UNITED STATES DEPARTMENT OF THE INTERIOR

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Sketch maps showing areal extent, thickness, and amount of commercial-quality peat in deposits of southern and western Maine

by

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and

Michael K. Mullen

Open-File Report 82-184

CONTENTS

ILLUSTRATIONS

ILLUSTRATIONS--continued

ILLUSTRATIONS--continued

ILLUSTRATIONS--continued

ILLUSTRATIONS--continued

ILLUSTRATIONS--continued

TABLE

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ABSTRACT

Peat deposits in southern and western Maine were investigated for their estimated potential as peat resources suitable for energy, horticultural, and agricultural uses. Fifty-six sketch maps illustrate the areal extent, thickness, and amount of commercial-quality peat. The total yield is estimated at 27,736,400 short tons air-dried peat.

INTRODUCTION

General nature and classifications of peat

Peat is light-brown to dark-brown or almost black residuum formed by the partial decay and disintegration of plants that grew in marshes and swamps or in damp places such as heaths. It may be (1) fibrous matted material composed of mosses, ferns, grasses, rushes, reeds, sedges, and woody material from trees and shrubs; (2) finely divided plants so decomposed that their biological identity has been lost; or (3) nonfibrous, plastic colloidal, and macerated material deposited at the bottom of lakes or other bodies of water. The U.S. Bureau of Mines classifies peat in three general types. Material derived from moss is moss peat; that from reed, sedge, shrub, and tree groups is classified as reed-sedge peat; and material so decomposed that its botanical identity has been obscured and its further oxidation impeded is classified as humus peat. The American Society for Testing and Materials (ASTM) refined these definitions in 1969 to include in commercial-quality peat only that having an ash content of not more than 25 percent. To avoid confusion with soil-science terminology, sphagnum moss peat in this report is equivalent to fibric peat, reed-sedge peat is equivalent to hemic herbaceous peat, and humus peat is equivalent to sapric peat (Olson and others, 1979).

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Uses of peat and outlook for peat industry

Virtually, all peat sold in the United States in 1979 was used for agricultural and horticultural purposes. It was marketed through nurseries, garden centers, and chain stores chiefly in suburban areas of the North-Central, Northeast, and Middle Atlantic States and Florida. Production during 1980 in the United States was estimated (Searles, 1981) at 790,000 short tons for agricultural use. Value of the 1980 production was about $17,000,000 f.o.b. (freight on board) mine, and the average value per ton was about $21.80. Apparent consumption of peat in the United States during 1980, however, was 1,115,000 short tons, of which imports composed 355,000 short tons.

Demand for peat in the production of food is expected to increase from the 1978 demand at an average annual rate of about 3 percent to 1.4 million short tons in 1985 (Searles, 1981). The demand for peat in the production of energy is also expected to begin. Experimental studies on the gasification of peat continue in the Midwest, and a large industrial corporation in North Carolina is investigating and promoting the possible commercial generation of electrical power from steam produced by direct burning of peat.

Scope of report

The purpose of this report is to make the 50 sketch maps immediately available for use in assessing peat resources in Maine. The complete study is an expansion of studies begun earlier in Washington, southeastern Aroostook, Hancock, and Penobscot Counties (Cameron, 1975; Cameron and Massey, 1978; Cameron and Anderson, 1979, 1980; Cameron and Mullen, 1981). The locations of the 56 peat deposits mapped for this report are shown in the index map (figure 1), and described in more detail in the captions of the individual deposit maps (figures 2-57). All estimates given in figures 2-57 are in short tons.

Method of study

Field studies consisted of pace and compass traverses for determining extent of deposits. Stratigraphy was examined in cores taken by use of Macaulay augers and Davis peat samplers, and ash content of peat was determined by simple field methods.

Estimates of commercial-quality resources were based on acre-feet of peat where it was 5 or more feet thick and had an ash content not greater than 25 percent; this definition of commercial-quality peat resources is in accord with ASTM (1969) standards. The formula for converting acre-feet of peat to short tons of air-dried peat was devised by E. S. Bastin and C. A. Davis (1909) of the U.S. Geological Survey during their study to determine the extent and value of Maine's peat deposits as sources of potential fuel and as raw materials for various other uses. Bastin and Davis (1909, p. 24) stated, "the quantity of peat in a deposit may readily be calculated, with enough accuracy for practical purposes, by obtaining its average depth and its area, and assuming that it will yield at least 200 tons of dry machine-made fuel per acre, for each foot in depth." This formula was based on the following figures (Bastin and Davis, 1909, p. 62):

> "The specific gravity of the dry peat substance is slightly but not much greater than that of water. A cubic foot of water weighs 62.5 pounds. It is probable that a cubic foot of wet peat as it comes from the bog will weigh more than this, probably somewhat over 65 pounds...many peats as they come from the bog contain 85 to 90 percent of water by weight. In others the water percentage is lower, but for purposes of a conservative estimate it may be assumed that the vegetable matter constitutes only 10 to 15 percent by weight of the wet peat. On this basis, a cubic foot of wet peat would contain only 10 to 15 percent of 65 pounds or 6.5 to 9.75 pounds of vegetable material.
>
> The water contained in air-dried machine peat will probably average about 25 percent by weight, but a conservative estimate may assume that it constitutes only 20 percent...Forty pounds may be taken as an average figure (for the weight of air-dried machine peat per cubic foot). Of this about 80 percent, or 32 pounds, would be vegetable material.
>
> As each cubic foot of peat as it comes from the bog contains 6.5 to 9.75 pounds of vegetable matter, it would take...5 to 3.2 cubic feet of wet peat to make 1 cubic foot of air-dried machine peat. If we assume 4 cubic feet of wet peat as an average figure, we have the following relations:

$$\frac{\text{Volume of wet peat in bog, in cubic feet}}{\text{4 (number of cubic feet of wet peat equal to 1 cubic foot of machine peat)}} \times \frac{\text{40 (average weight in pounds of 1 cubic foot of machine peat)}}{\text{2,000 (pounds in short ton)}} = \frac{\text{Volume of wet peat in bog, in cubic feet}}{200} = \text{Number of tons of air-dried machine peat which the bog can produce."}$$

Acknowledgments

The Maine Geological Survey supported this study with assistance from the Maine Office of Energy Resources, Augusta, Maine. Appreciation is especially extended to Carolyn A. Lepage, Robert A. Johnston, Robert D. Tucker, and Bennett J. Wilson, Maine Geological Survey, for assistance in preparation of this report. The excellent field assistance by Vernon L. Shaw and Robert A. Johnston, also with the Maine Geological Survey is gratefully acknowledged.

RESOURCES

Peat resources having a minimum thickness of 5 feet and a maximum ash content of 25 percent occupy a total of 13,810 acres and will yield 27,736,400 short tons air-dried peat (table 1). Most of these resources are in deposits greater than 5 feet thick and have an ash content of probably less than 15 percent. Almost all the resources may be classed as moss (fibric) peat and reed-sedge (hemic) peat.

Table 1. Estimated peat resources in the 56 studied areas, Maine

INDEX MAP (Fig. 1) LOC. NUMBER	ACRES	SHORT TONS AIR-DRIED PEAT
1	27	37,800
2	370	742,000
3	250	680,000
4	280	720,000
5	540	1,730,000
6	128	128,000
7	Too thin and poor in quality to be a peat resource	
8	360	1,140,000
9	100	200,000
10	665	1,444,000
11	420	770,000
12	175	175,000
13	130	208,000
14	Too thin and poor in quality to be a peat resource	
15	340	625,000
16	330	396,000
17	605	1,864,000
18	100	300,000
19	125	200,000
20	385	891,000
21	180	396,000
22	110	154,000
23	495	983,000
24	Too thin and poor in quality to be a peat resource.	
25	170	355,000
26	200	400,000
27	135	243,000
28	595	602,000
29	435	1,044,000
30	220	352,000
31	320	512,000
32	170	170,000
33	687	925,800
34	240	614,000
35	111	163,800
36	325	558,000
37	115	225,000
38	77	147,000
39	113	288,200
40	110	264,000
41	117	187,200
42	60	100,000

Table 1.--continued

INDEX MAP (Fig. 1) LOC. NUMBER	ACRES	SHORT TONS AIR-DRIED PEAT
43	150	300,000
44	160	160,000
45	144	473,600
46	55	55,000
47	215	215,000
48	185	315,000
49	396	847,200
50	751	2,010,800
51	227	399,000
52	365	752,000
53	285	408,000
54	152	188,000
55	170	221,000
56	240	457,000
TOTAL	13,810	27,736,400

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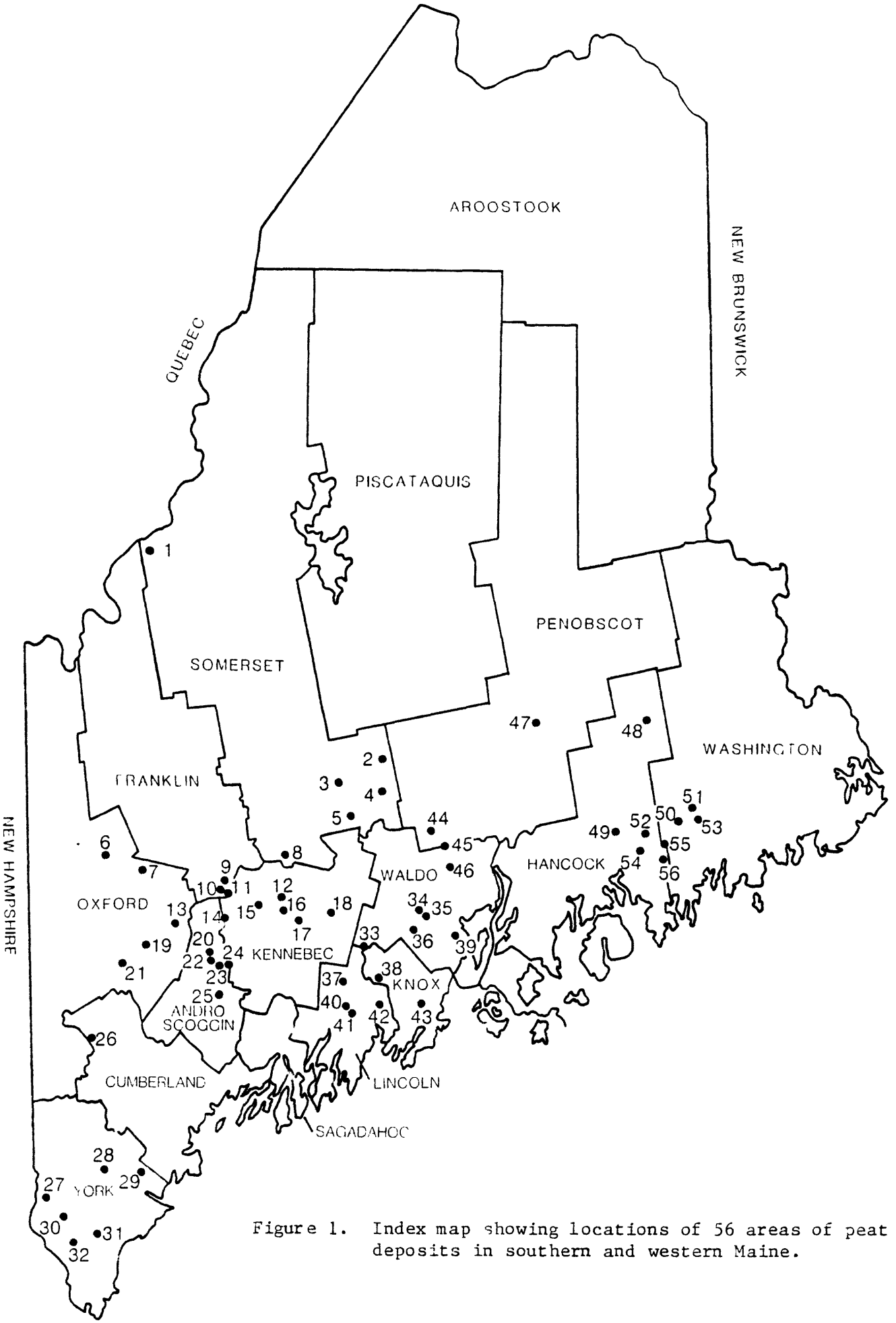


Figure 1. Index map showing locations of 56 areas of peat deposits in southern and western Maine.

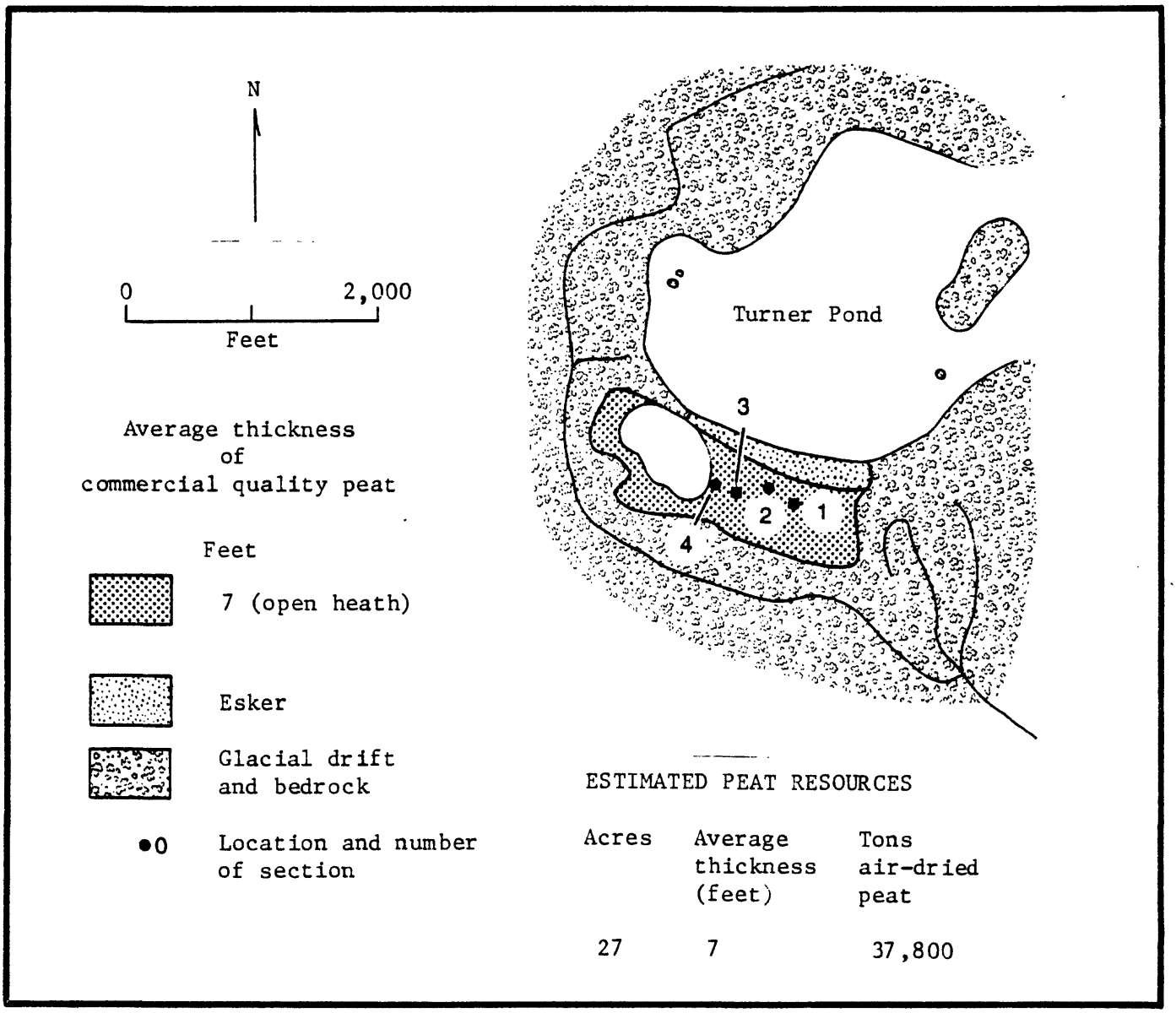


Figure 2. Sketch map of "Cow Pasture" bog at Turner Pond, T6 R2 NBKP (Forsythe Twp.), Attean 15 minute Quadrangle, Somerset County, Maine. (Number 1 on Index Map).

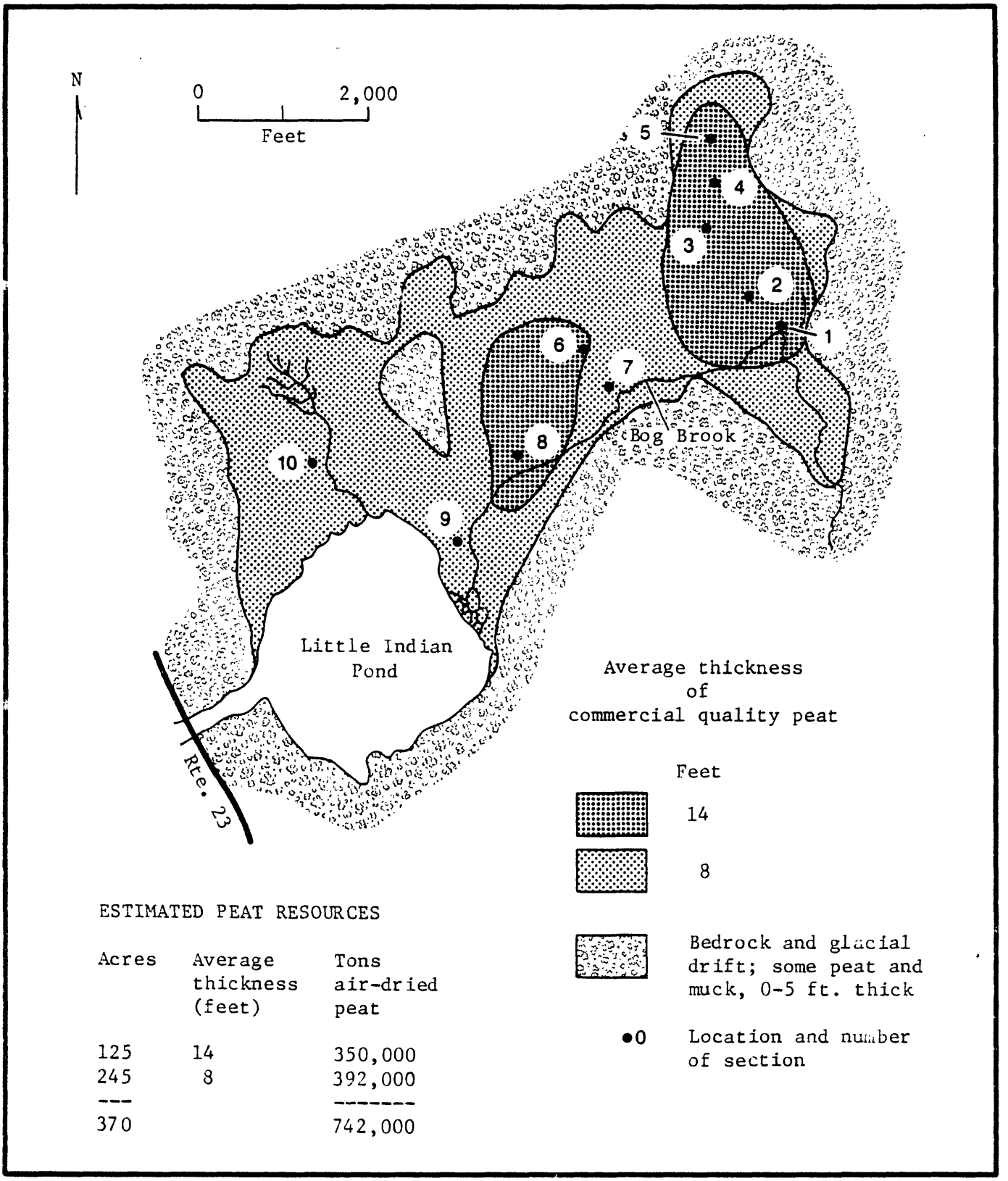


Figure 3. Sketch map of bogs at Little Indian Pond and Bog Brook, St. Albans Twp., Pittsfield 15 minute Quadrangle, Somerset County, Maine. (Number 2 on Index map).

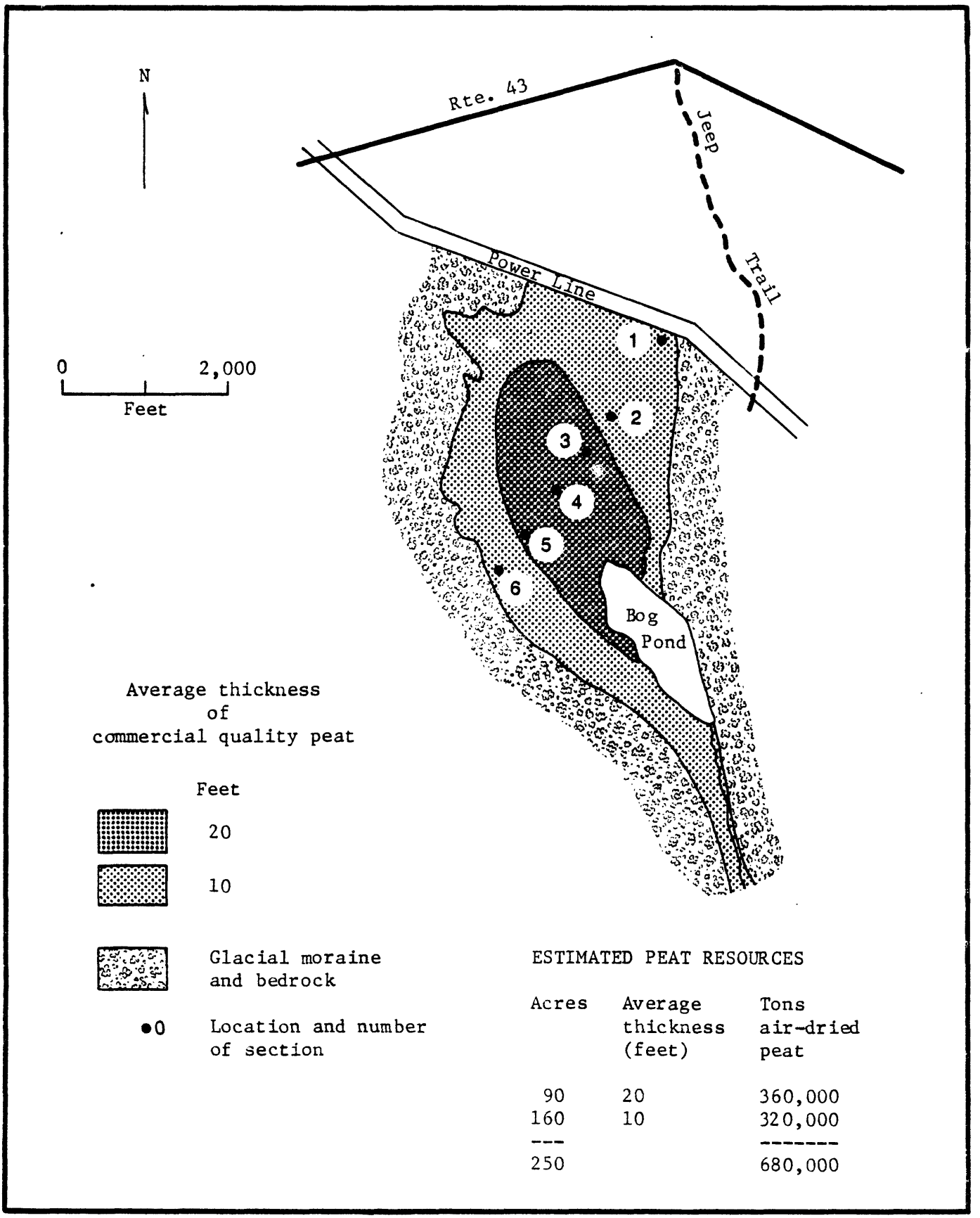
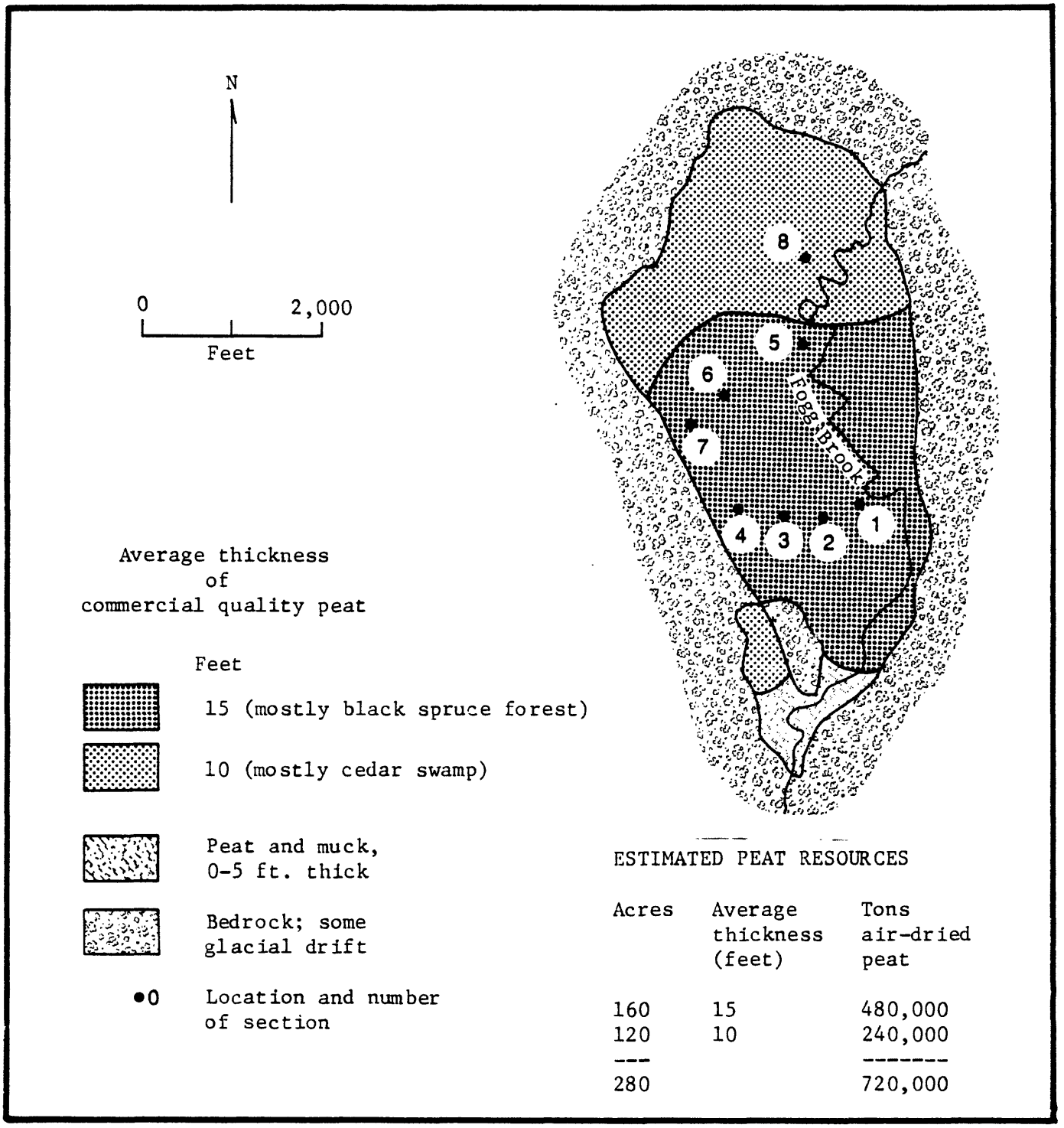


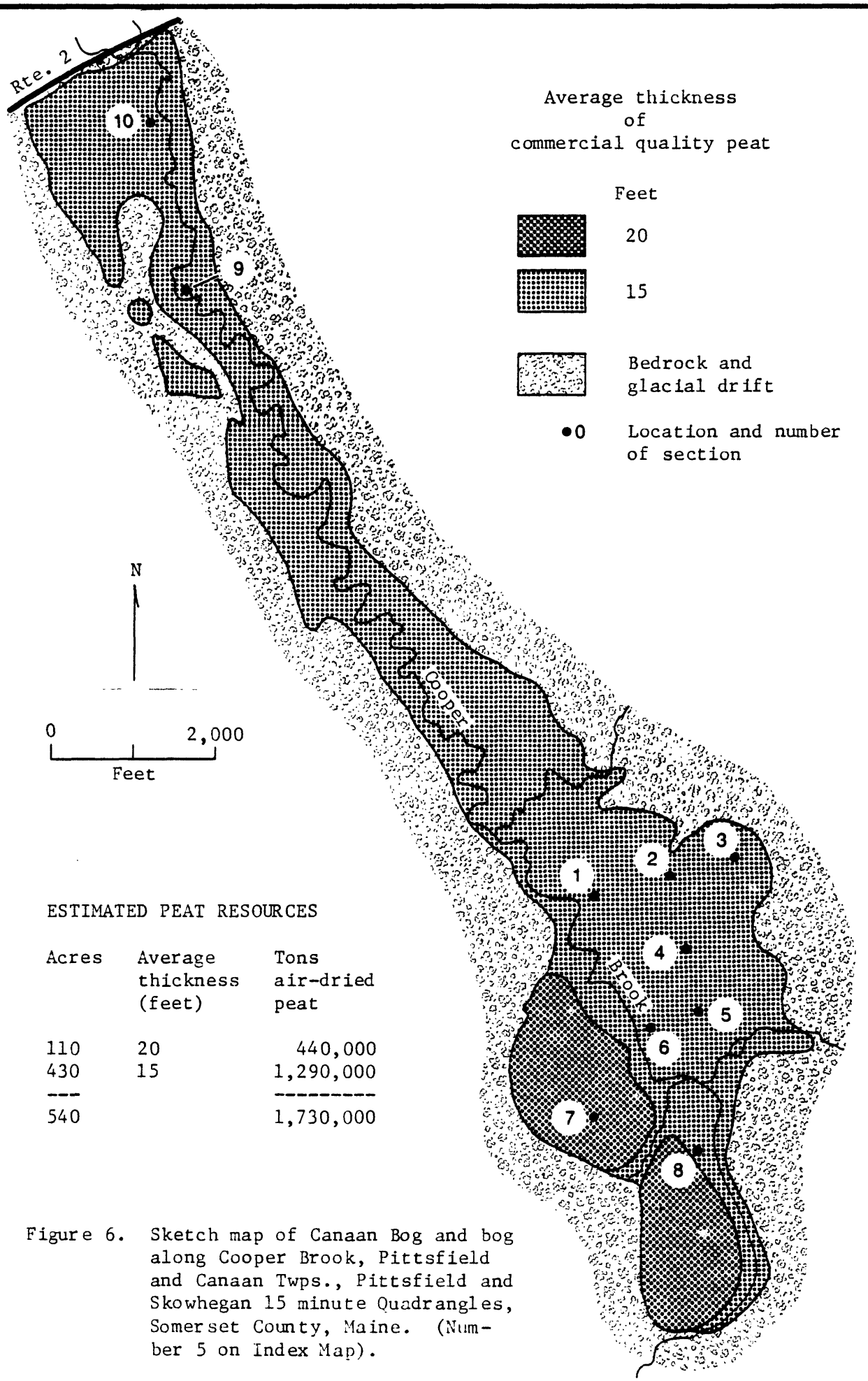
Figure 4. Sketch map of bog at Bog Pond southeast of Corson Corner, Hartland Twp., Skowhegan 15 minute Quadrangle, Somerset County, Maine. (Number 3 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
160	15	480,000
120	10	240,000
280		720,000

Figure 5. Sketch map of bog along Fogg Brook, Palmyra Twp., Pittsfield 15 minute Quadrangle, Somerset County, Maine. (Number 4 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
110	20	440,000
430	15	1,290,000
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540		1,730,000

Figure 6. Sketch map of Canaan Bog and bog along Cooper Brook, Pittsfield and Canaan Twps., Pittsfield and Skowhegan 15 minute Quadrangles, Somerset County, Maine. (Number 5 on Index Map).

