UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Sketch maps showing areal extent, thickness, and amount of commercial-quality peat in deposits in and near Piscataquis and Somerset Counties and northeastern Aroostook County, Maine

by

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and

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards.

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ABSTRACT

Peat deposits in and near Piscataquis and Somerset Counties and northeastern Aroostook County, Maine, were investigated for their estimated potential as peat resources suitable for energy, horticultural, and agricultural uses. Fifty sketch maps illustrate the areal extent, thickness, and amount of commercial-quality peat. The total yield is estimated at 23,908,000 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). The locations of the 50 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 2-51). All estimates given in figures 2-51 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:

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

(number of cubic feet of wet peat equal to 1 cubic foot of machine peat)

(pounds in short ton)

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 David N. Brown, 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 14,262 acres and will yield 23,908,000 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 50 studied areas, Maine

INDEX MAP (Fig. 1) LOC. NUMBER	ACRES	SHORT TONS AIR-DRIED PEAT
1	262	314,400
2	50	88,000
3	309	450,000
4	45	54,000
5	44	71,000
6	115	153,000
7	235	392,000
8	235	188,000
9	362	626,000
10	200	224,000
11	947	1,160,000
12	202	323,200
13	185	222,000
14	100	100,000
15	50	50,000
16	250	250,000
17	210	348,000
18	55	110,000
19	87	121,800
20	117	117,000
21	56	101,000
22	Too thin and poor in quality to be a peat resource.	
23	170	306,000
24	Too thin and poor in quality to be a peat resource.	
25	85	85,000
26	167	200.400
27	214	282,000
28	348	405,600
29	170	216,000
30	125	125,000
31	153	367,200
32	1,344	3,204,800
33	170	240,000
34	345	345,000
35	510	886,000
36	430	810,000
37	360	557,000
38	175	329,000
39	283	485,200
40	100	200,000
41	515	975,000
42	115	203,000

Table 1.--continued

INDEX MAP (Fig. 1) LOC. NUMBER	ACRES	SHORT TONS AIR-DRIED PEAT
43	235	469,000
44	710	1,042,000
45	460	900,000
46	130	338,000
47	805	1,221,000
48	665	2,023,400
49	630	1,059,800
50	732	1,171,200
TOTAL	14,262	23,908,000

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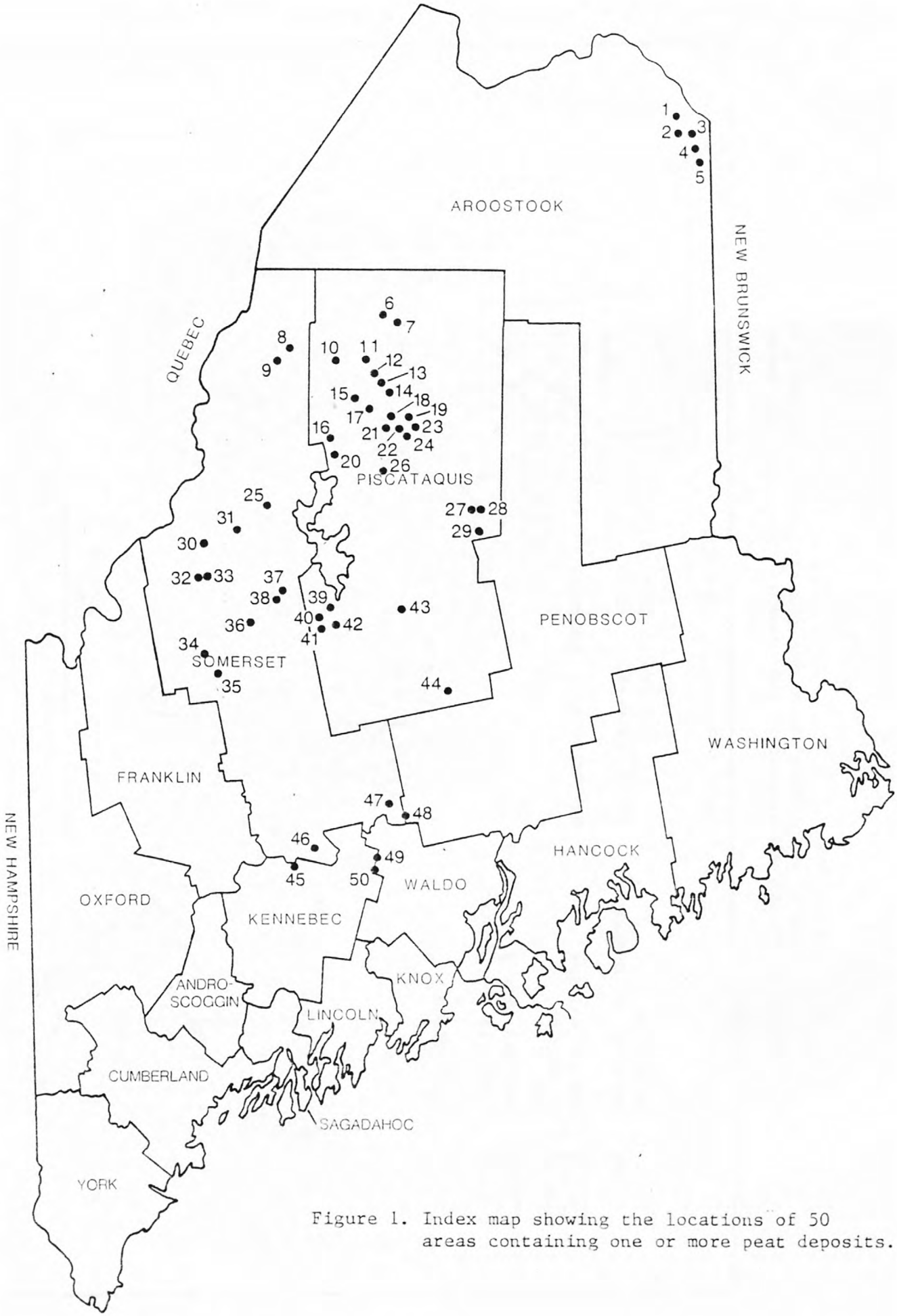


Figure 1. Index map showing the locations of 50 areas containing one or more peat deposits.

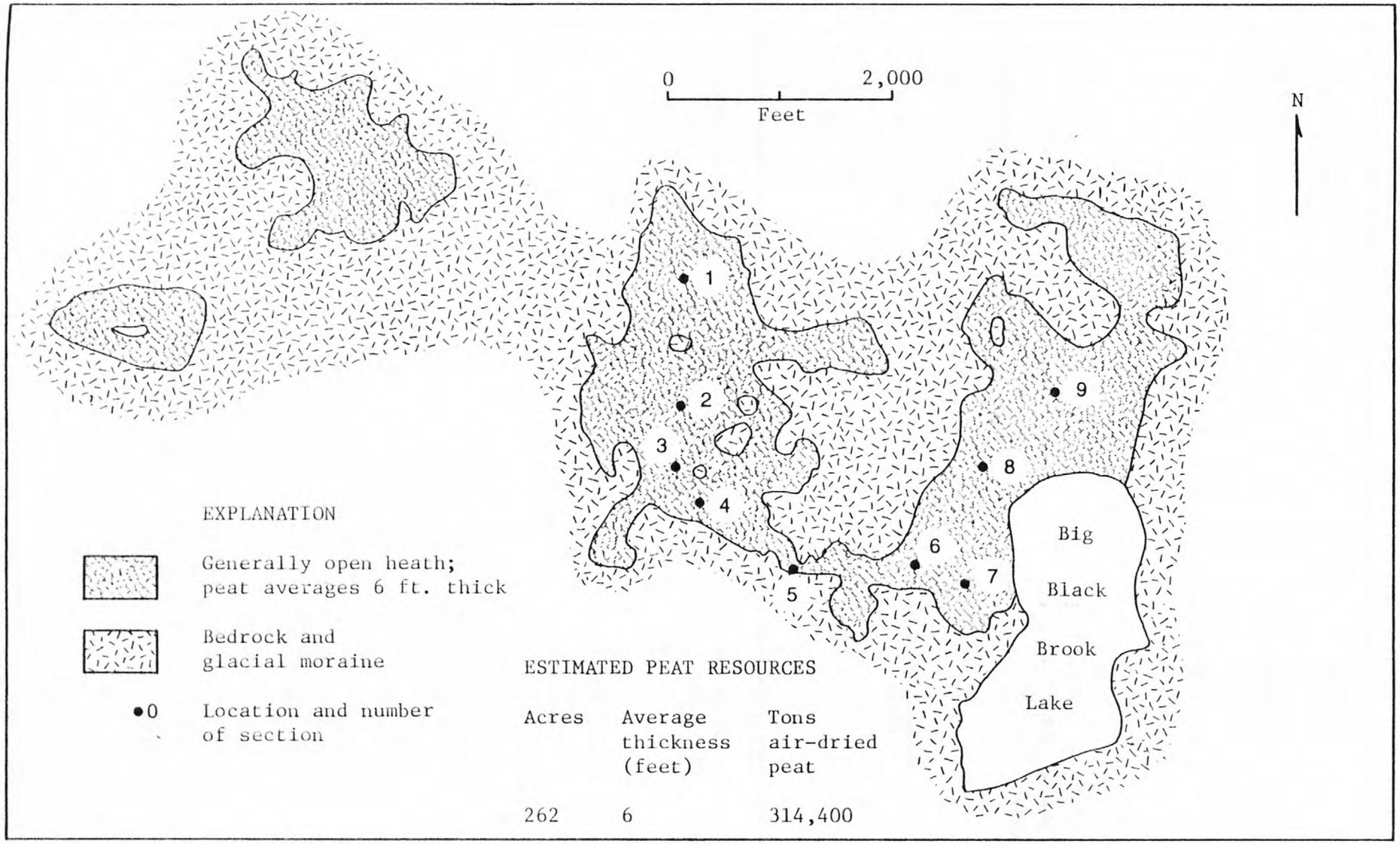
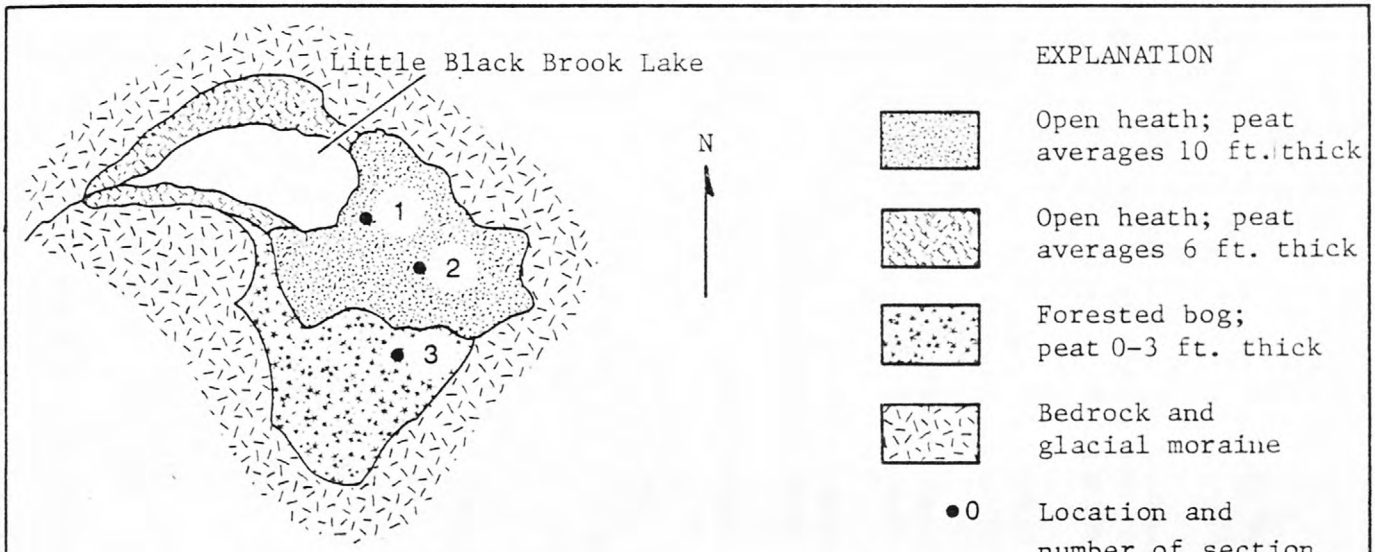


Figure 2. Sketch map of Orchard Bog, Caswell Plantation, Van Buren 15 minute Quadrangle, Aroostook County, Maine. (Number 1 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
35	10	70,000
15	6	18,000
50		88,000

Figure 3. Sketch map of bog at Little Black Brook Lake, Caswell Plantation, Van Buren 15 minute Quadrangle, Aroostook County, Maine. (Number 2 on Index Map).

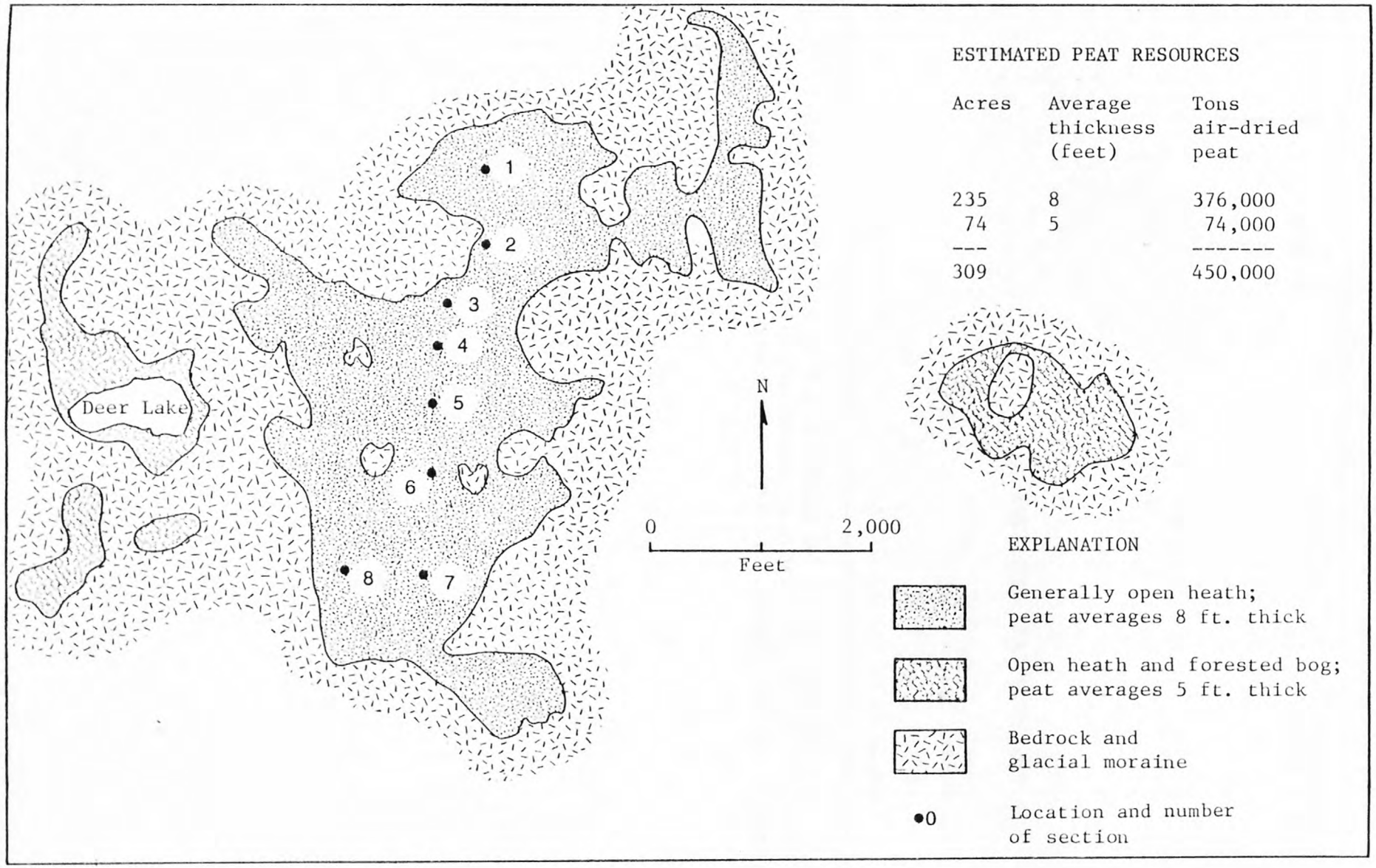


Figure 4. Sketch map of bogs between Deer and Mud Lakes, Caswell Plantation, Van Buren 15 minute Quadrangle, Aroostook County, Maine. (Number 3 on Index Map).

