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

LAKE TROPHIC DATA

MORPHOMETRIC:

Lake:	SQUAM LAKE, STN 1	Lake Area (ha):	2737.5
Town:	HOLDERNESS	Maximum depth (m):	30.2
County:	Grafton	Mean depth (m):	7.4
River Basin:	Merrimack	Volume (m^3):	187047000
Latitude:	43°45'30" N	Relative depth:	0.5
Longitude:	71°31'00" W	Shore configuration:	5.45
Elevation (ft):	562	Areal water load (m/yr):	1.47
Shore length (m):	97400	Flushing rate (yr^{-1}):	0.20
Watershed area (ha):	8443.4	P retention coeff.:	0.83
% watershed ponded:	3.0	Lake type:	natural w/dam

BIOLOGICAL:	27 February 1989	3 August 1988
DOM. PHYTOPLANKTON (% TOTAL) #1	ASTERIONELLA 40%	CHRYSOSPHAERELLA 45%
#2	DINOBRYON 25%	
#3		
PHYTOPLANKTON ABUNDANCE (cells/mL)		820.0
CHLOROPHYLL-A (ug/L)		1.88
DOM. ZOOPLANKTON (% TOTAL) #1	KELLICOTTIA 24%	KERATELLA 39%
#2		SYNCHAETA 20%
#3		COLOTHECA 17%
ROTIFERS/LITER	35	85
MICROCRUSTACEA/LITER	24	15
ZOOPLANKTON ABUNDANCE (#/L)	63	100
VASCULAR PLANT ABUNDANCE		Scattered
SECCHI DISK TRANSPARENCY (m)		7.7
BOTTOM DISSOLVED OXYGEN (mg/L)	7.2	4.0
BACTERIA (fecal col., #/100 ml) #1		
#2		
#3		

SUMMER THERMAL STRATIFICATION:

stratified

Depth of thermocline (m): 6.5
Hypolimnion volume (m^3): None

CHEMICAL:

Lake: SQUAM LAKE. STN 1
Town: HOLDERNESS

	27 February 1989		3 August 1988		
DEPTH (m)	5.0	10.0	2.0	5.5	9.0
pH (units)	6.8	6.2	6.9	6.7	6.5
A.N.C. (Alkalinity)	5.9	6.0	5.1	6.8	5.6
NITRATE NITROGEN	< 0.05	< 0.05	< 0.05		0.05
TOTAL KJELDAHL NITROGEN	0.12	0.12	0.33	0.38	0.44
TOTAL PHOSPHORUS	0.011	0.013	0.005	0.005	0.012
CONDUCTIVITY (µ mhos/cm)	40.9	41.4	36.9	36.4	38.6
APPARENT COLOR (cpu)	6	6	< 5	8	10
MAGNESIUM			0.46		
CALCIUM			2.6		
SODIUM			2.7		
POTASSIUM			0.50		
CHLORIDE	4	4	4		4
SULFATE	5	5	5		5
TN : TP	11	9	66		41
CALCITE SATURATION INDEX			3.3		

All results in mg/L unless indicated otherwise

TROPHIC CLASSIFICATION: 1988

D.O.	S.D.	PLANT	CHL	TOTAL	CLASS
**	0	1	0	1	Oligo.

COMMENTS:

1. Squam Lake was previously surveyed and classified in 1979. There was no change in trophic classification of any of the 3 stations.
2. A good bathymetric chart exists for Squam Lake, so the lake was not sounded in 1988.
3. The whole-water phytoplankton classes were dominated by greens (80%). Tiny green flagellates (75%) were the dominant genus.

