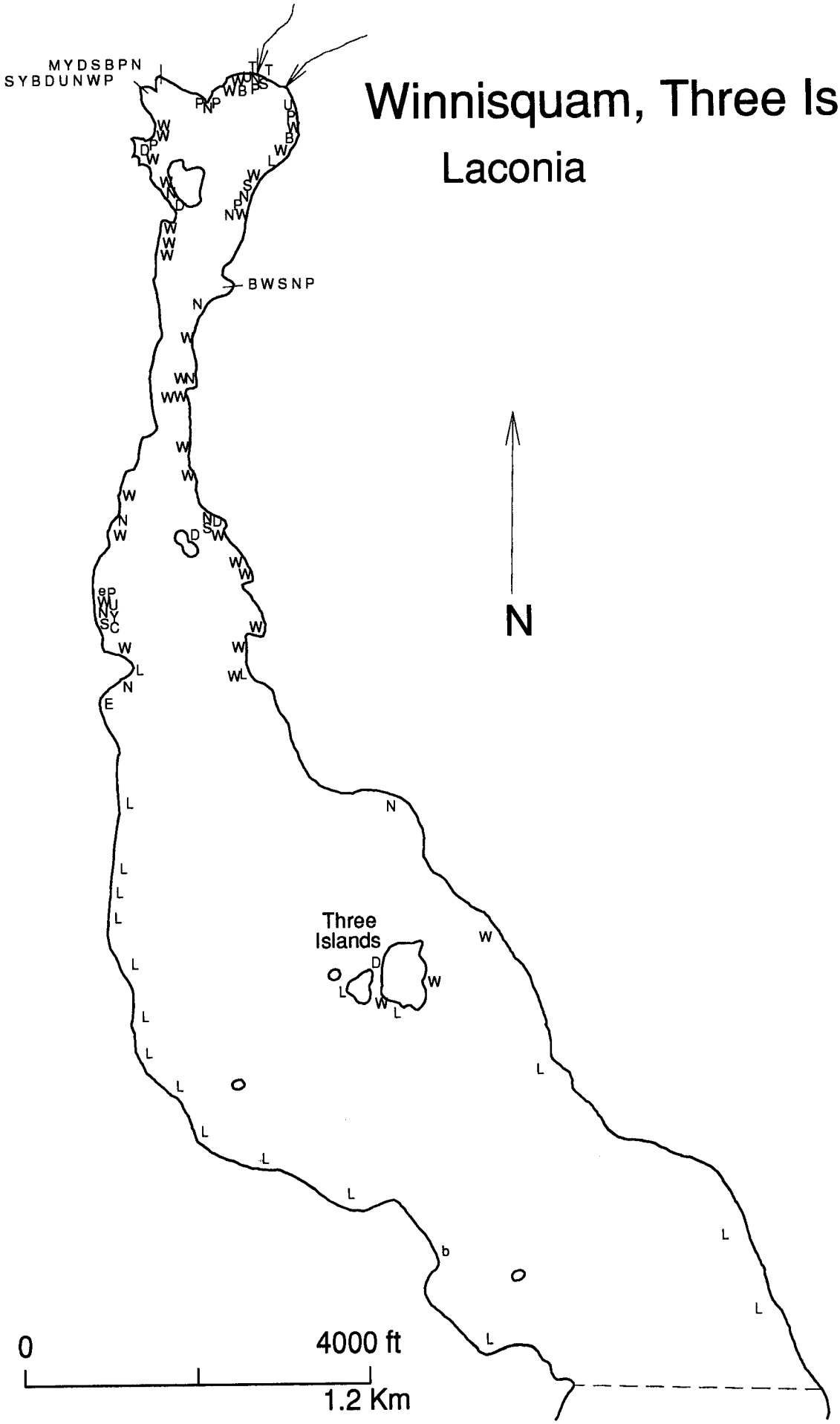
	DEPTH (M)	TEMP (°C)	*DISSOLVED OXYGEN	OXYGEN SATURATION
	0.1	24.9	8.4	99 %
	1.0	24.5	8.3	98 %
	2.0	24.1	8.2	97 %
	3.0	24.0	8.2	97 %
	4.0	23.9	8.2	95 %
	5.0	22.6	8.4	95 %
	6.0	20.5	9.1	100 %
	7.0	15.1	10.4	102 %
	8.0	12.0	8.8	80 %
	9.0	11.0	6.0	54 %
	10.0	10.4	3.7	32 %
	11.0	10.0	2.7	24 %
	12.0	9.7	2.8	24 %
	13.0	9.5	2.7	23 %
	14.0	9.2	2.6	22 %
	15.0	9.0	2.6	22 %

SECCHI DISK (m): 8.5 COMMENTS:
BOTTOM DEPTH (m): 15.6
TIME: 1000

*Dissolved oxygen values are in mg/L

Winnisquam, Three Isl.