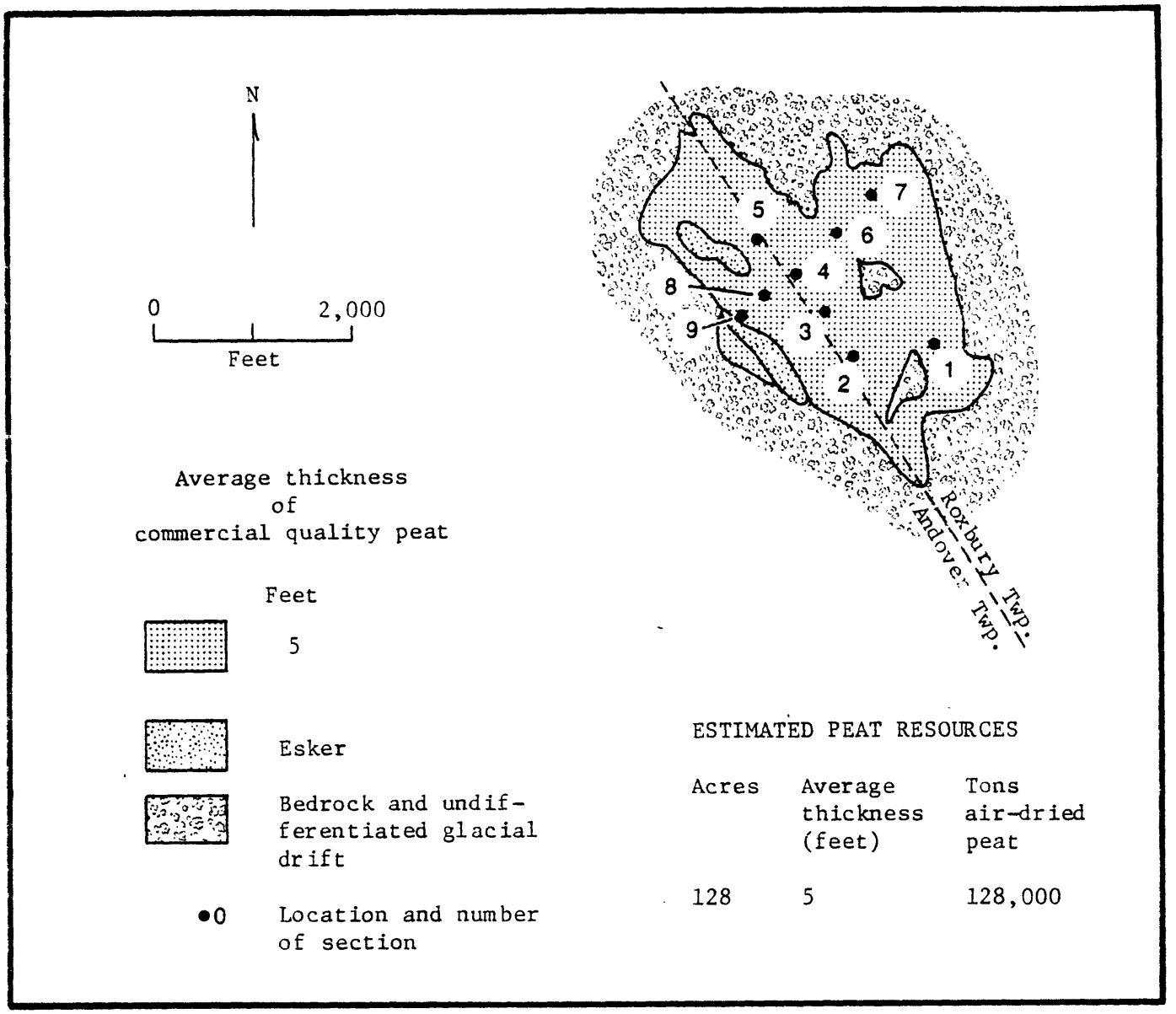


Figure 7. Sketch map of bog between Horseshoe Brook and Meadow Brook, Andover and Roxbury Twps., East Andover 7½ minute Quadrangle, Oxford County, Maine. (Number 6 on Index Map).

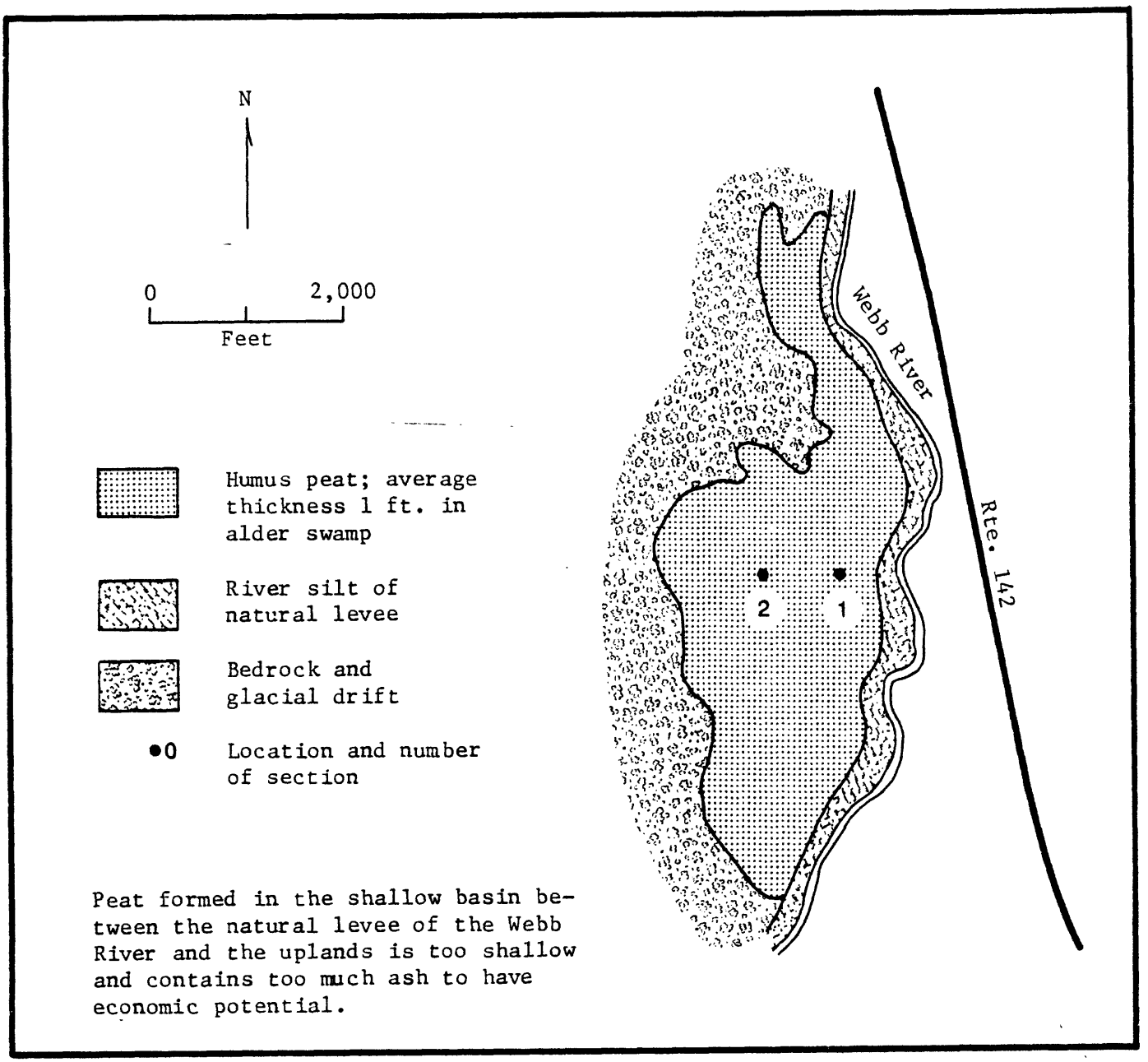
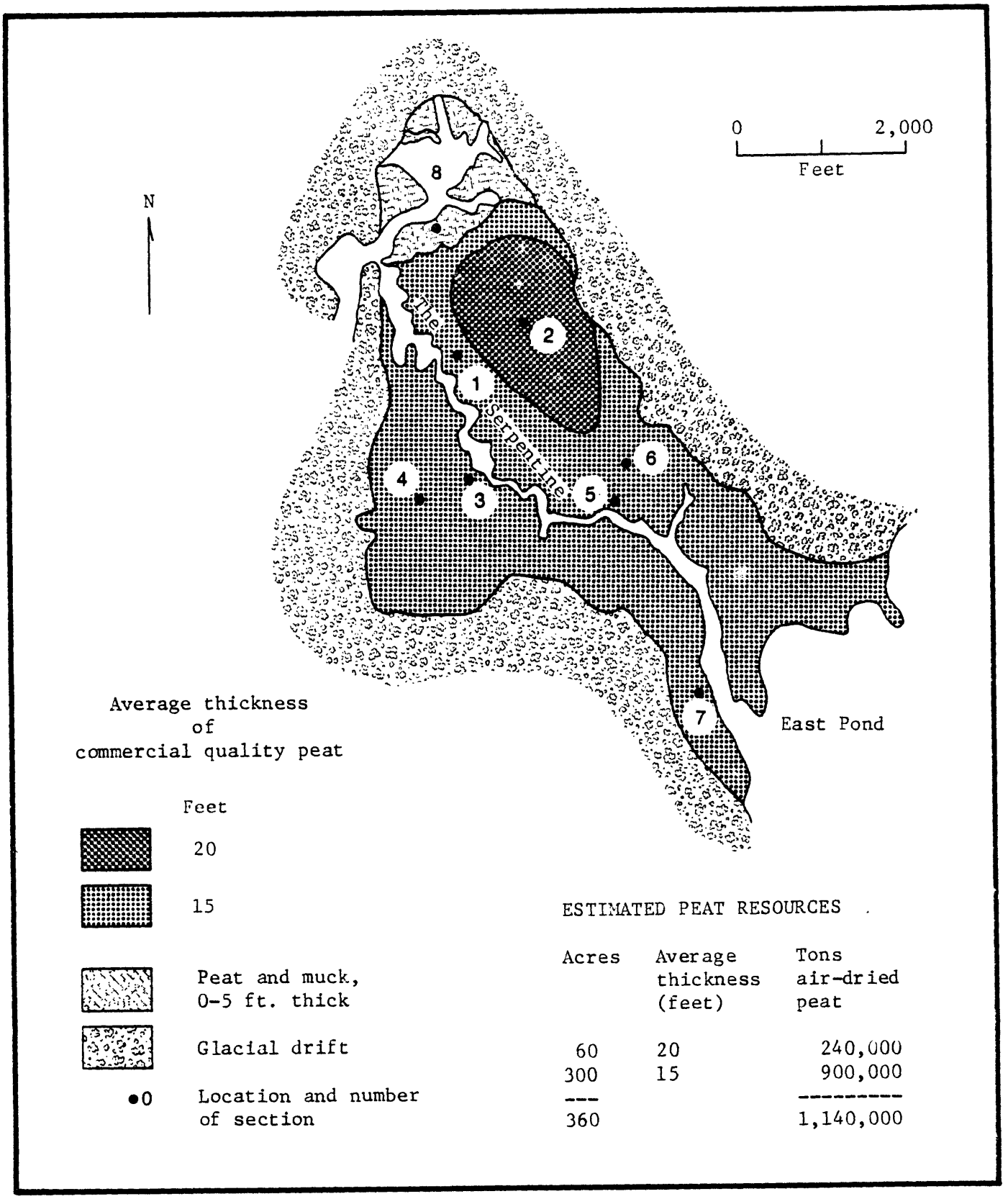


Figure 8. Sketch map of bog along Webb River north of Dixfield, Mexico Twp., Dixfield 15 minute Quadrangle, Oxford County, Maine (Number 7 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
60	20	240,000
300	15	900,000
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360		1,140,000

Figure 9. Sketch map of bog along The Serpentine, Smithfield Twp., Norridgewock 15 minute Quadrangle, Somerset County, Maine. (Number 8 on Index Map).

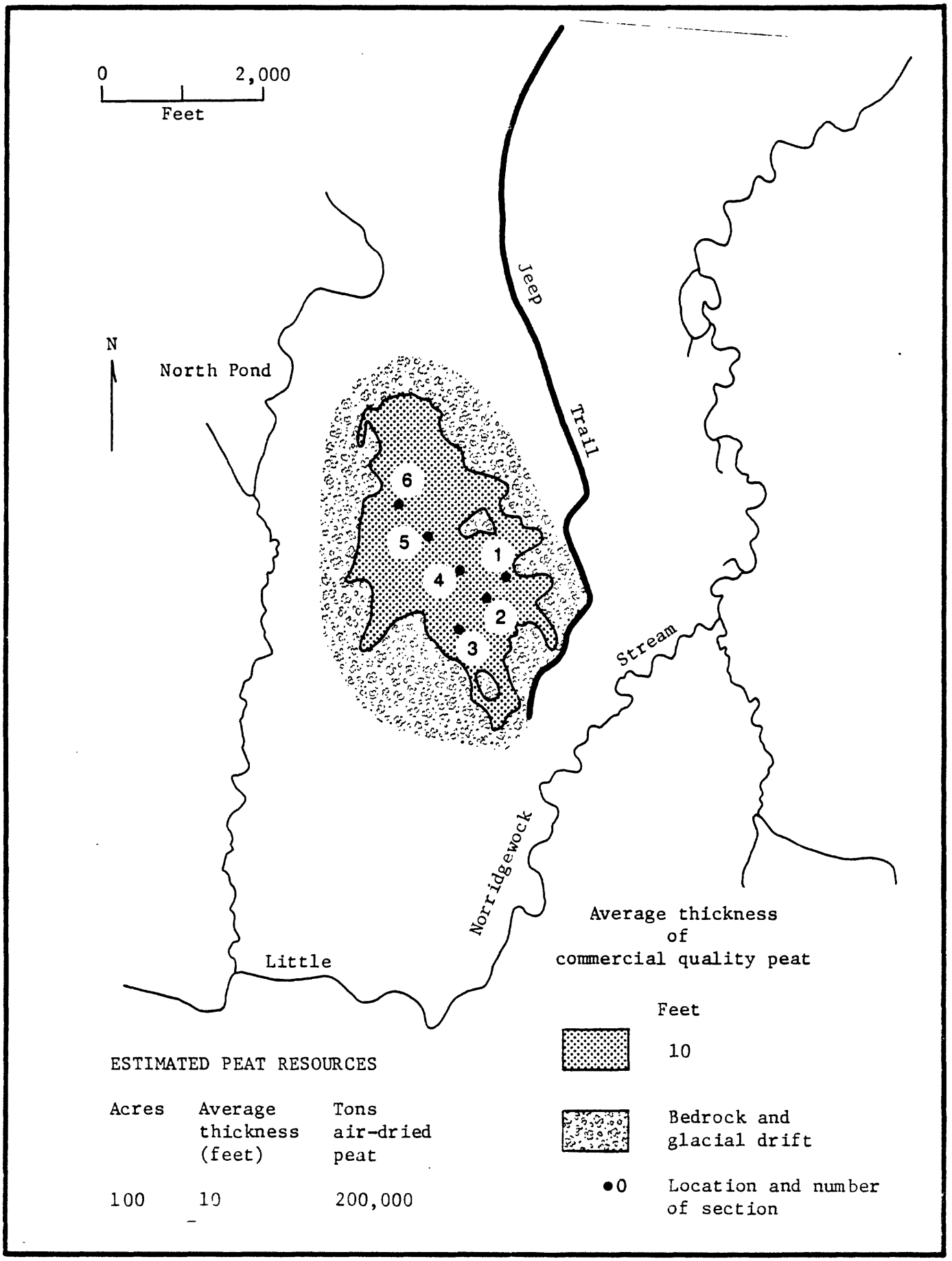


Figure 10. Sketch map of bog southeast of North Pond, Chesterville Twp., Farmington 15 minute Quadrangle, Franklin County, Maine. (Number 9 on Index Map).

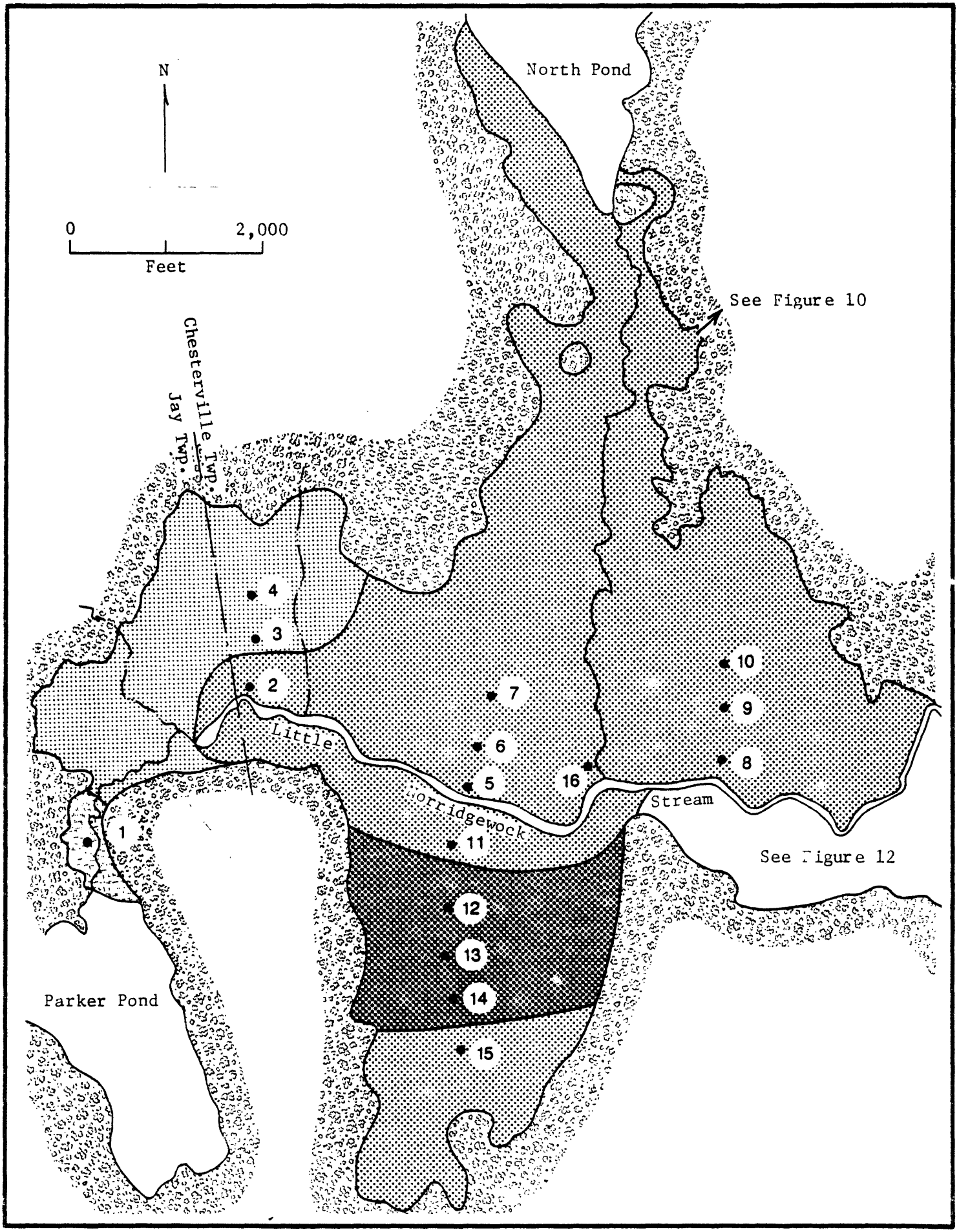


Figure 11. Sketch map of bog south of North Pond and along Little Norridgewock Stream, Jay and Chesterville Twps., Farmington 15 minute Quadrangle, Franklin County, Maine. (Number 10 on Index Map).

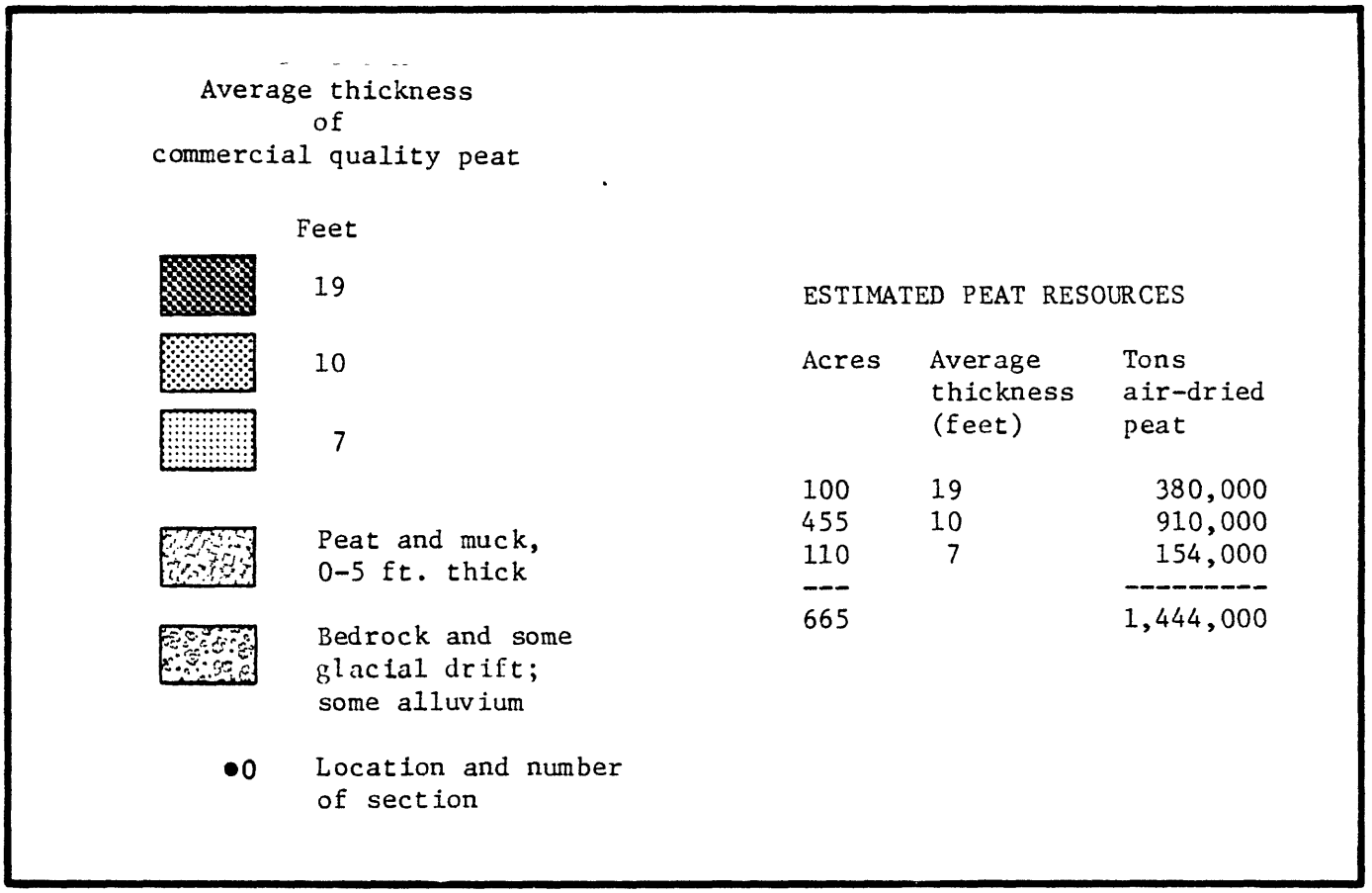


Figure 11. Continued.

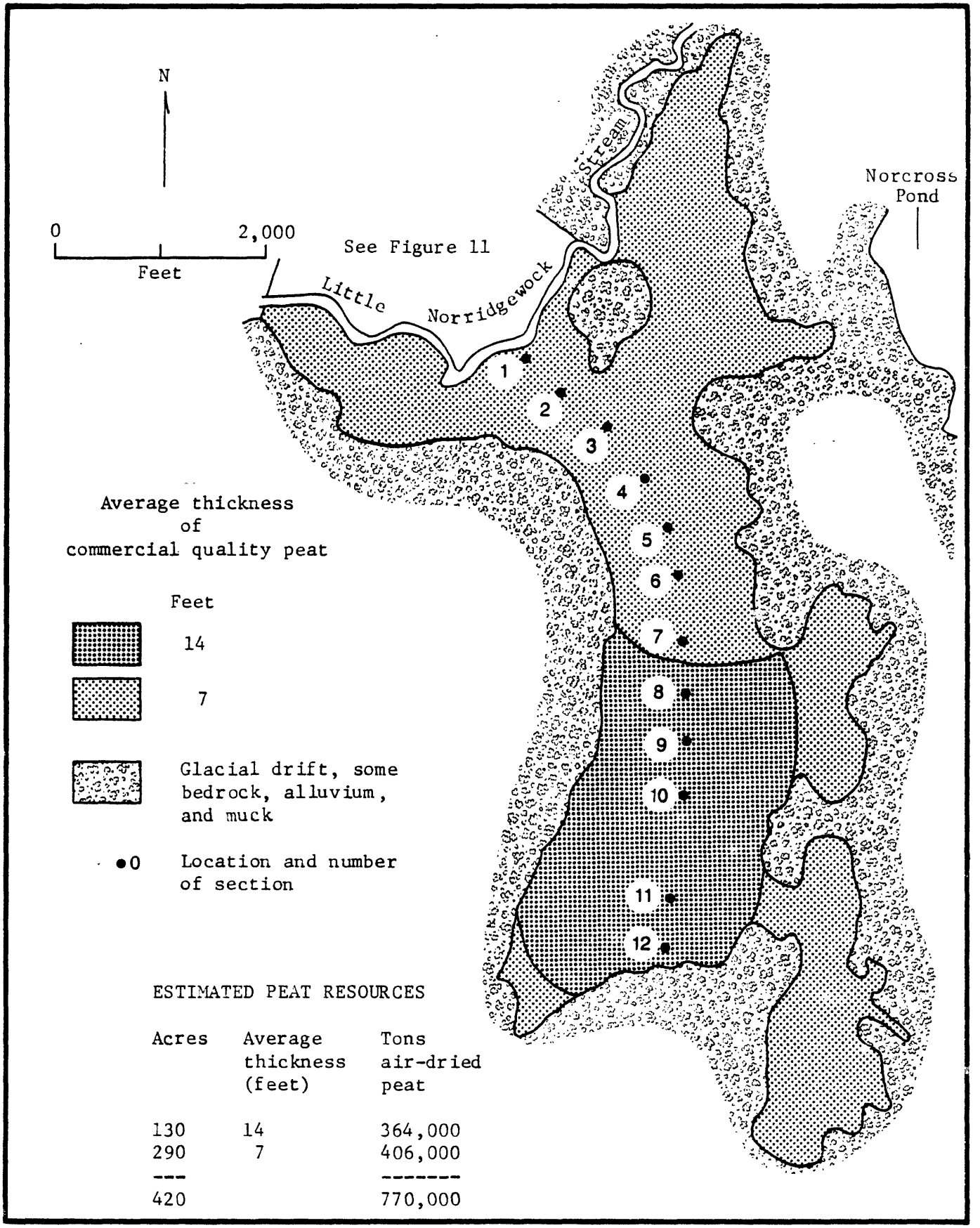


Figure 12. Sketch map of bog west of Norcross Pond and south of Little Norridgewock Stream, Chesterville Twp., Farmington 15 minute Quadrangle, Franklin County, Maine. (Number 11 on Index Map).

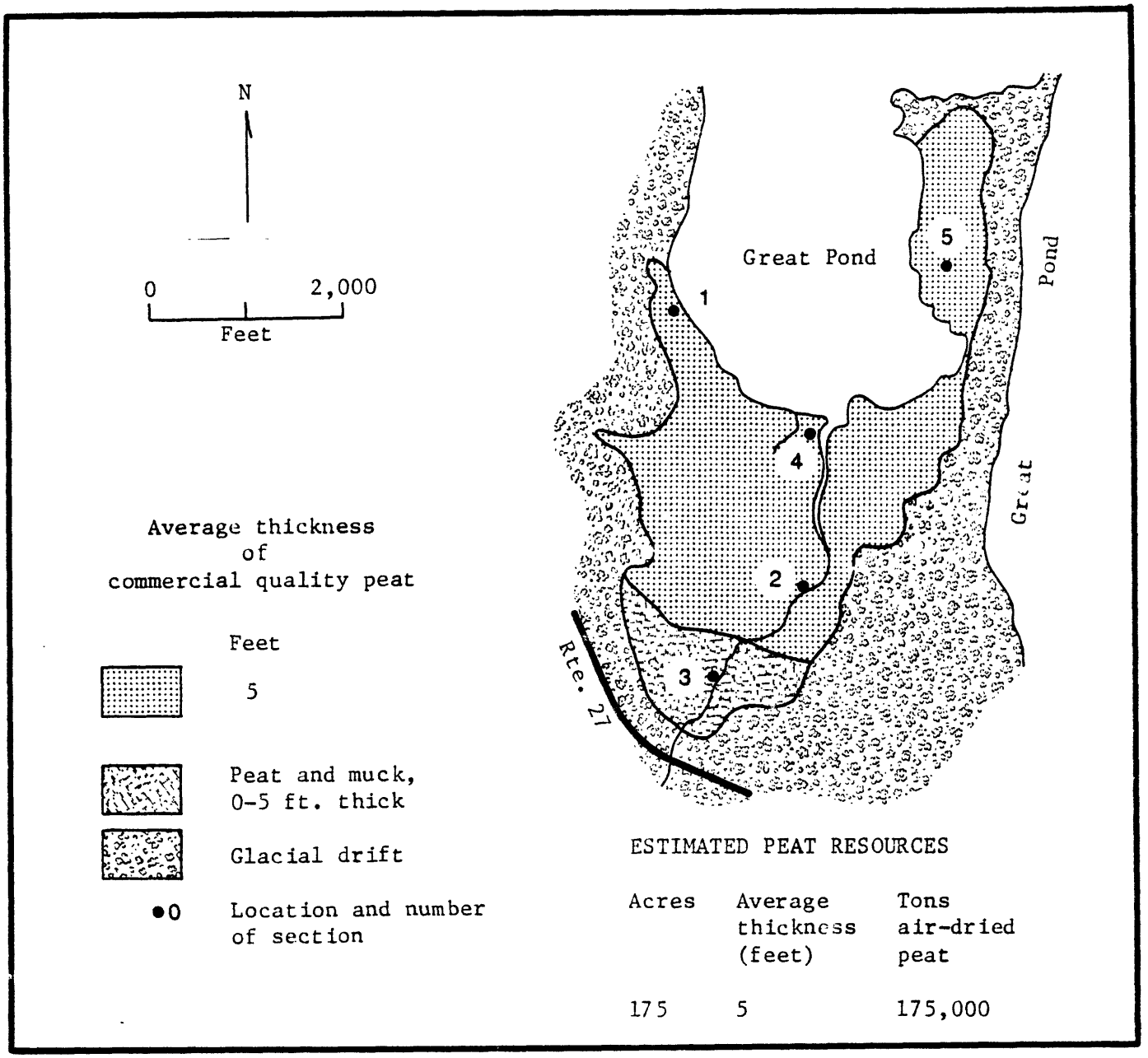


Figure 13. Sketch map of Austin Bog at south end of Great Pond, Belgrade Twp., Belgrade 7½ minute Quadrangle, Kennebec County, Maine. (Number 12 on Index Map).