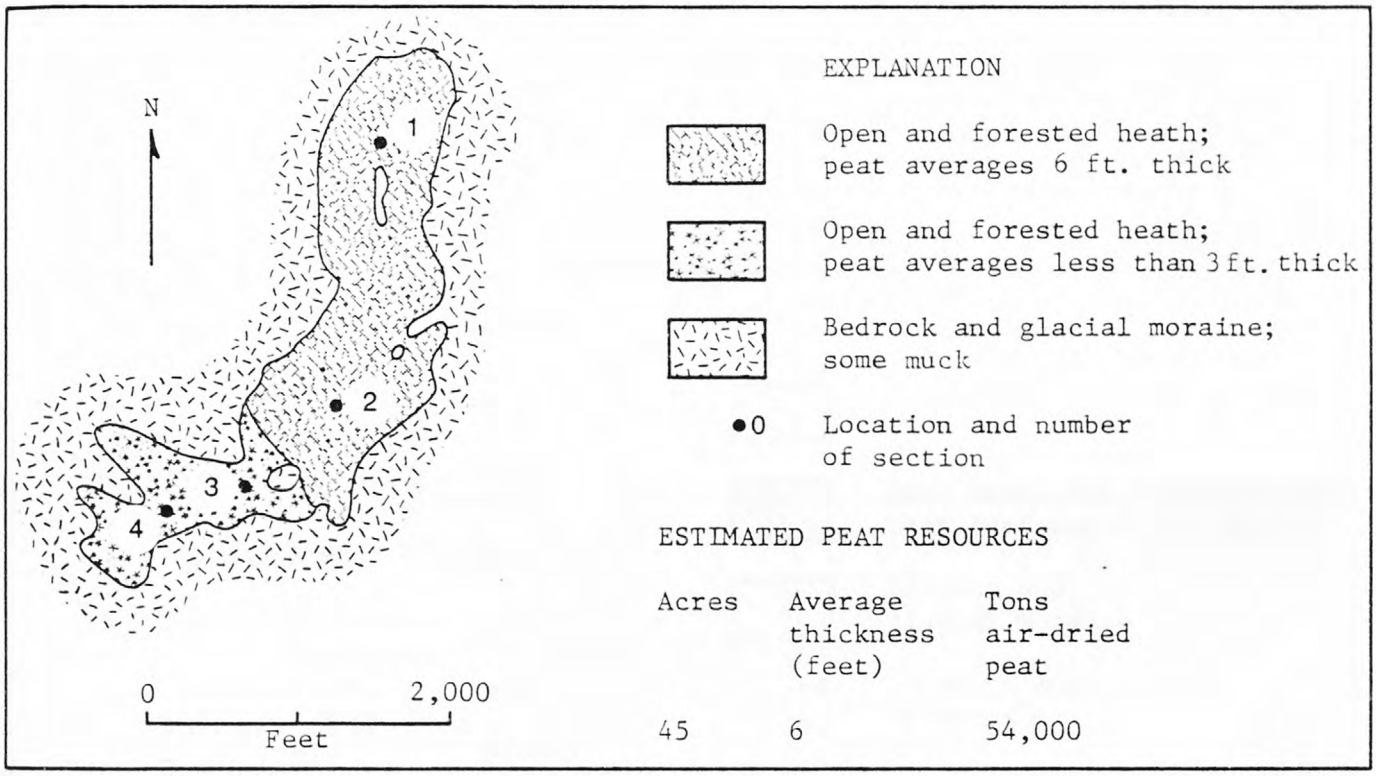
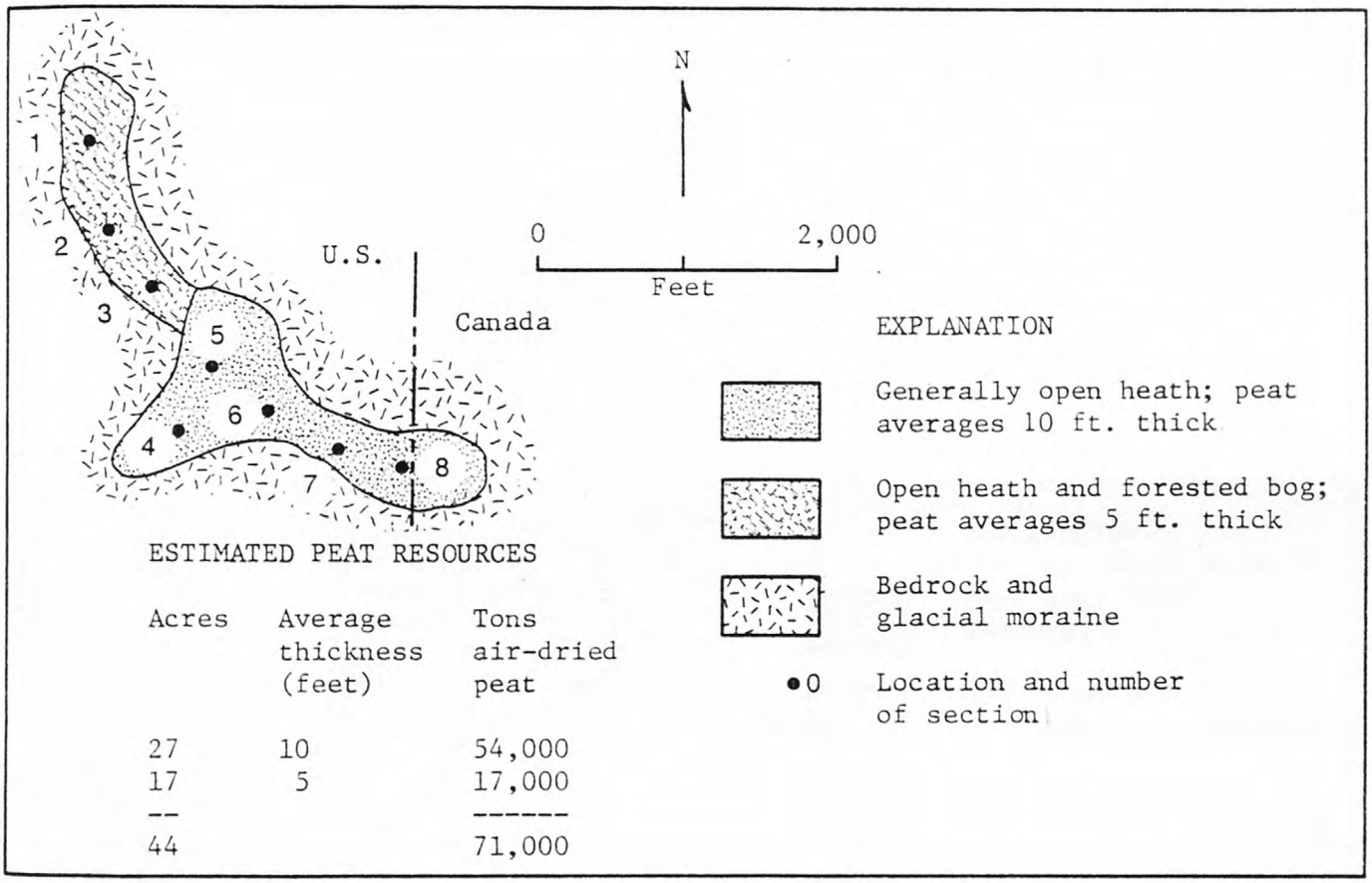


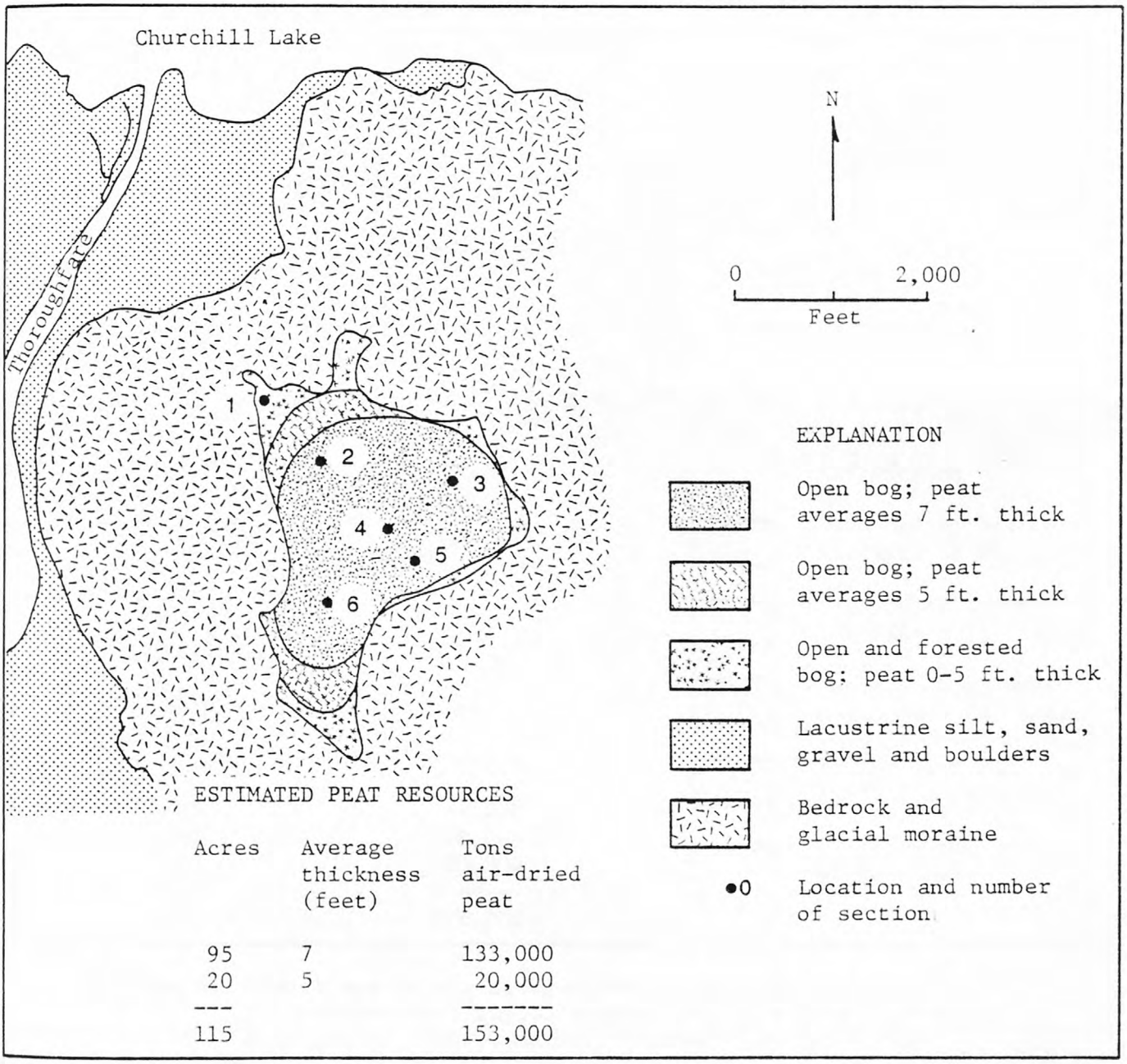
Figure 5. Sketch map of bog northwest of Pierce Lake and west of Route 165, Caswell Plantation, northeast corner of Fort Fairfield, 15 minute Quadrangle, Aroostook County, Maine. (Number 4 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
27	10	54,000
17	5	17,000
--		------
44		71,000

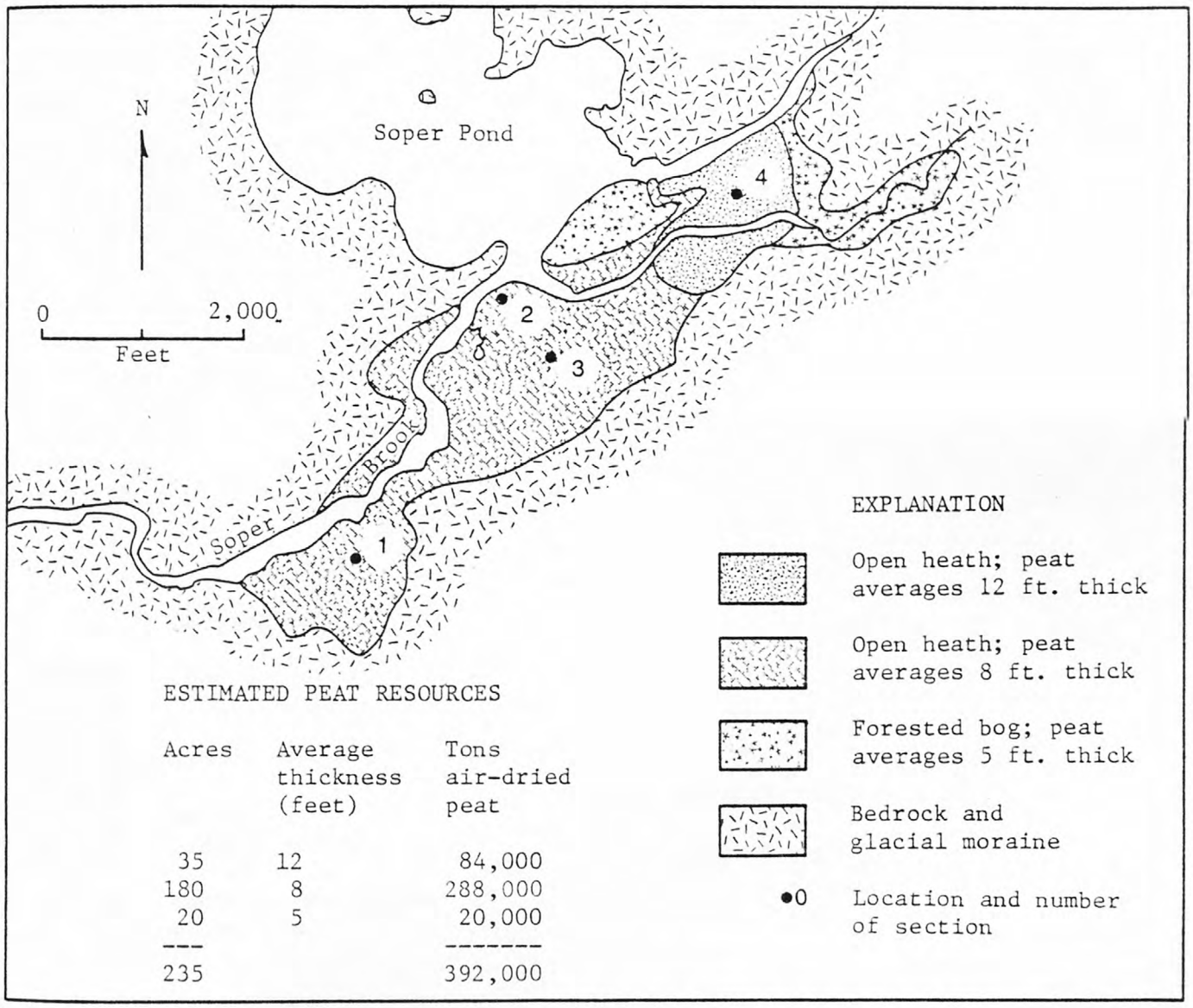
Figure 6. Sketch map of bog 2 miles northeast of Limestone on U.S.-Canada boundary, Limestone Twp., Fort Fairfield 15 minute Quadrangle, Aroostook County, Maine. (Number 5 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
95	7	133,000
20	5	20,000
115		153,000

Figure 7. Sketch map of bog south of Churchill Lake and east of Thoroughfare, T9 R12 WELS, Churchill Lake 15 minute Quadrangle, Piscataquis County, Maine. (Number 6 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
35	12	84,000
180	8	288,000
20	5	20,000
235		392,000

Figure 8. Sketch map of bog along Soper Brook at Soper Pond, T8 R12 WELS (Soper Mtn. Twp.), Spider Lake 15 minute Quadrangle, Piscataquis County, Maine. (Number 7 on Index Map).