Laconia



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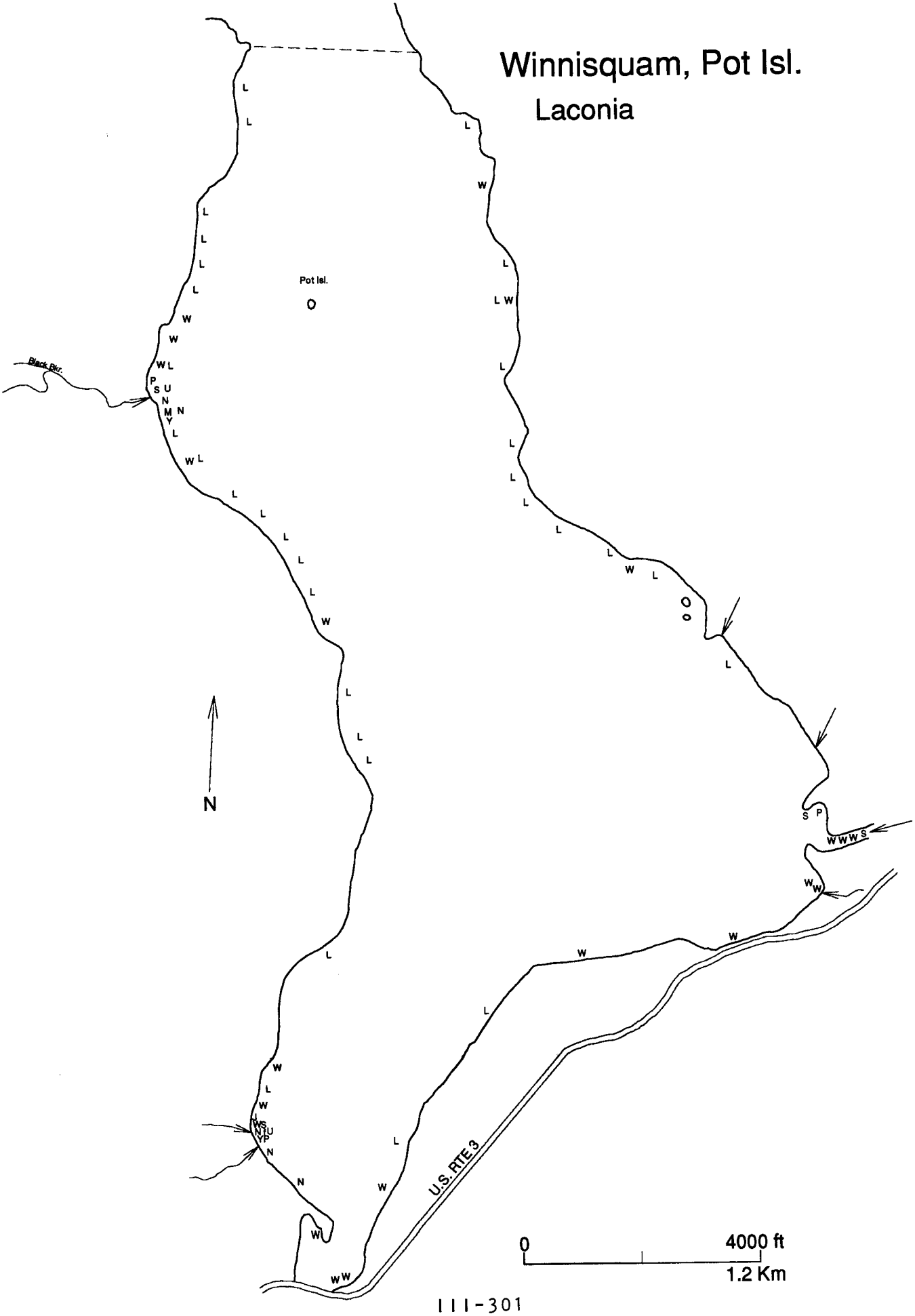
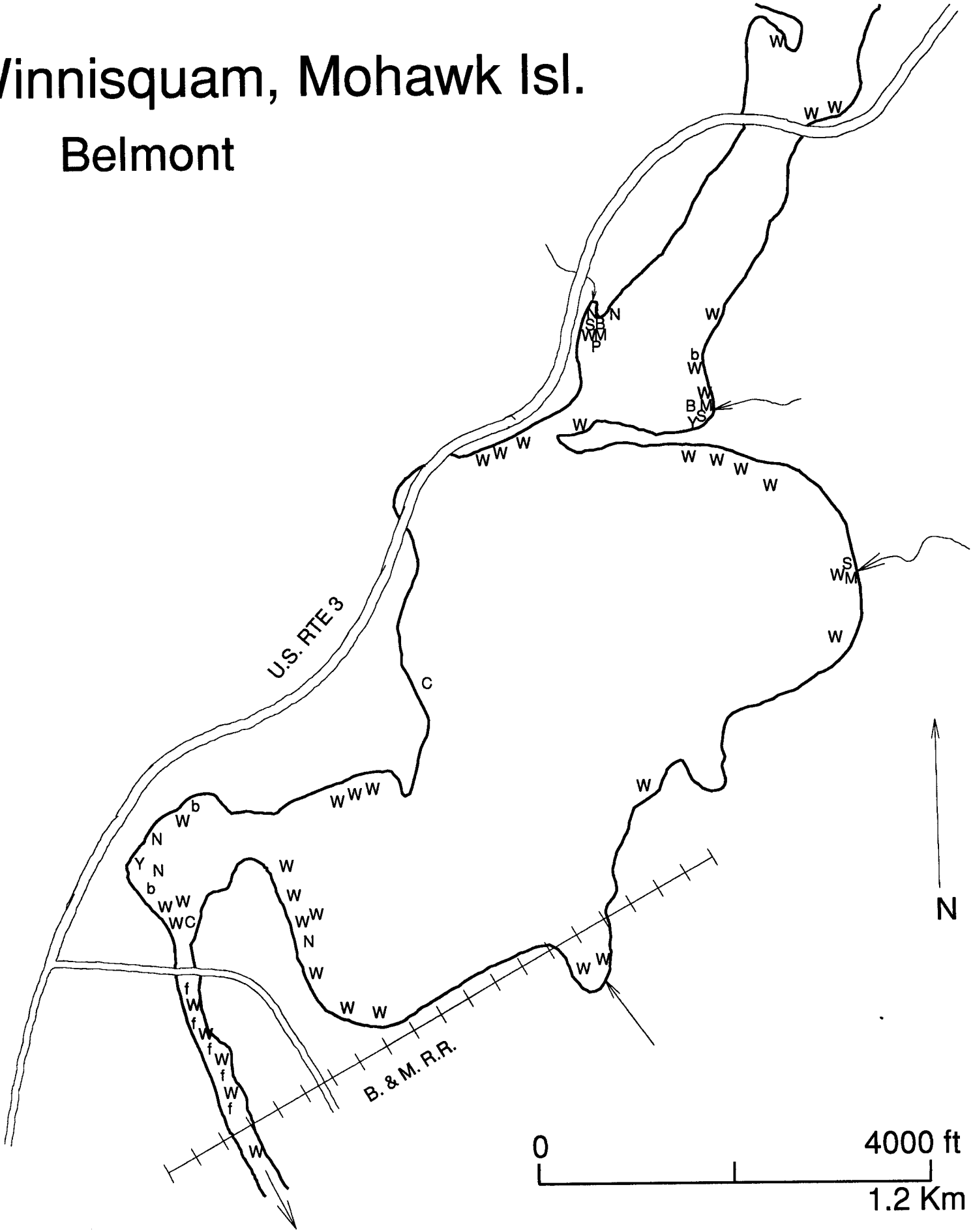
Winnisquam, Pot Isl.