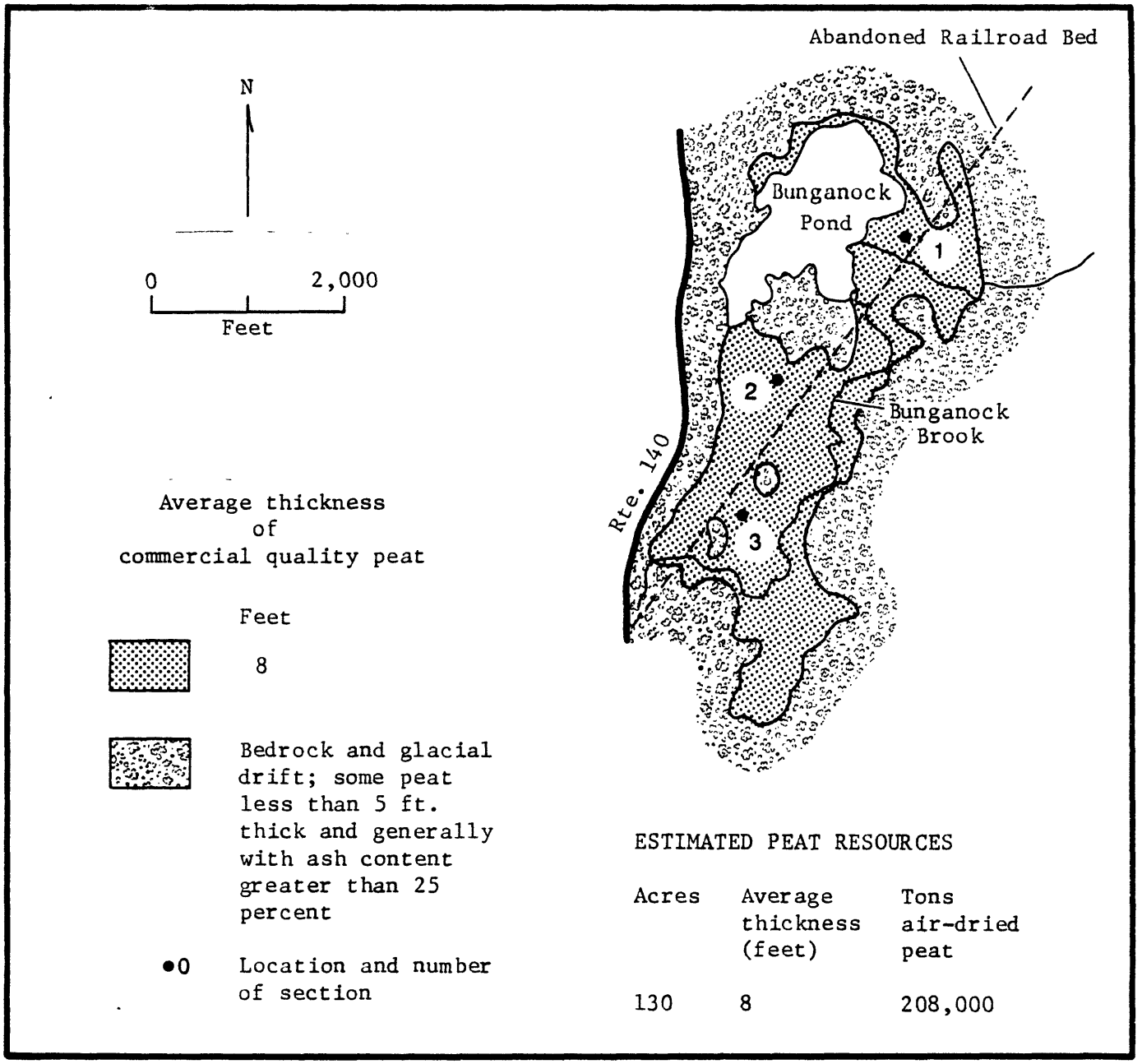


Figure 14. Sketch map of bog at Bunganock Pond and Bunganock Brook, Hartford Twp., Canton 7½ minute Quadrangle, Oxford County, Maine. (Number 13 on Index Map).

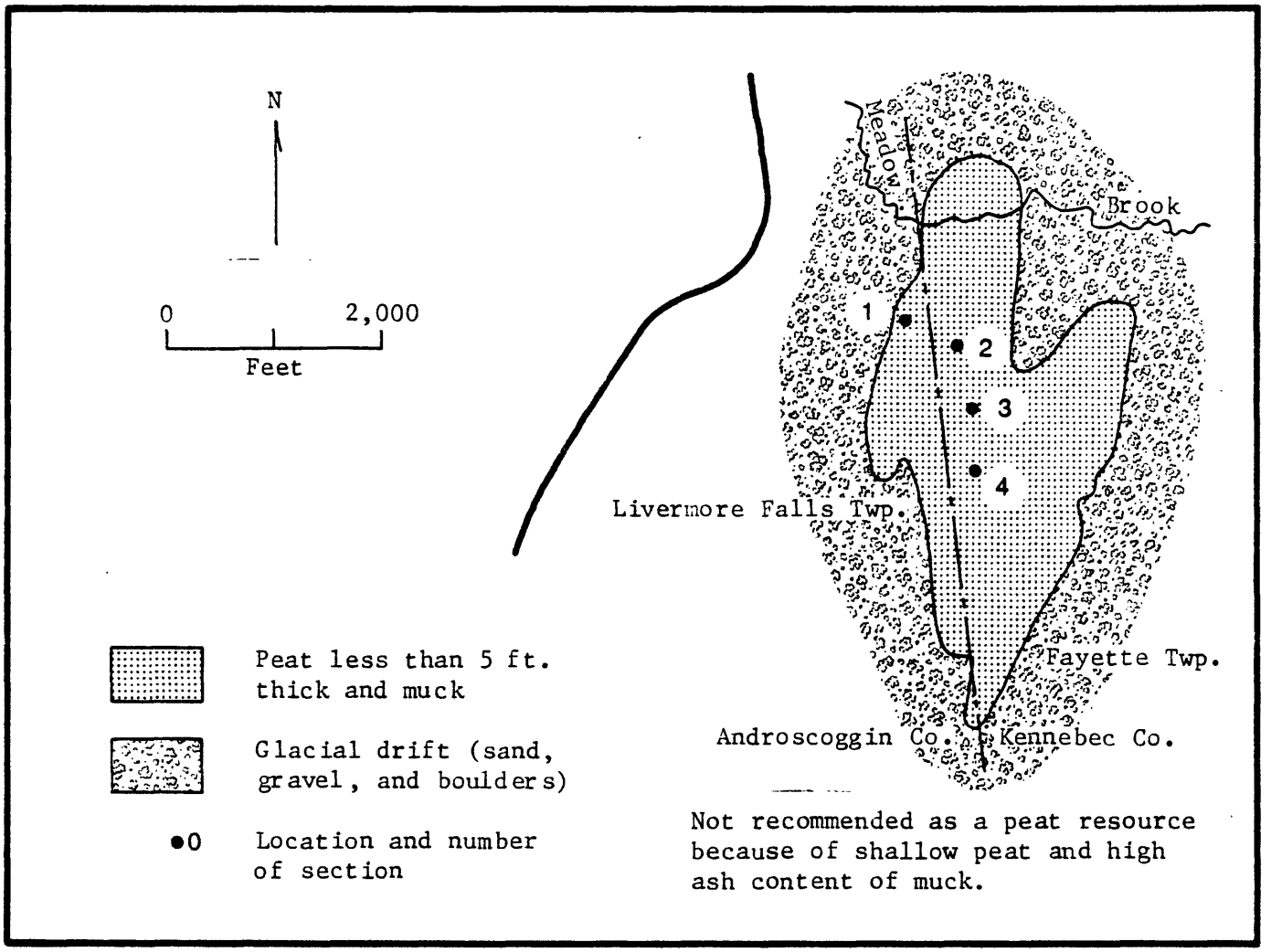


Figure 15. Sketch map of bog south of Meadow Brook on Kennebec-Androscoggin County line, Livermore Falls and Fayette Twps., Fayette 7½ minute Quadrangle, Maine. (Number 14 on Index Map).

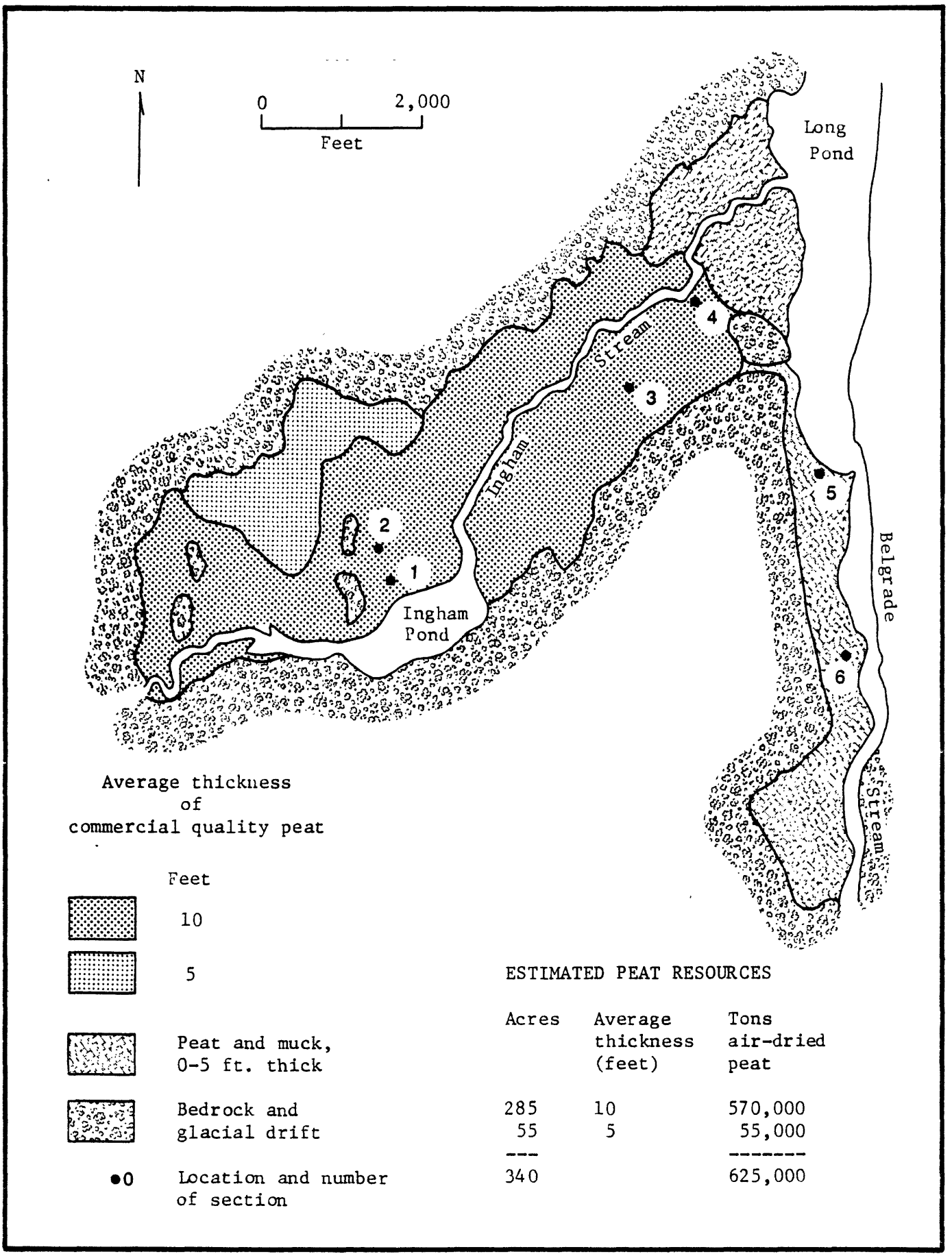


Figure 16. Sketch map of bogs along Ingham Stream and Belgrade Stream, Mount Vernon Twp., Augusta 15 minute Quadrangle, Kennebec County, Maine. (Number 15 on Index Map).

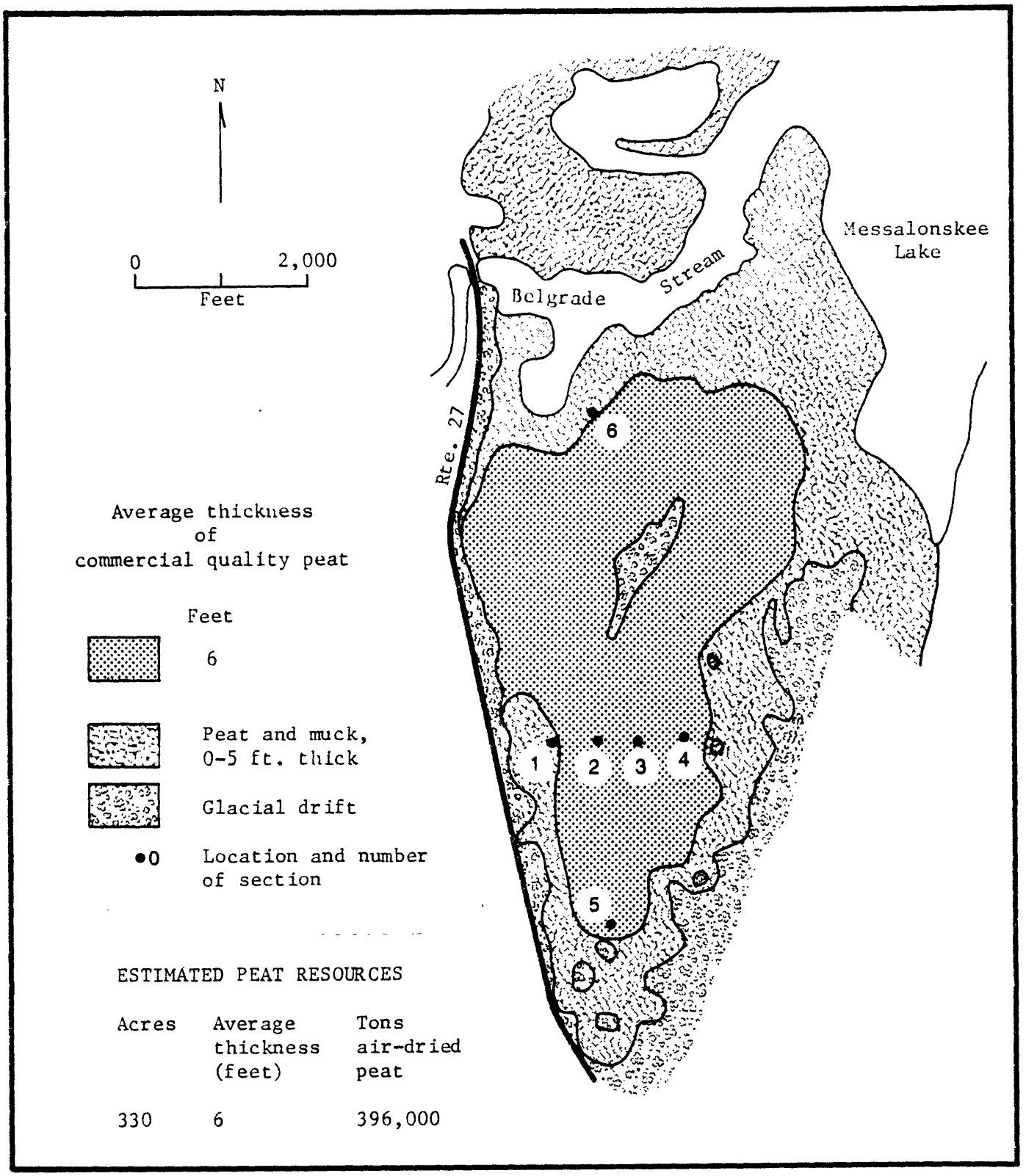


Figure 17. Sketch map of Belgrade Bog, Belgrade Twp., Belgrade 7½ minute Quadrangle, Kennebec County, Maine. (Number 16 on Index Map).

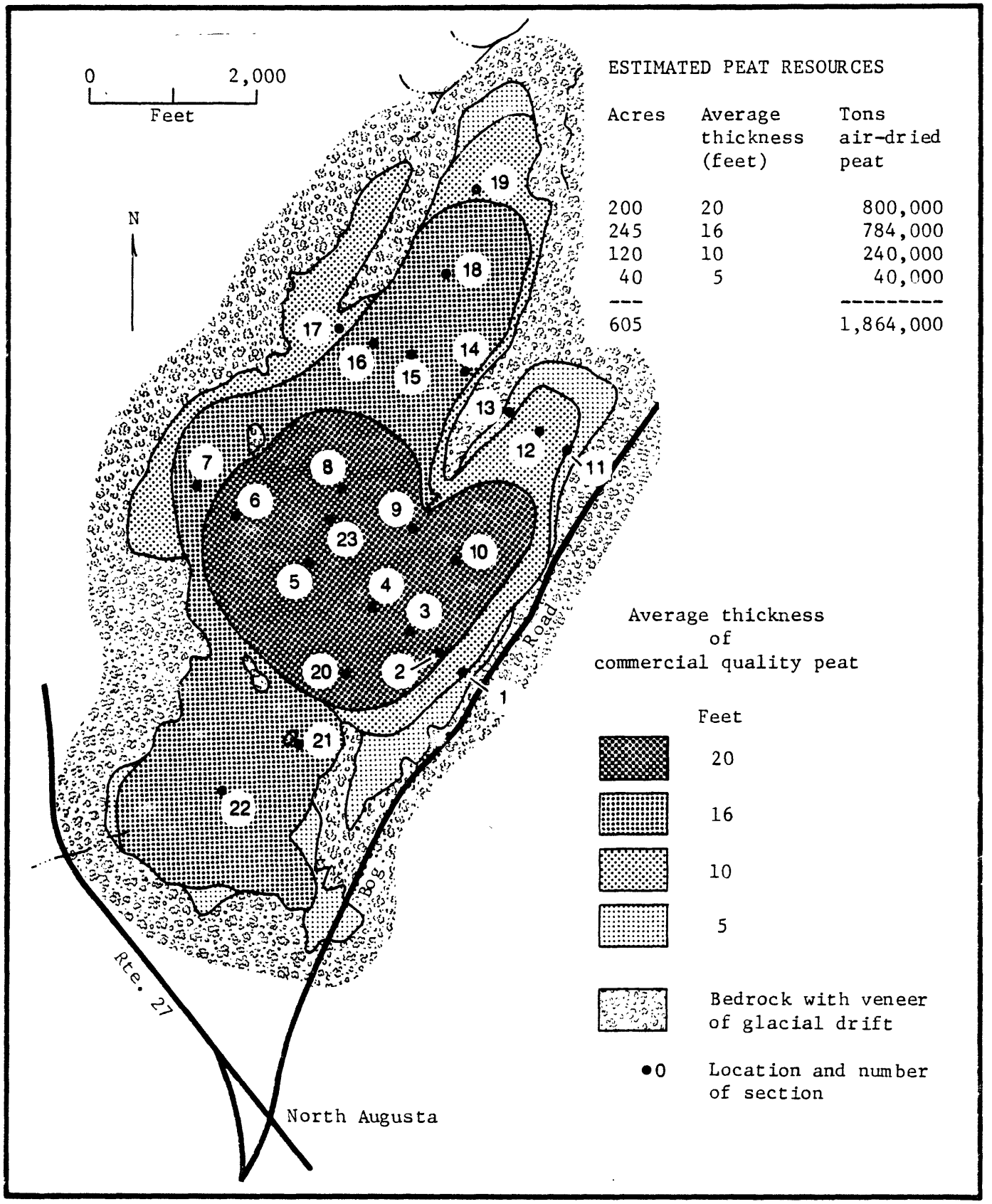


Figure 18. Sketch map of Great Sidney Bog, Sidney and Augusta Twps., Augusta 15 minute Quadrangle, Kennebec County, Maine. (Number 17 on Index Map).

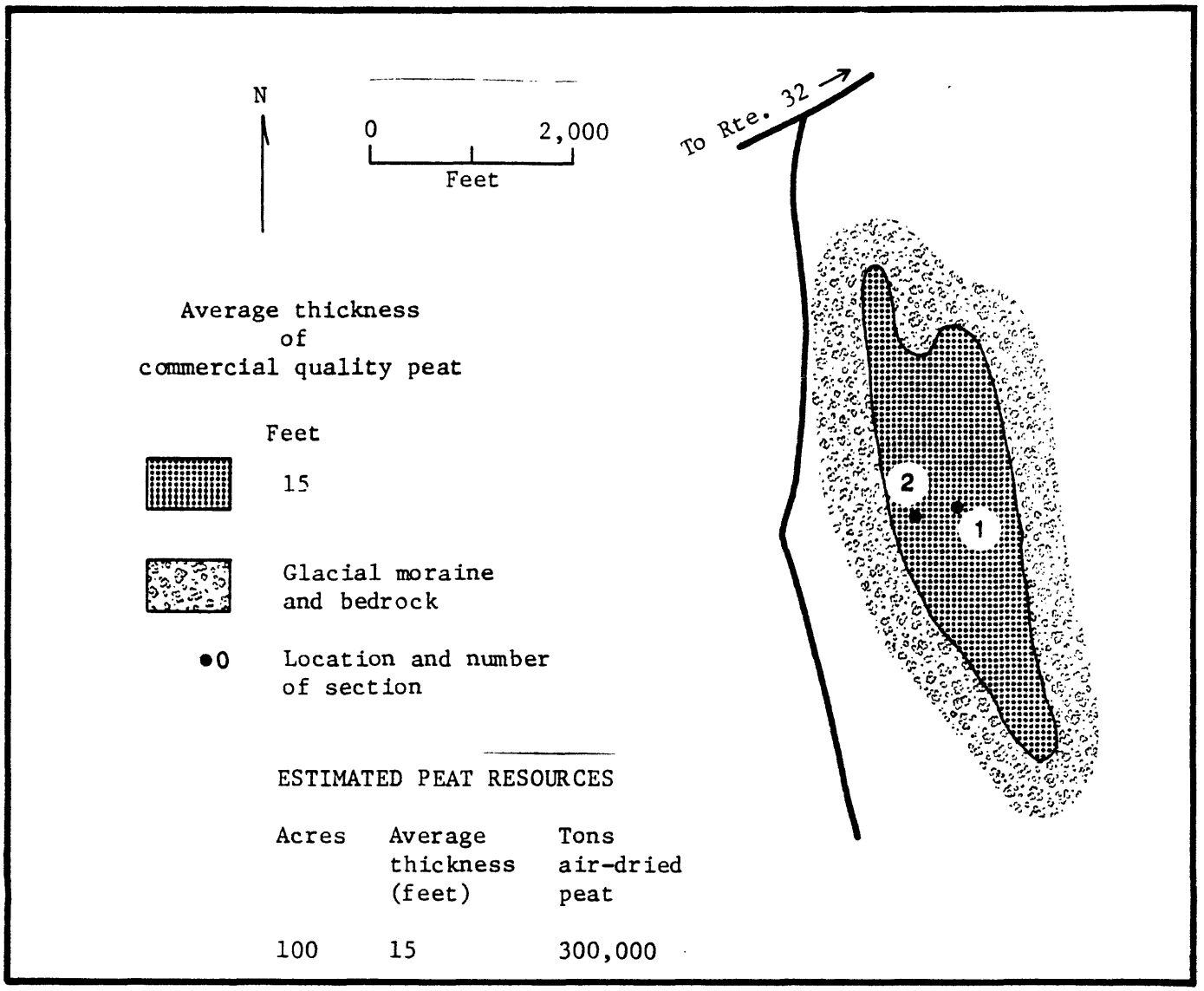


Figure 19. Sketch map of bog 1½ miles south of East Vassalboro, Vassalborough Twp., Vassalboro 15 minute Quadrangle, Kennebec County, Maine. (Number 18 on Index Map).

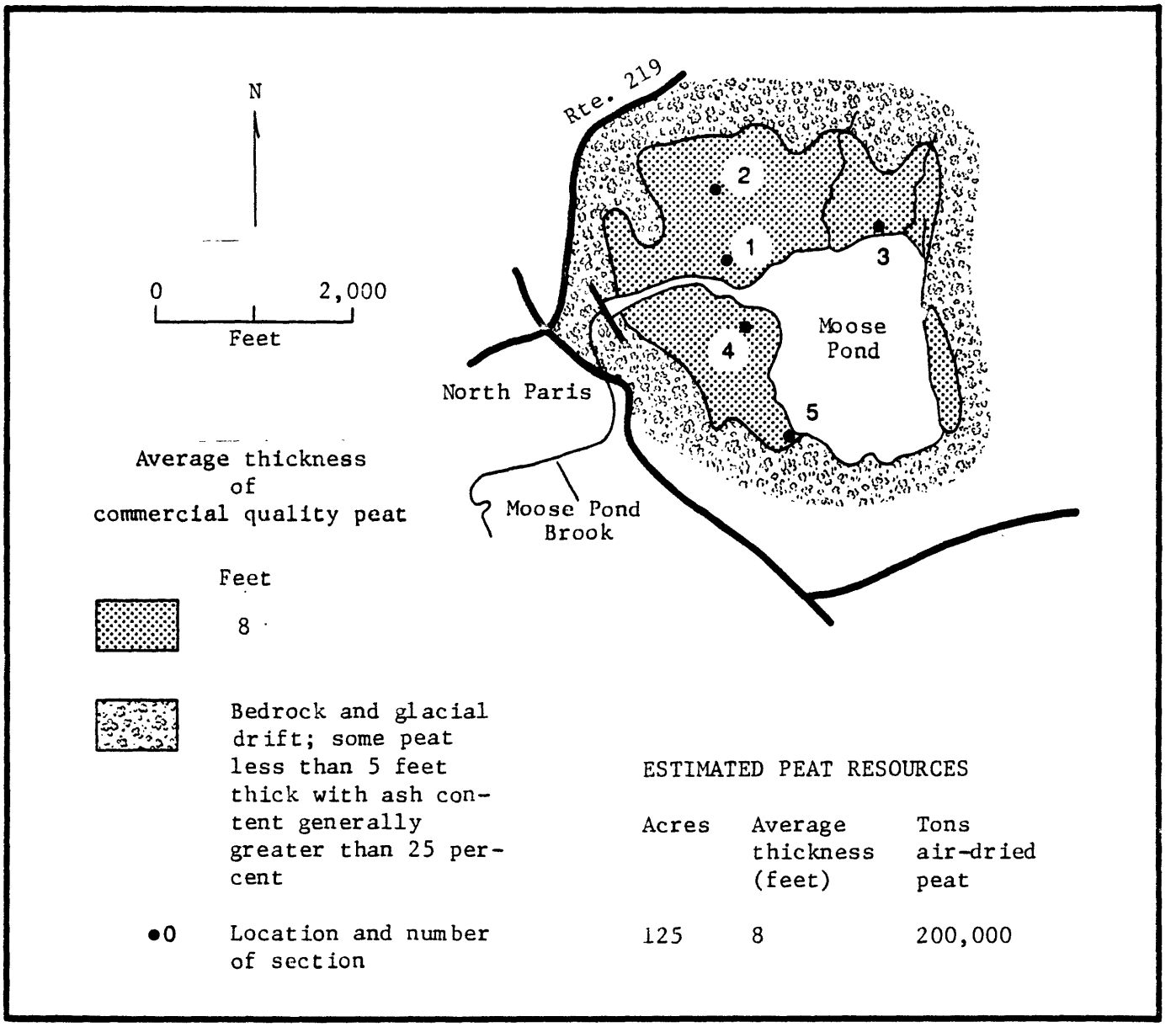
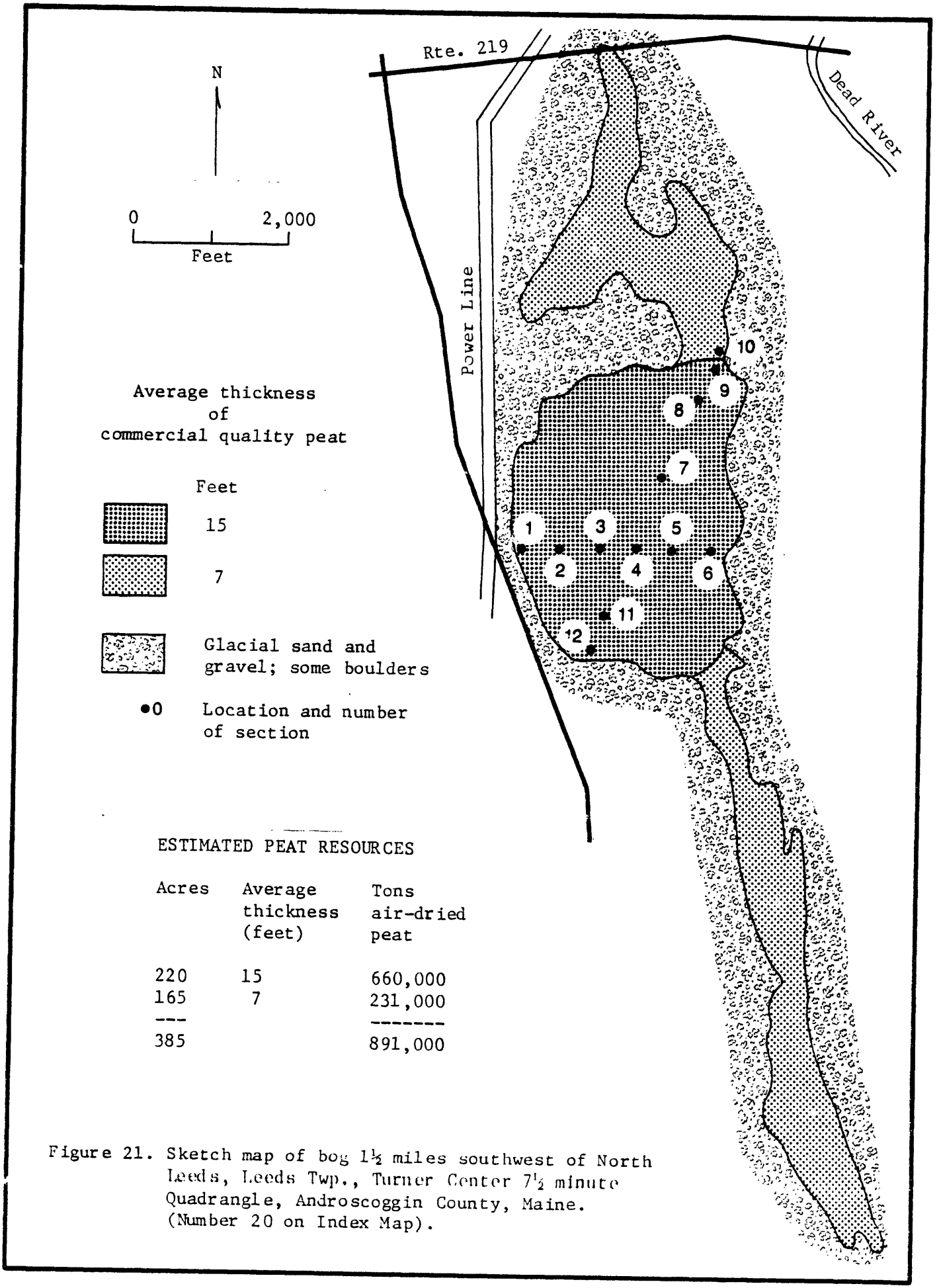


Figure 20. Sketch map of bog adjacent to Moose Pond at North Paris, West Paris Twp., West Paris 7½ minute Quadrangle, Oxford County, Maine. (Number 19 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
220	15	660,000
165	7	231,000
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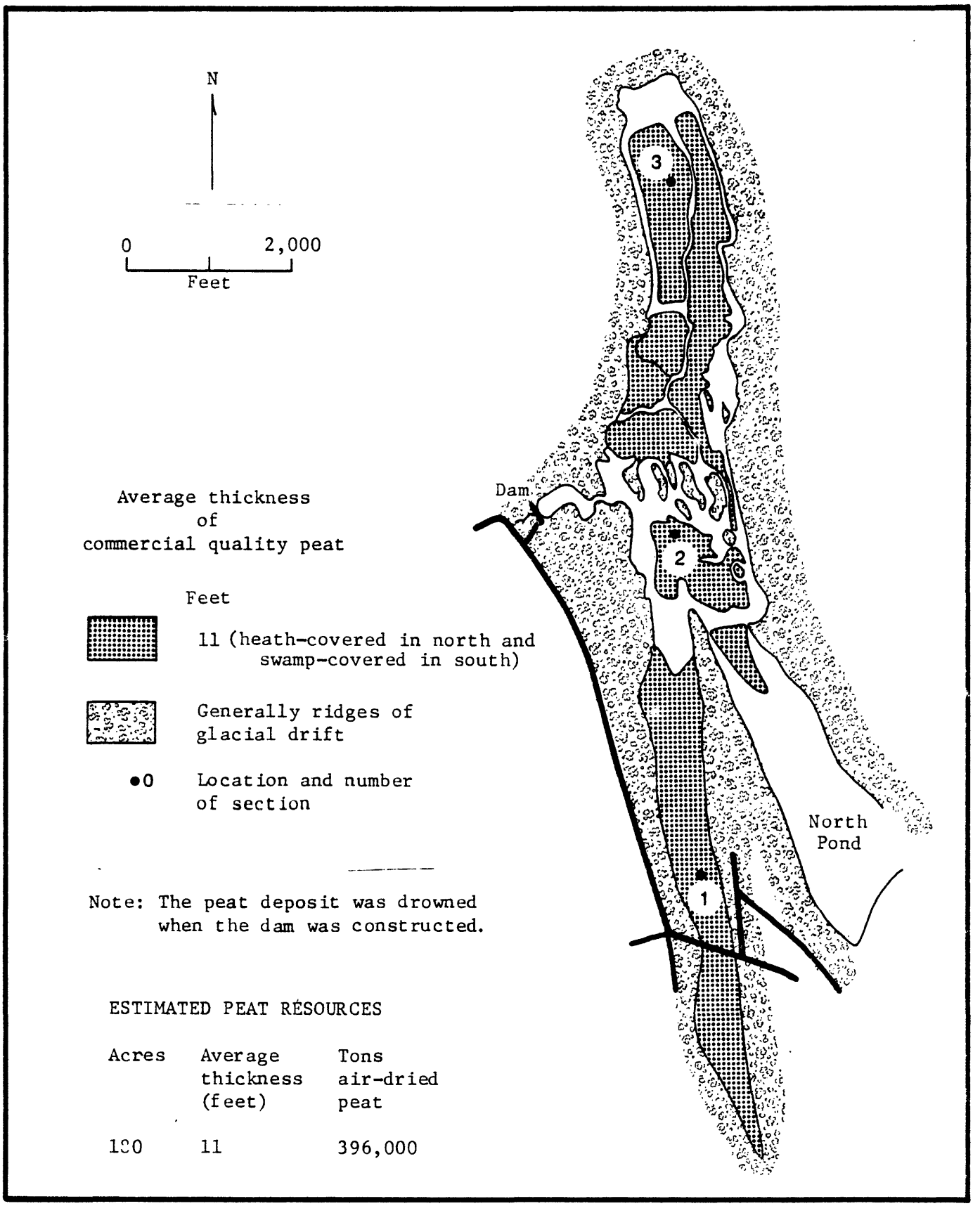
385		891,000

Figure 21. Sketch map of bog 1½ miles southwest of North Leeds, Leeds Twp., Turner Center 7½ minute Quadrangle, Androscoggin County, Maine. (Number 20 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
100	11	396,000

Figure 22. Sketch map of bog at North Pond, Norway Twp., West Paris 7½ minute Quadrangle, Oxford County, Maine. (Number 21 on Index Map).