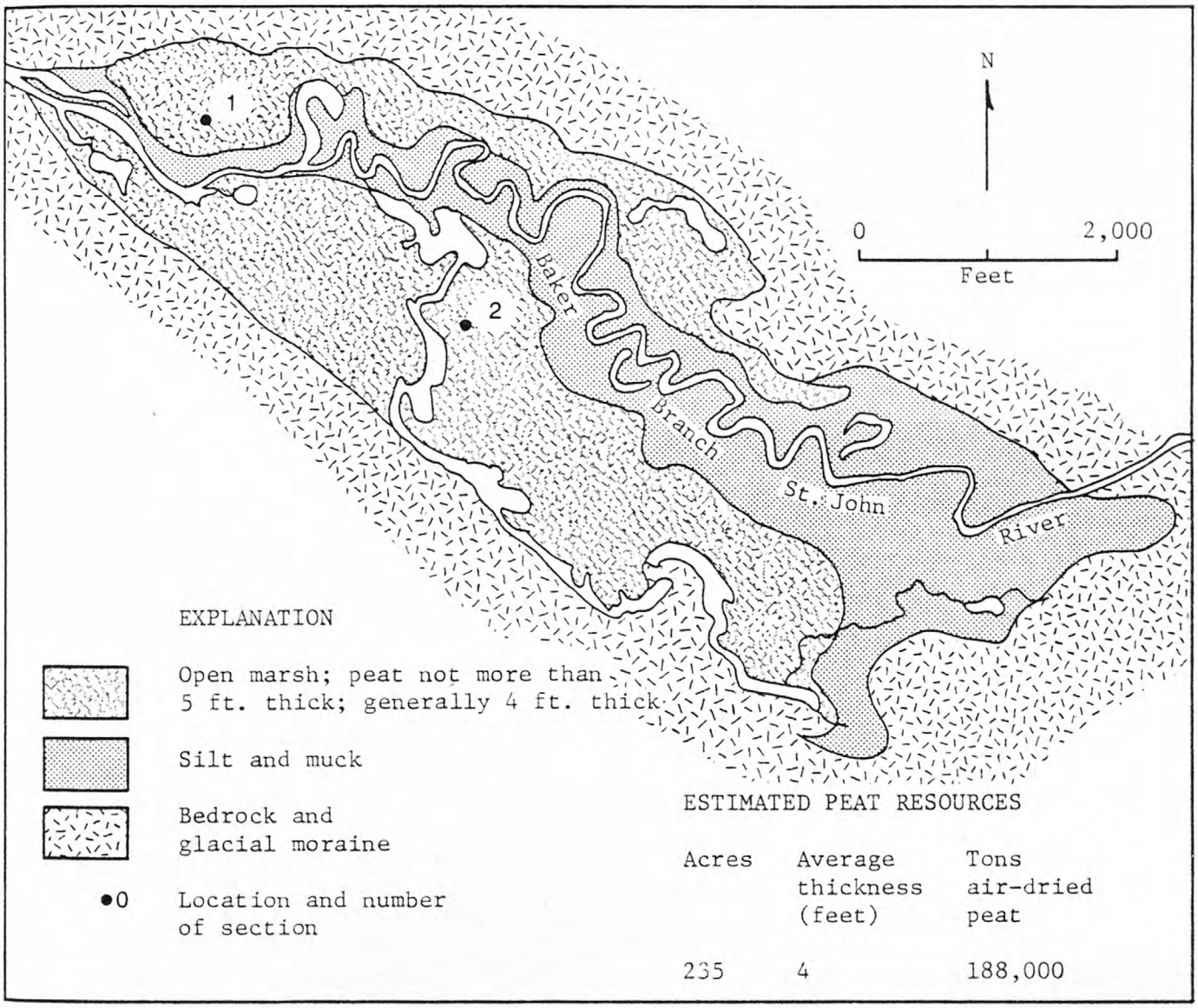
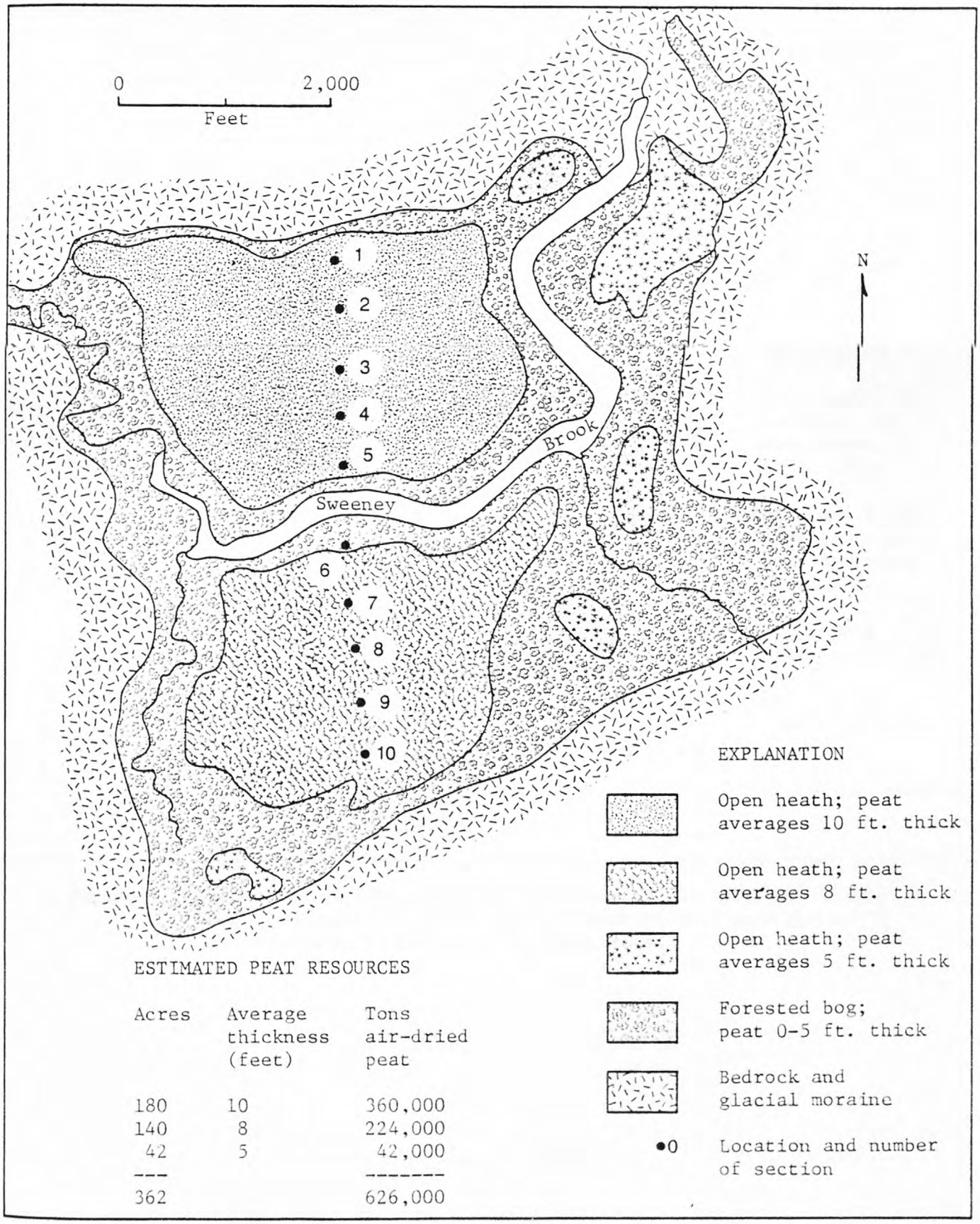


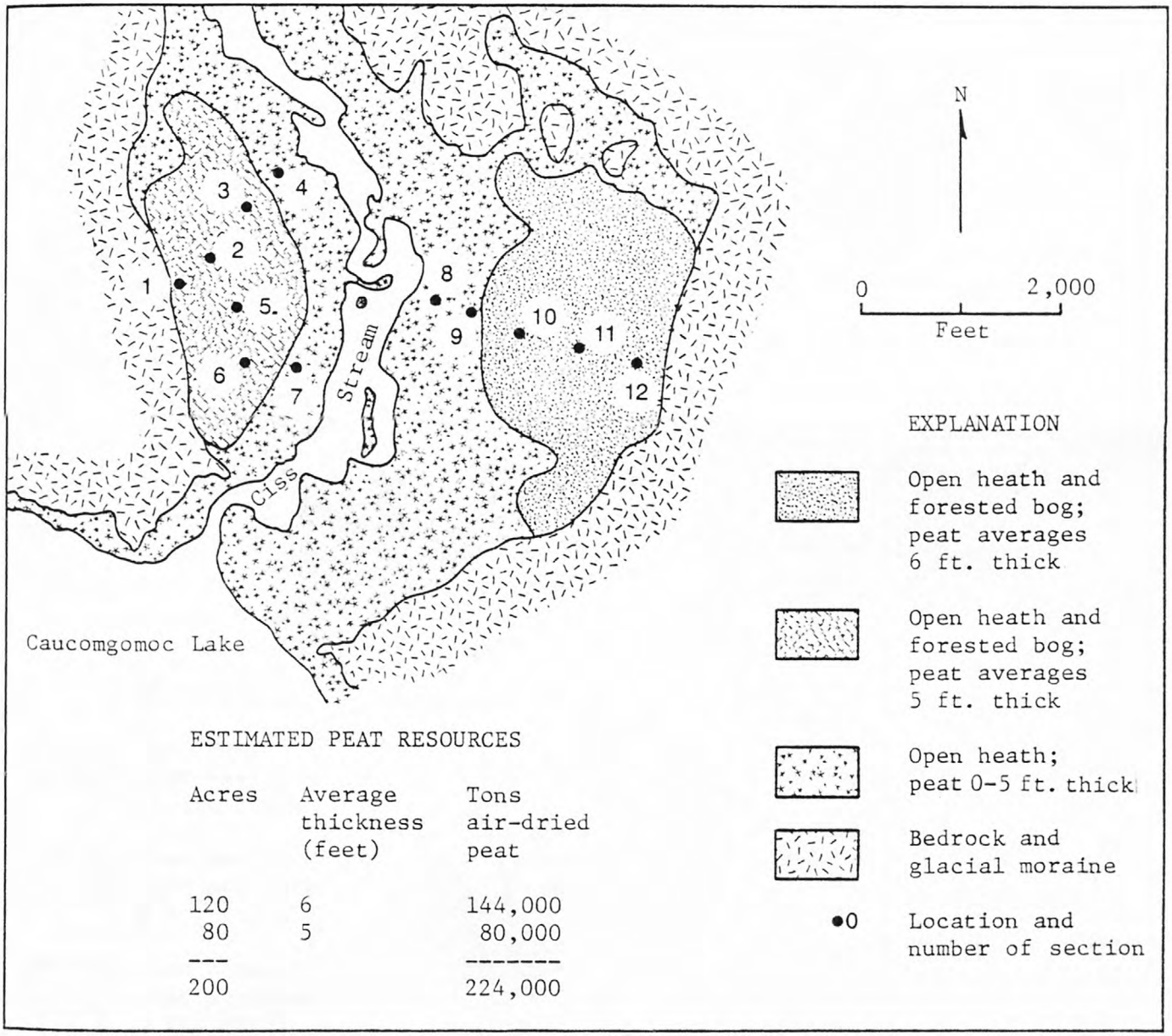
Figure 9. Sketch map of marsh along Baker Branch, St. John River, T7 R16 WELS, Baker Lake and Saint John Pond 15 minute Quadrangles, Somerset County, Maine. (Number 8 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
180	10	360,000
140	8	224,000
42	5	42,000
362		626,000

Figure 10. Sketch map of Sweeney Bog, T6 R17 WELS, Saint John Pond 15 minute Quadrangle, Somerset County, Maine. (Number 9 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
120	6	144,000
80	5	80,000
200		224,000

Figure 11. Sketch map of bogs along Ciss Stream, T6 R14 WELS and T7 R14 WELS, Caucomgomoc Lake 15 minute Quadrangle, Piscataquis County, Maine. (Number 10 on Index Map).

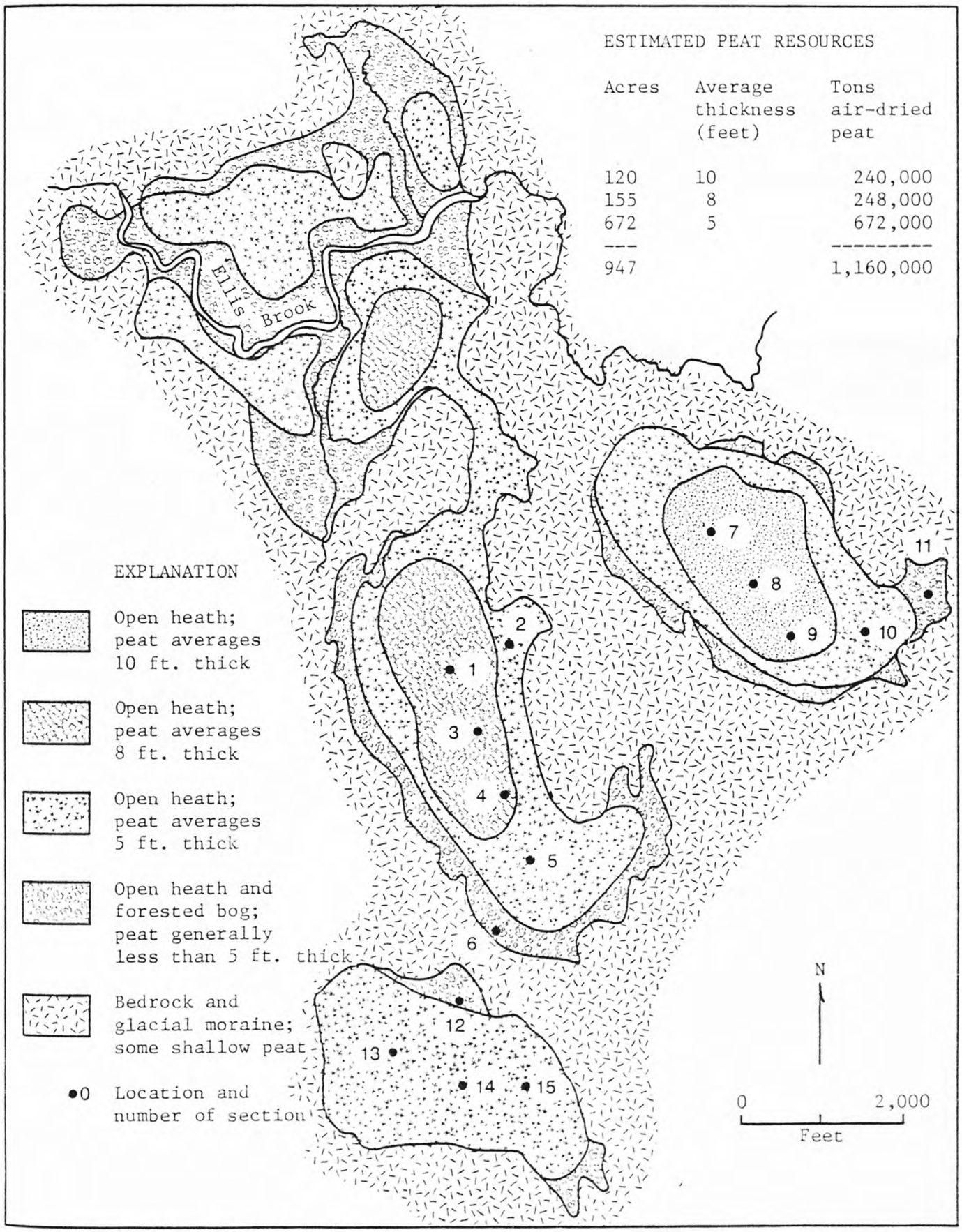


Figure 12. Sketch map of Ellis Bog complex, T6 R13 WELS and T7 R13 WELS, Chesuncook 15 minute Quadrangle, Piscataquis County, Maine. (Number 11 on Index Map).