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LAKE TROPHIC DATA

MORPHOMETRIC:

Lake:	SQUAM LAKE, STN 2	Lake Area (ha):	2737.5
Town:	HOLDERNESS	Maximum depth (m):	30.2
County:	Grafton	Mean depth (m):	7.4
River Basin:	Merrimack	Volume (m^3):	187047000
Latitude:	43°45'30" N	Relative depth:	0.5
Longitude:	71°31'00" W	Shore configuration:	5.45
Elevation (ft):	562	Areal water load (m/yr):	1.47
Shore length (m):	97400	Flushing rate (yr^{-1}):	0.20
Watershed area (ha):	8443.4	P retention coeff.:	0.83
% watershed ponded:	3.0	Lake type:	natural w/dam

BIOLOGICAL:	27 February 1989	3 August 1988
DOM. PHYTOPLANKTON (% TOTAL) #1	SYNEDRA 35%	SYNURA 25%
#2		CHRYSOSPHAERELLA 15%
#3		DINOBRYON 15%
PHYTOPLANKTON ABUNDANCE (cells/mL)		930.0
CHLOROPHYLL-A (µg/L)		4.58
DOM. ZOOPLANKTON (% TOTAL) #1	SYNCHAETA 33%	NO DOMINANTS
#2	KELLICOTTIA 28%	
#3		
ROTIFERS/LITER	70	33
MICROCRUSTACEA/LITER	17	44
ZOOPLANKTON ABUNDANCE (#/L)	92	78
VASCULAR PLANT ABUNDANCE		Scattered
SECCHI DISK TRANSPARENCY (m)		7.5
BOTTOM DISSOLVED OXYGEN (mg/L)	8.1	4.6
BACTERIA (fecal col., #/100 ml) #1		< 10
#2		
#3		

SUMMER THERMAL STRATIFICATION:

stratified

Depth of thermocline (m): 6.5
Hypolimnion volume (m^3): 35539000

CHEMICAL:

Lake: SQUAM LAKE. STN 2
Town: HOLDERNESS

	27 February 1989		3 August 1988		
DEPTH (m)	9.0	18.0	3.0	11.0	23.0
pH (units)	6.5	6.3	7.0	6.8	6.1
A.N.C. (Alkalinity)	5.9	5.7	5.1	6.7	5.6
NITRATE NITROGEN	< 0.05	< 0.05	< 0.05		< 0.05
TOTAL KJELDAHL NITROGEN	0.21	0.18	0.42	0.35	0.40
TOTAL PHOSPHORUS	0.010	0.011	0.011	0.008	0.008
CONDUCTIVITY (µ mhos/cm)	39.7	39.1	36.3	36.4	37.1
APPARENT COLOR (cpu)	< 5	< 5	6	8	8
MAGNESIUM			0.45		
CALCIUM			2.6		
SODIUM			2.7		
POTASSIUM			0.50		
CHLORIDE	4	4	4		4
SULFATE	5	5	5		5
TN : TP	21	16	38		50
CALCITE SATURATION INDEX			3.2		

All results in mg/L unless indicated otherwise

TROPHIC CLASSIFICATION: 1988

D.O.	S.D.	PLANT	CHL	TOTAL	CLASS
0	0	1	1	2	Oligo.

COMMENTS:

1. See Stn. 1 for general comments.
2. Green algae (60%) and cryptomonads (30%) were the dominant classes of whole-water phytoplankton. The dominant genera were tiny green flagellates (55%) and Chroomonas (25%).

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LAKE TROPHIC DATA

MORPHOMETRIC:

Lake:	SQUAM LAKE, STN 3	Lake Area (ha):	2737.5
Town:	SANDWICH	Maximum depth (m):	30.2
County:	Grafton	Mean depth (m):	7.4
River Basin:	Merrimack	Volume (m^3):	187047000
Latitude:	43°45'30" N	Relative depth:	0.5
Longitude:	71°31'00" W	Shore configuration:	5.45
Elevation (ft):	562	Areal water load (m/yr):	1.47
Shore length (m):	97400	Flushing rate (yr^{-1}):	0.20
Watershed area (ha):	8443.4	P retention coeff.:	0.83
% watershed ponded:	3.0	Lake type:	natural w/dam