Laconia



Winnisquam, Mohawk Isl.

Belmont



AQUATIC PLANT SURVEY

LAKE: WINNISQUAM TOWN: LACONIA DATE: 07/20/94

Key	PLANT NAME		ABUNDANCE
	GENERIC	COMMON	
W	Potamogeton	Pondweed	Sparse
C	Ceratophyllum demersum	Coontail	Sparse
b	Scirpus	Bulrush	Sparse
N	Nymphaea	White water lily	Sparse
Y	Nuphar	Yellow water lily	Sparse
f	Fontinalis	Water moss	Sparse
e	Elodea nuttallii	Waterweed	Sparse
M	Myriophyllum heterophyllum	Water milfoil	Sparse
S	Sparganium	Bur reed	Sparse
B	Brasenia schreberi	Water shield	Sparse
L	Lobelia dortmanna	Water lobelia	Sparse
P	Pontederia cordata	Pickerelweed	Sparse
U	Utricularia	Bladderwort	Sparse
J	Juncus	Rush	Sparse
E	Eriocaulon septangulare	Pipewort	Sparse
D	Decodon verticillatus	Swamp loosestrife	Sparse
T	Typha	Cattail	Sparse

OVERALL ABUNDANCE: Sparse

GENERAL OBSERVATIONS:

1. Plants were locally abundant in the very northern end and in some coves but were sparse overall.
2. Milfoil was present at Jay's Marina, Mallard's Landing and Sunray Shores, all in the lower end of the lake.
3. Freshwater mussels were observed in several areas of the lake.