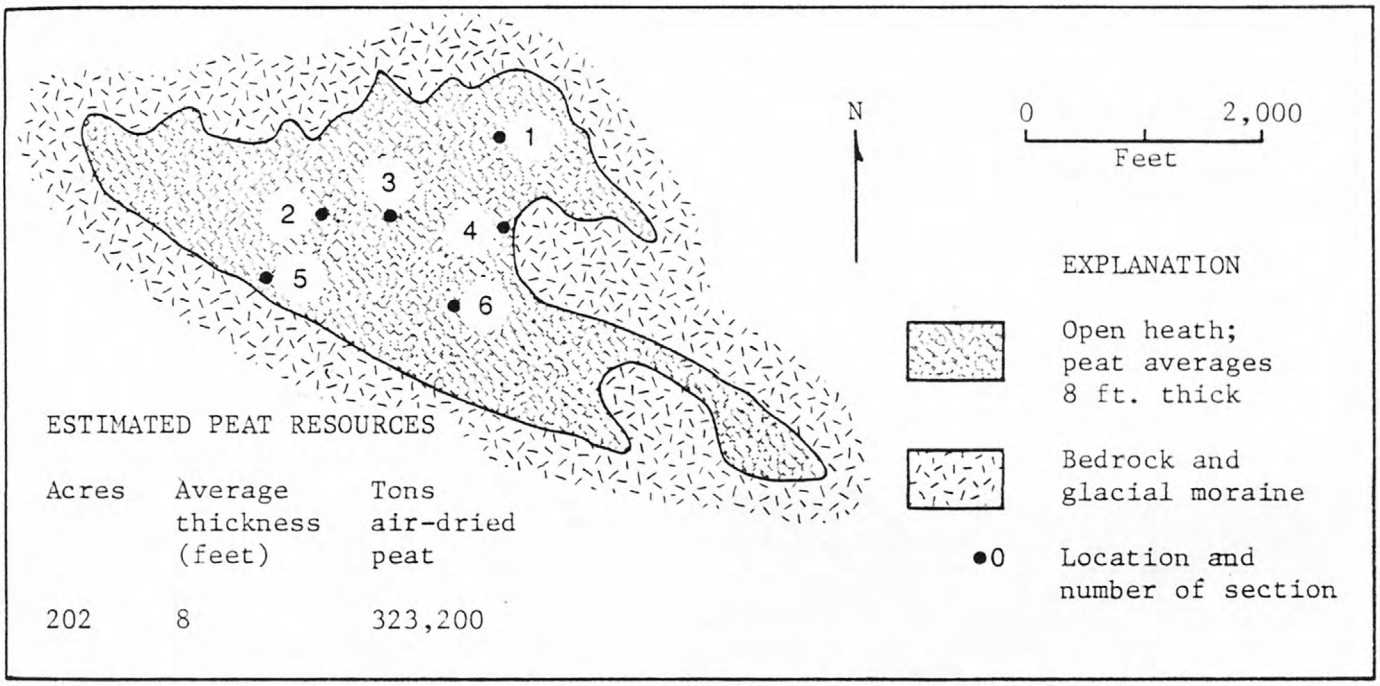


Figure 13. Sketch map of Carry Bog, T6 R13 WELS, Chesuncook 15 minute Quadrangle, Piscataquis County, Maine. (Number 12 on Index Map).

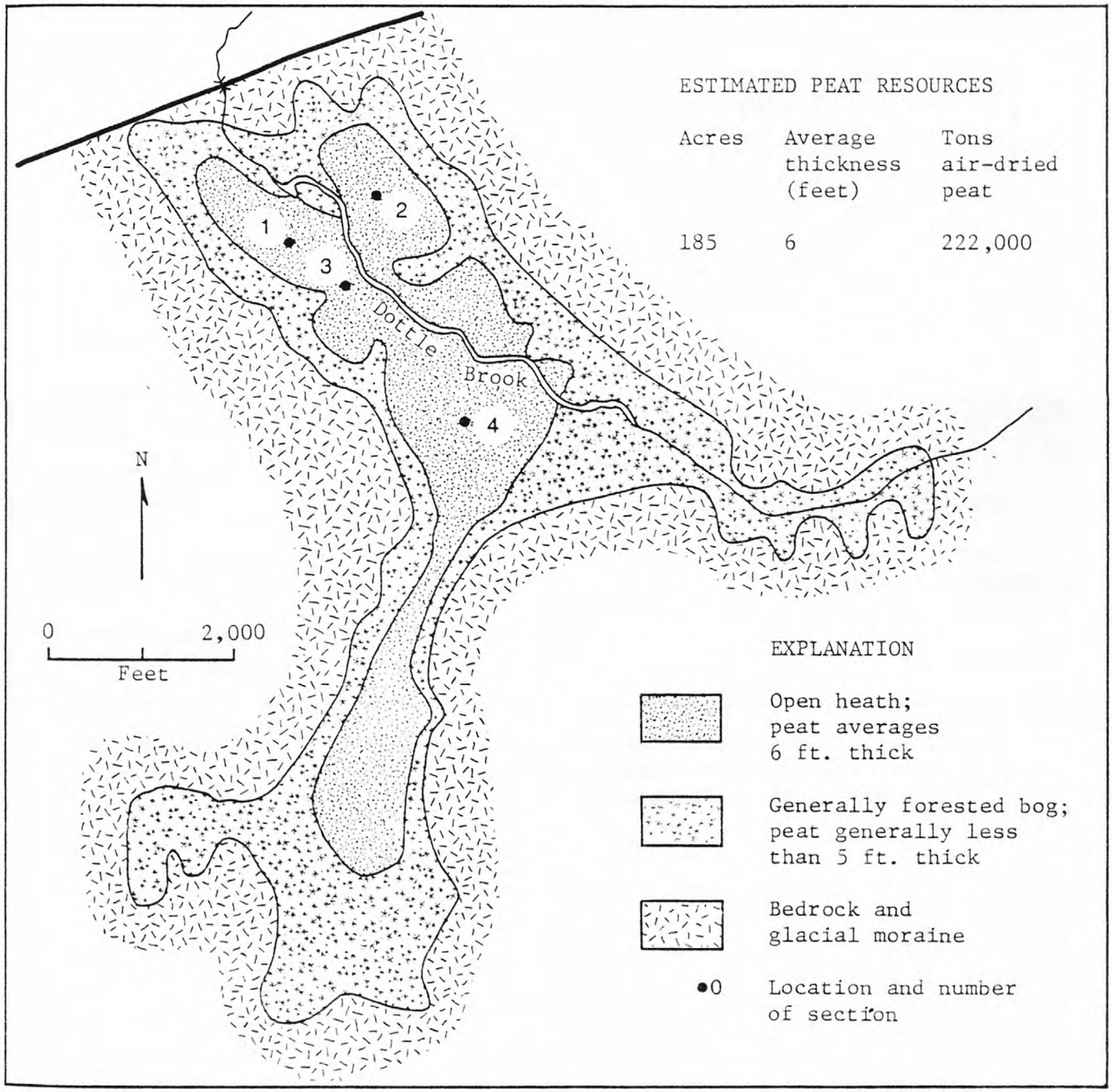


Figure 14. Sketch map of bog along Dottle Brook, T6 R12 WELS, Chesuncook 15 minute Quadrangle, Piscataquis County, Maine. (Number 13 on Index Map).

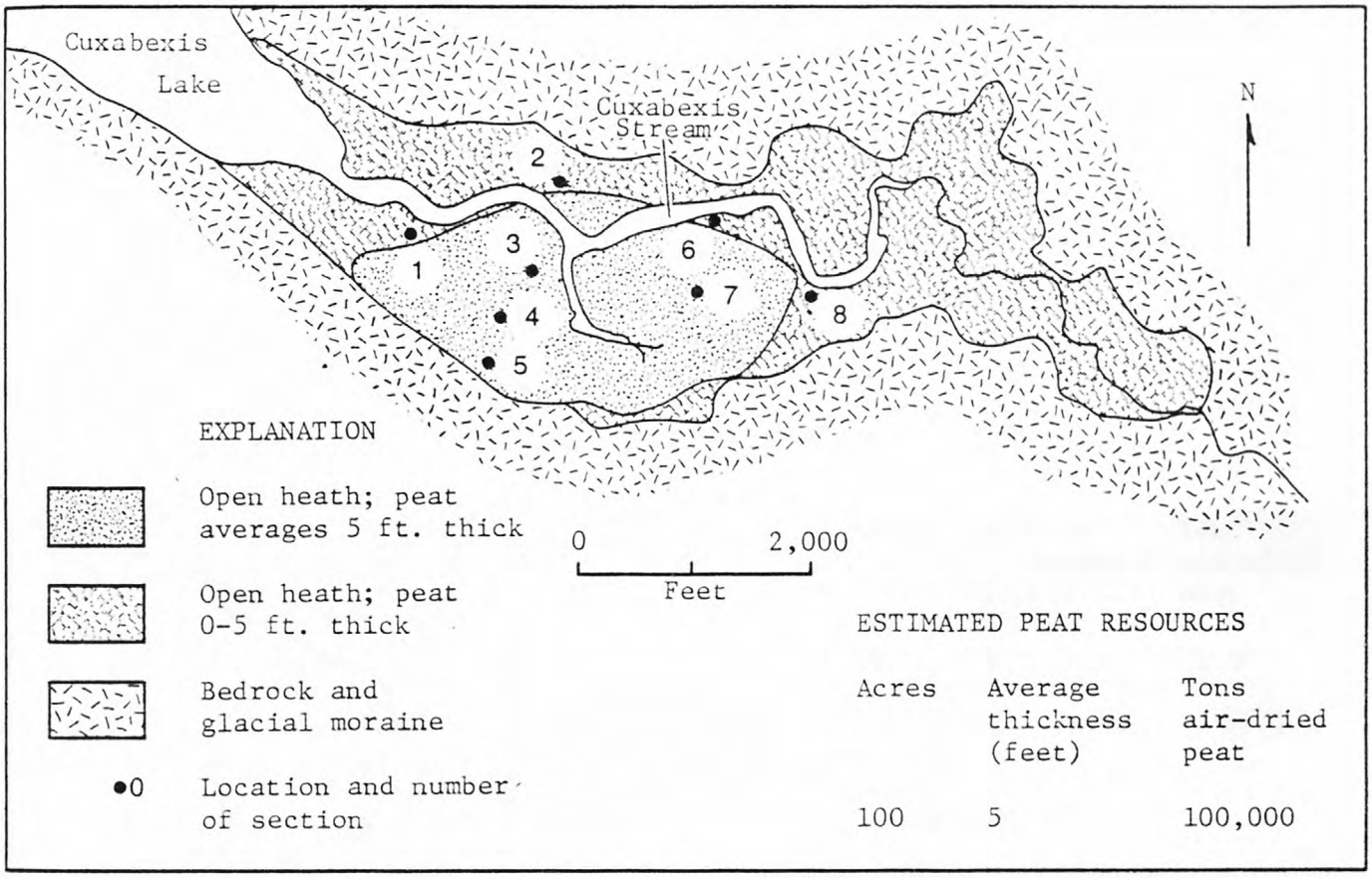


Figure 15. Sketch map of bog along Cuxabexis Stream at southeast end of Cuxabexis Lake, T5 R12 WELS, Chesuncook 15 minute Quadrangle, Piscataquis County, Maine. (Number 14 on Index Map).

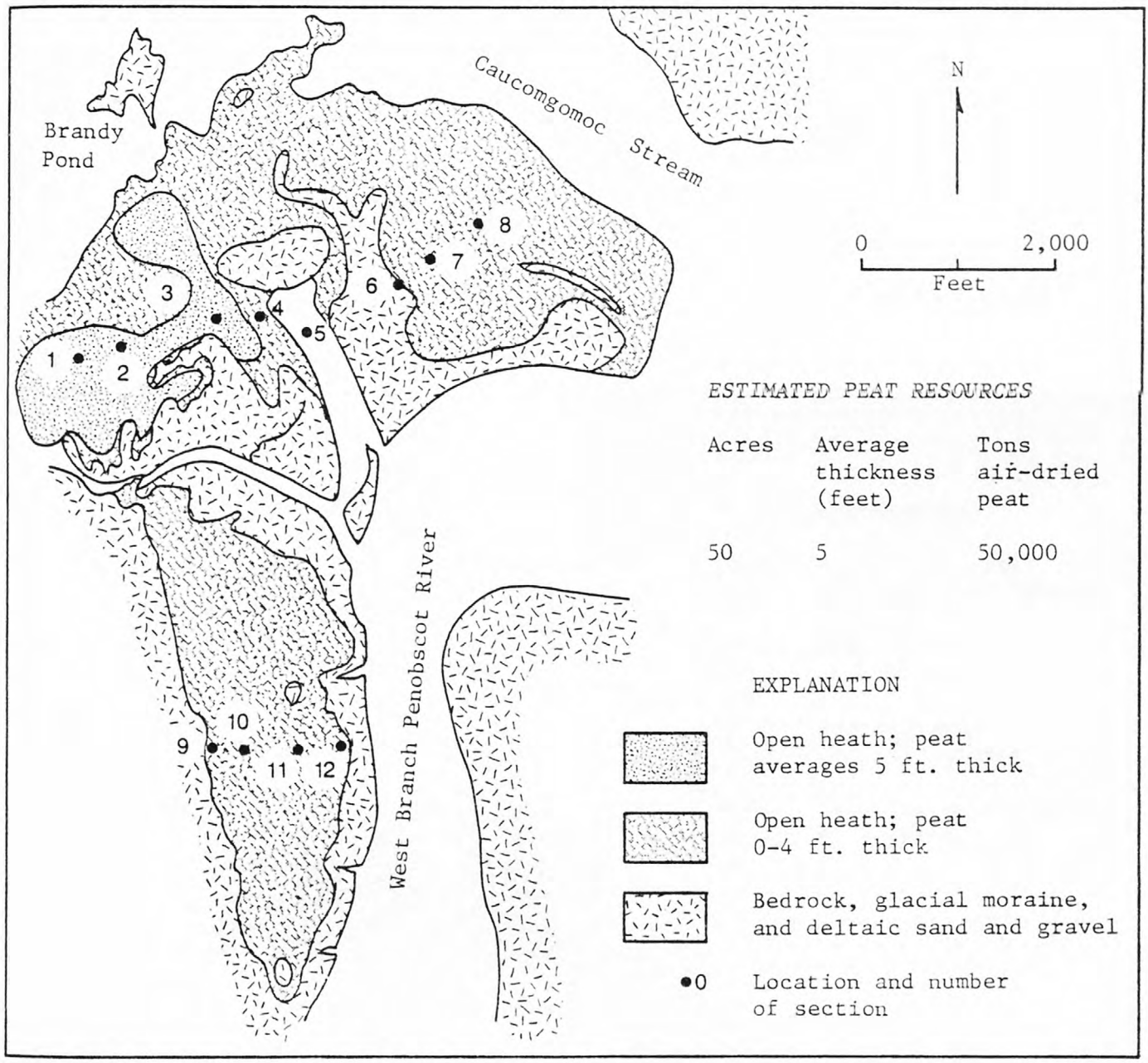


Figure 16. Sketch map of bogs at mouth of the West Branch, Penobscot River and east of Brandy Pond, T5 R13 WELS (Chesuncook Twp.), Chesuncook 15 minute Quadrangle, Piscataquis County, Maine. (Number 15 on Index Map).

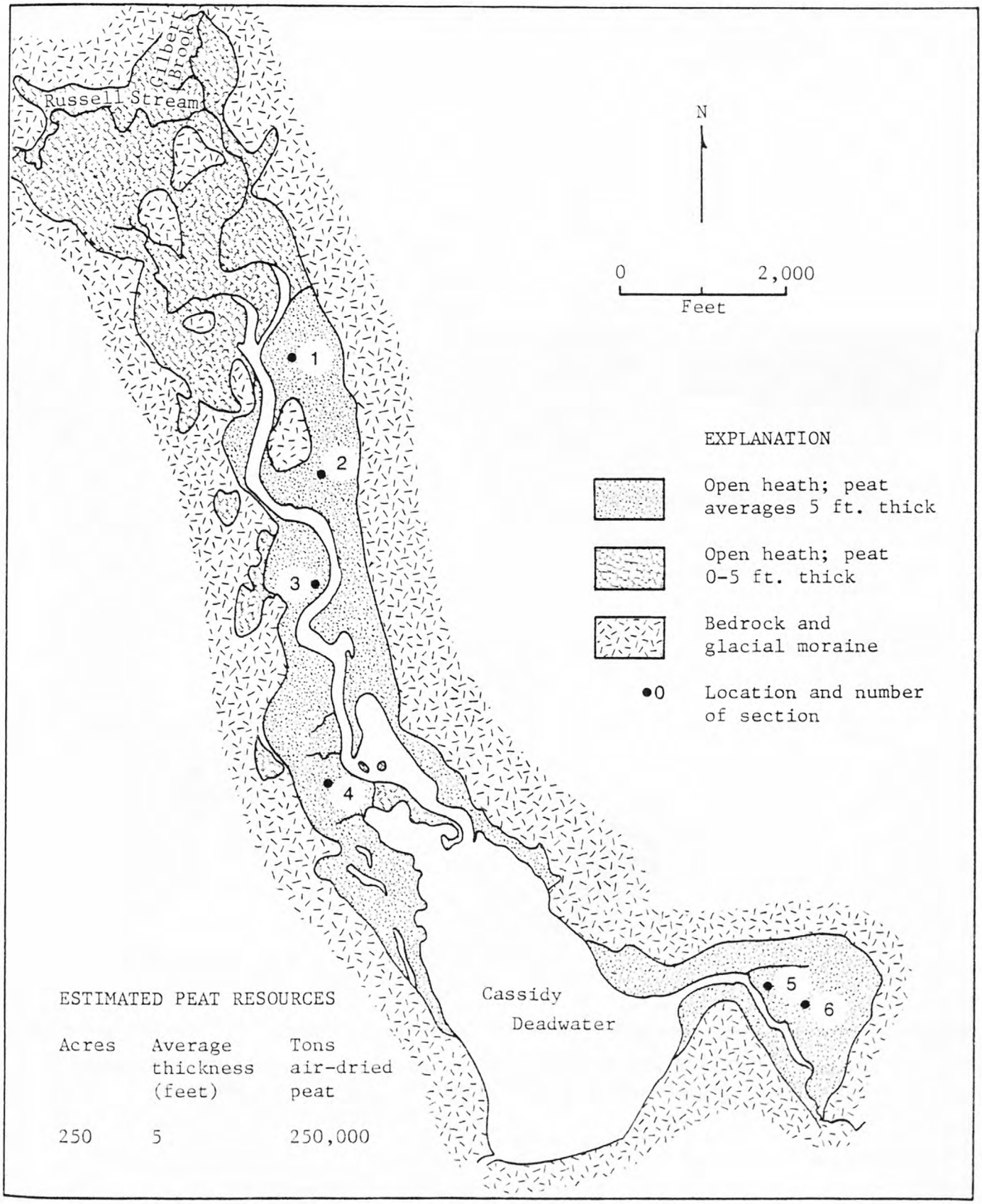


Figure 17. Sketch map of bogs at Cassidy Deadwater, T4 R15 WELS, Caucomgomoc Lake and North East Carry 15 minute Quadrangles, Piscataquis County, Maine. (Number 16 on Index Map).