BIOLOGICAL:	27 February 1989	3 August 1988
DOM. PHYTOPLANKTON (% TOTAL) #1	SYNEDRA 40%	DINOBRYON 20%
#2	RHIZOSOLENIA 25%	CHRYSOSPHAERELLA 20%
#3	DINOBRYON 15%	
PHYTOPLANKTON ABUNDANCE (cells/mL)		
CHLOROPHYLL-A (ug/L)		5.24
DOM. ZOOPLANKTON (% TOTAL) #1	SYNCHAETA 34%	NO DOMINANTS
#2	KELLICOTTIA 23%	
#3		
ROTIFERS/LITER	41	39
MICROCRUSTACEA/LITER	20	37
ZOOPLANKTON ABUNDANCE (#/L)	65	87
VASCULAR PLANT ABUNDANCE		Scattered
SECCHI DISK TRANSPARENCY (m)		8.0
BOTTOM DISSOLVED OXYGEN (mg/L)	9.5	4.5
BACTERIA (fecal col., #/100 ml) #1		< 10
#2		
#3		

SUMMER THERMAL STRATIFICATION:

stratified

Depth of thermocline (m): 6.5
Hypolimnion volume (m^3): 35539000

CHEMICAL:

Lake: SQUAM LAKE. STN 3
Town: SANDWICH

	27 February 1989		3 August 1988		
DEPTH (m)	5.0	10.0	3.0	10.5	22.0
pH (units)	6.6	6.6	6.7	6.6	6.1
A.N.C. (Alkalinity)	6.2	5.7	4.7	5.5	6.7
NITRATE NITROGEN	< 0.05	< 0.05	< 0.05		< 0.05
TOTAL KJELDAHL NITROGEN	0.16	0.26	0.33	0.60	0.40
TOTAL PHOSPHORUS	0.011	0.012	0.004	0.007	0.011
CONDUCTIVITY (µ mhos/cm)	40.8	38.9	36.1	36.9	37.4
APPARENT COLOR (cpu)	5	< 5	< 5	7	9
MAGNESIUM			0.47		
CALCIUM			2.7		
SODIUM			2.9		
POTASSIUM			0.50		
CHLORIDE	4	4	4		4
SULFATE	5	5	5		5
TN : TP	15	22	83		36
CALCITE SATURATION INDEX			3.5		

All results in mg/L unless indicated otherwise

TROPHIC CLASSIFICATION: 1988

D.O.	S.D.	PLANT	CHL	TOTAL	CLASS
0	0	1	1	2	Oligo.

COMMENTS:

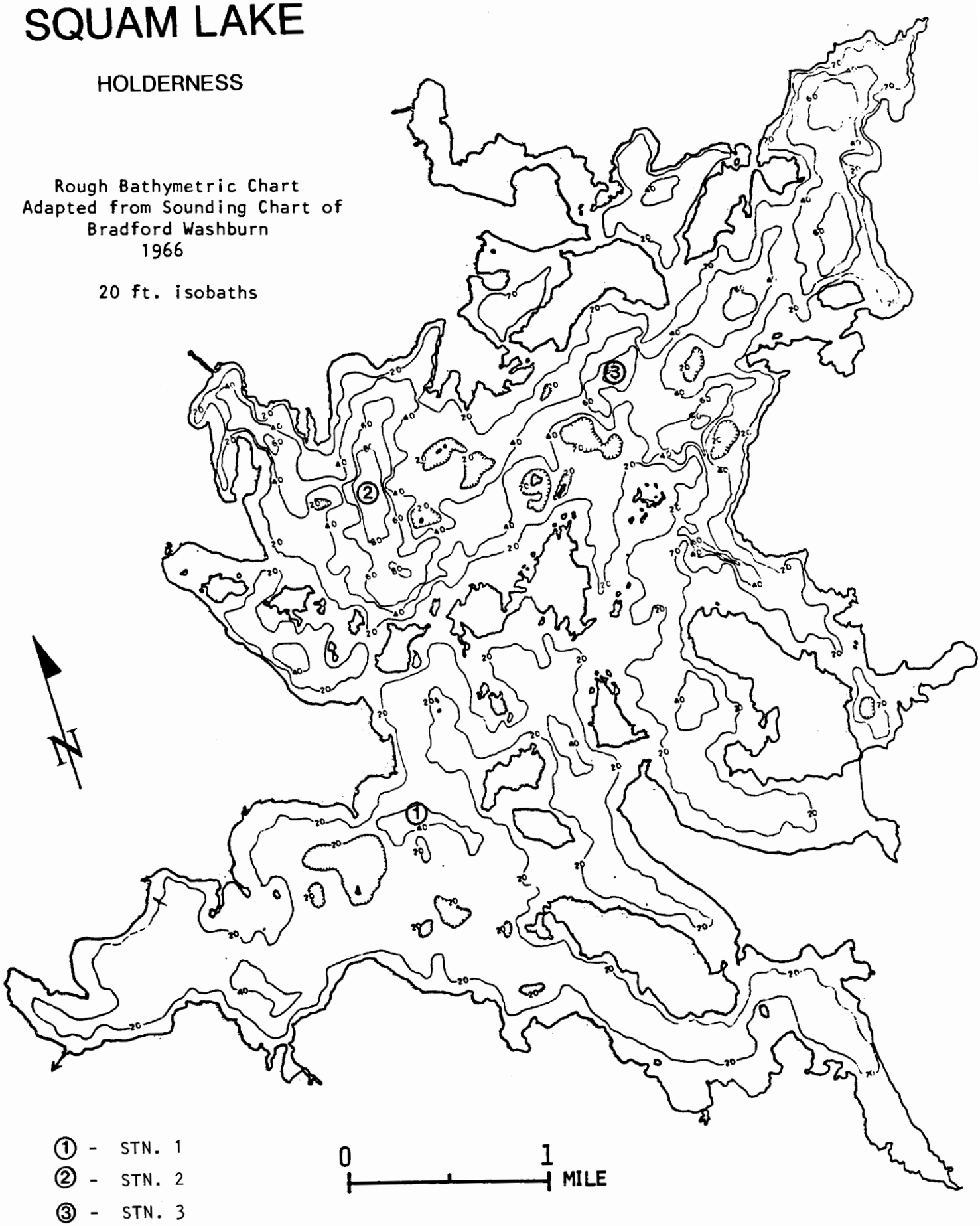
1. See Stn. 1 for general comments.
2. No whole-water phytoplankton analysis was conducted for station 3.

SQUAM LAKE

HOLDERNESS

Rough Bathymetric Chart
Adapted from Sounding Chart of
Bradford Washburn
1966

20 ft. isobaths



① - STN. 1
② - STN. 2
③ - STN. 3

FIELD DATA SHEET

LAKE: SQUAM LAKE. STN 1 TOWN: HOLDERNESS
DATE: 08/03/88 WEATHER: SUNNY, HOT

	DEPTH (M)	TEMP (°C)	*DISSOLVED OXYGEN	OXYGEN SATURATION
	0.1	26.0	8.5	104 %
	1.0	25.5	8.5	102 %
	2.0	24.7	8.5	100 %
	3.0	24.2	8.5	100 %
	4.0	24.0	8.5	100 %
	5.0	22.8	8.5	96 %
	6.0	21.2	8.5	94 %
	7.0	19.0	7.5	80 %
	8.0	17.9	6.5	67 %
	9.0	17.0	5.0	52 %
	10.5	16.0	4.0	41 %

SECCHI DISK (m): 7.7 COMMENTS:

BOTTOM DEPTH (m): 11.0

TIME: 1530

*Dissolved oxygen values are in mg/L

FIELD DATA SHEET

LAKE: SQUAM LAKE, STN 2 TOWN: HOLDERNESS
DATE: 08/03/88 WEATHER: SUNNY, HOT

	DEPTH (M)	TEMP (°C)	*DISSOLVED OXYGEN	OXYGEN SATURATION
	0.1	26.3	8.5	104 %
	1.0	25.1	8.5	102 %
	2.0	24.8	8.5	100 %
	3.0	24.2	8.5	100 %
	4.0	24.0	8.5	100 %
	5.0	23.0	8.8	101 %
	6.0	21.3	9.0	101 %
	7.0	19.1	9.1	98 %
	8.0	17.2	9.1	94 %
	9.0	15.8	9.0	89 %
	10.0	14.0	6.5	62 %
	11.0	12.7	7.5	69 %
	12.0	11.2	6.8	61 %
	13.0	10.0	6.7	58 %
	14.0	8.9	6.5	54 %
	16.0	7.2	6.4	52 %
	18.0	6.2	6.1	49 %
	20.0	6.0	5.5	44 %
	25.0	5.5	5.0	39 %
	27.0	5.2	4.7	36 %
	28.5	5.2	4.6	35 %

SECCHI DISK (m): 7.5 COMMENTS:

BOTTOM DEPTH (m): 28.7

TIME: 1405

*Dissolved oxygen values are in mg/L

FIELD DATA SHEET

LAKE: SQUAM LAKE, STN 3 TOWN: SANDWICH
DATE: 08/03/88 WEATHER: SUNNY, HOT

	DEPTH (M)	TEMP (°C)	*DISSOLVED OXYGEN	OXYGEN SATURATION
	0.1	26.0	8.4	103 %
	1.0	25.1	8.4	101 %
	2.0	25.0	8.5	102 %
	3.0	25.0	8.5	102 %
	4.0	24.5	8.7	102 %
	5.0	23.0	8.8	101 %
	6.0	21.5	9.0	101 %
	7.0	19.2	9.0	97 %
	8.0	17.5	9.2	95 %
	9.0	16.0	8.8	88 %
	10.0	14.0	8.2	79 %
	11.0	12.8	7.5	69 %
	12.0	12.0	6.5	60 %
	14.0	10.8	5.8	50 %
	16.0	9.0	5.0	43 %
	18.0	8.2	5.2	44 %
	22.0	7.2	4.5	37 %
	27.0	7.2	4.5	37 %

SECCHI DISK (m): 8.0 COMMENTS:

BOTTOM DEPTH (m): 27.5

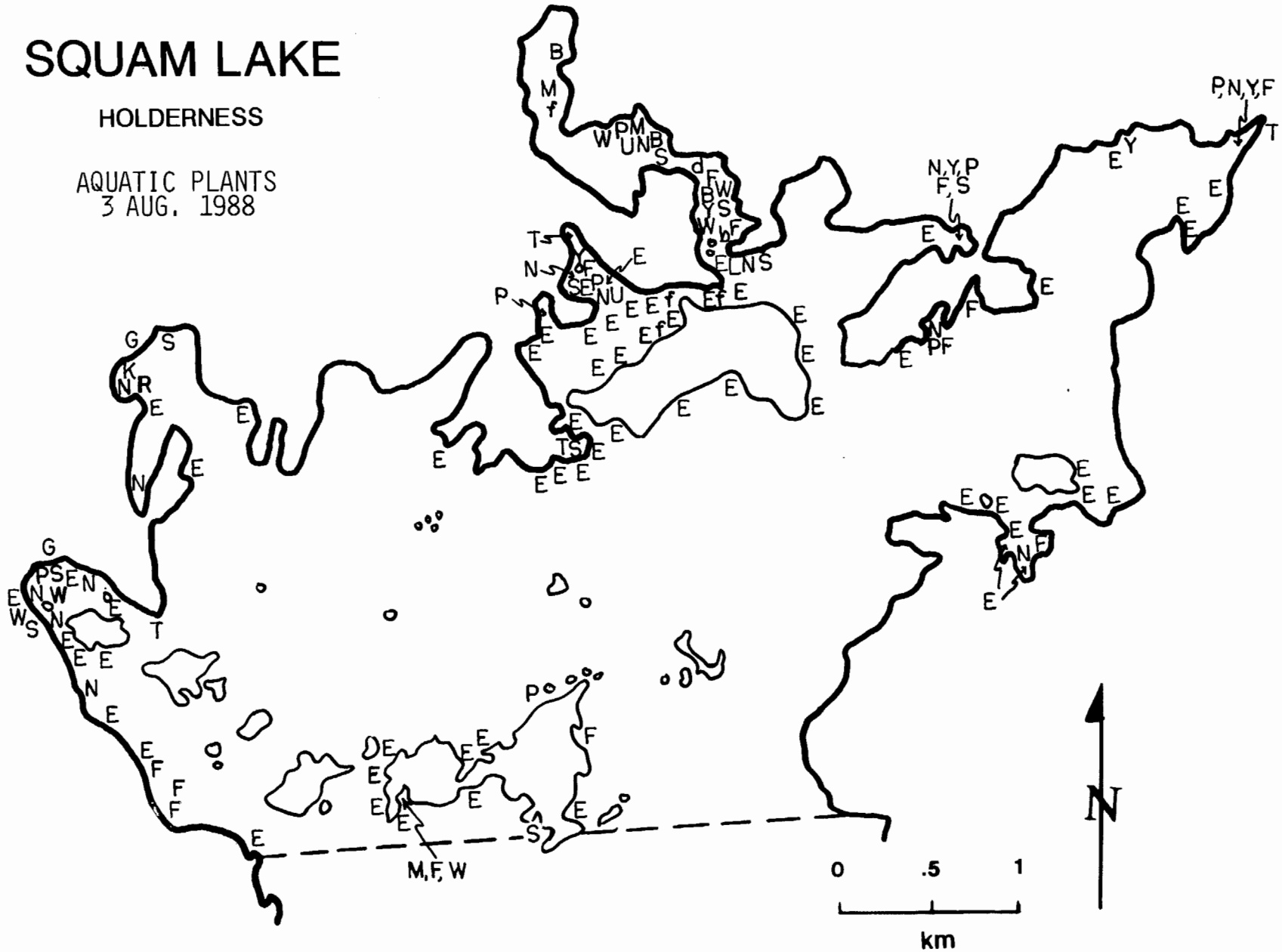
TIME: 1315

*Dissolved oxygen values are in mg/L

SQUAM LAKE

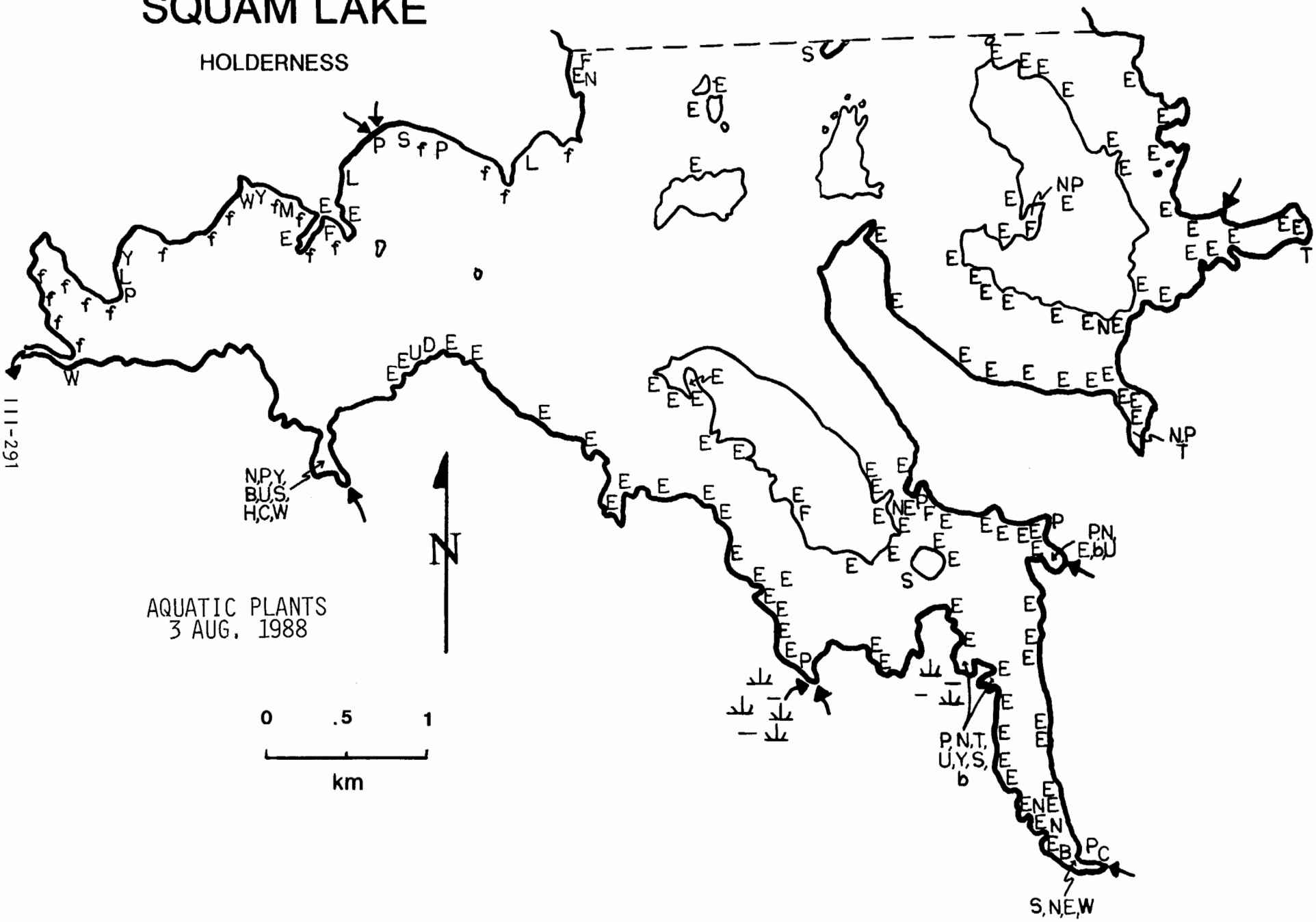
HOLDERNESS

AQUATIC PLANTS
3 AUG. 1988



SQUAM LAKE

HOLDERNESS



AQUATIC PLANT SURVEY

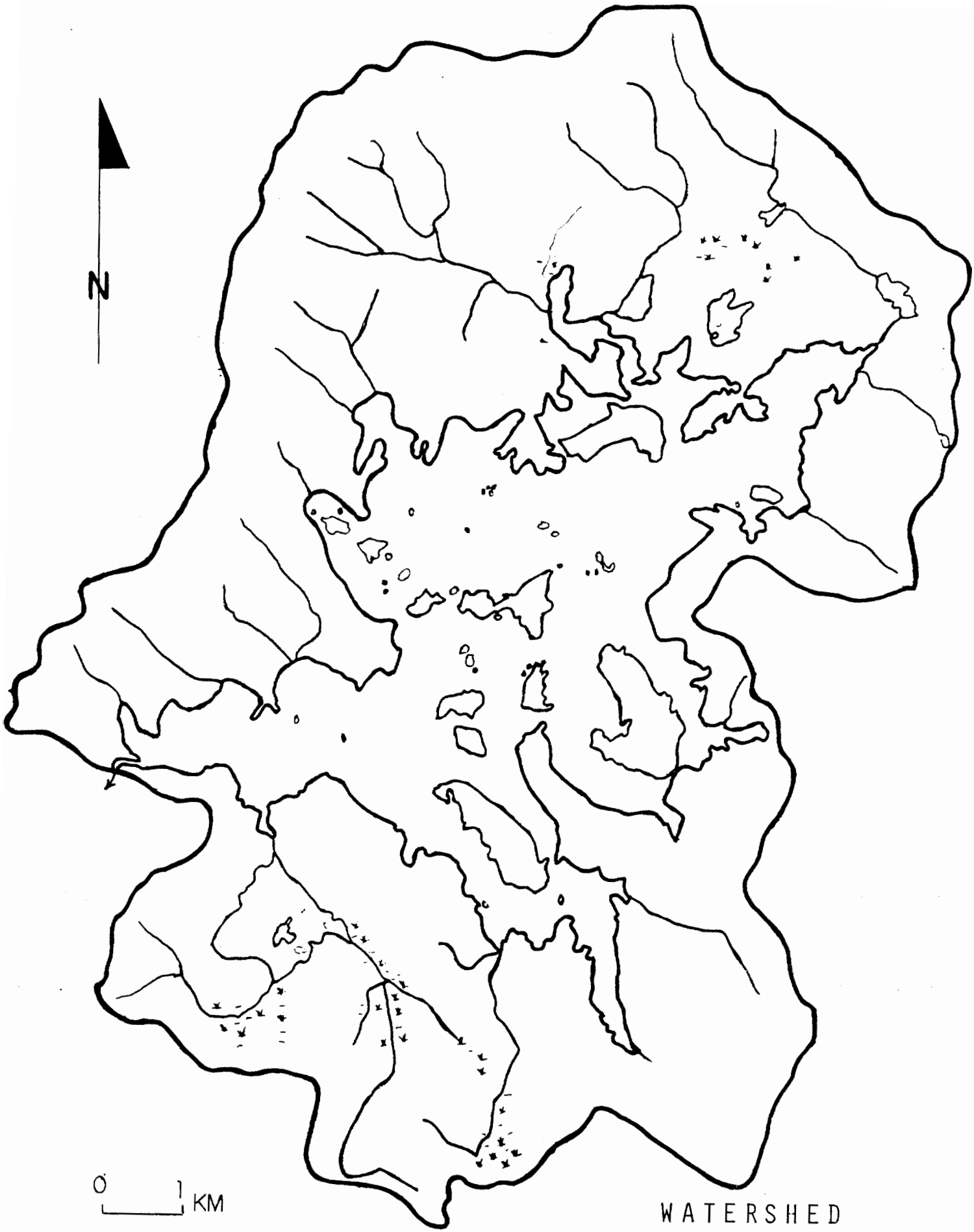
LAKE: SQUAM LAKE | TOWN: HOLDERNESS | DATE: 08/03/88

Key	PLANT NAME		ABUNDANCE
	GENERIC	COMMON	
W	Potamogeton	Pondweed	Scattered
E	Eriocaulon septangulare	Pipewort	Scattered