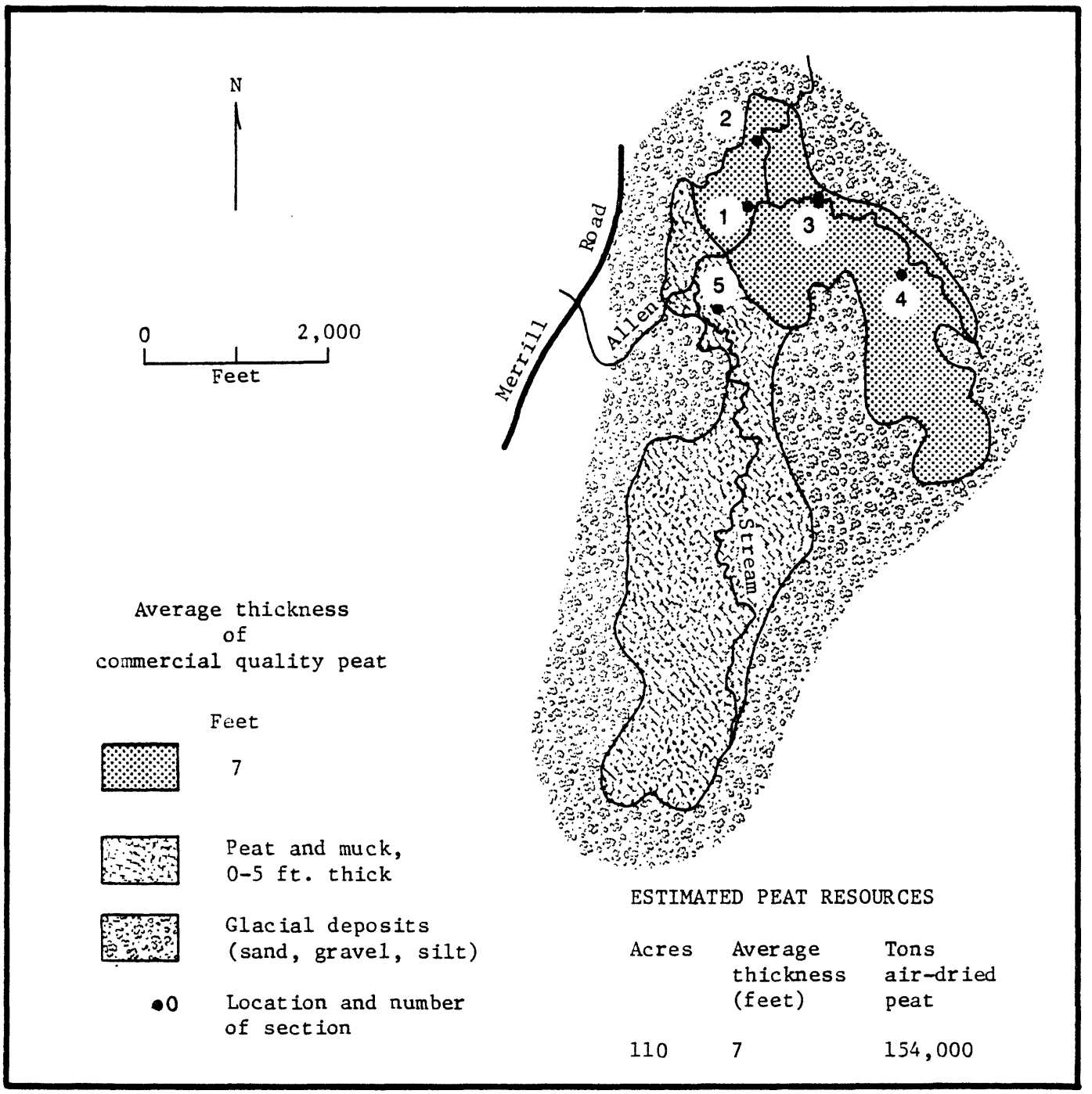


Figure 23. Sketch map of bog along Allen Stream, Leeds Twp., Turner Center 7½ minute Quadrangle, Androscoggin County, Maine. (Number 22 on Index Map).

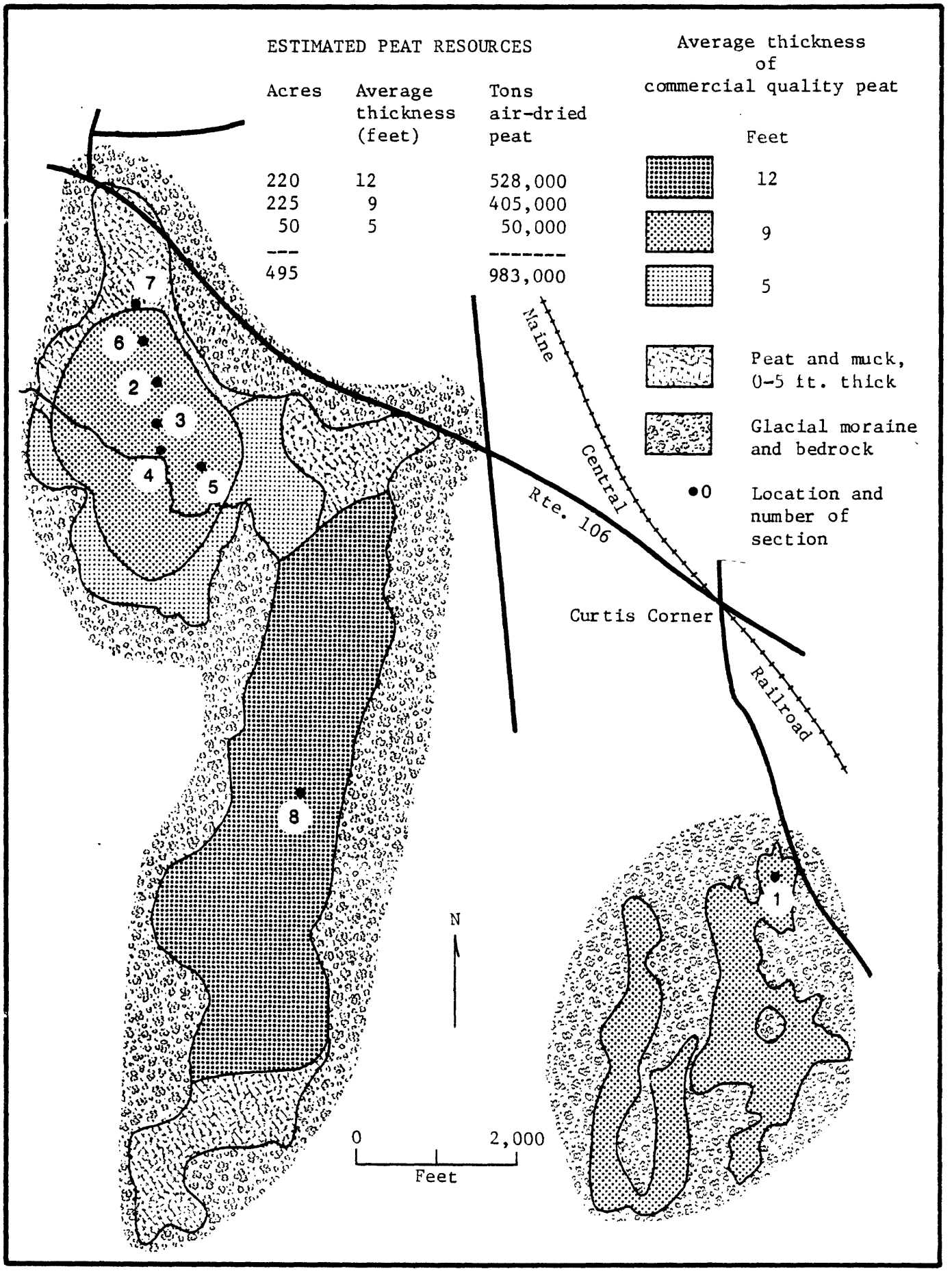


Figure 24. Sketch map of bogs west and south of Curtis Corner, Leeds Twp., Wayne 7½ minute Quadrangle, Androscoggin County, Maine. (Number 23 on Index Map).

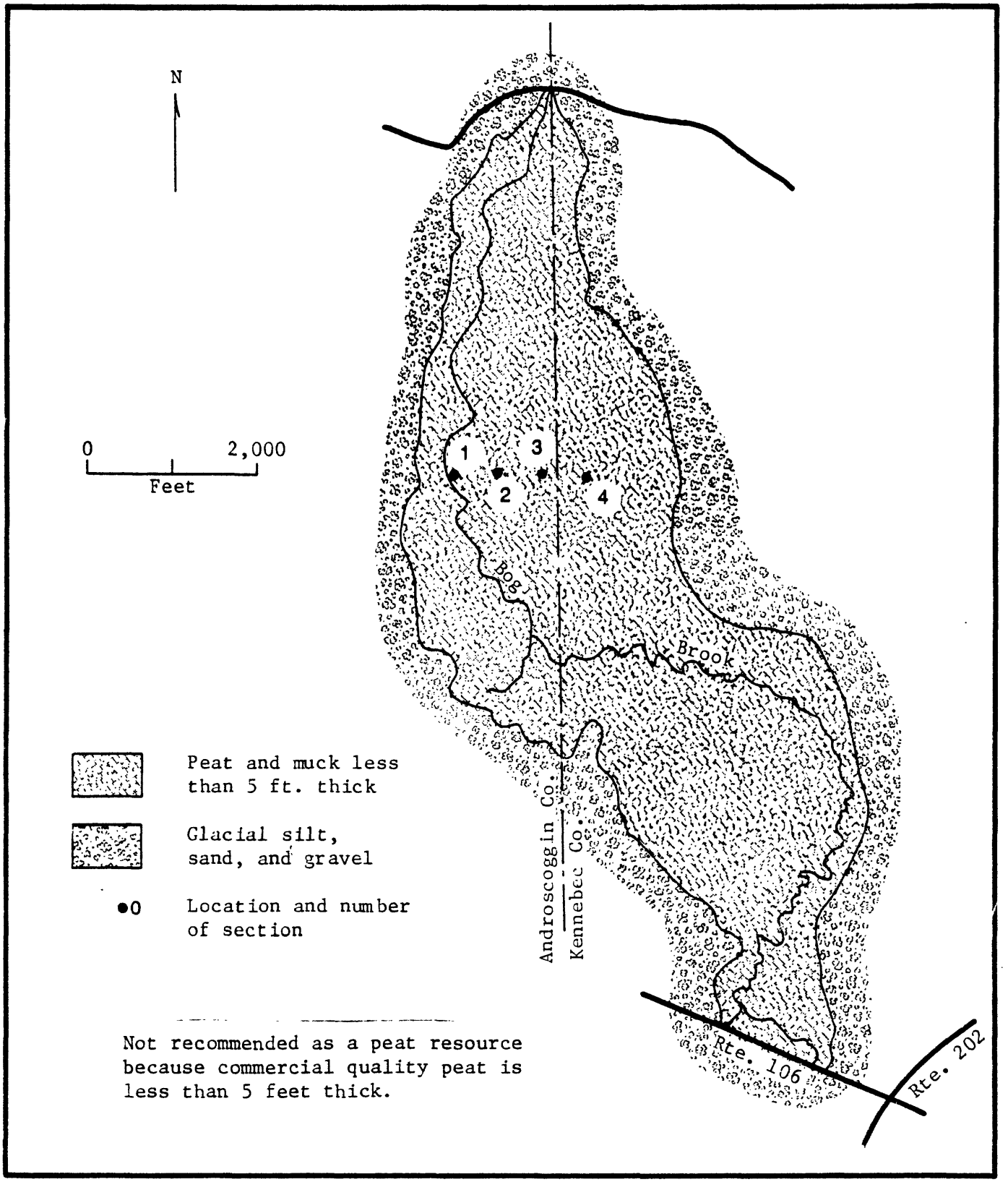
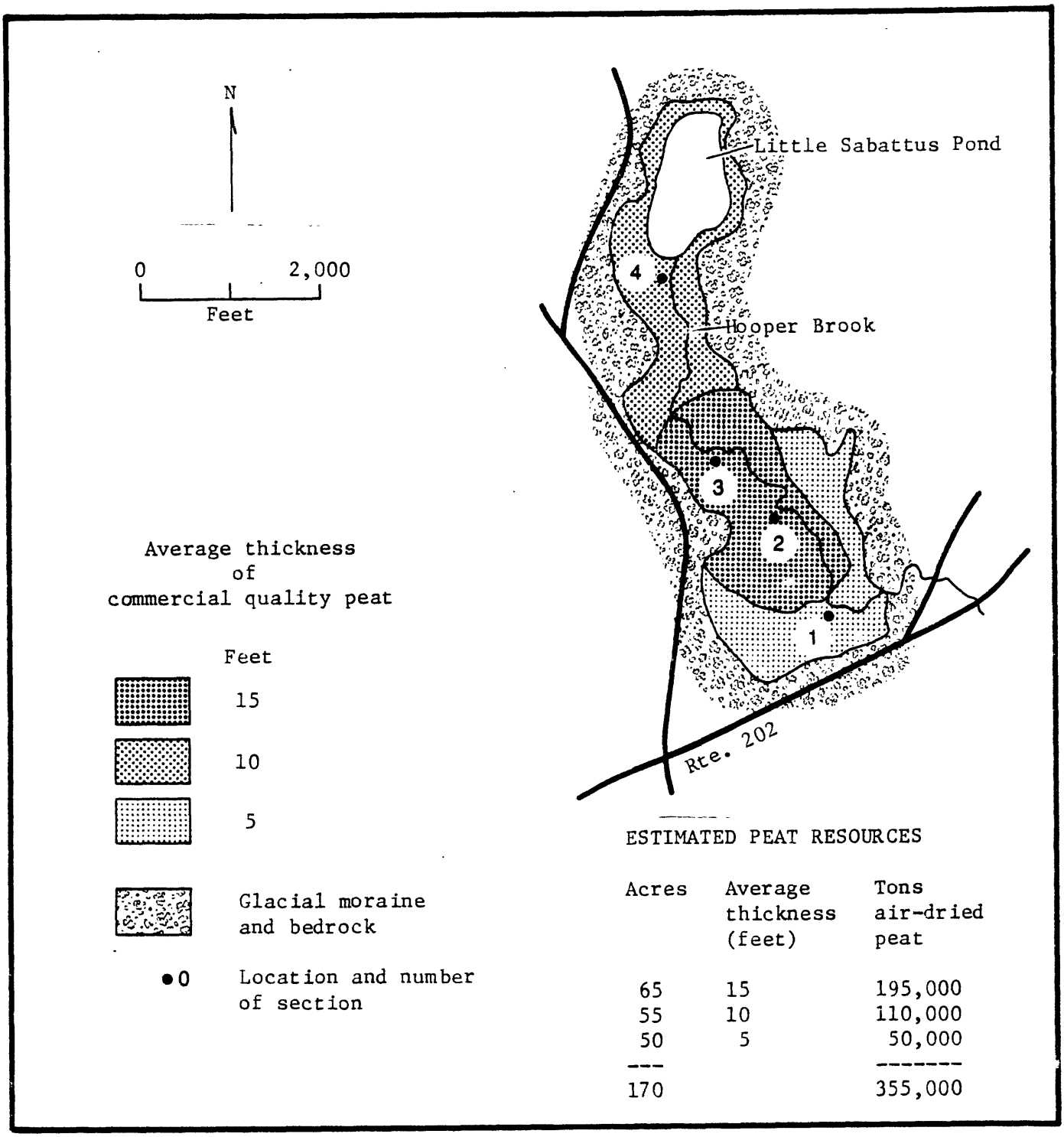


Figure 25. Sketch map of bog along Bog Brook south of Androscoggin Lake on the Androscoggin-Kennebec County Line, Leeds and Monmouth Twps., Wayne 7½ minute Quadrangle, Maine. (Number 24 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
65	15	195,000
55	10	110,000
50	5	50,000
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170		355,000

Figure 26. Sketch map of bog at Little Sabattus Pond, Greene Twp., Lewiston 15 minute Quadrangle, Androscoggin County, Maine. (Number 25 on Index Map).

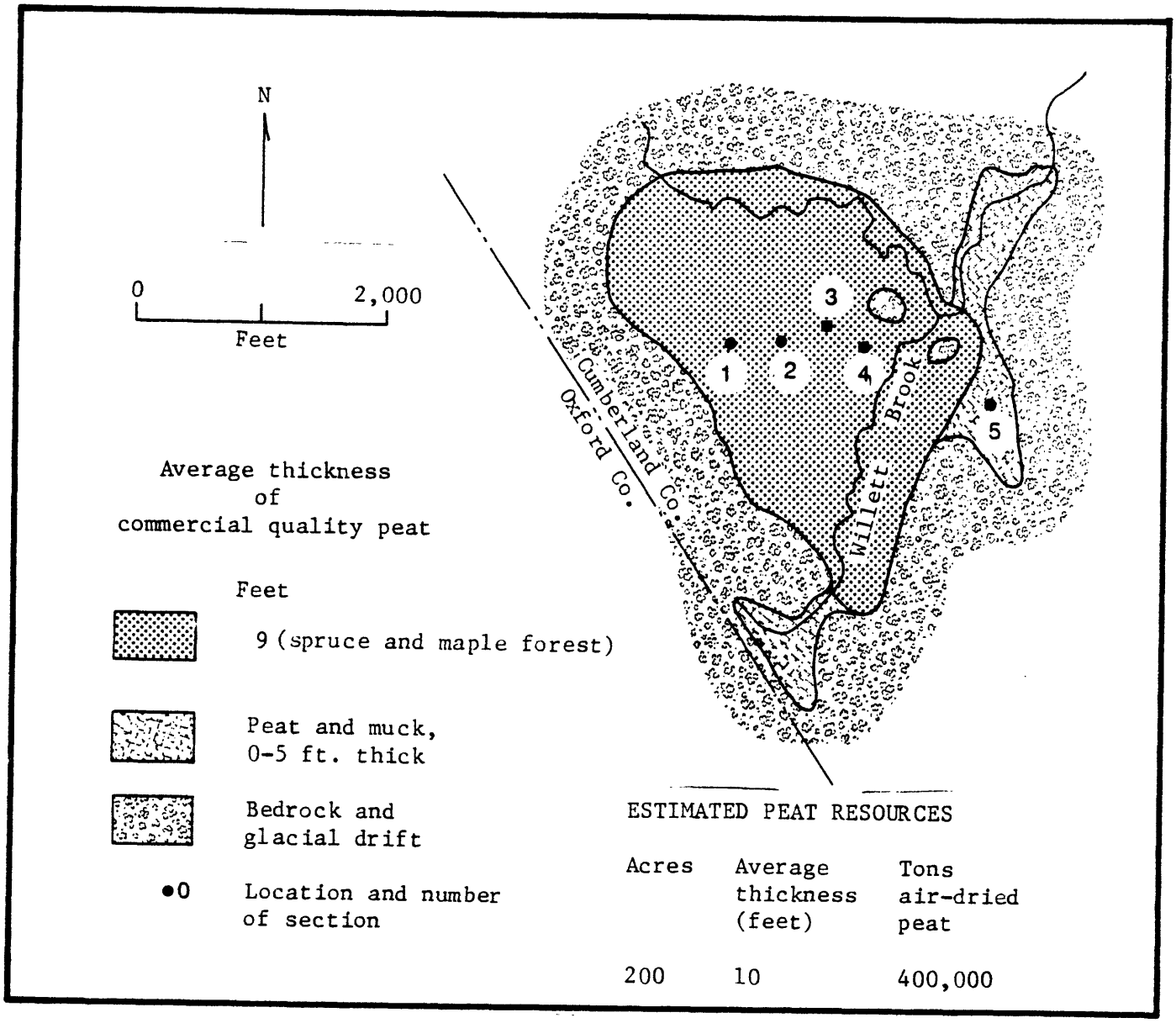


Figure 27. Sketch map of bog along Willett Brook, Bridgton Twp., Norway and Sebago Lake 15 minute Quadrangles, Cumberland County, Maine. (Number 26 on Index Map).

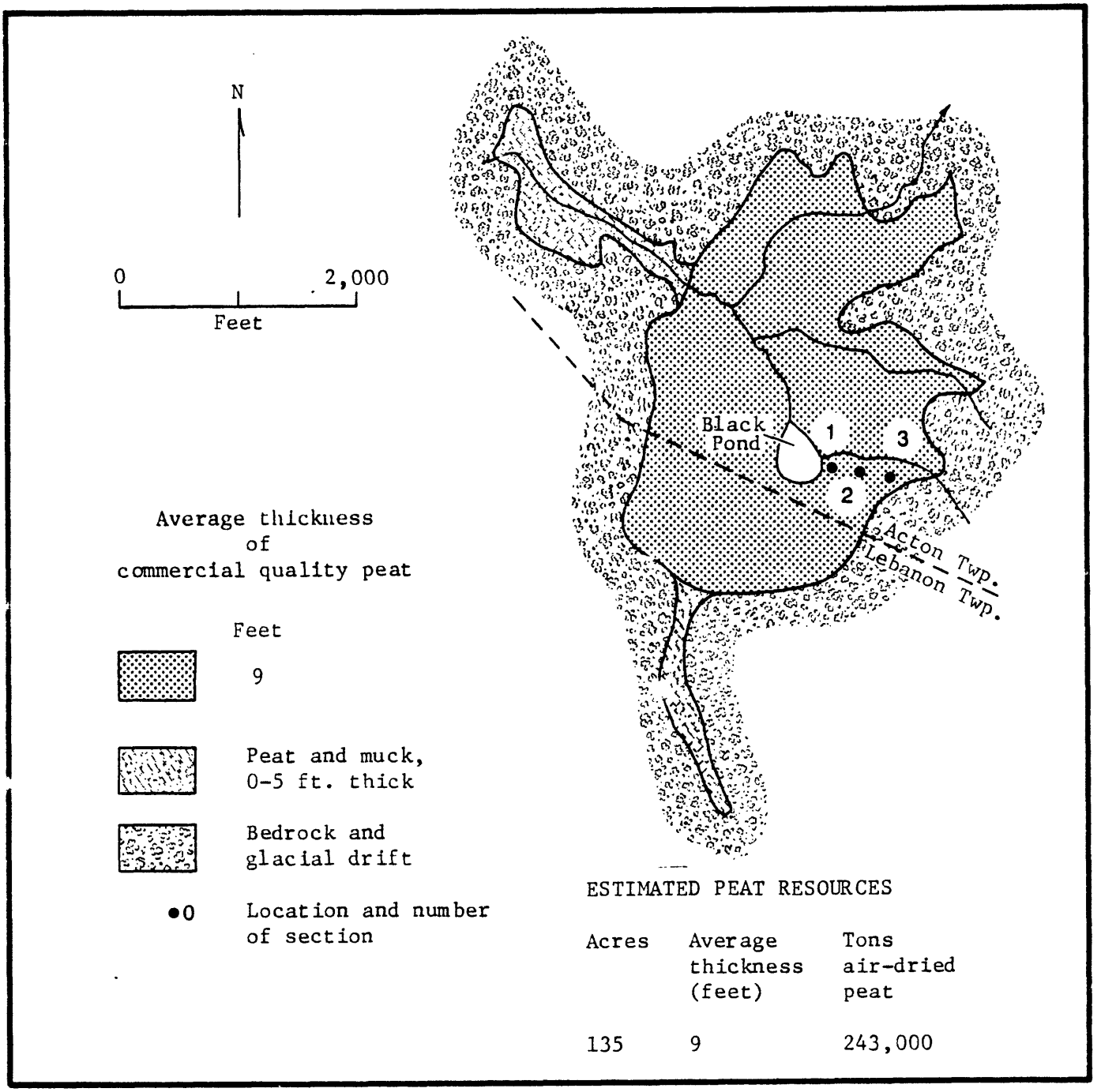


Figure 28. Sketch map of bog at Black Pond, Acton and Lebanon Twps., Berwick 15 minute Quadrangle, York County, Maine. (Number 27 on Index Map).

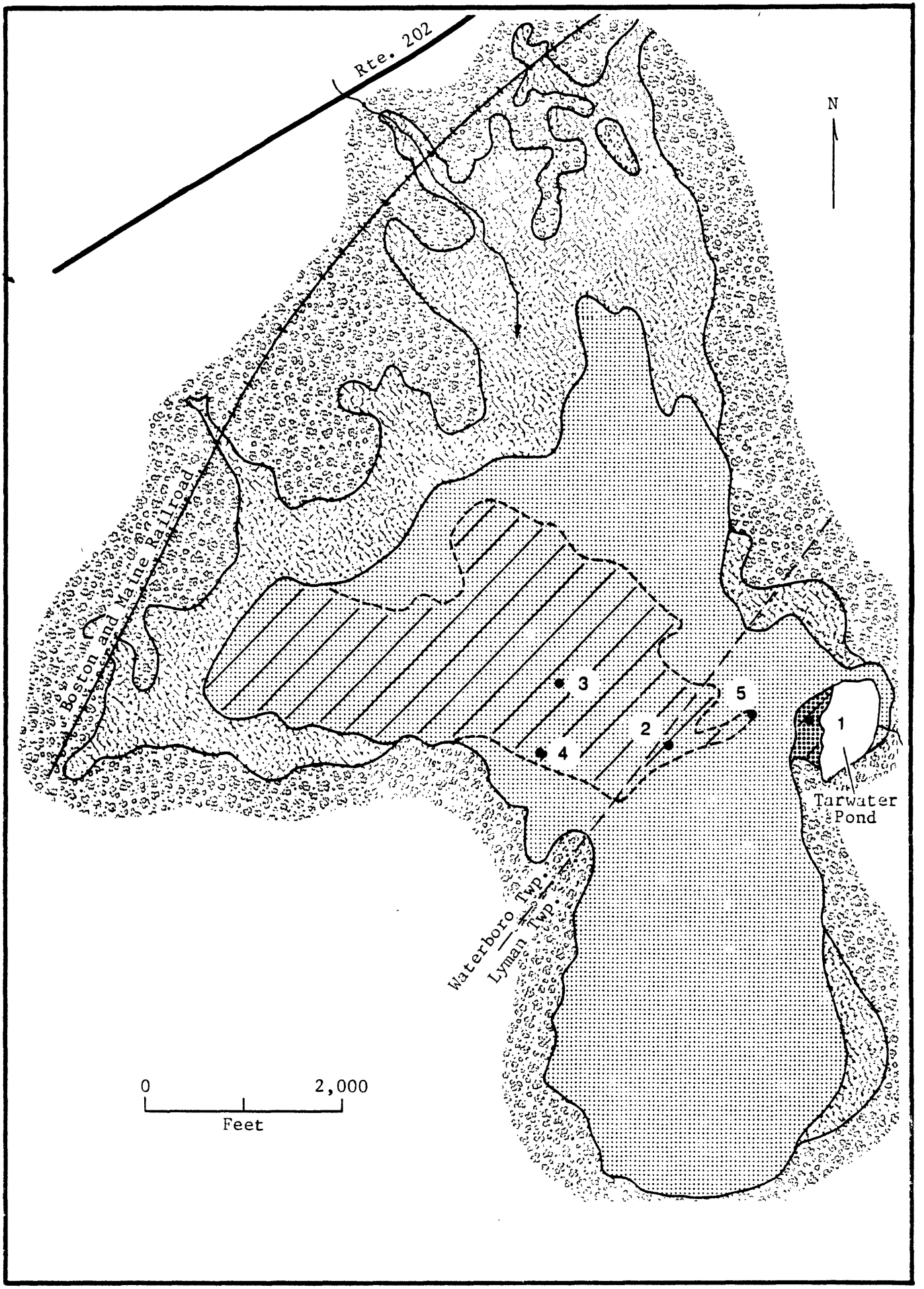


Figure 29. Sketch map of The Heath, Lyman and Waterboro Twps., Buxton 15 minute Quadrangle, York County, Maine. (Number 28 on Index Map).

ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
5	12	12,000
590	5	590,000
595		602,000

Note: Charcoal prevalent in cores and in forest.

Figure 29. Continued.

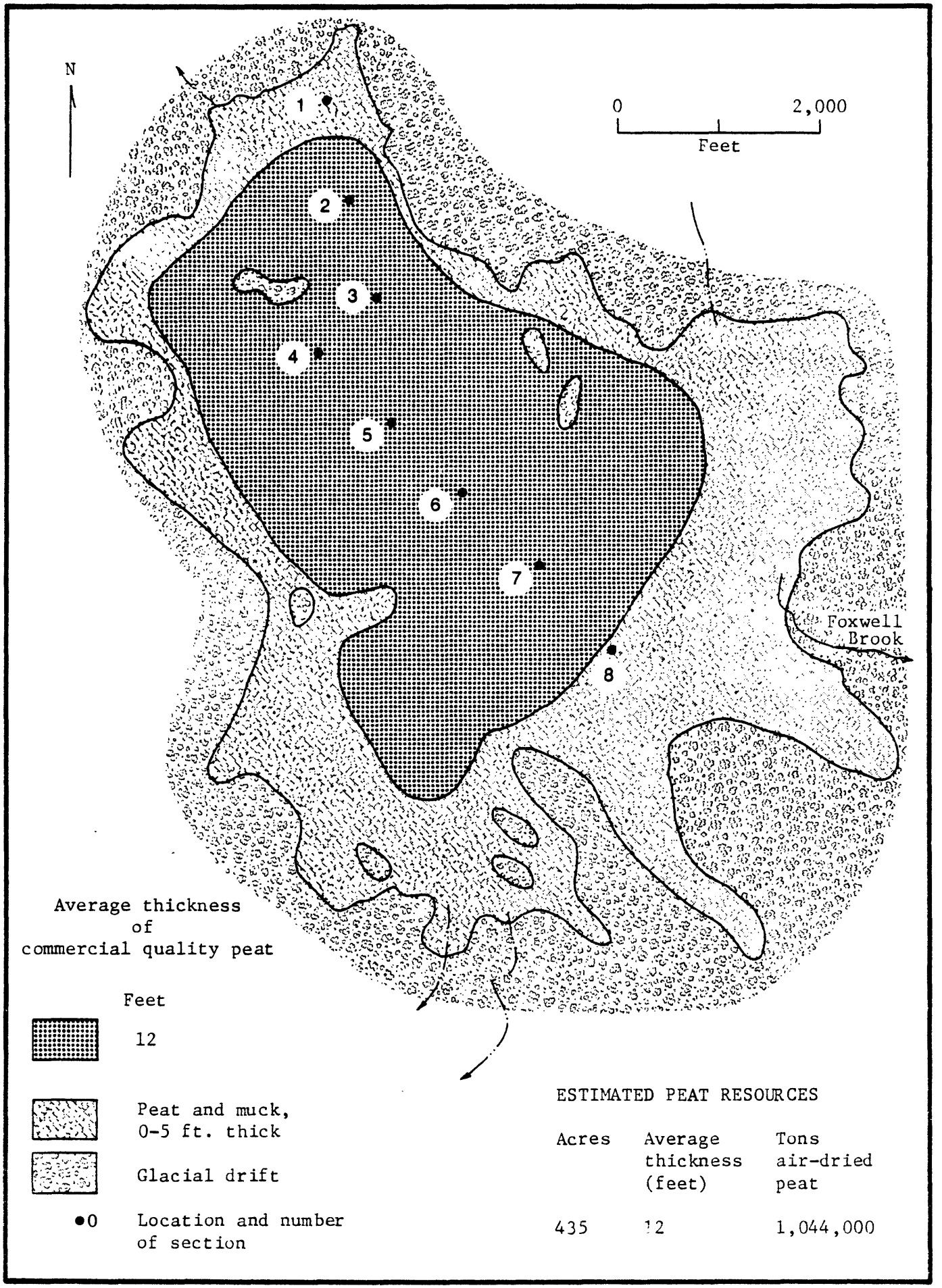


Figure 30. Sketch map of The Heath, Saco Twp., Portland 15 minute Quadrangle, York County, Maine. (Number 29 on Index Map).

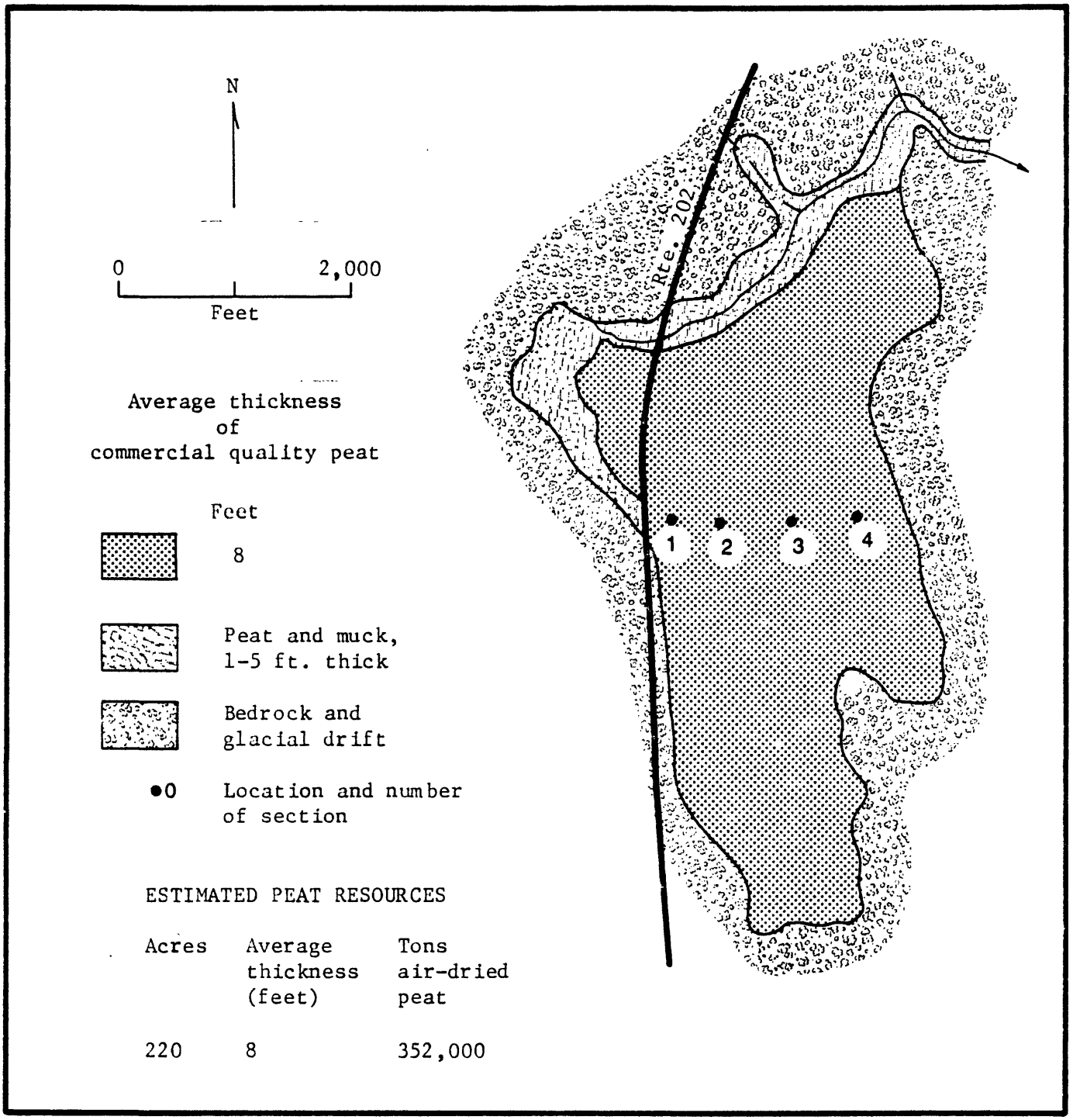


Figure 31. Sketch map of bog south of East Lebanon along Route 202, Lebanon Twp., Berwick 15 minute Quadrangle, York County, Maine. (Number 30 on Index Map).

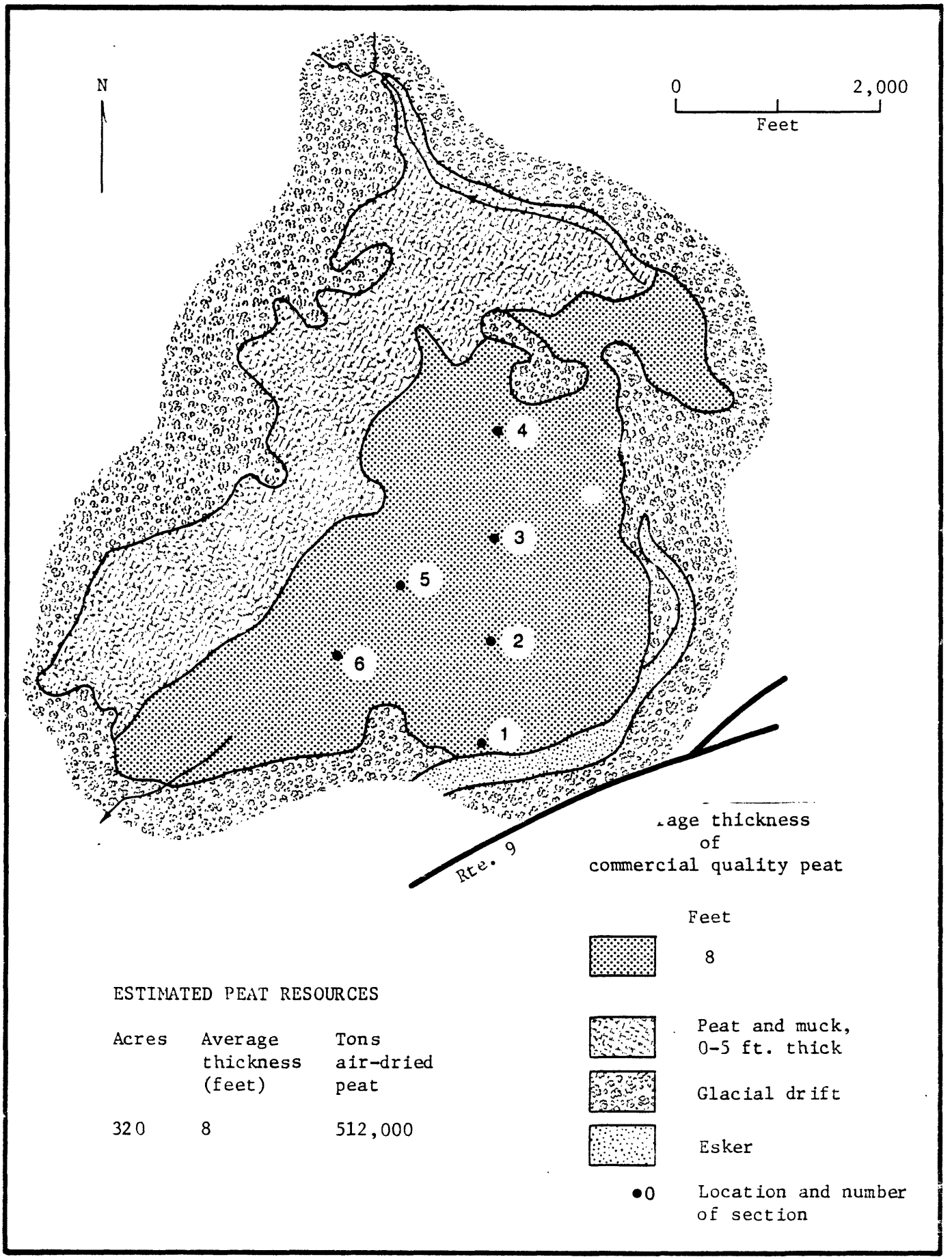


Figure 32. Sketch map of The Heath north of Merriland Ridge, Wells Twp., Kennebunk 15 minute Quadrangle, York County, Maine. (Number 31 on Index Map).

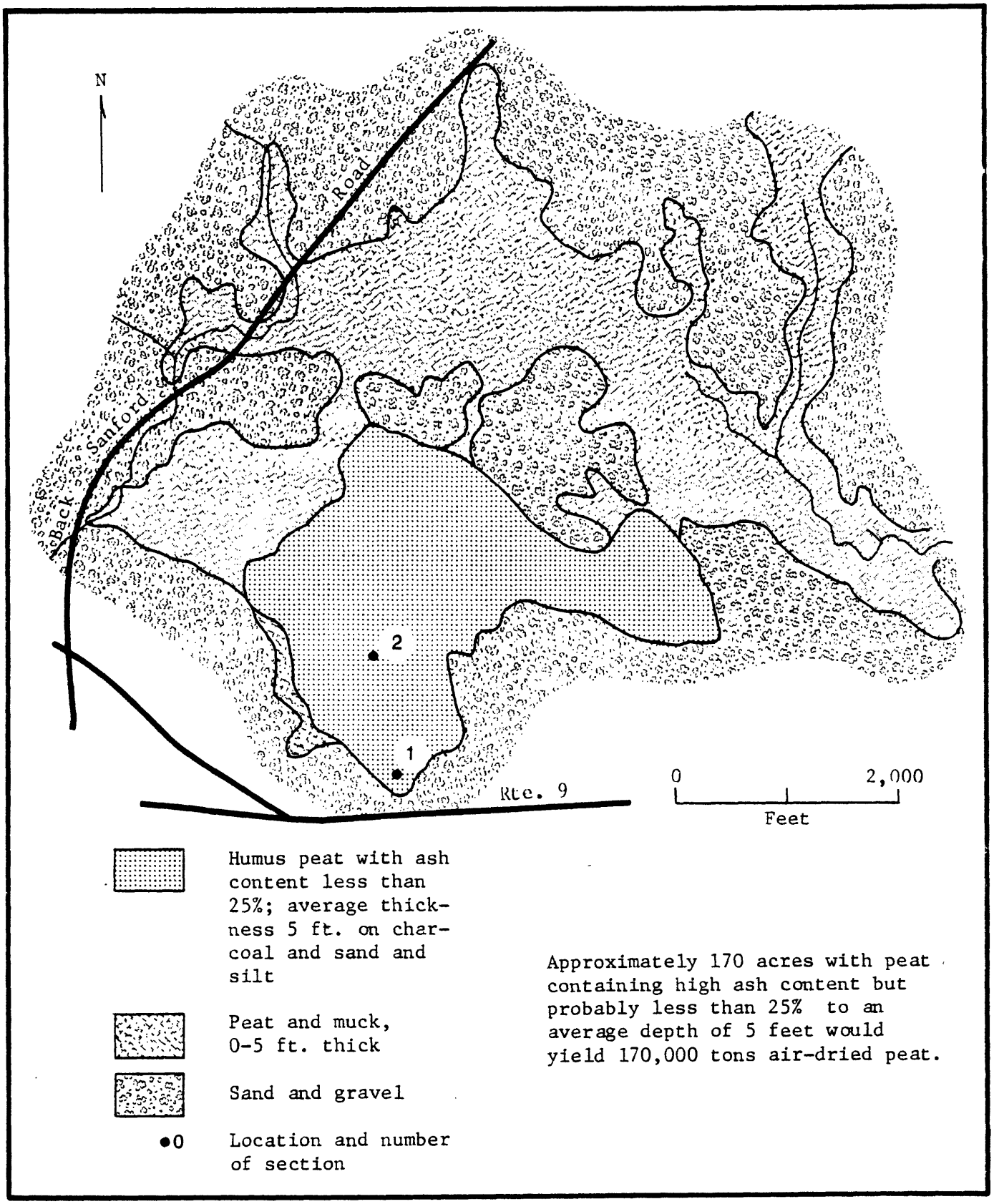
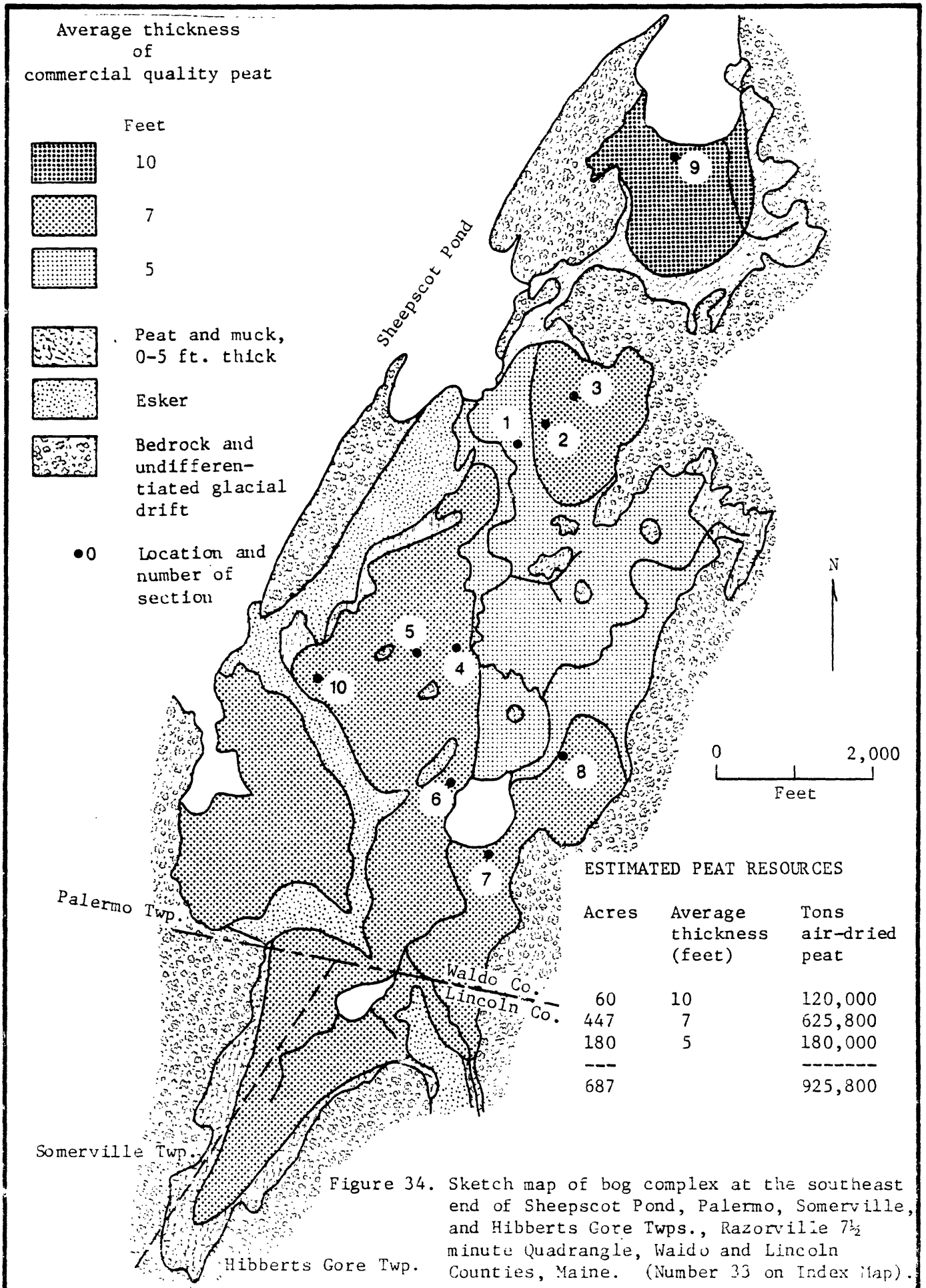


Figure 33. Sketch map of Beaver Dam Heath, Berwick Twp., Berwick 15 minute Quadrangle, York County, Maine. (Number 32 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
60	10	120,000
447	7	625,800
180	5	180,000
687		925,800

Figure 34. Sketch map of bog complex at the southeast end of Sheepscot Pond, Palermo, Somerville, and Hibberts Gore Twps., Razorville 7½ minute Quadrangle, Waldo and Lincoln Counties, Maine. (Number 33 on Index Map).

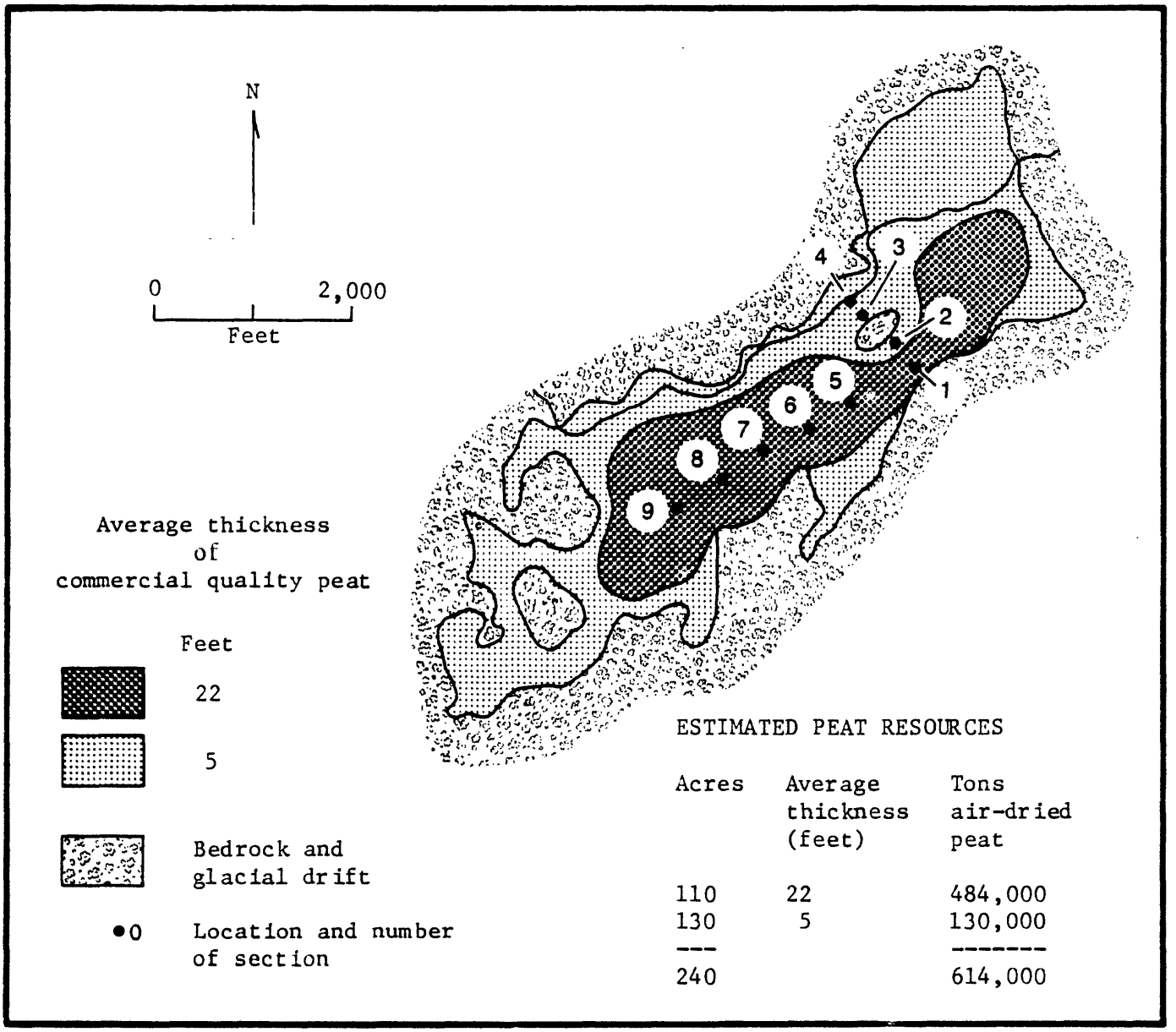


Figure 35. Sketch map of Smiths Millpond Bog, Morrill Twp., Morrill 7½ minute Quadrangle, Waldo County, Maine. (Number 34 on Index Map).

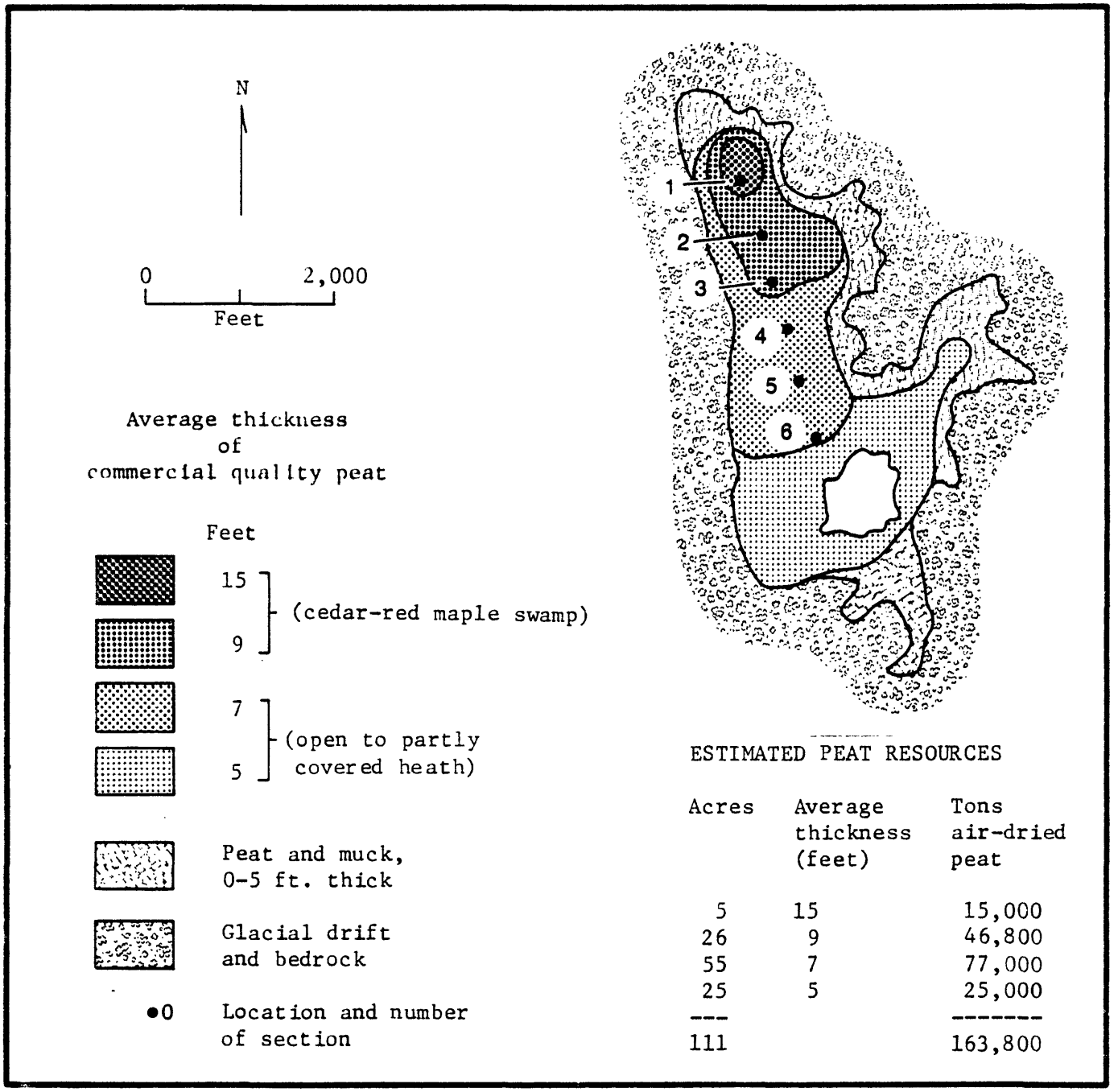
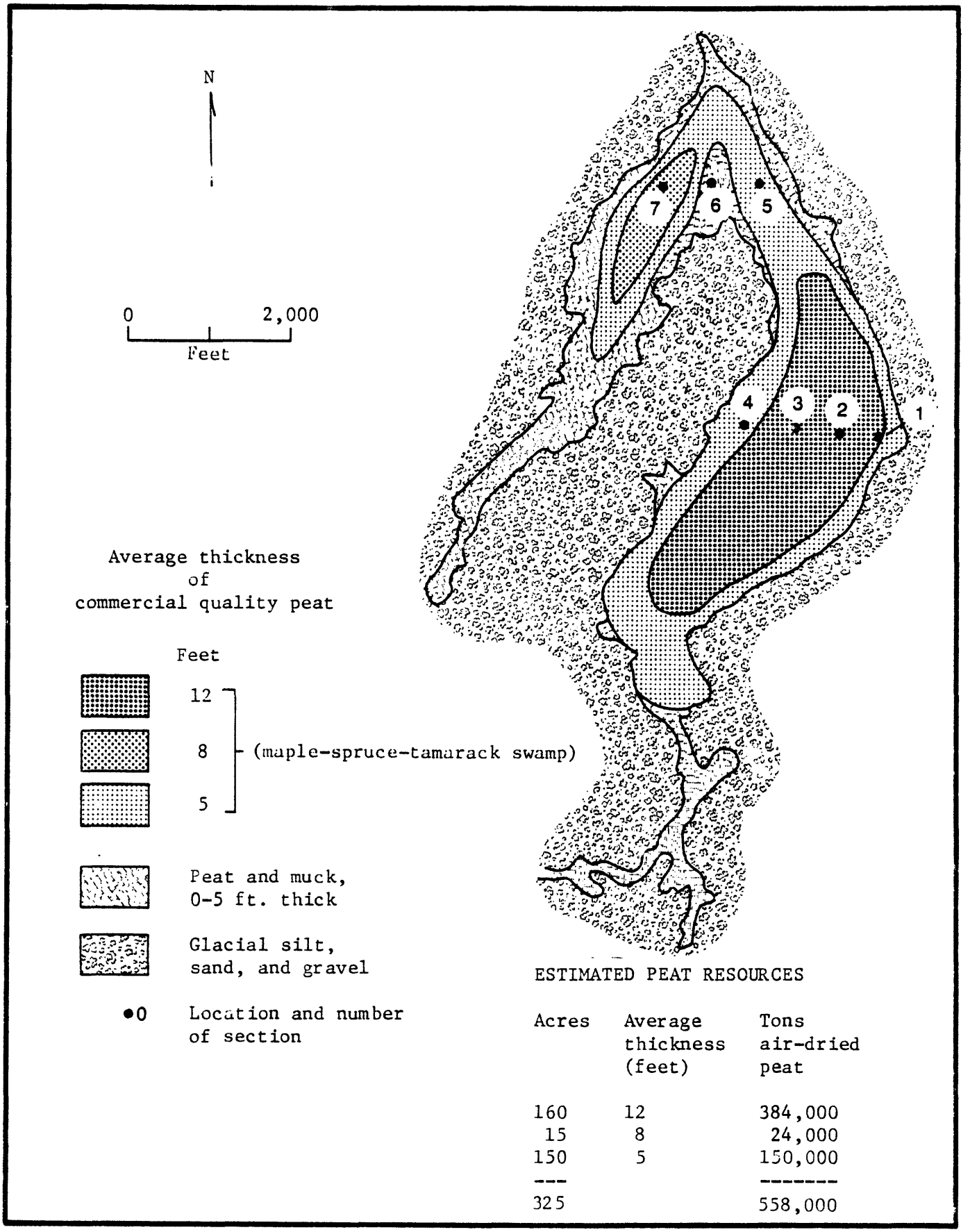


Figure 36. Sketch map of Greers Bog, Morrill Twp., Morrill 7½ minute Quadrangle, Waldo County, Maine. (Number 35 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
160	12	384,000
15	8	24,000
150	5	150,000
325		558,000

Figure 37. Sketch map of Witcher Swamp, Searsmont Twp., Morrill and Searsmont 7½ minute Quadrangles, Waldo County, Maine. (Number 36 on Index Map).