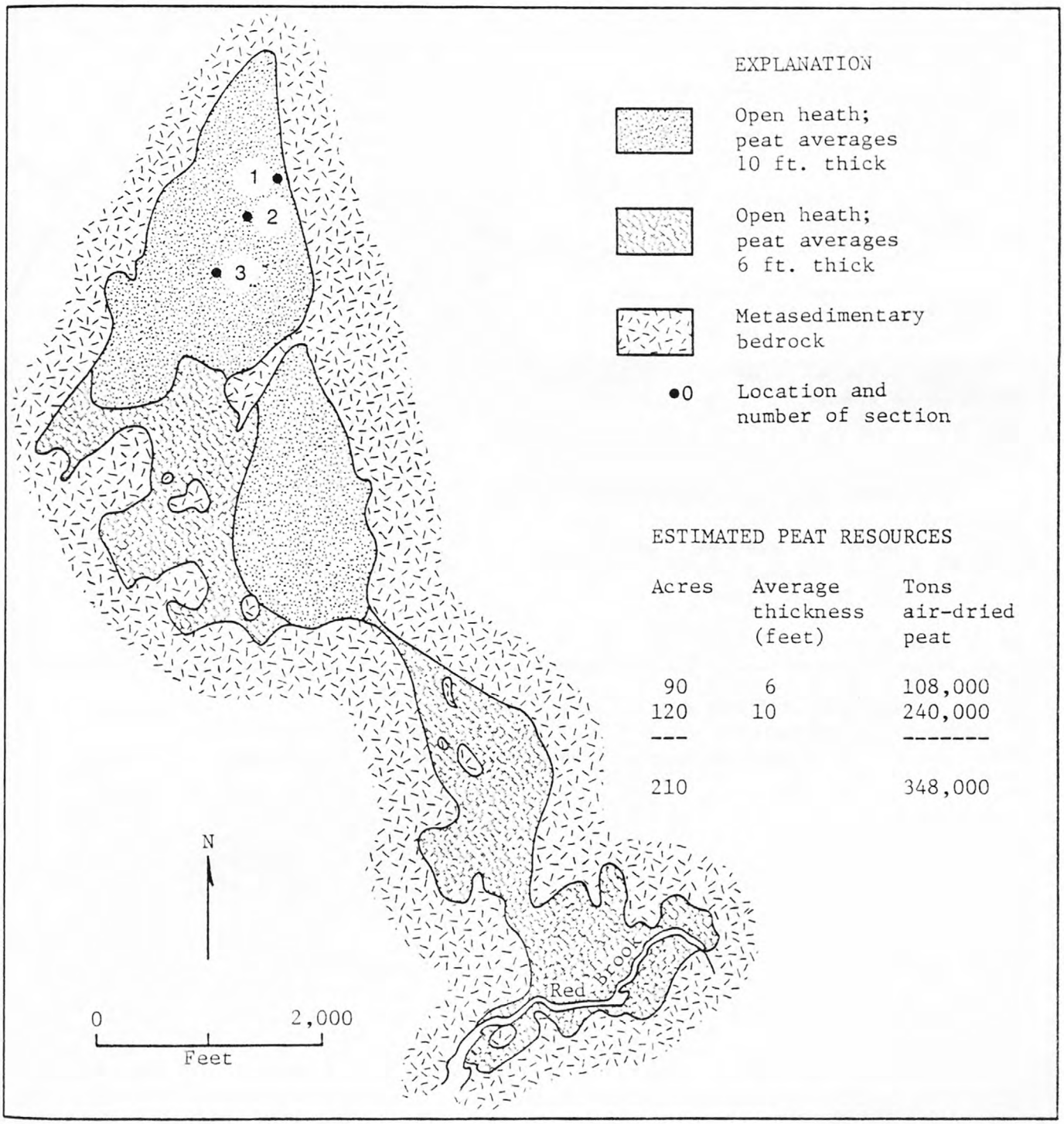


Figure 18. Sketch map of bog south of Duck Pond, T4 R12 WELS, Chesuncook 15 minute Quadrangle, Piscataquis County, Maine. (Number 17 on Index Map).

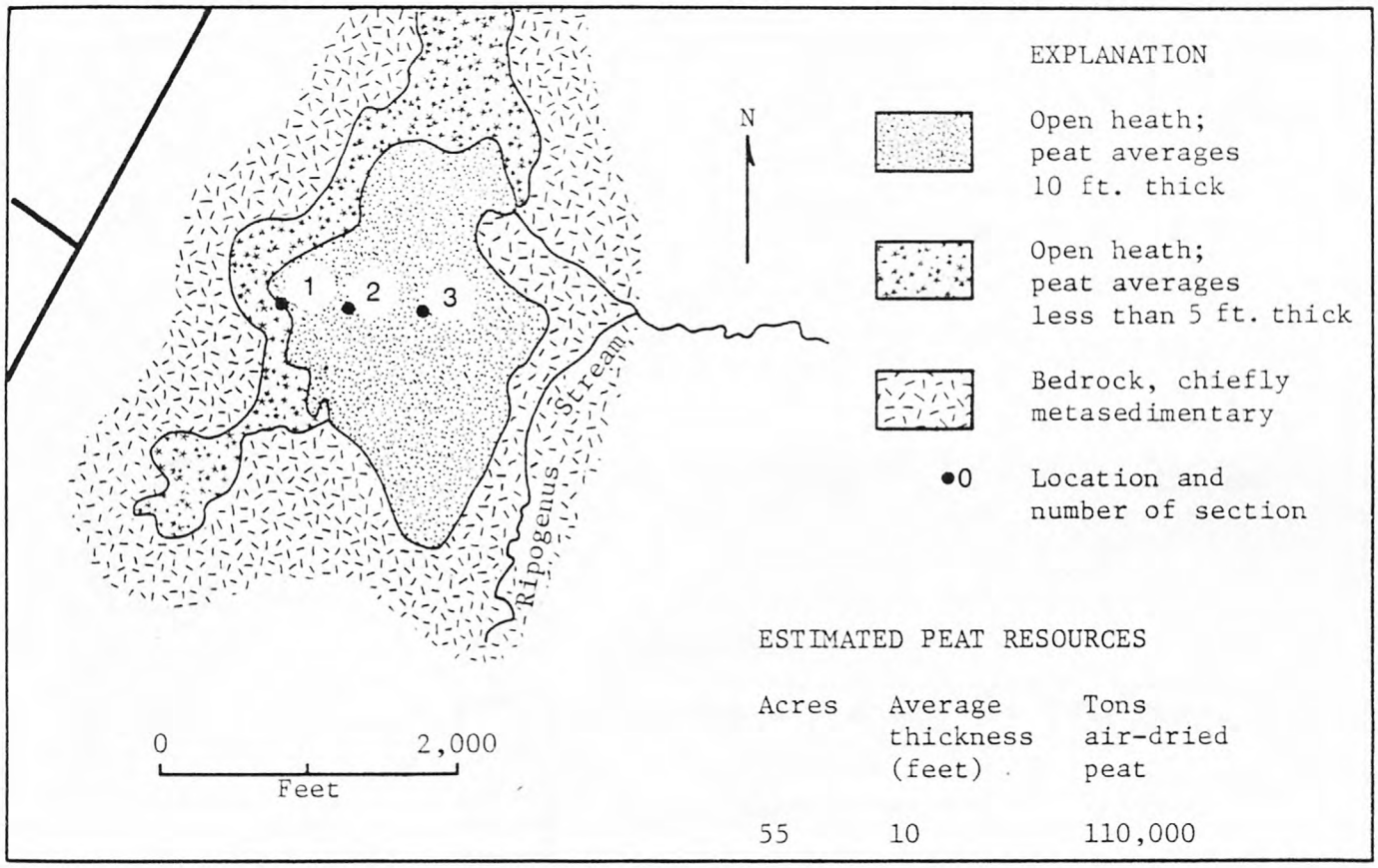


Figure 19. Sketch map of bog on Ripogenus Stream north of Ripogenus Pond, T4 R12 WELS, Chesuncook 15 minute Quadrangle, Piscataquis County, Maine. (Number 18 on Index Map).

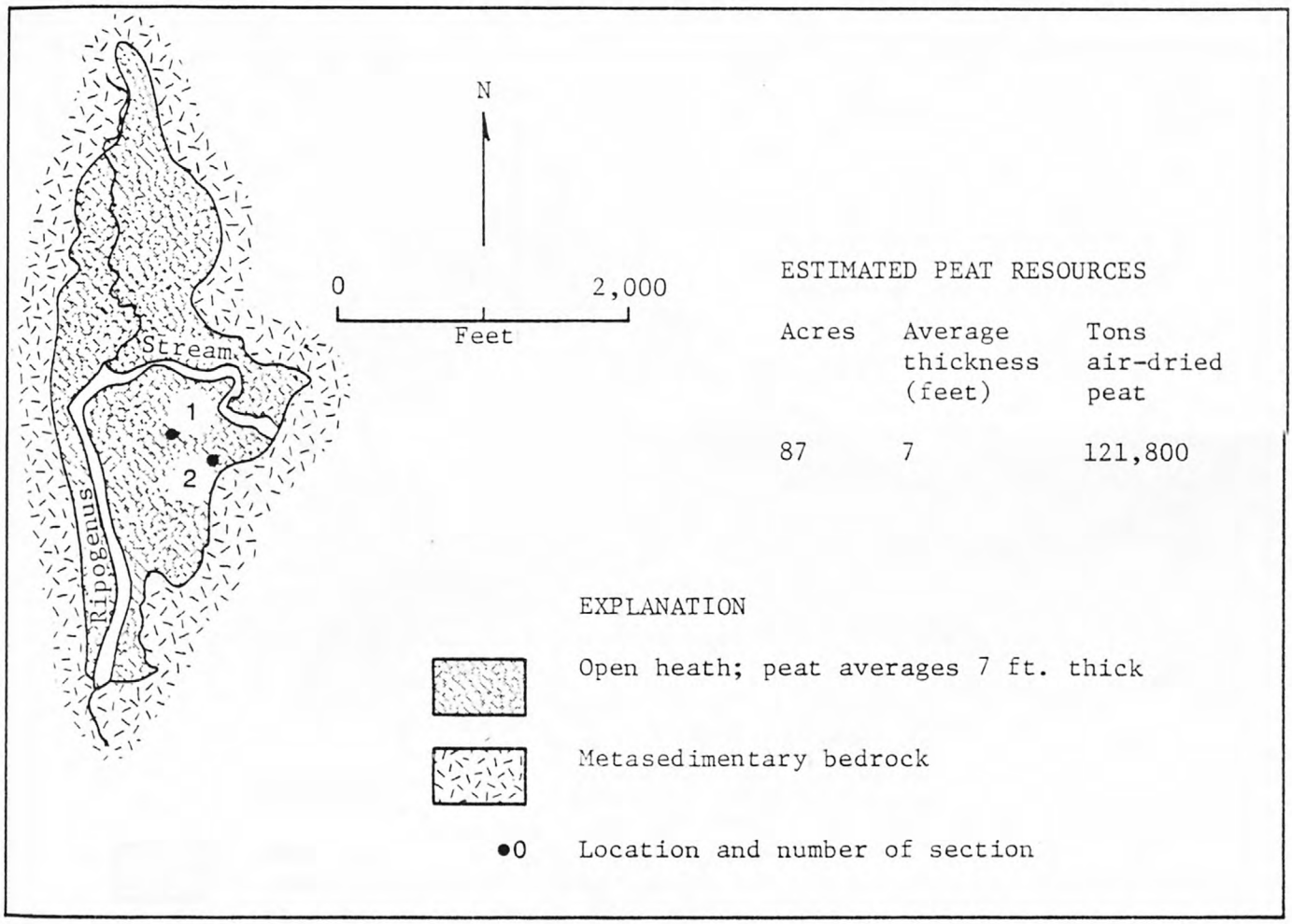


Figure 20. Sketch map of bog on Ripogenus Stream, T4 R12 WELS, Telos Lake 15 minute Quadrangle, Piscataquis County, Maine. (Number 19 on Index Map).

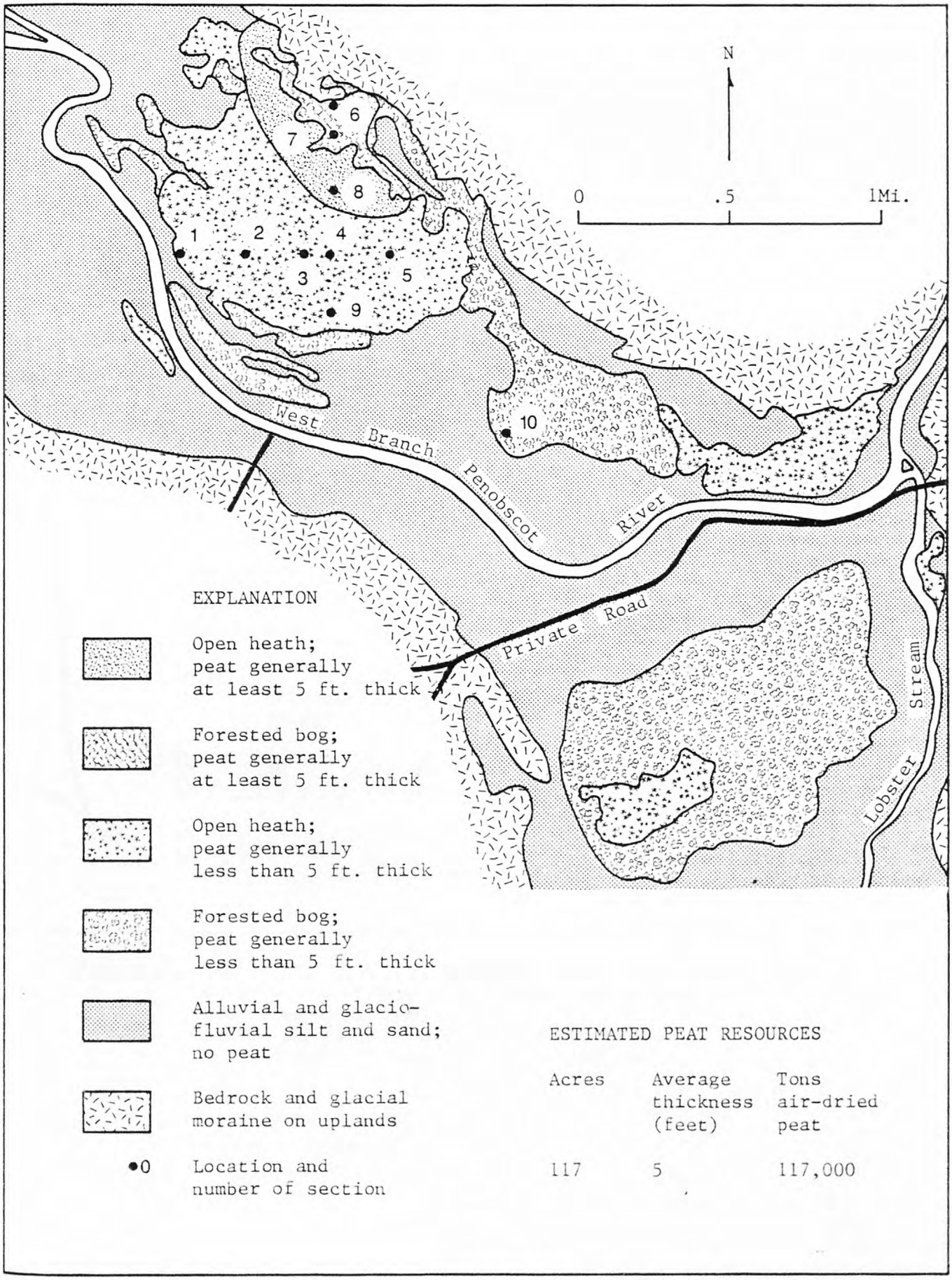


Figure 21. Sketch map of bogs along the West Branch of the Penobscot River and Lobster Stream, T3 R15 WELS (North East Carry Twp.) North East Carry 15 minute Quadrangle, Piscataquis County, Maine. (Number 20 on Index Map).