f	Chlorophyceae	Filamentous green algae	Scattered
N	Nymphaea	White water lily	Sparse
Y	Nuphar	Yellow water lily	Sparse
S	Sparganium	Bur reed	Sparse
H	Equisetum	Horsetail	Sparse
B	Brasenia schreberi	Water shield	Sparse
P	Pontederia cordata	Pickerelweed	Sparse
U	Utricularia	Bladderwort	Sparse
C	Carex	Sedge	Sparse
b	Scirpus	Bulrush	Sparse
F	Nymphoides cordatum	Floating heart	Sparse
M	Myriophyllum humile	Water milfoil	Sparse
G	Gratiola	Hedge hyssop	Sparse
R	Polygonum	Smartweed	Sparse
K	Eleocharis	Spike rush	Sparse
T	Typha	Cattail	Sparse
d	Dulichium arundinaceum	Three-way sedge	Sparse
L	Lobelia dortmanna	Water lobelia	Sparse

OVERALL ABUNDANCE: Scattered

GENERAL OBSERVATIONS:

1. Plants were locally abundant in some of the shallow coves, but were scattered overall; pipewort was present along much of the shoreline, but in scattered patches.
2. Freshwater sponges and bryozoans were observed in the northern cove (Squaw Cove), along with much bottom growth.



WATERSHED
SQUAM LAKE
HOLDERNESS