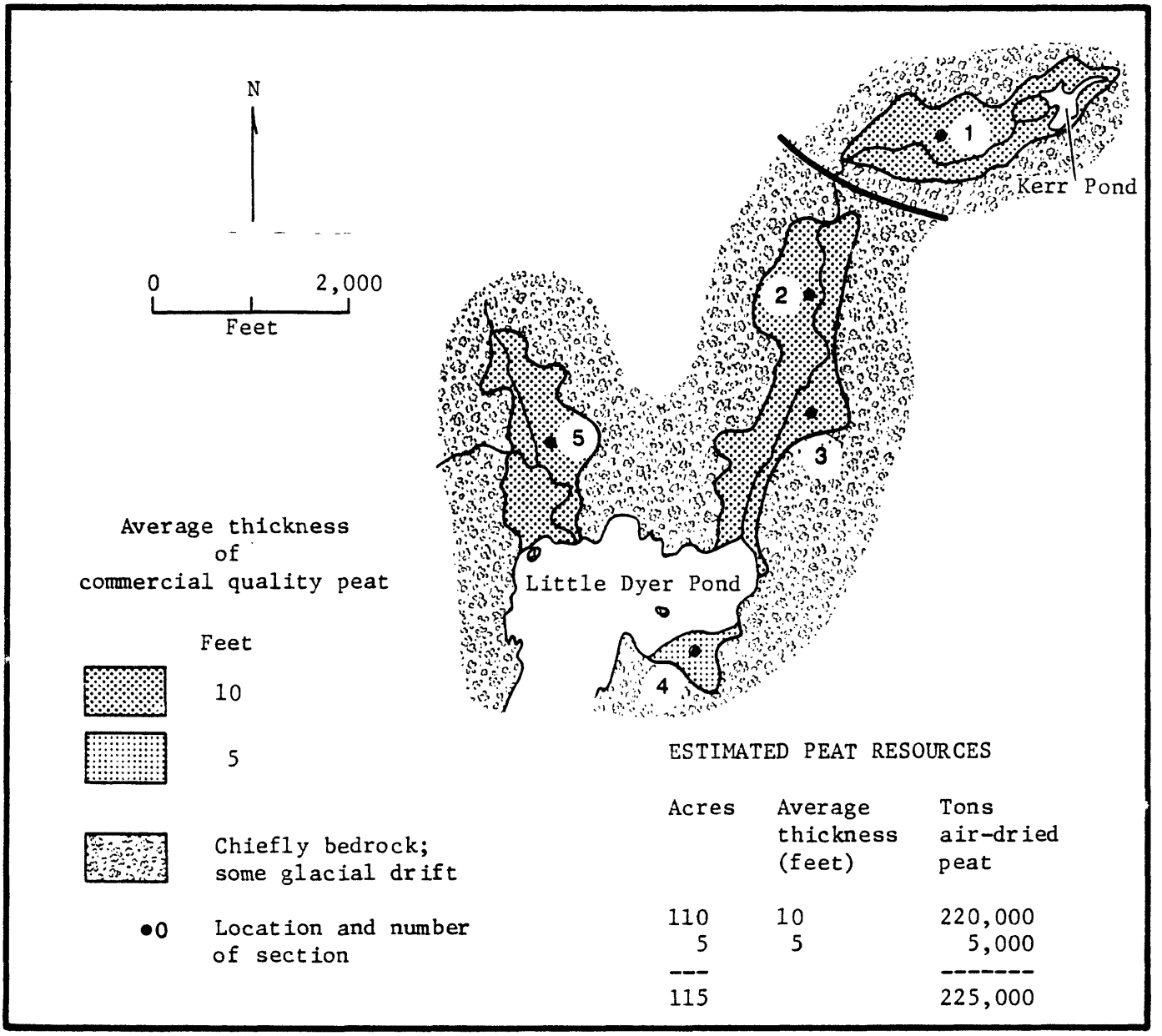
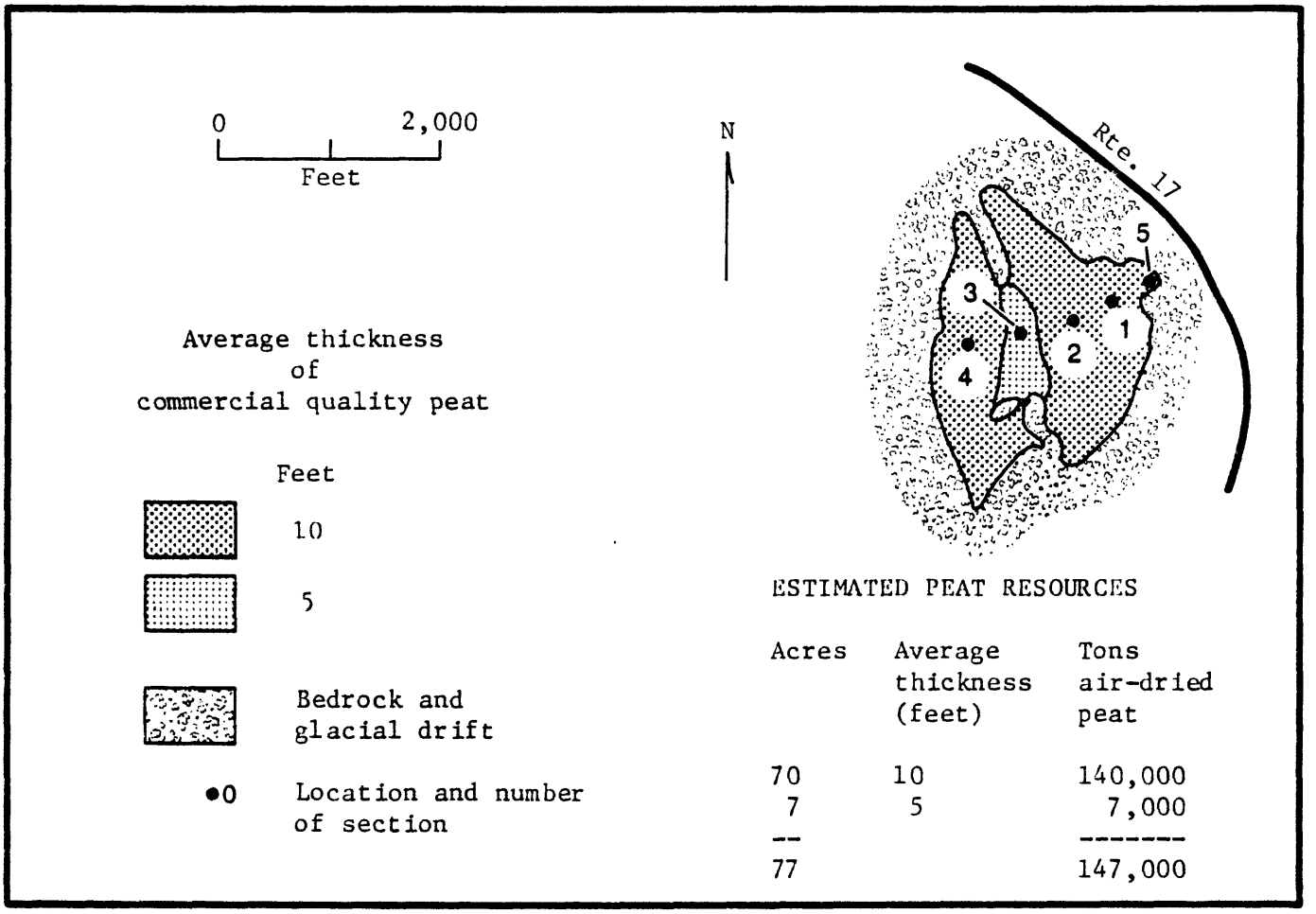


Figure 38. Sketch map of bogs north of Little Dyer Pond and south of Kerr Pond, Jefferson Twp., Wiscasset 15 minute Quadrangle, Lincoln County, Maine. (Number 37 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
70	10	140,000
7	5	7,000
77		147,000

Figure 39. Sketch map of Rice Heath, Washington Twp., Union 7½ minute Quadrangle, Knox County, Maine. (Number 38 on Index Map).

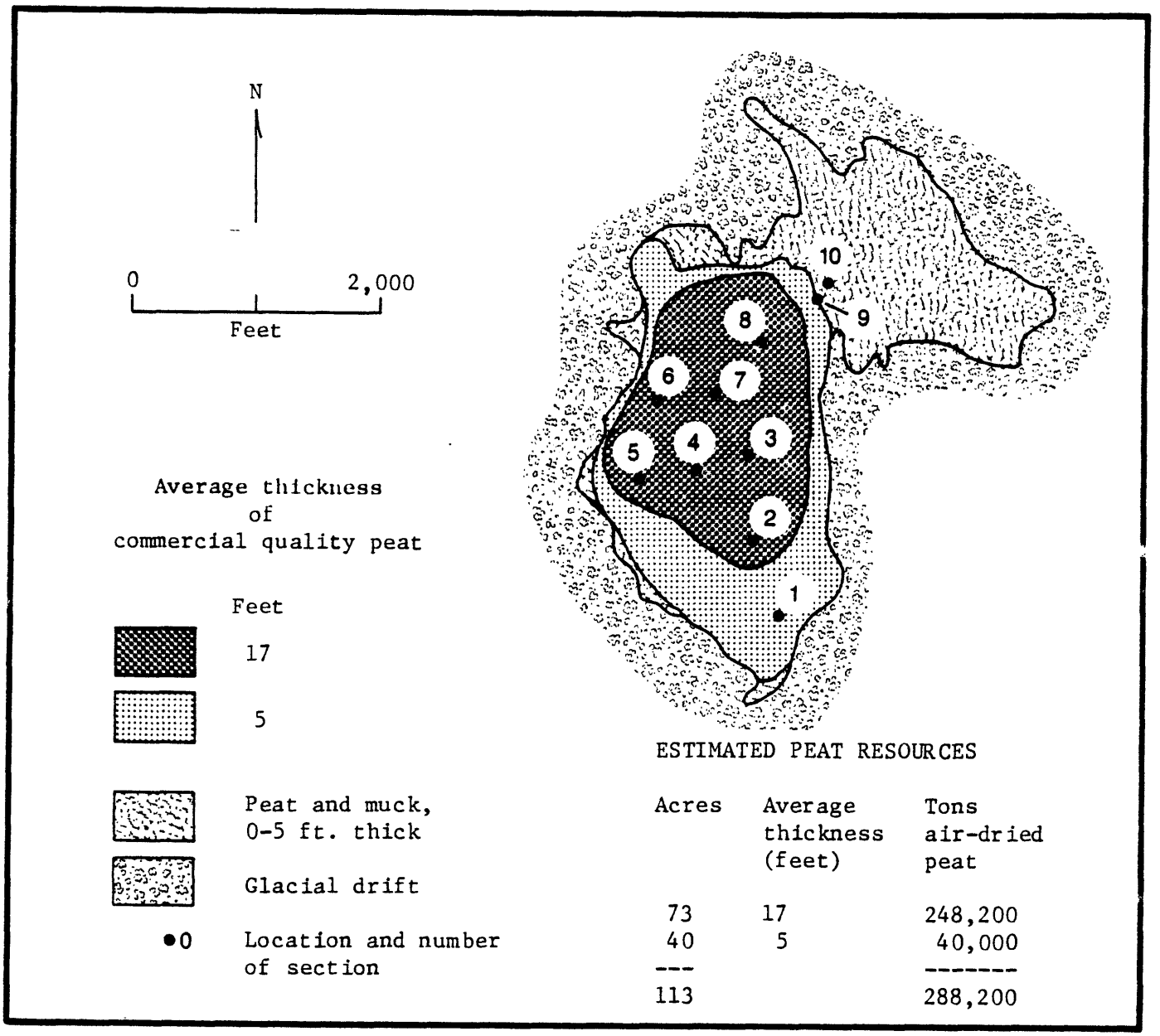


Figure 40. Sketch map of Herricks Bog, Northport Twp., Lincolnville 7½ minute Quadrangle, Waldo County, Maine. (Number 39 on Index Map).

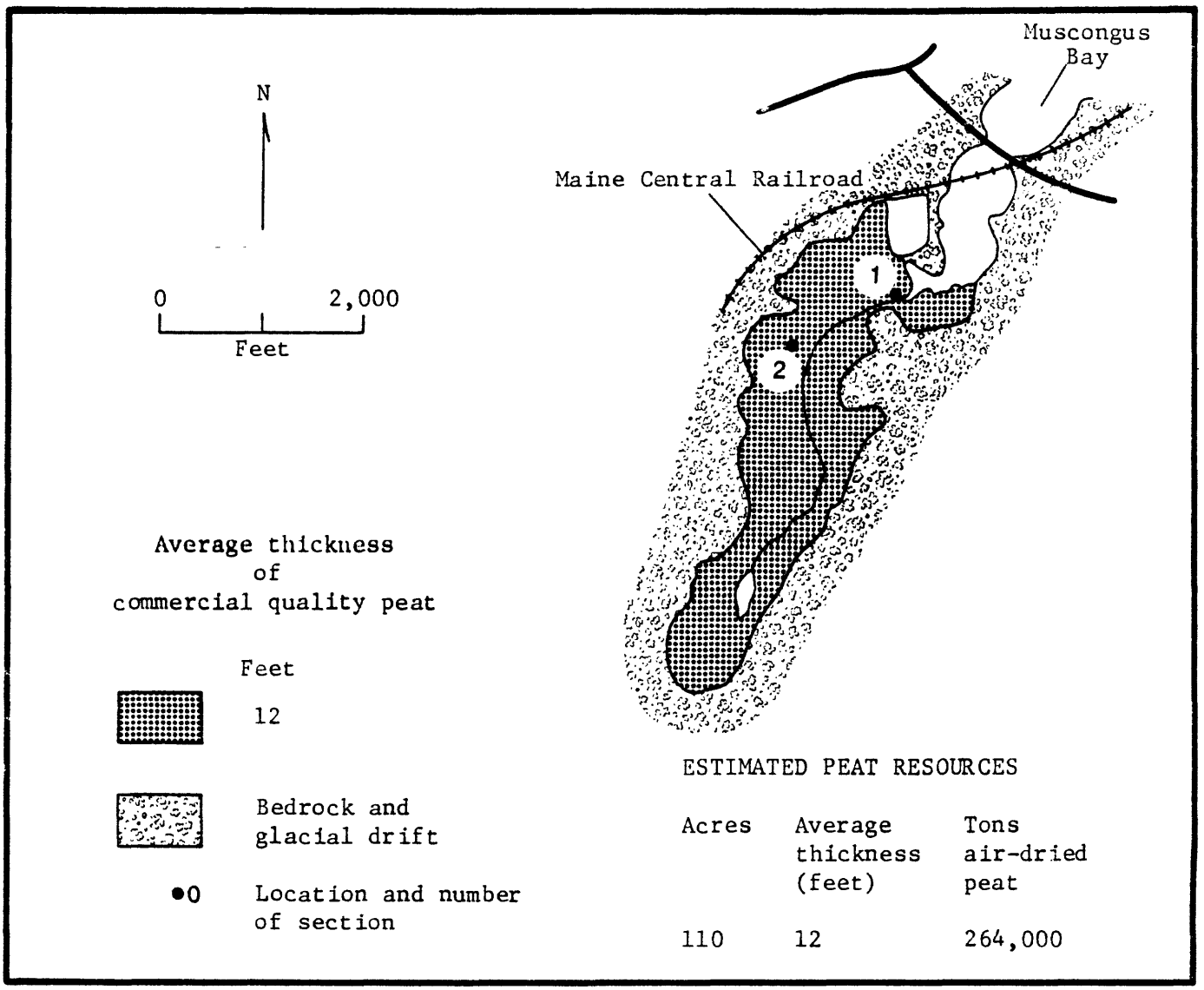


Figure 41. Sketch map of bog at south end of Muscongus Bay, Nobleboro Twp., Waldoboro West 7½ minute Quadrangle, Lincoln County, Maine. (Number 40 on Index Map).

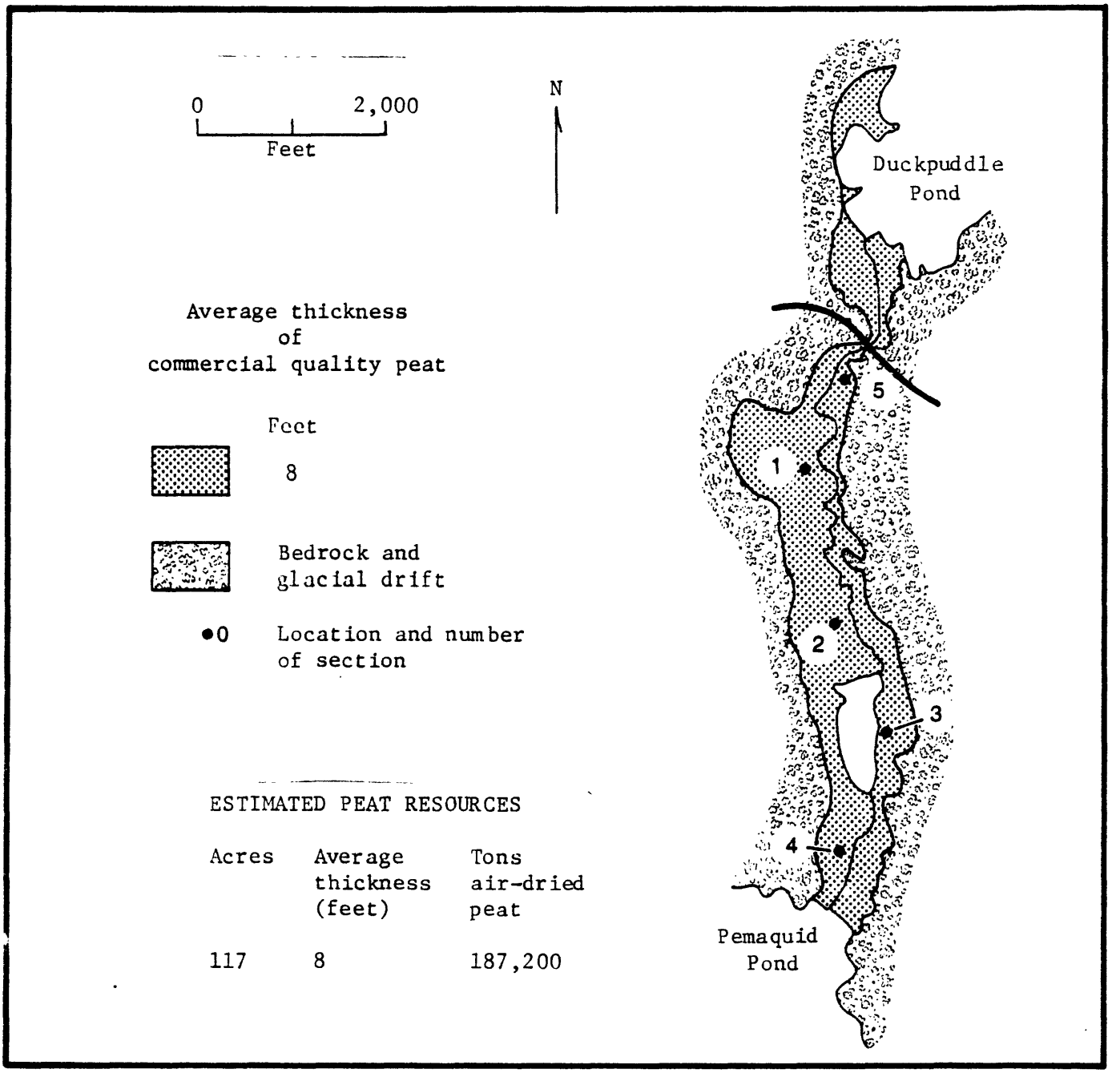
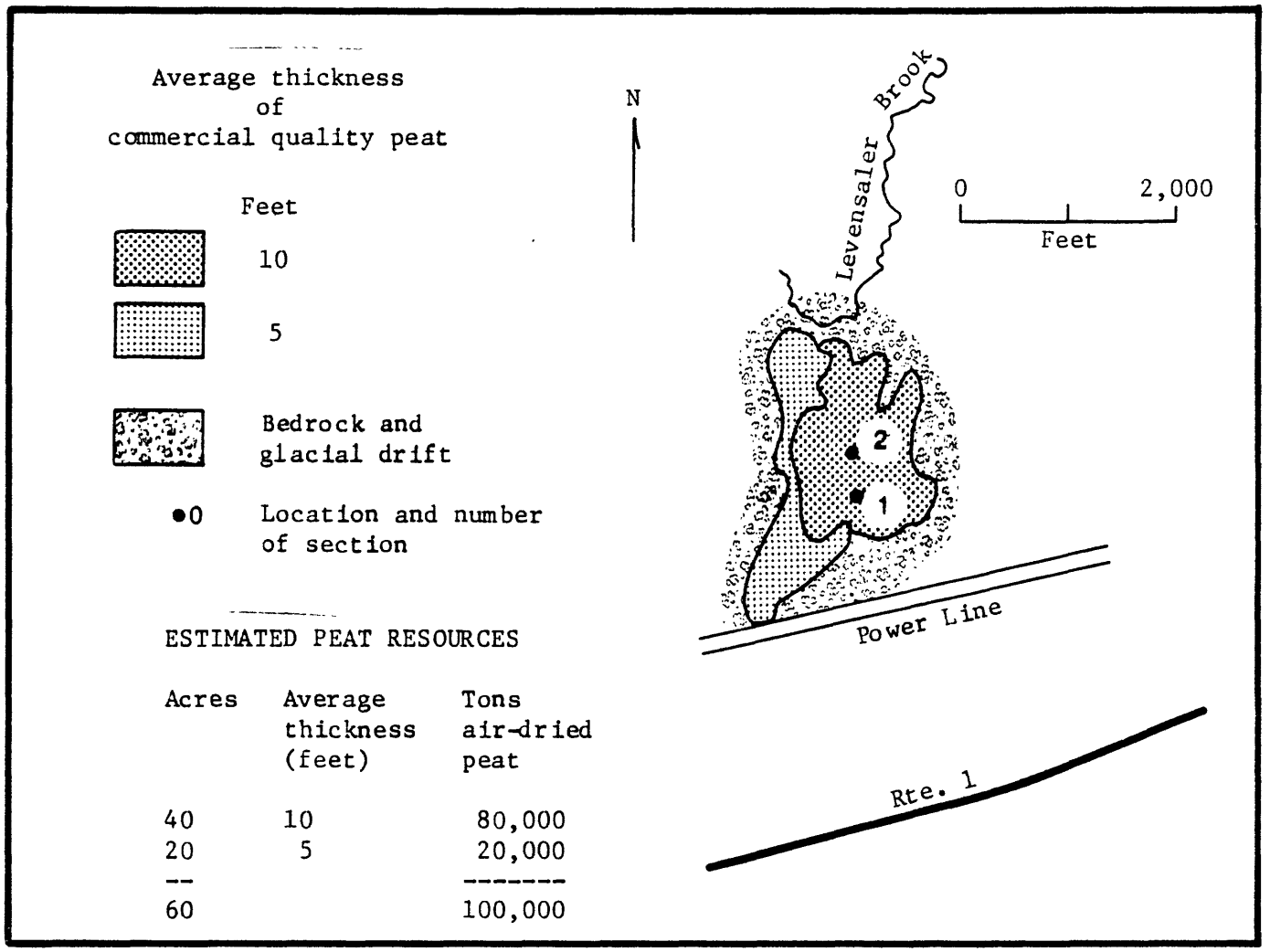


Figure 42. Sketch map of bog between Duckpuddle Pond and Pemaquid Pond, Nobleboro and Waldoboro Twps., Waldoboro West 7½ minute Quadrangle, Lincoln County, Maine. (Number 41 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
40	10	80,000
20	5	20,000
--		-------
60		100,000

Figure 43. Sketch map of bog north of Rte. 1 and east of Rte. 235, Waldoboro Twp., Waldoboro East 7½ minute Quadrangle, Lincoln County, Maine. (Number 42 on Index Map).

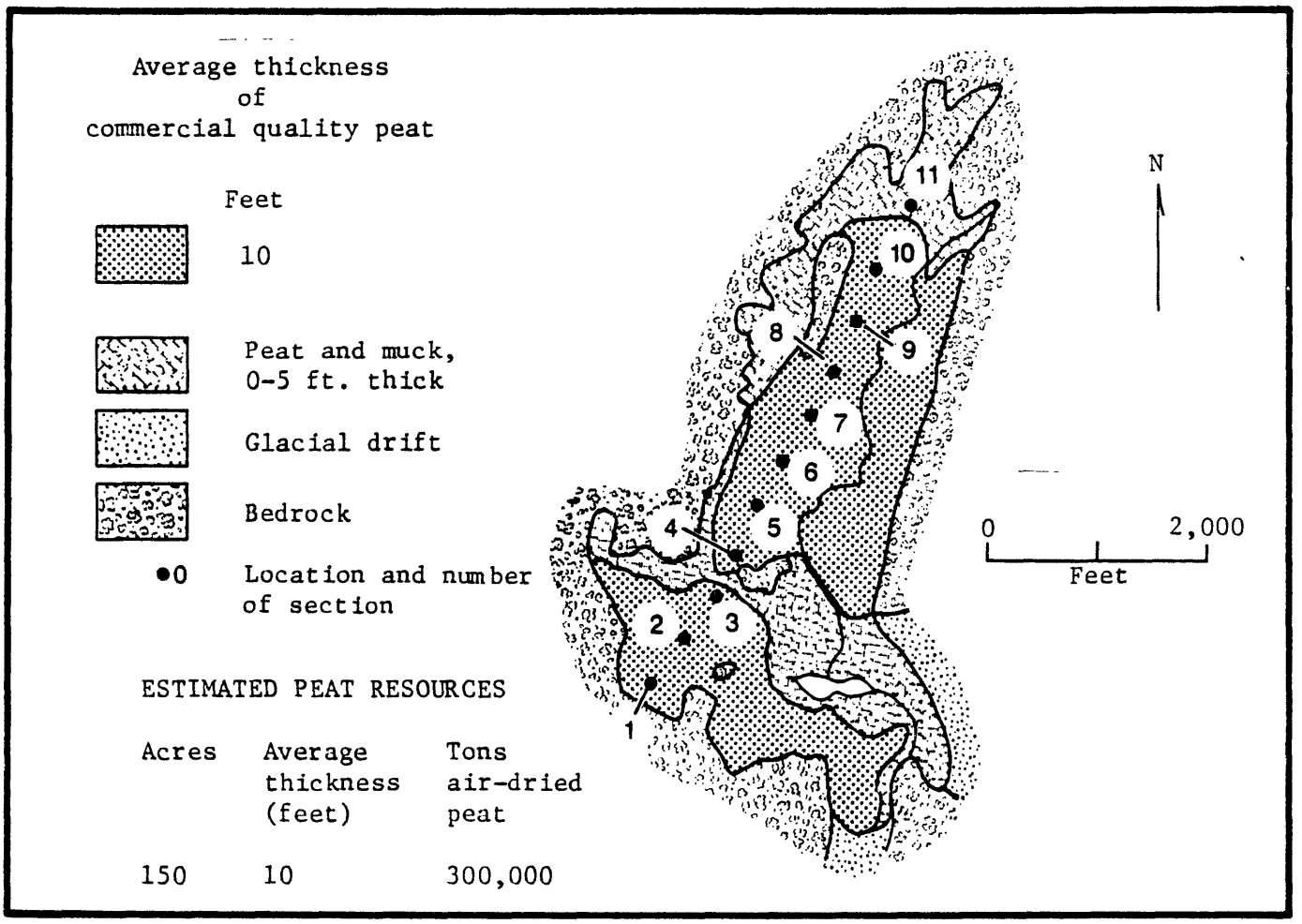


Figure 44. Sketch map of The Bog, Rockland Twp., West Rockport 7½ minute Quadrangle, Knox County, Maine. (Number 43 on Index Map).

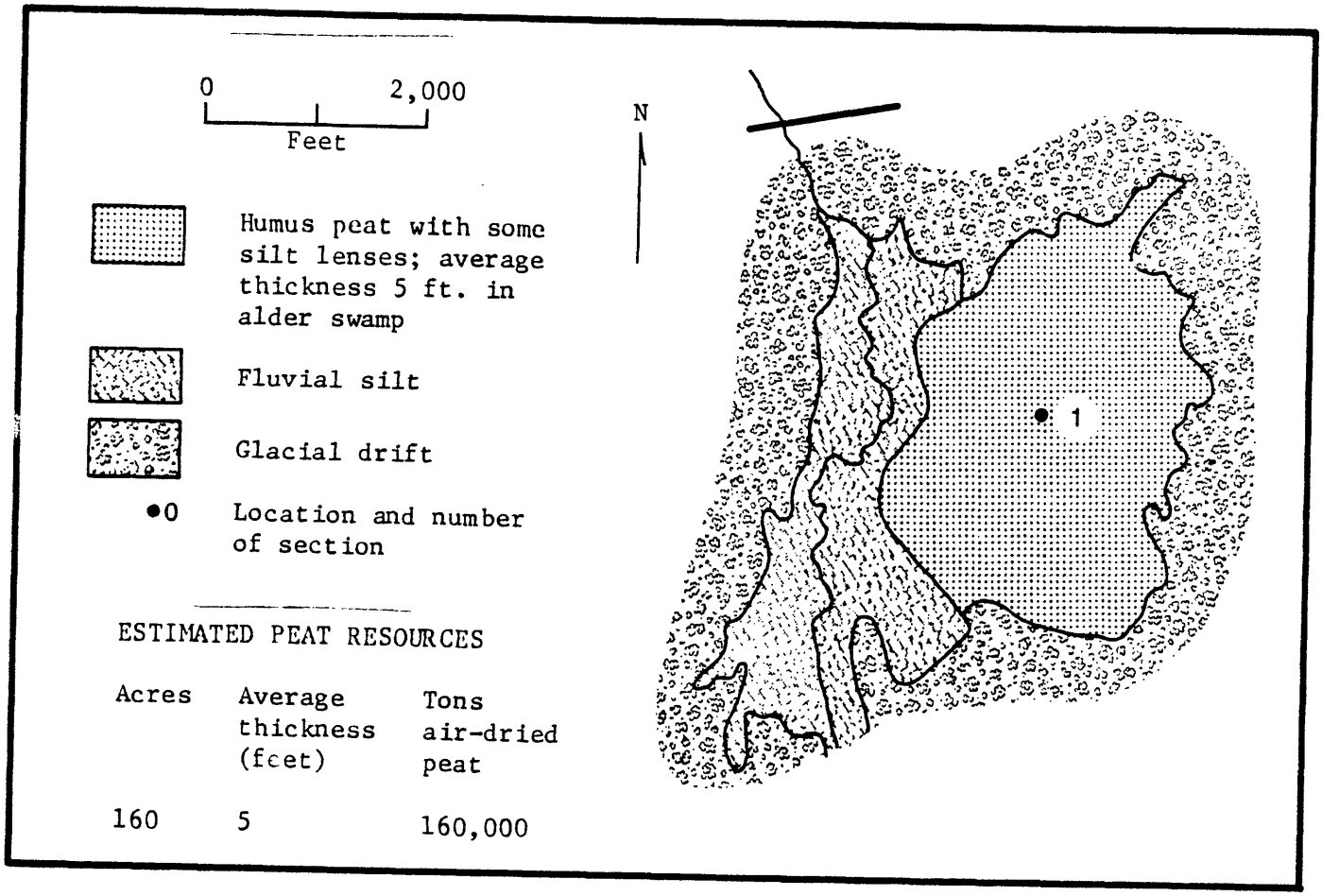


Figure 45. Sketch map of Skinner Bog, Dixmont Twp., Brooks 15 minute Quadrangle, Penobscot County, Maine. (Number 44 on Index Map).