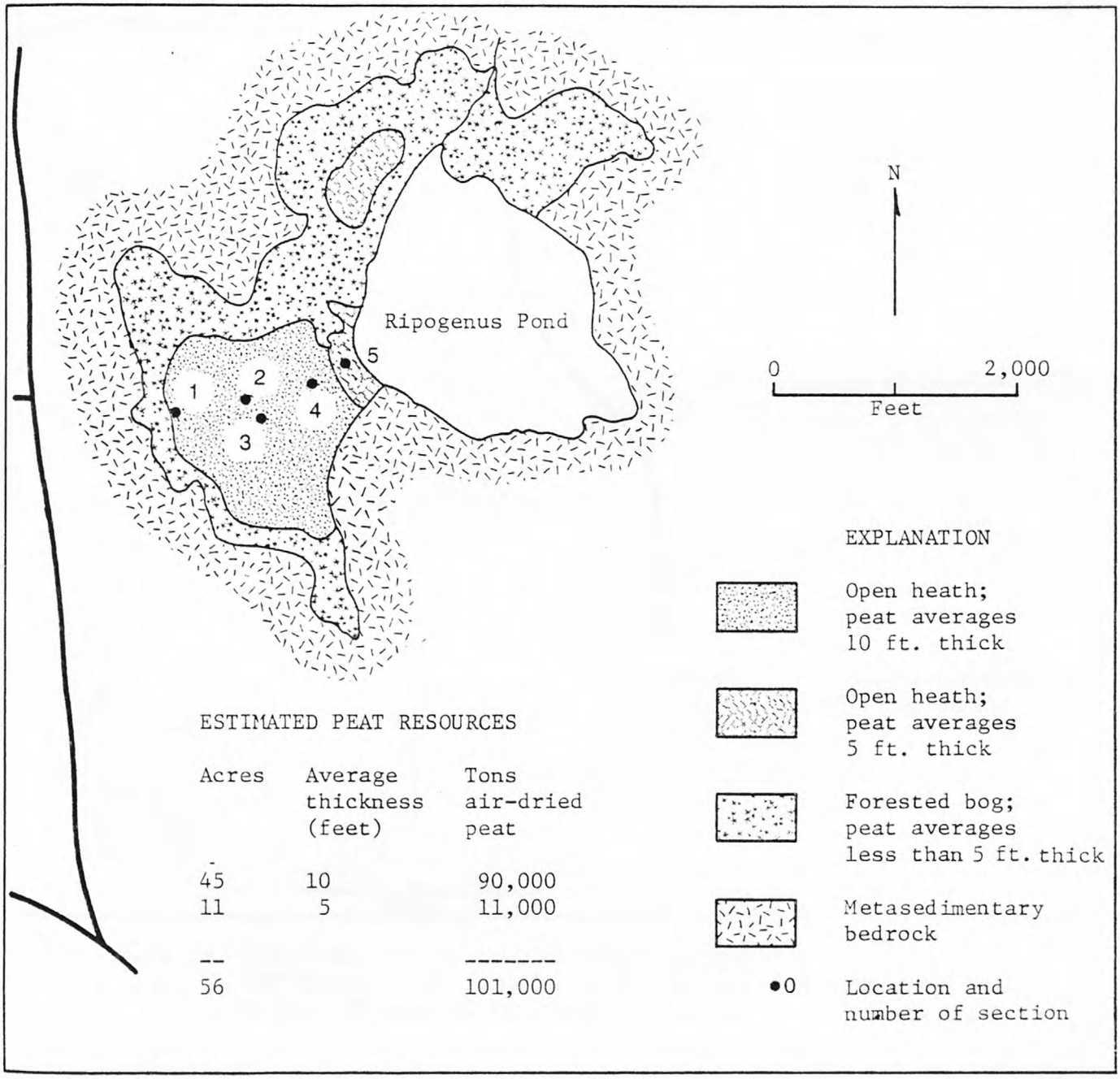


Figure 22. Sketch map of bog at Ripogenus Pond, T4 R12 WELS, Ragged Lake 15 minute Quadrangle, Piscataquis County, Maine. (Number 21 on Index Map).

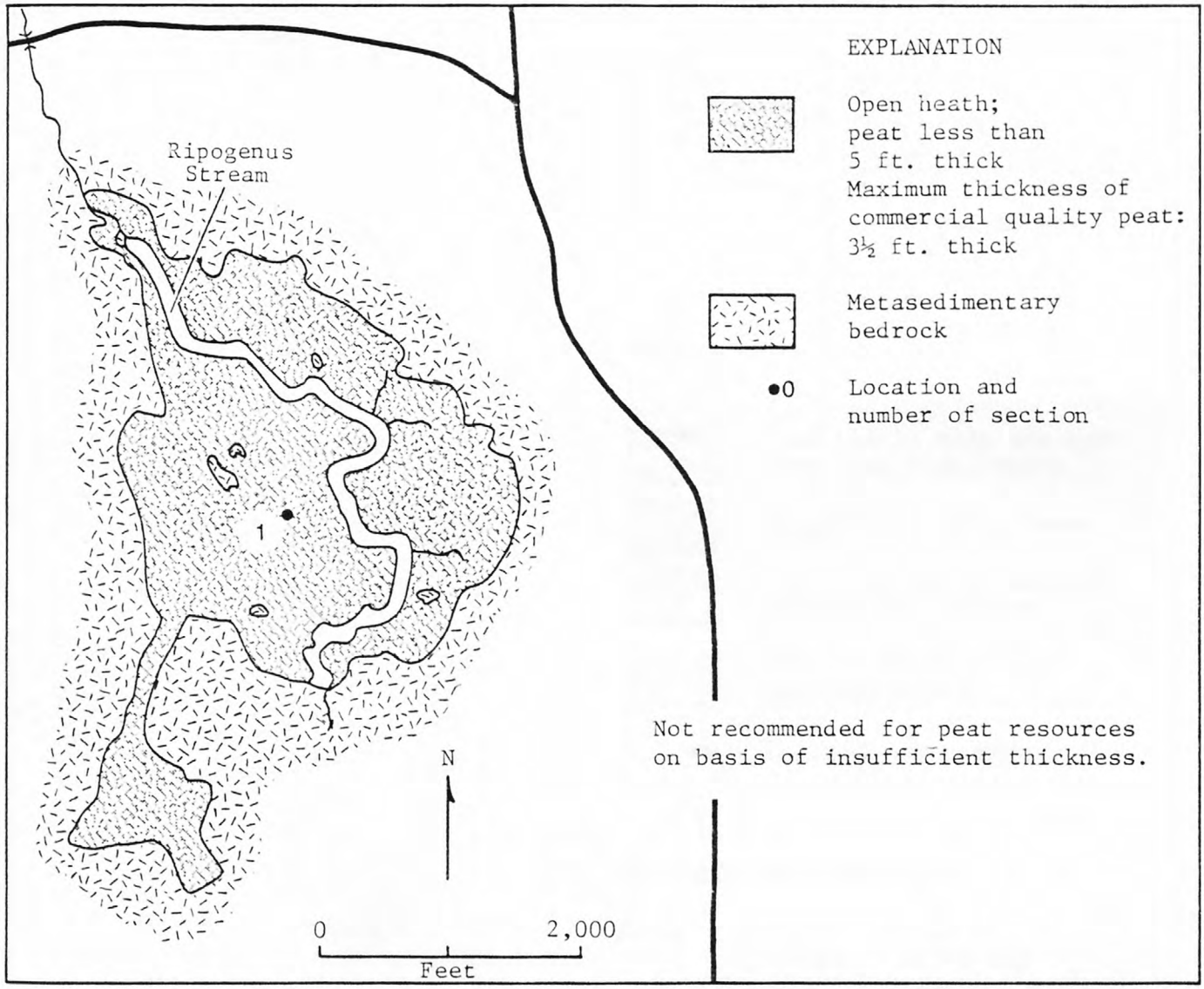


Figure 23. Sketch map of bog west of Soubunge Mountain, T4 R12 WELS, Harrington Lake 15 minute Quadrangle, Piscataquis County, Maine. (Number 22 on Index Map).

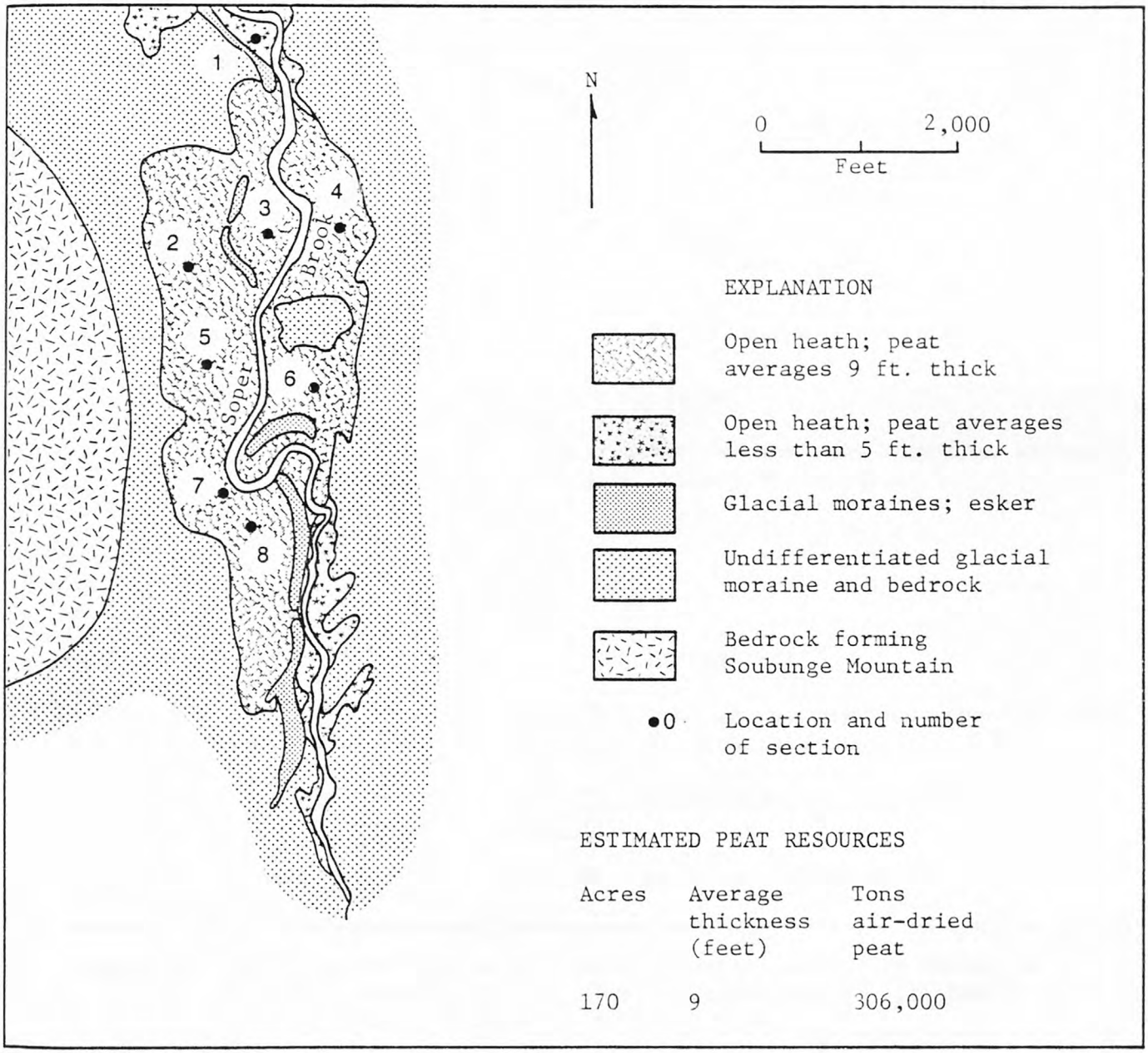


Figure 24. Sketch map of bog along Soper Brook, T4 R11 WELS, Harrington Lake 15 minute Quadrangle, Piscataquis County, Maine. (Number 23 on Index Map).

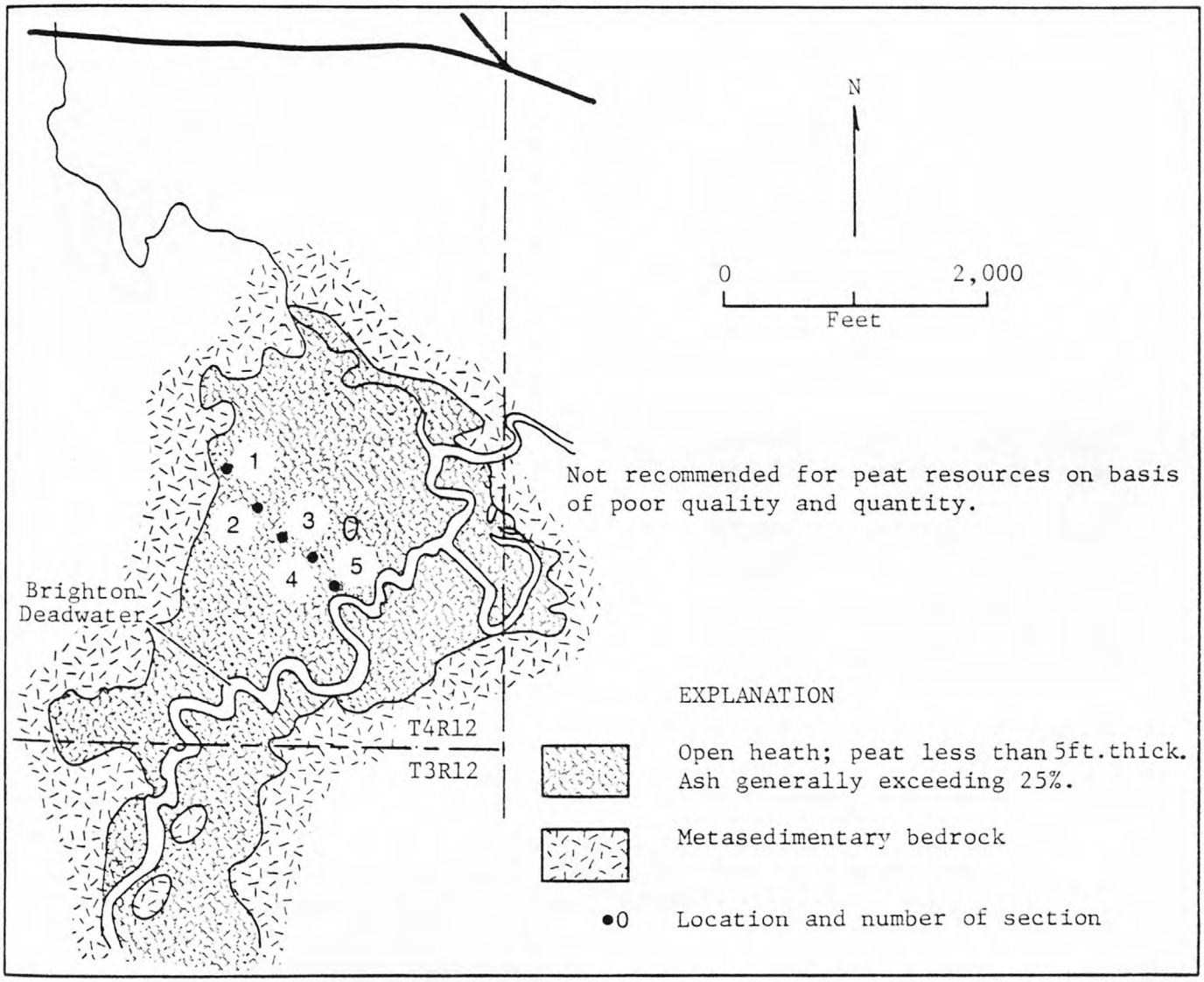


Figure 25. Sketch map of bog at Brighton Deadwater, southeast corner T4 R12 WELS, Harrington Lake 15 minute Quadrangle, Piscataquis County, Maine. (Number 24 on Index Map).

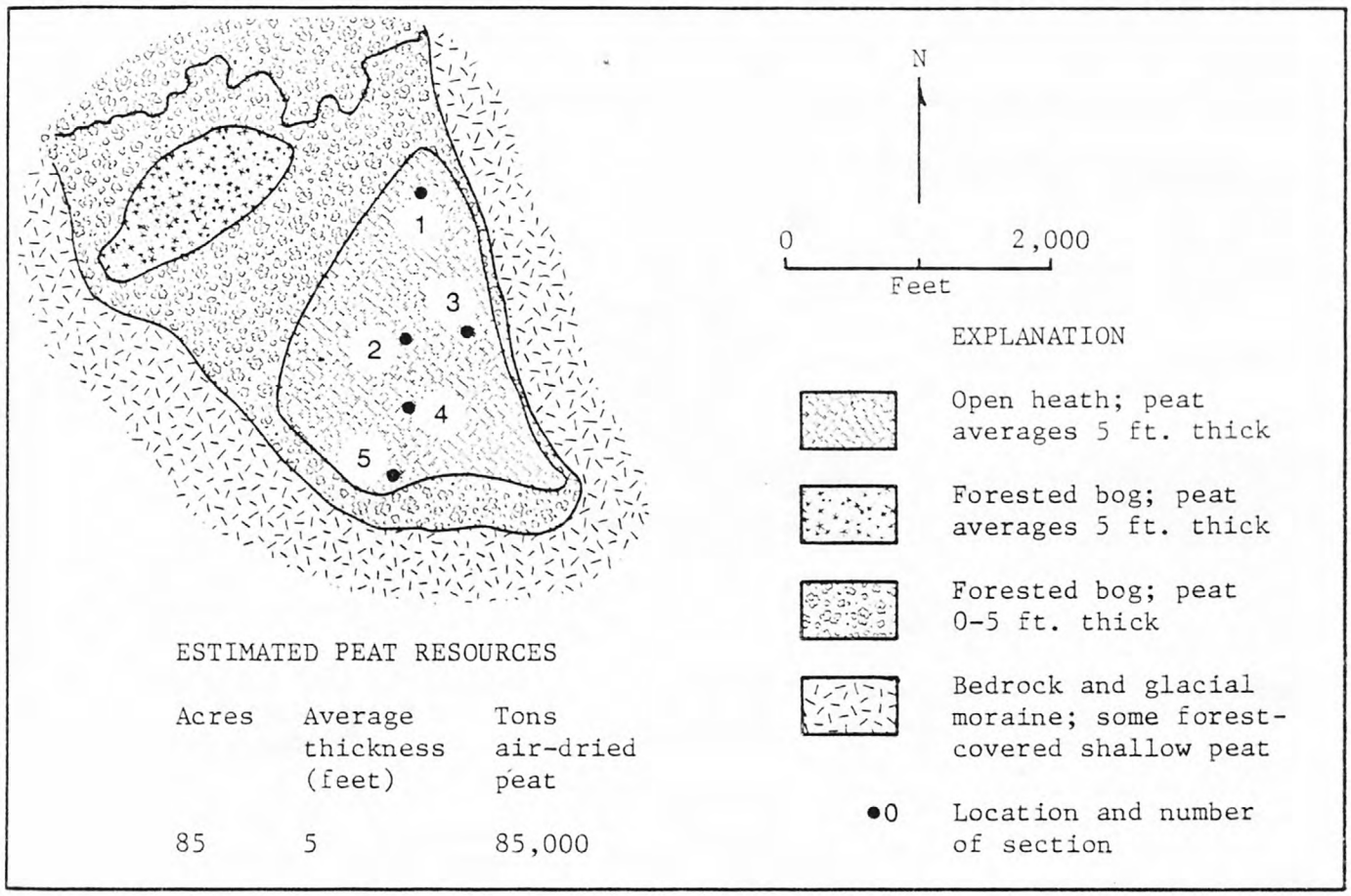


Figure 26. Sketch map of bog southwest of Tomhegan Pond, T2 R3 NBKP (Soldier Town Twp.), Seboomook Lake 15 minute Quadrangle, Somerset County, Maine. (Number 25 on Index Map).

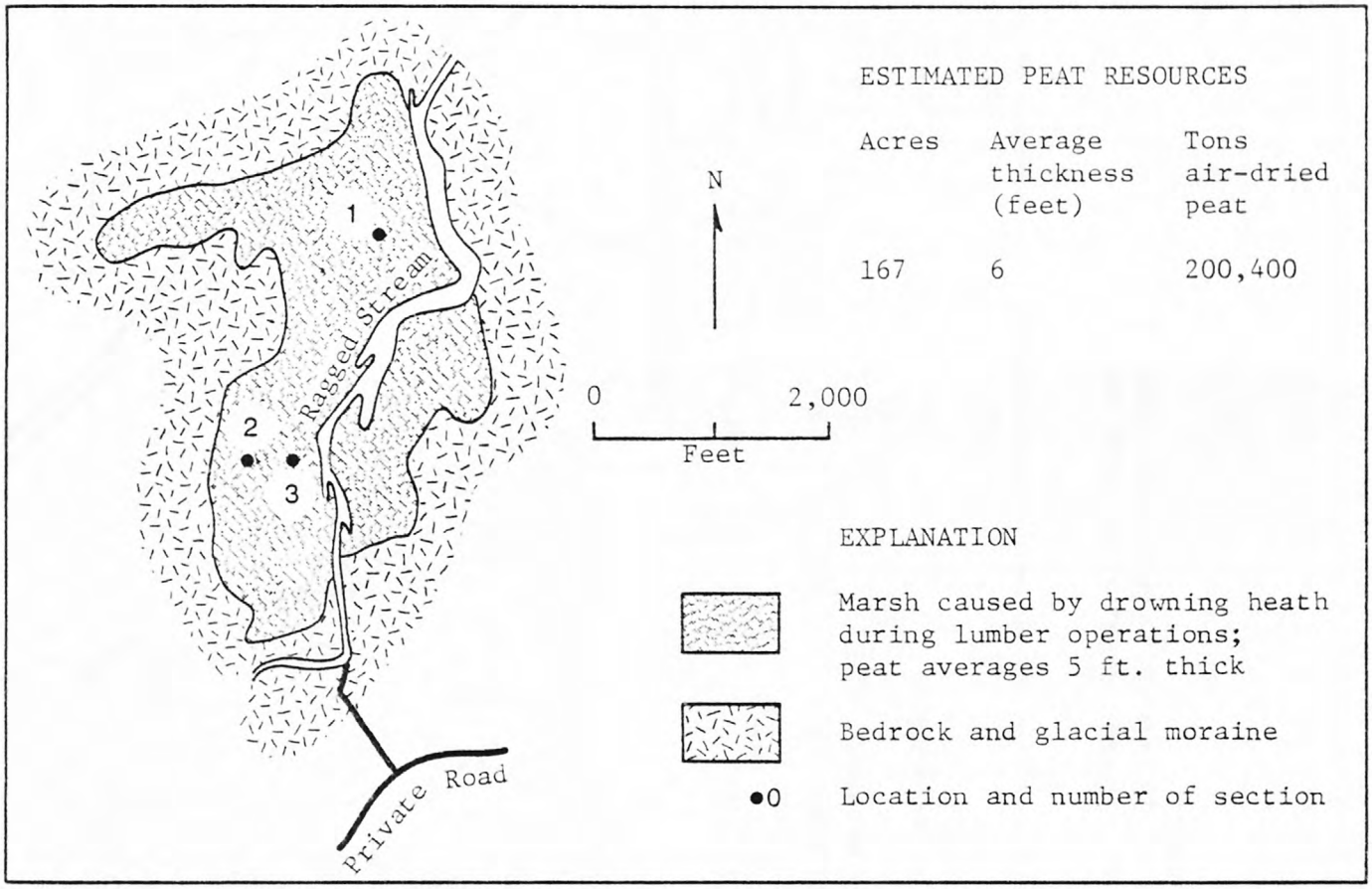


Figure 27. Sketch map of bog along Ragged Stream, T2 R12 WELS, Ragged Lake 15 minute Quadrangle, Piscataquis County, Maine. (Number 26 on Index Map).

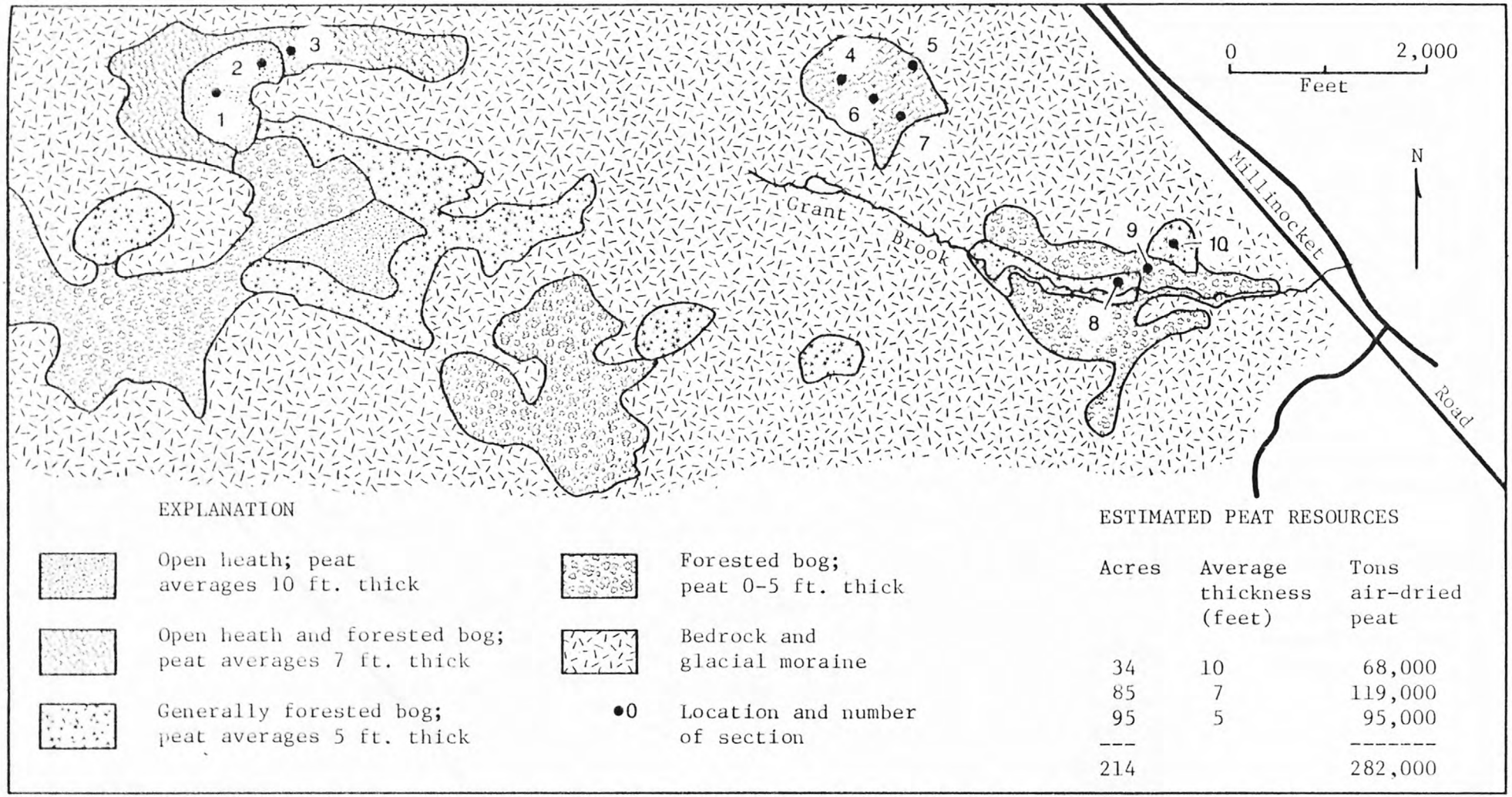


Figure 28. Sketch map of bogs west of Millinocket Road, T2 R9 WELS and T1 R9 WELS, Katahdin 15 minute Quadrangle, Piscataquis County, Maine. (Number 27 on Index Map).

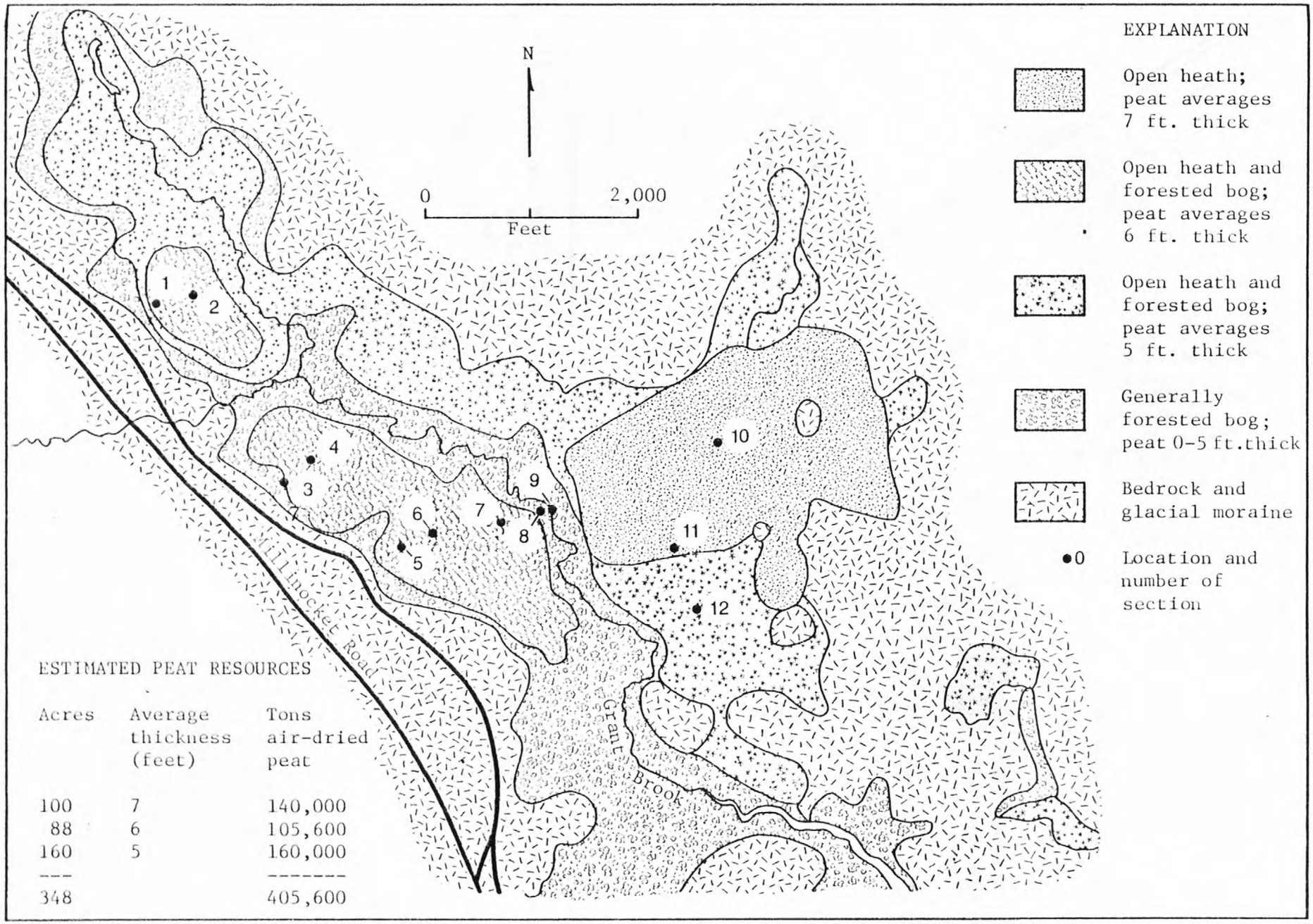


Figure 29. Sketch map of bogs east of Millinocket Road, T2 R9 WELS and T1 R9 WELS, Katahdin 15 minute Quadrangle, Piscataquis County, Maine. (Number 28 on Index Map).