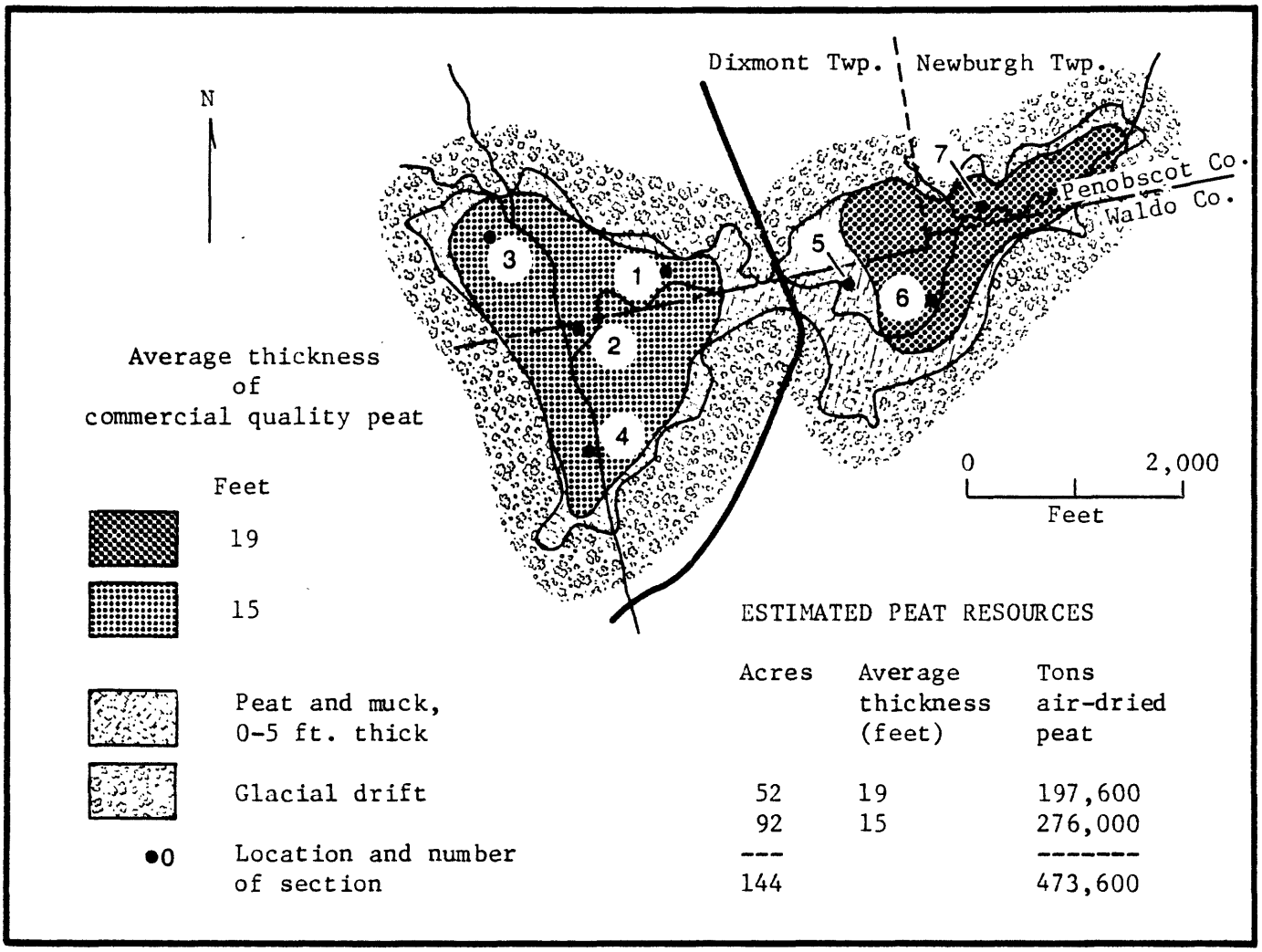


Figure 46. Sketch map of Chase Bog, Dixmont, Newburgh and Monroe Twps., Brooks 15 minute Quadrangle, Penobscot and Waldo Counties, Maine. (Number 45 on Index Map).

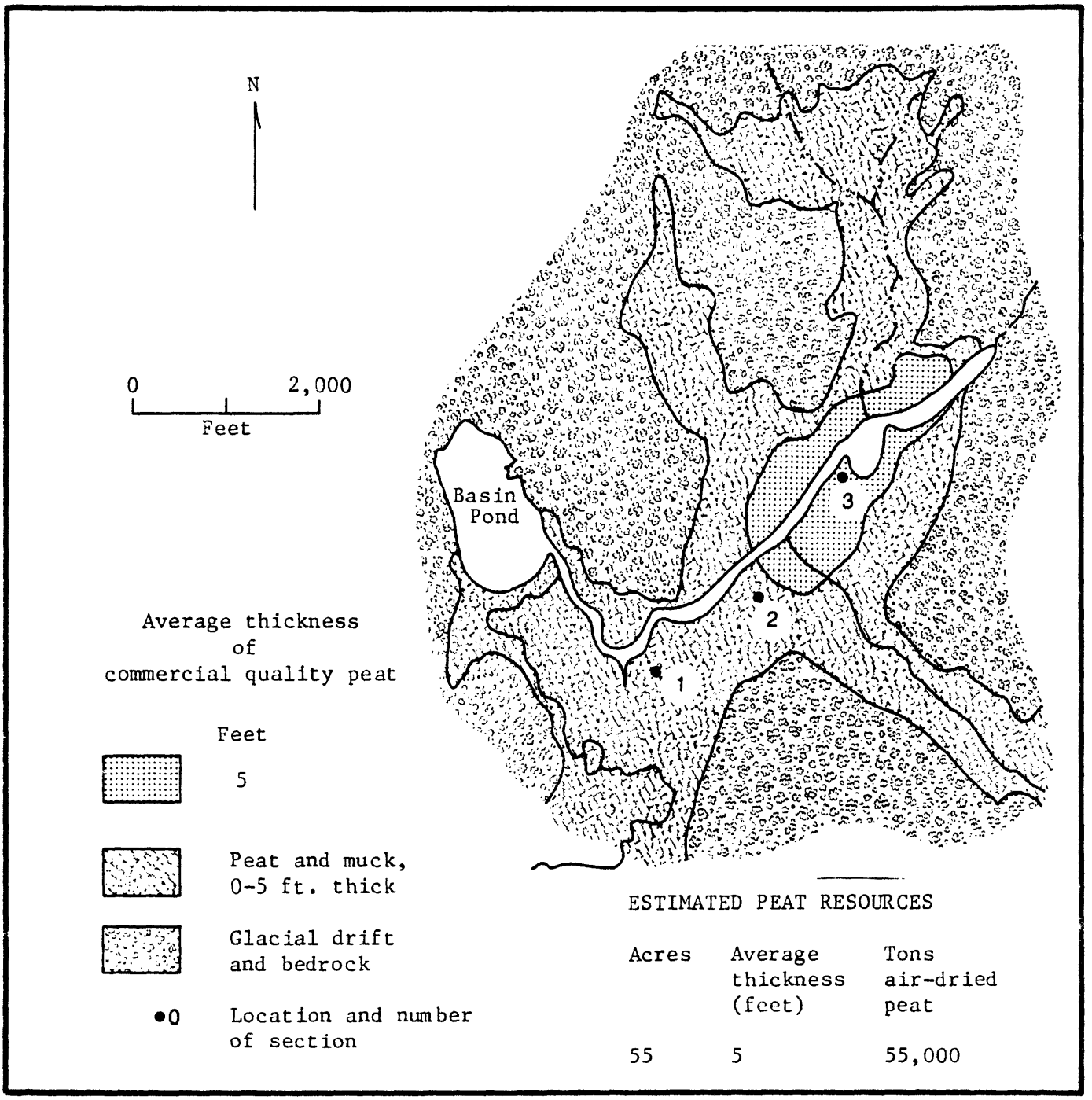


Figure 47. Sketch map of Jones Bog, Monroe Twp., Brooks 15 minute Quadrangle, Waldo County, Maine. (Number 46 on Index Map).

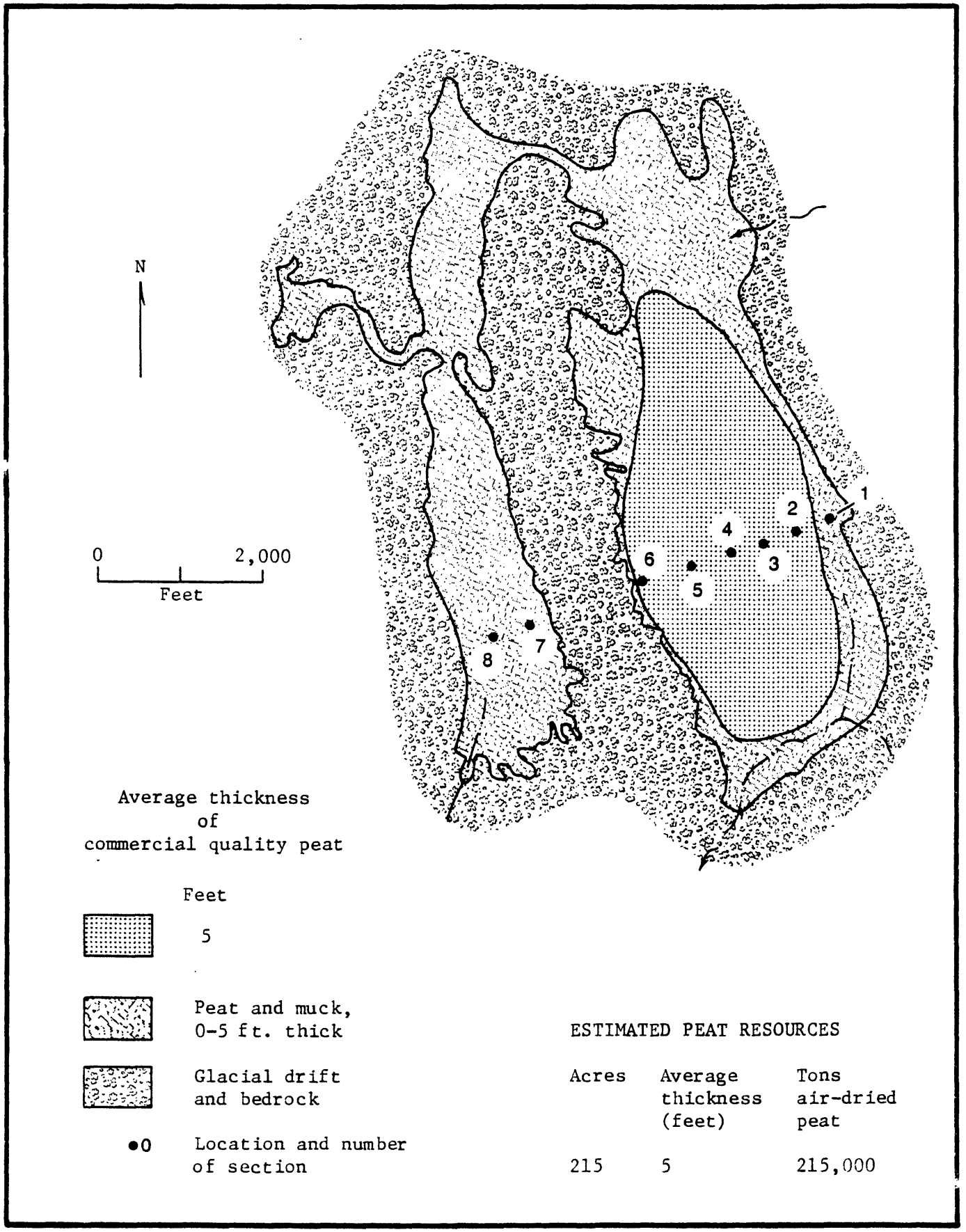


Figure 48. Sketch map of bogs southeast of Greenbush, Greenbush Twp., Passadumkeag 15 minute Quadrangle, Penobscot County, Maine. (Number 47 on Index Map).

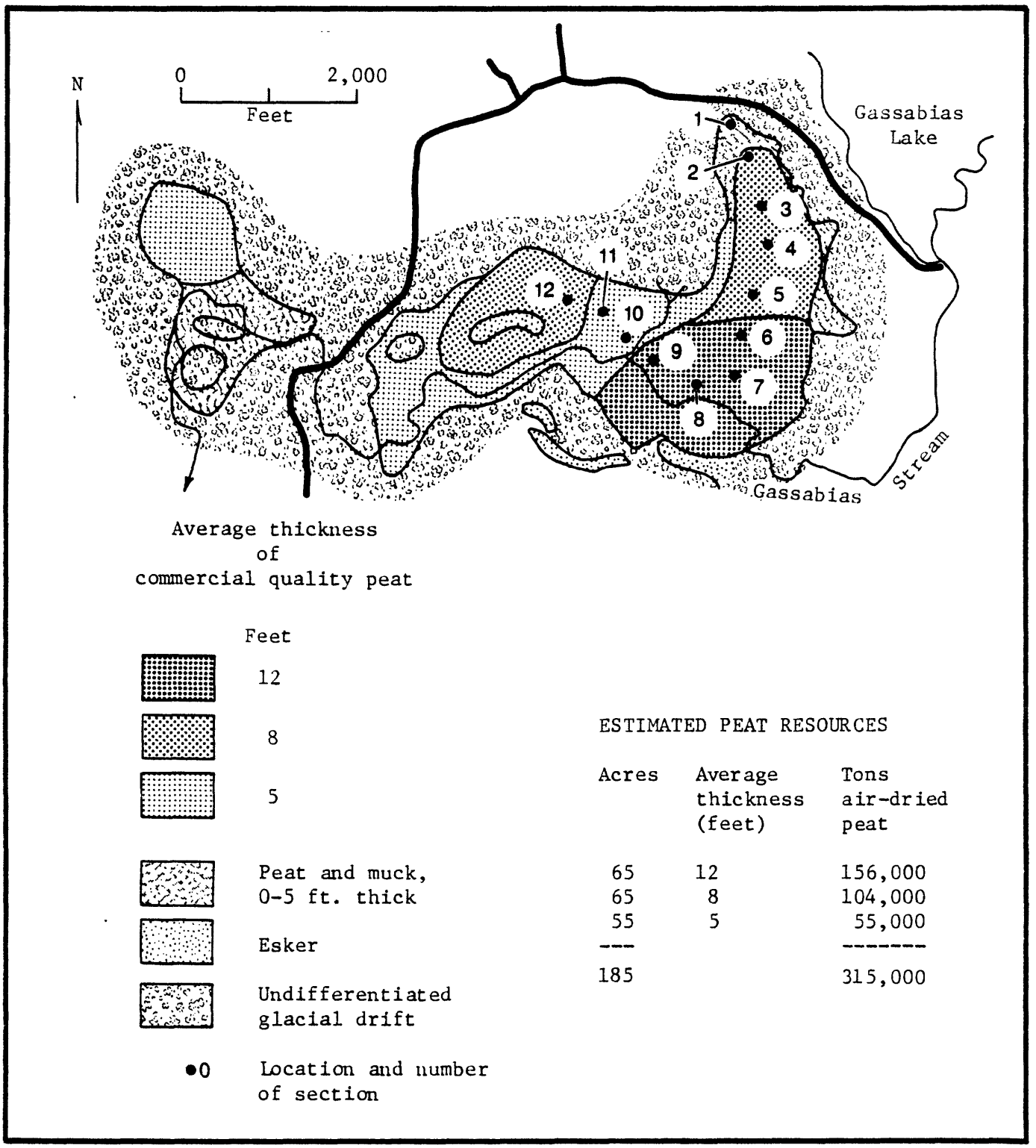
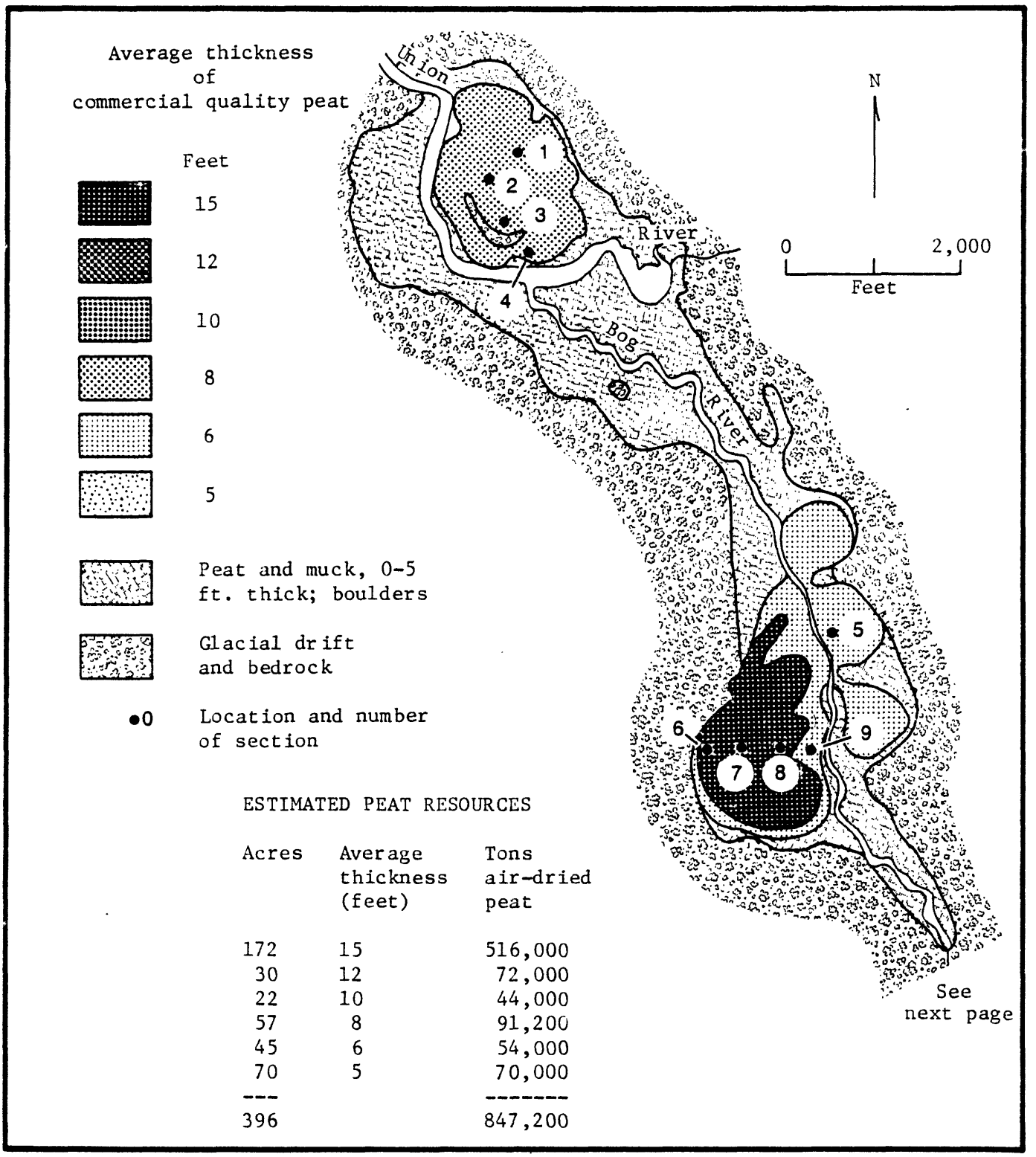


Figure 49. Sketch map of bogs along Gassabias Stream, T41 MD, Nicatous Lake 15 minute Quadrangle, Hancock County, Maine. (Number 48 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
172	15	516,000
30	12	72,000
22	10	44,000
57	8	91,200
45	6	54,000
70	5	70,000
396		847,200

Figure 50. Sketch map of bogs along Union and Bog Rivers between Ledge Falls, Osborn Twp. and trail crossing southwest of Little Bull Hill, Eastport and Osborn Twps., Great Pond, Ellsworth, and Tunk Lake 15 minute Quadrangles, Hancock County, Maine. (Number 49 on Index Map).

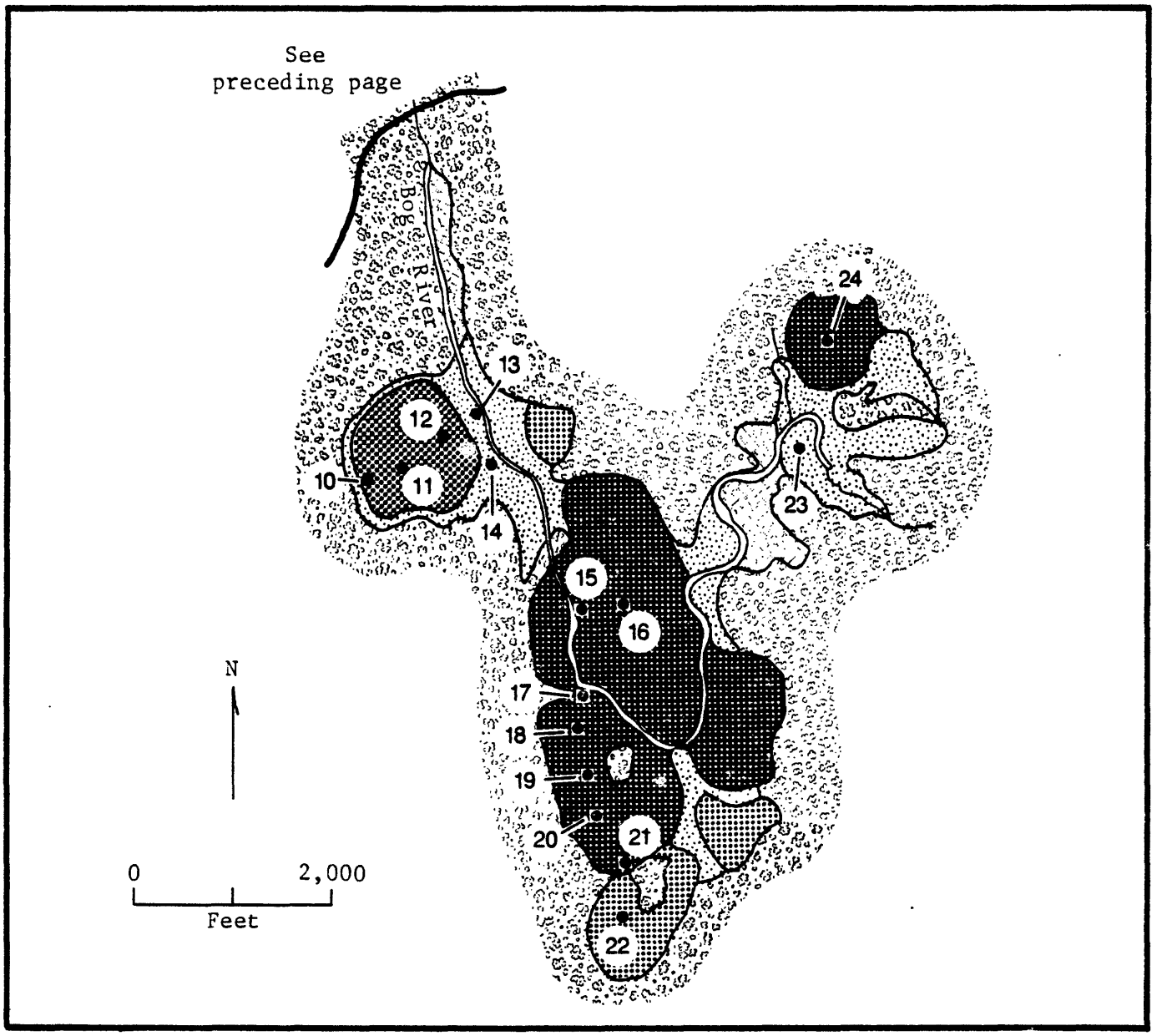


Figure 50. Continued.

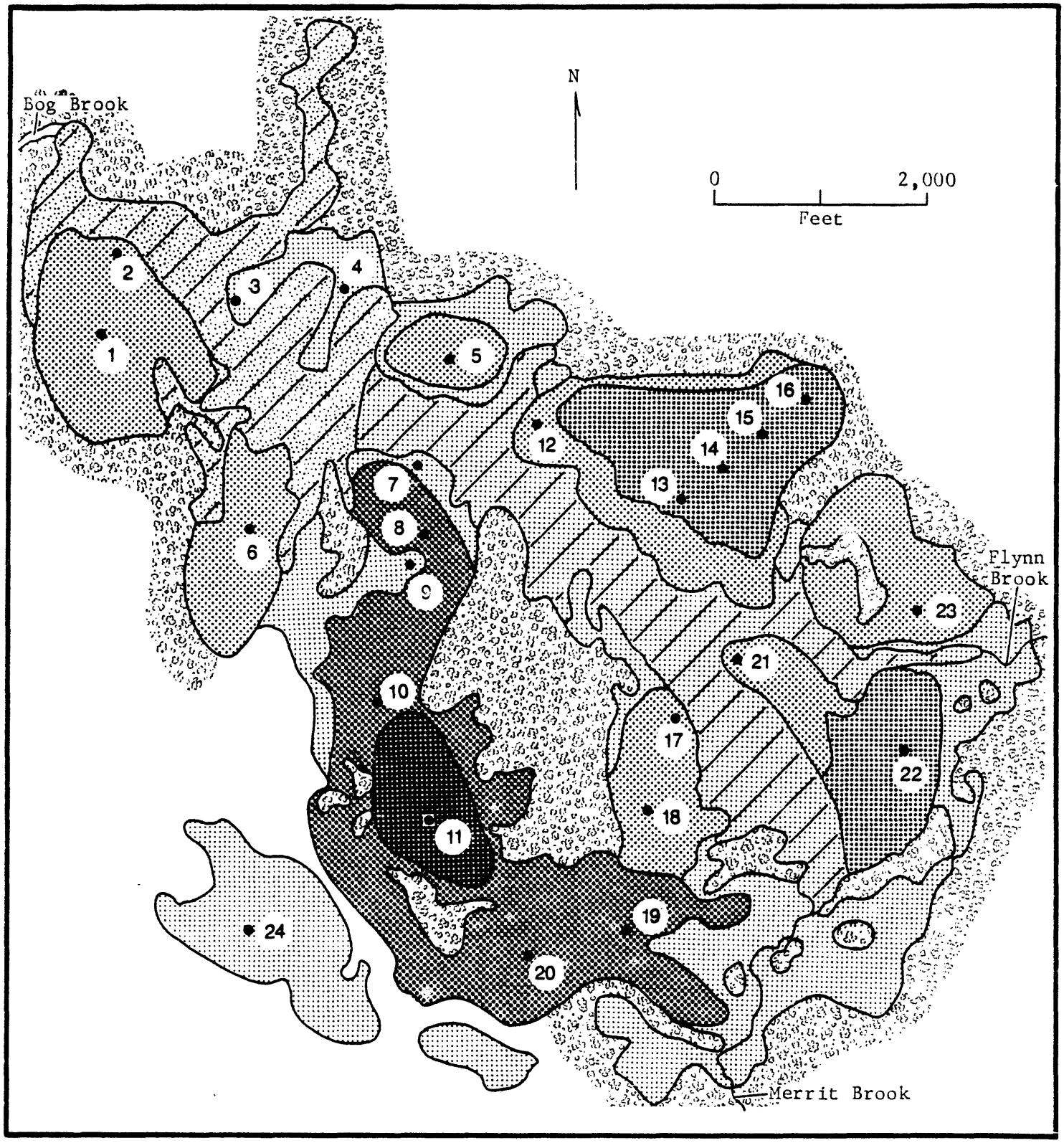
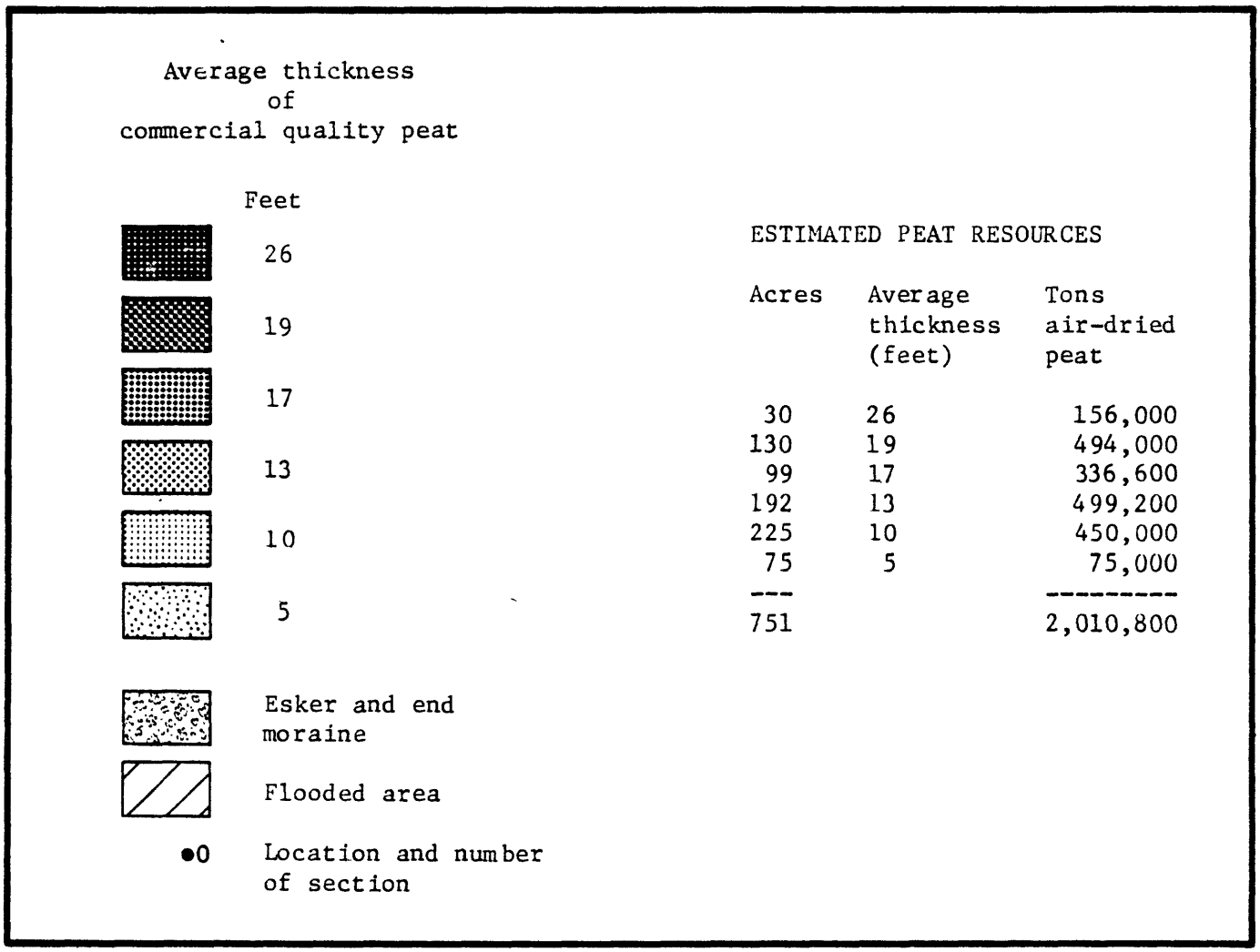


Figure 51. Sketch map of bog along Bog Brook, Beddington and Deblois Twps., Tug Mountain 15 minute Quadrangle, Washington County, Maine. (Number 50 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
30	26	156,000
130	19	494,000
99	17	336,600
192	13	499,200
225	10	450,000
75	5	75,000
751		2,010,800

Figure 51. Continued.

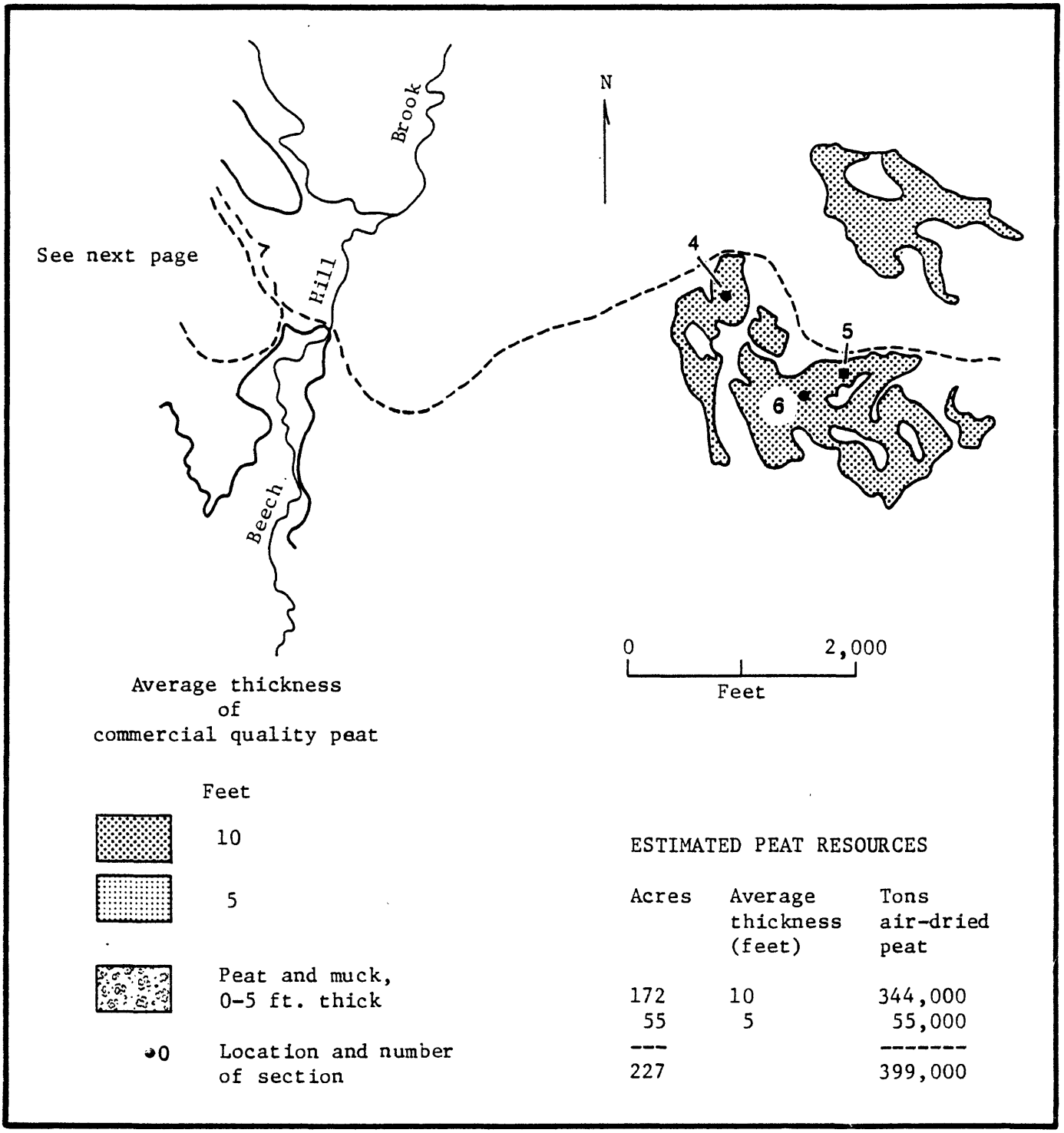


Figure 52. Sketch map of the northwestern Beech Hill Heath area and of Allen Heath, T24 MD, Tug Mountain 15 minute Quadrangle, Washington County, Maine. (Number 51 on Index Map).

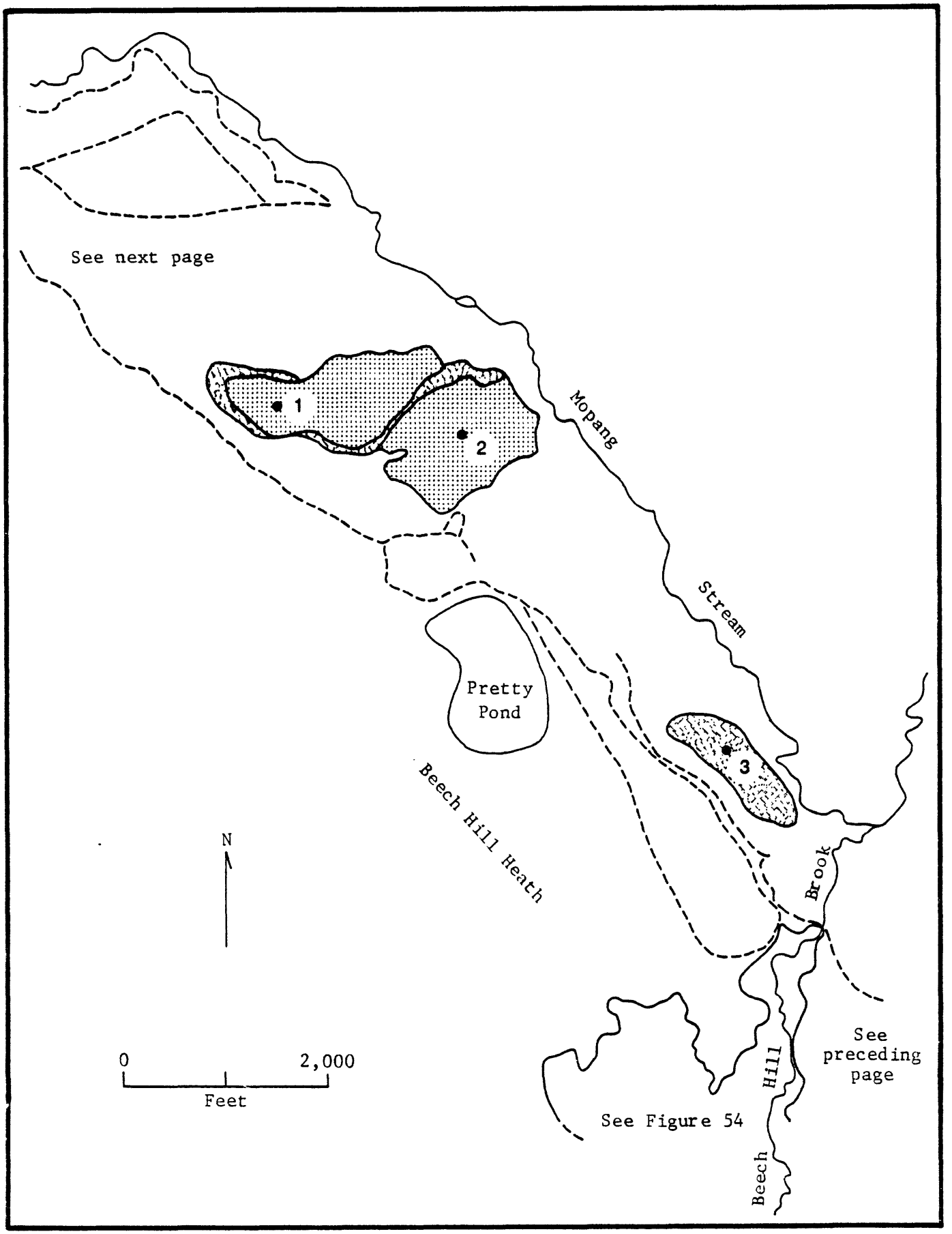


Figure 52. Continued.

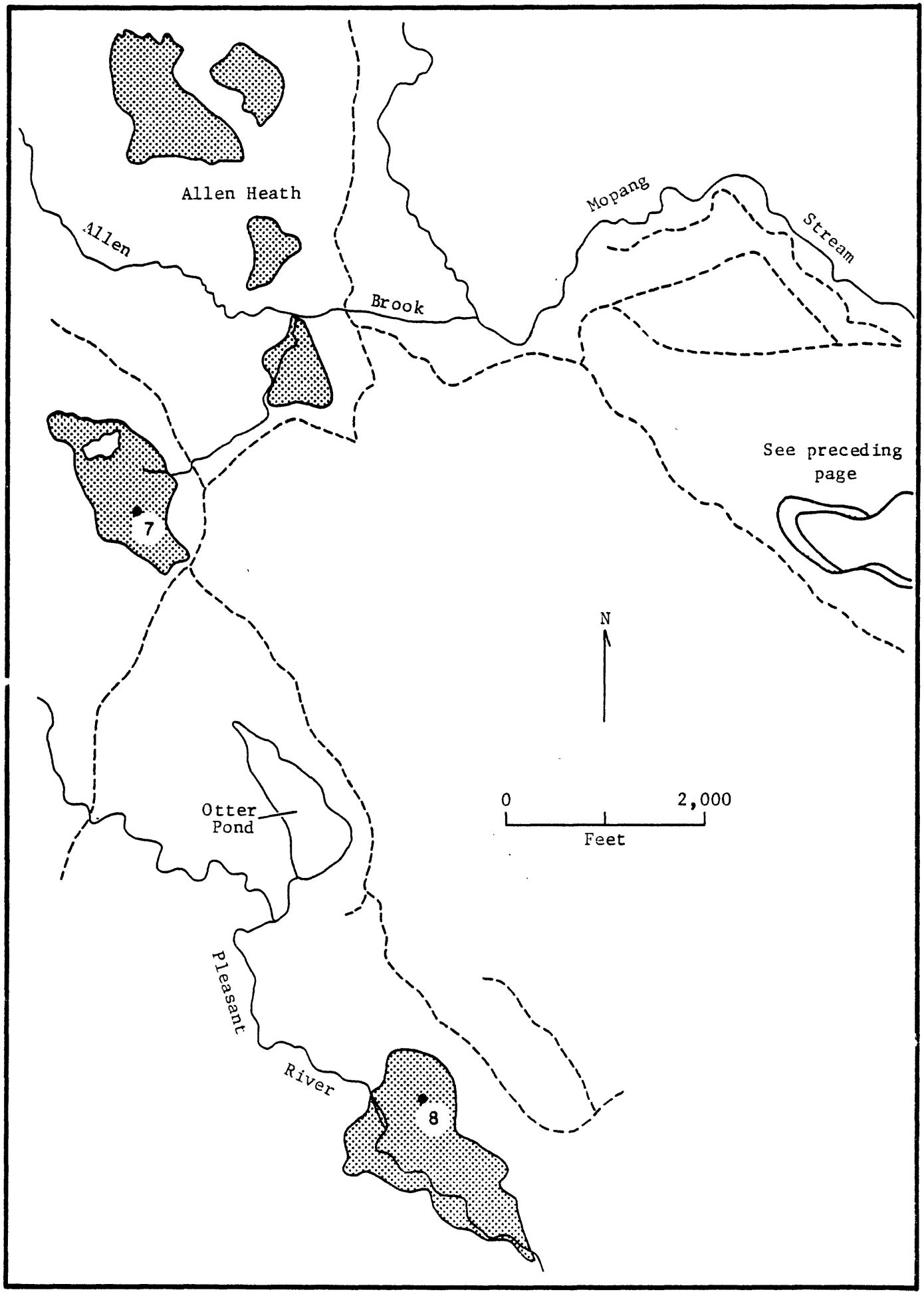


Figure 52. Continued.

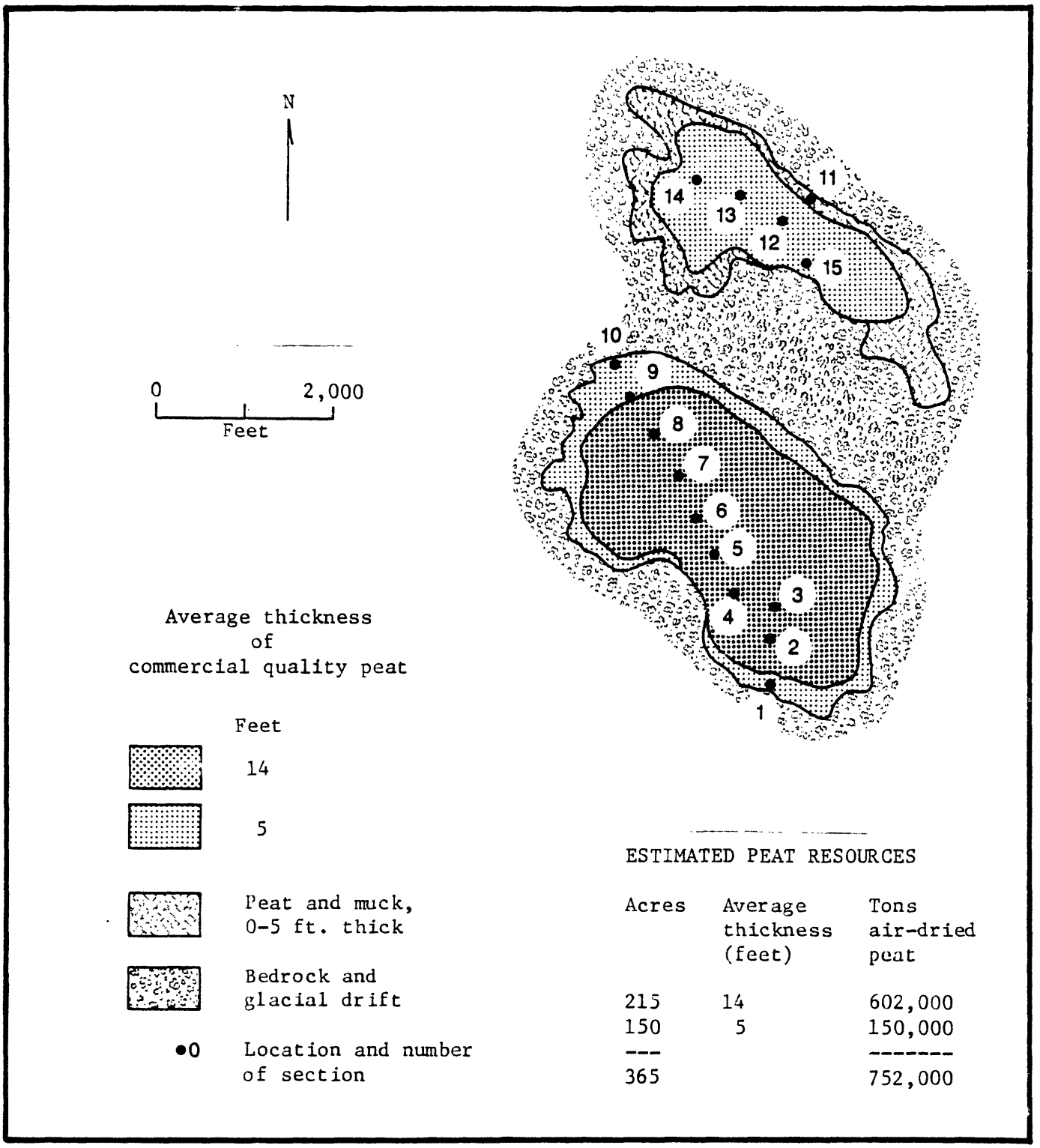
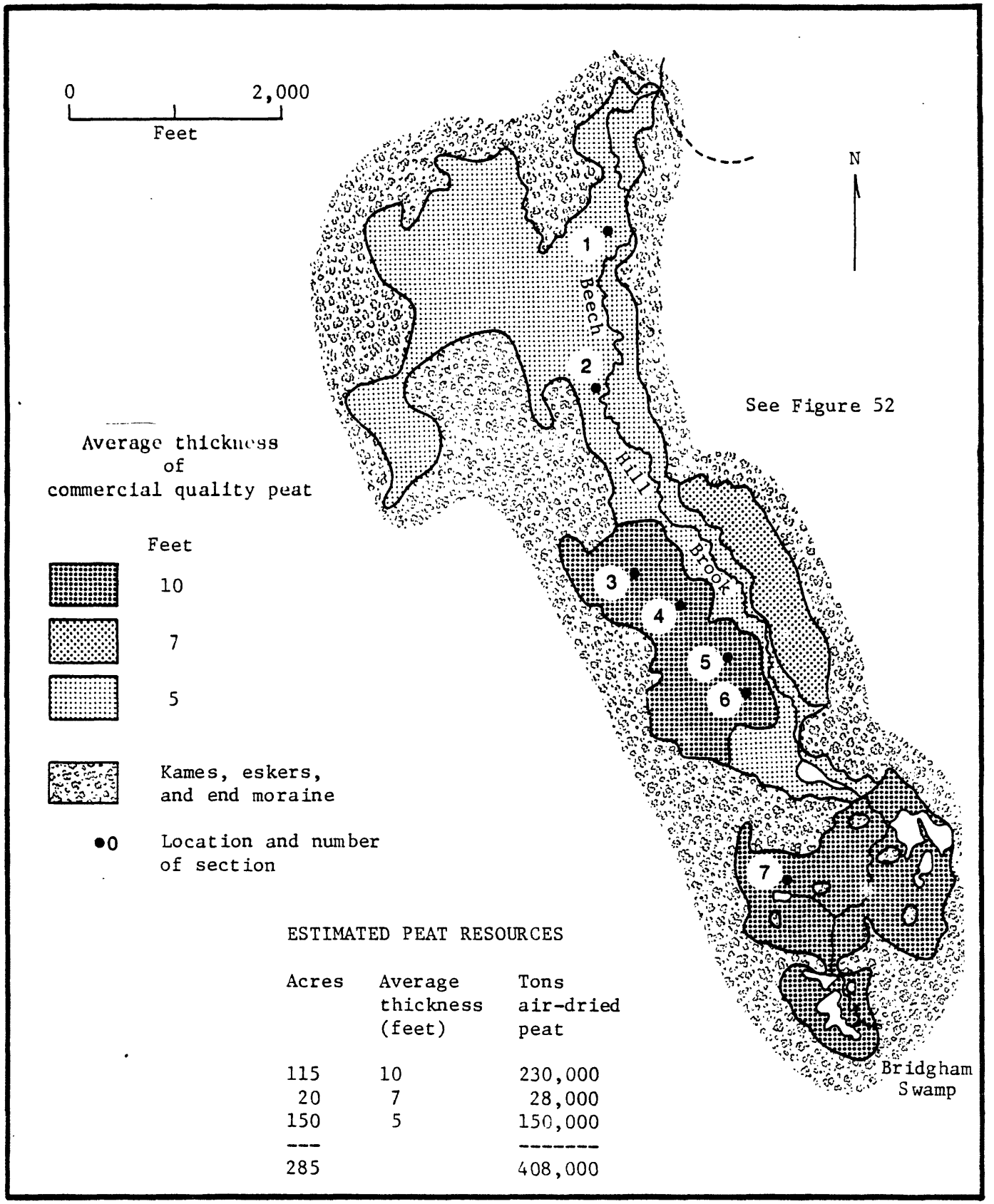


Figure 53. Sketch map of Rock Dam Heath bogs, T16 MD, Tunk Lake 15 minute Quadrangle, Hancock County, Maine. (Number 52 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
115	10	230,000
20	7	28,000
150	5	150,000
285		408,000

Figure 54. Sketch map of bog in Beech Hill Heath adjacent to Beech Hill Brook between road crossing and Bridgham Swamp, T24 MD, Tug Mountain 15 minute Quadrangle, Washington County, Maine. (Number 53 on Index Map).

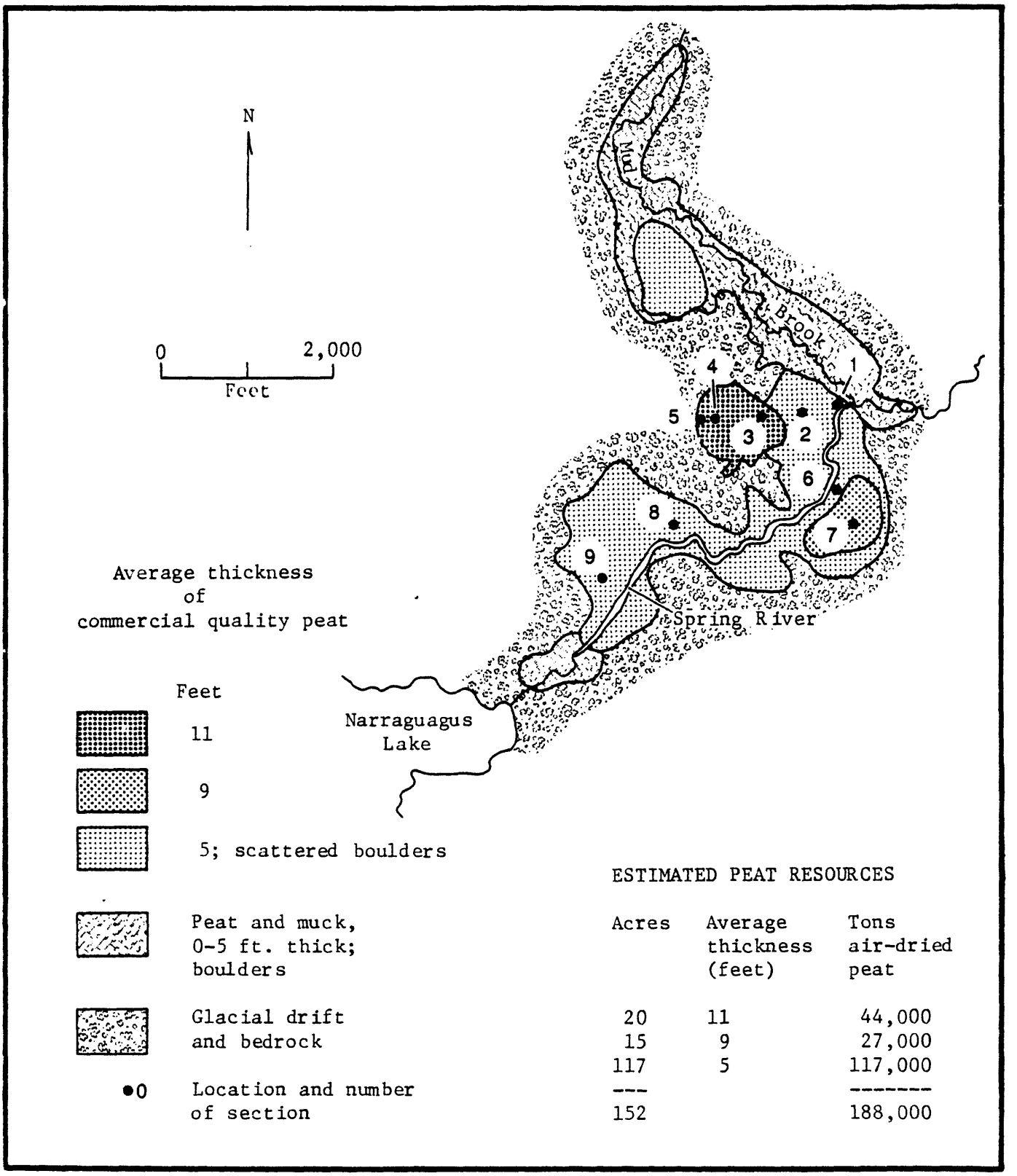


Figure 55. Sketch map of bog along Spring River, T16 MD, Tunk Lake 15 minute Quadrangle, Hancock County, Maine. (Number 54 on Index Map).

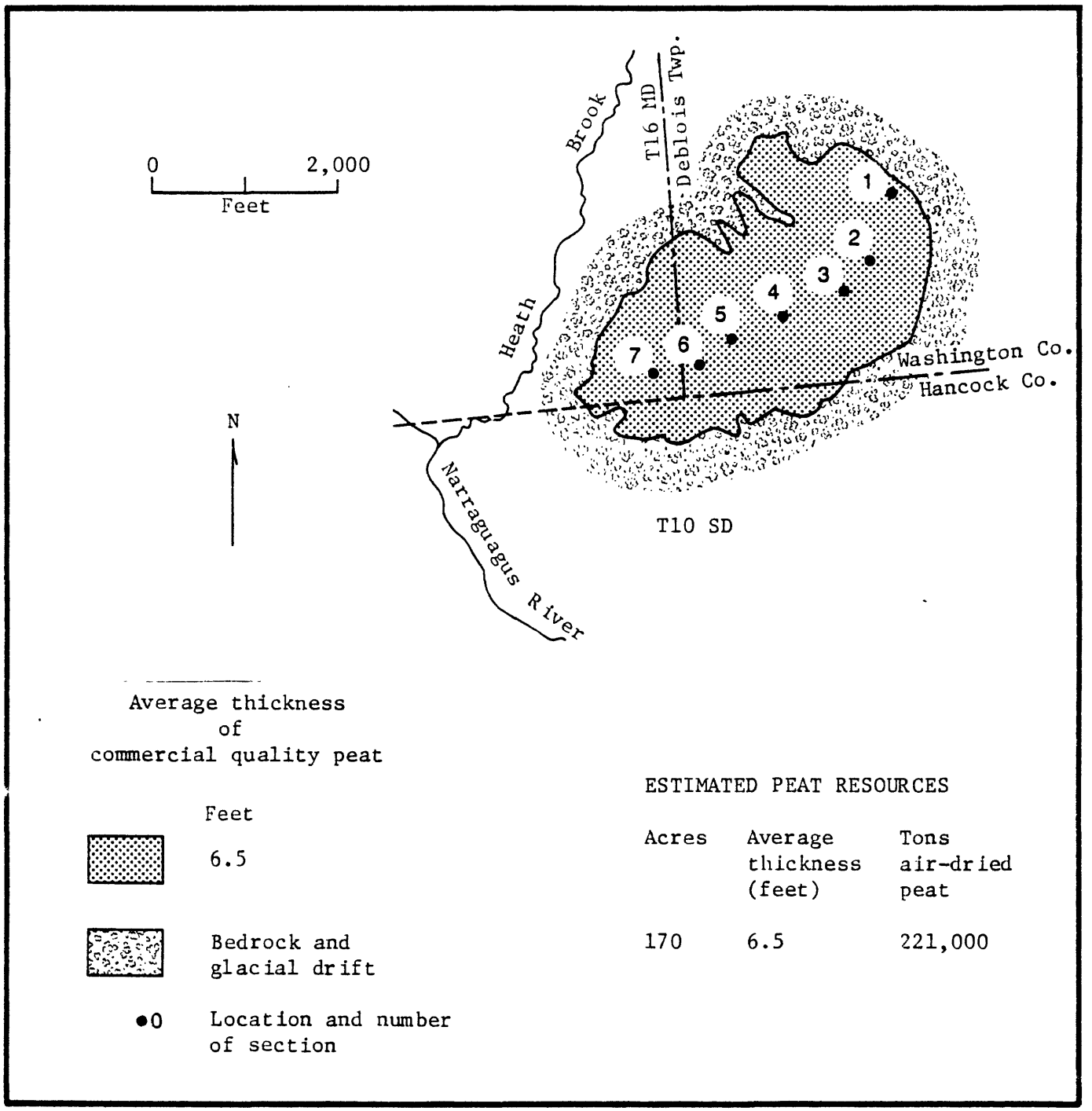
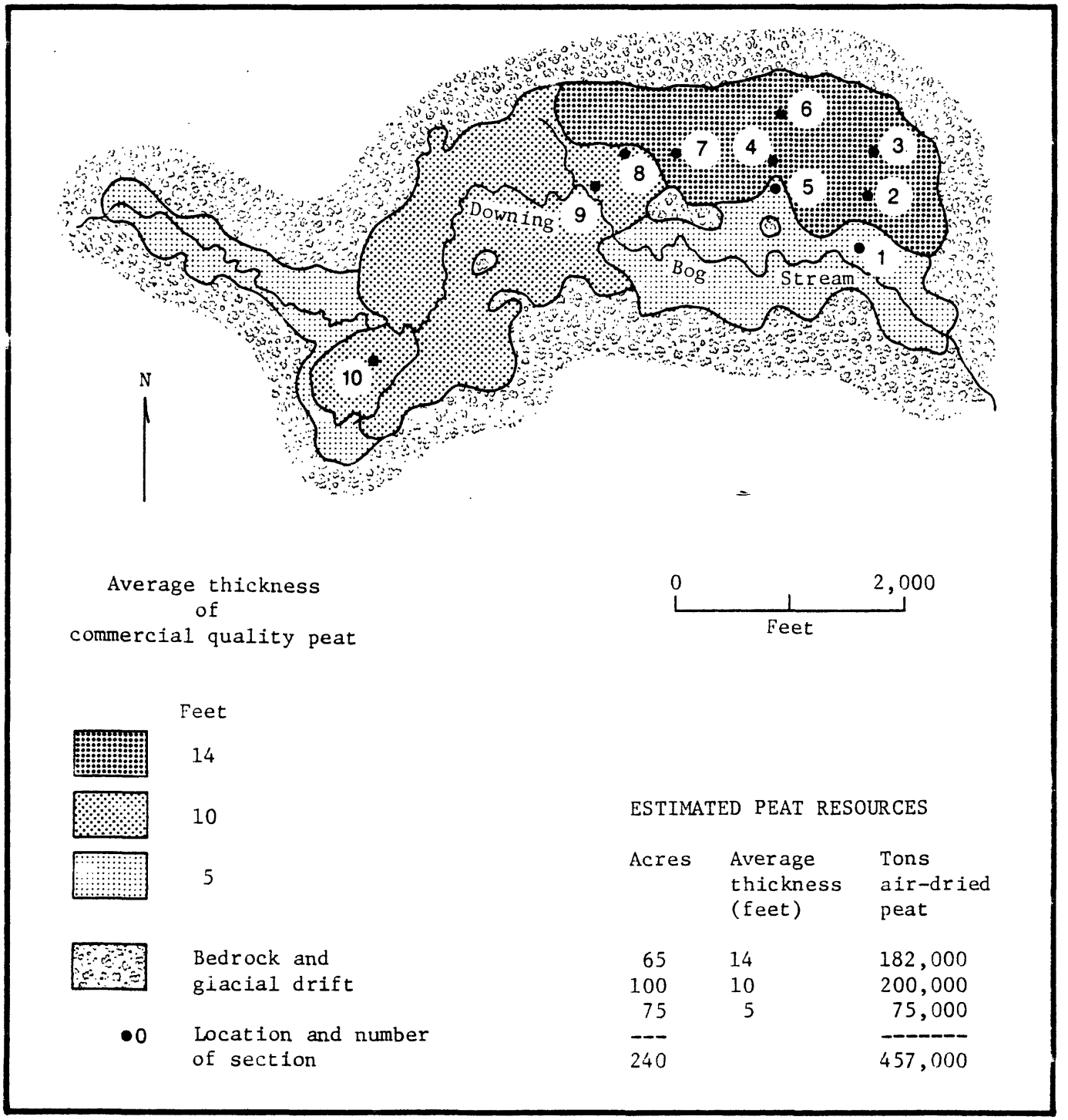


Figure 56. Sketch map of bog between Heath Brook and Fremont Peak, Deblois Twp., T16 MD, and T10 SD, Tunk Lake 15 minute Quadrangle, Washington and Hancock Counties, Maine. (Number 55 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
65	14	182,000
100	10	200,000
75	5	75,000
240		457,000

Figure 57. Sketch map of bog along Downing Bog Stream, T10 SD, Tunk Lake 15 minute Quadrangle, Hancock County, Maine. (Number 56 on Index Map).