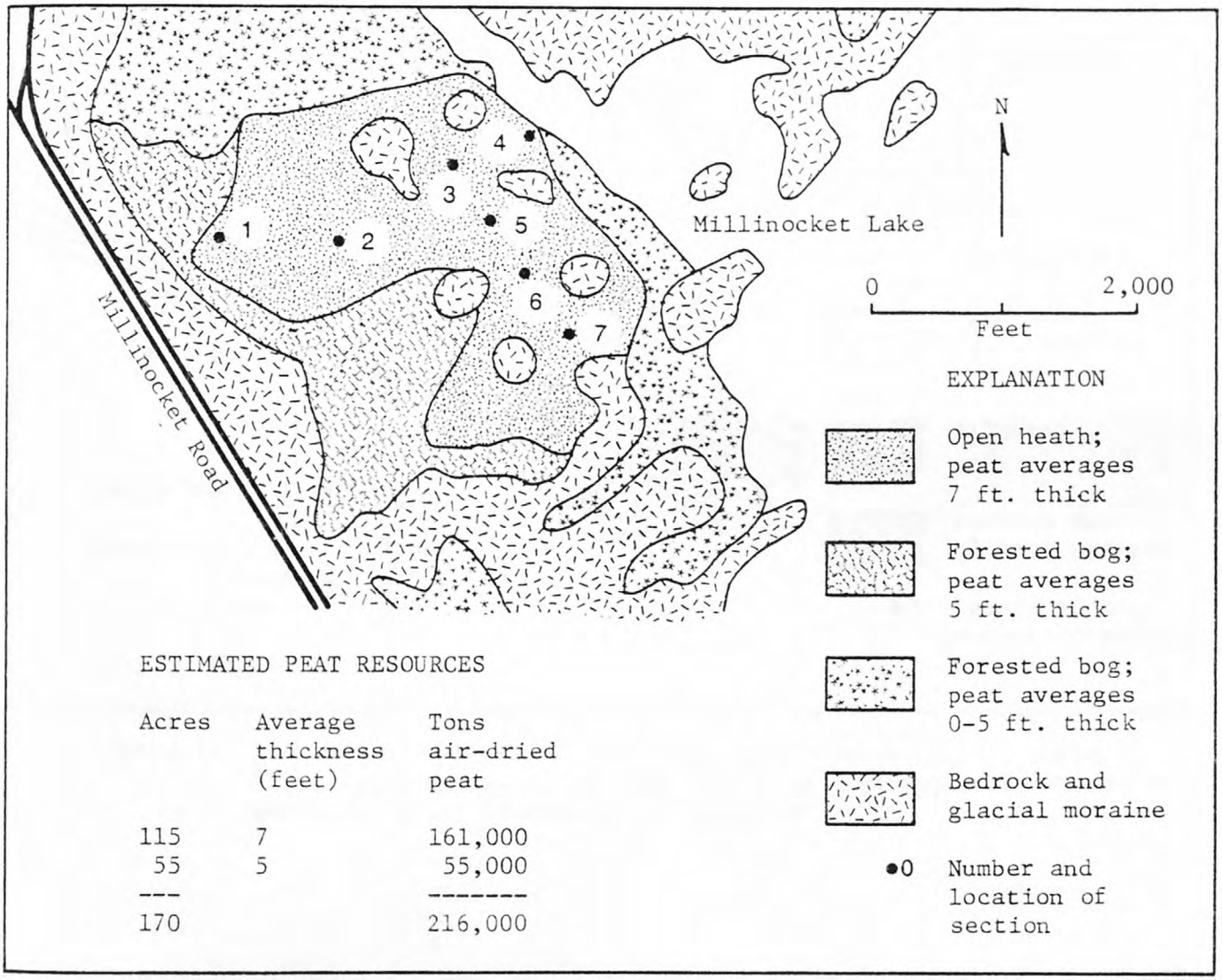


Figure 30. Sketch map of bog between Millinocket Lake and Millinocket Road in northeast corner of T1 R9 WELS, Norcross 15 minute Quadrangle, Piscataquis County, Maine. (Number 29 on Index Map).

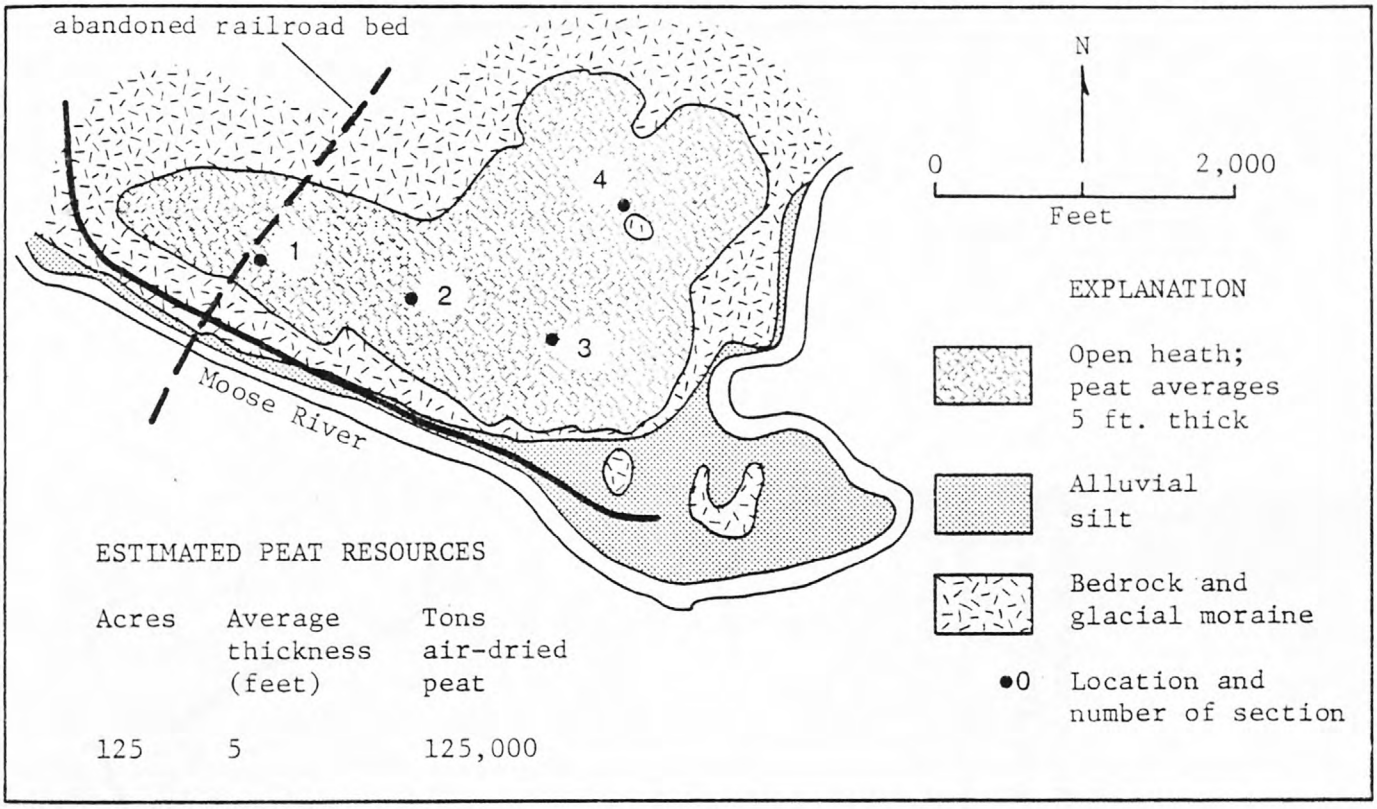


Figure 31. Sketch map of bog north of Moose River and south of Jackman Mill, Jackman Twp., Long Pond 15 minute Quadrangle, Somerset County, Maine. (Number 30 on Index Map).

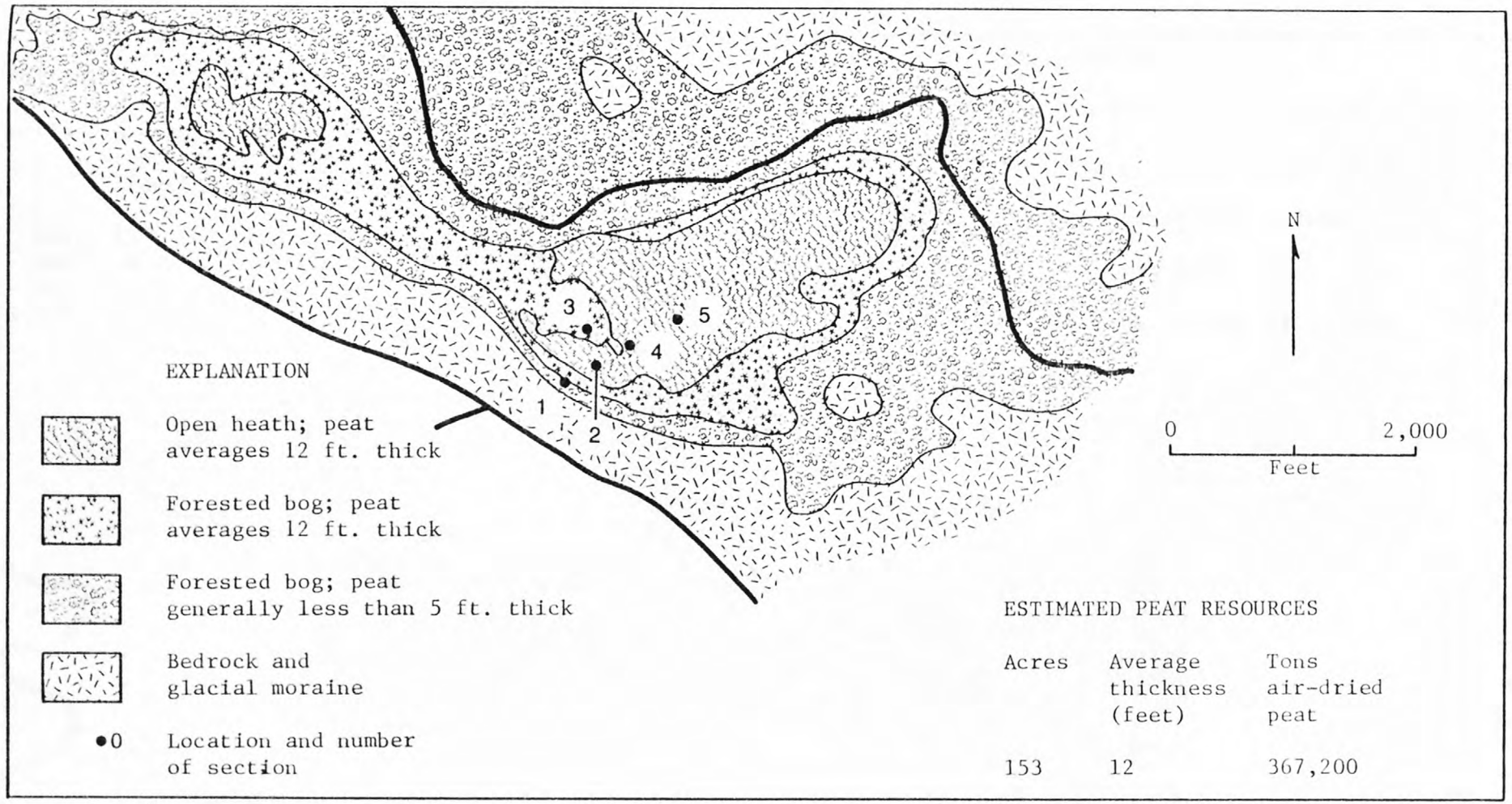


Figure 32. Sketch map of Twelve Mile Bog, T3 R1 NBKP (Long Pond Twp.), Long Pond 15 minute Quadrangle, Somerset County, Maine. (Number 31 on Index Map).

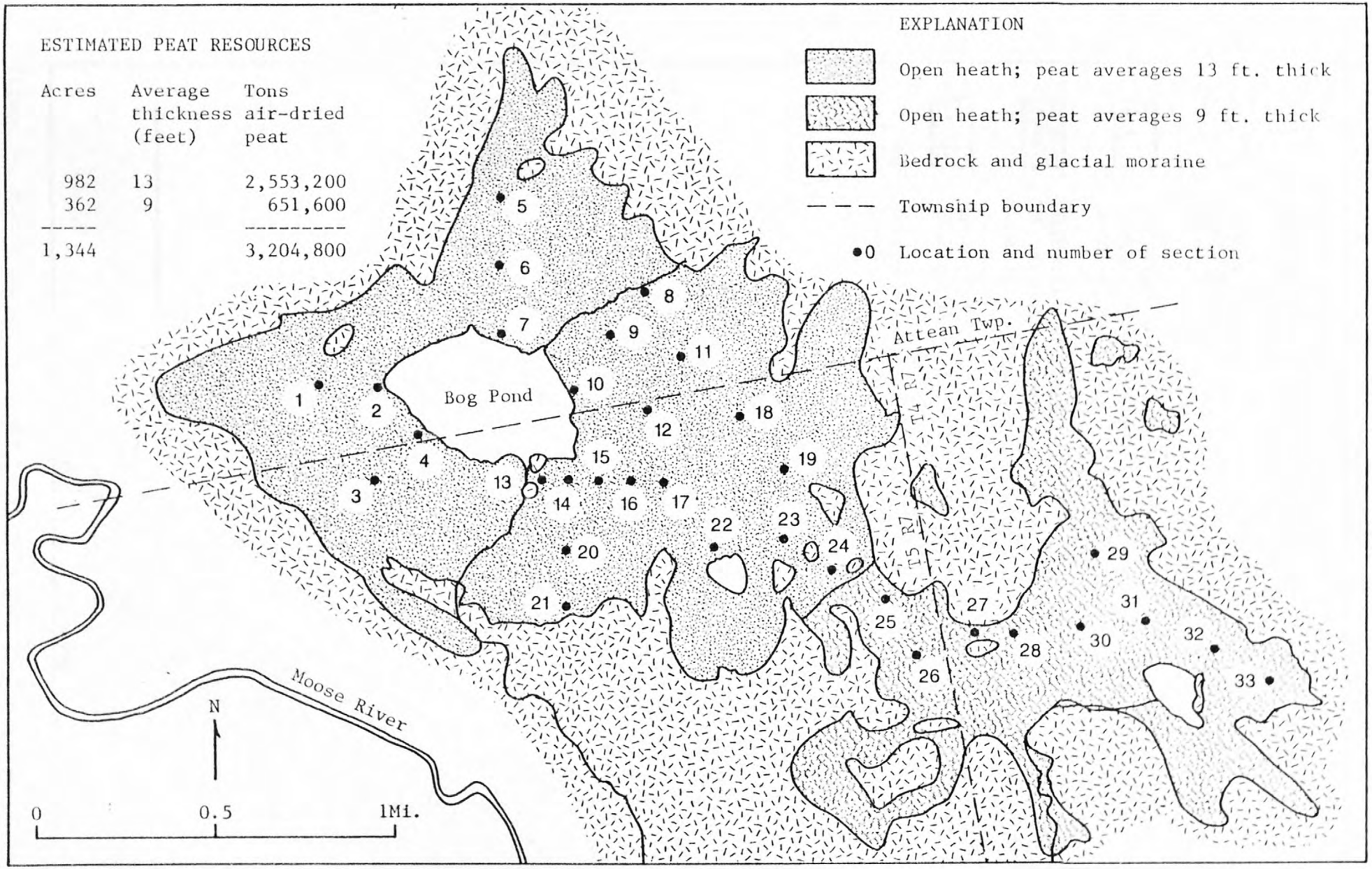


Figure 33. Sketch map of No. 5 Bog south of Attean Pond, T5 R1 NBKP (Attean Twp.), T4 R7 BKP WKR (Bradstreet Twp.), and T5 R7 BKP WKR, Attean 15 minute Quadrangle, Somerset County, Maine. (Number 32 on Index Map).

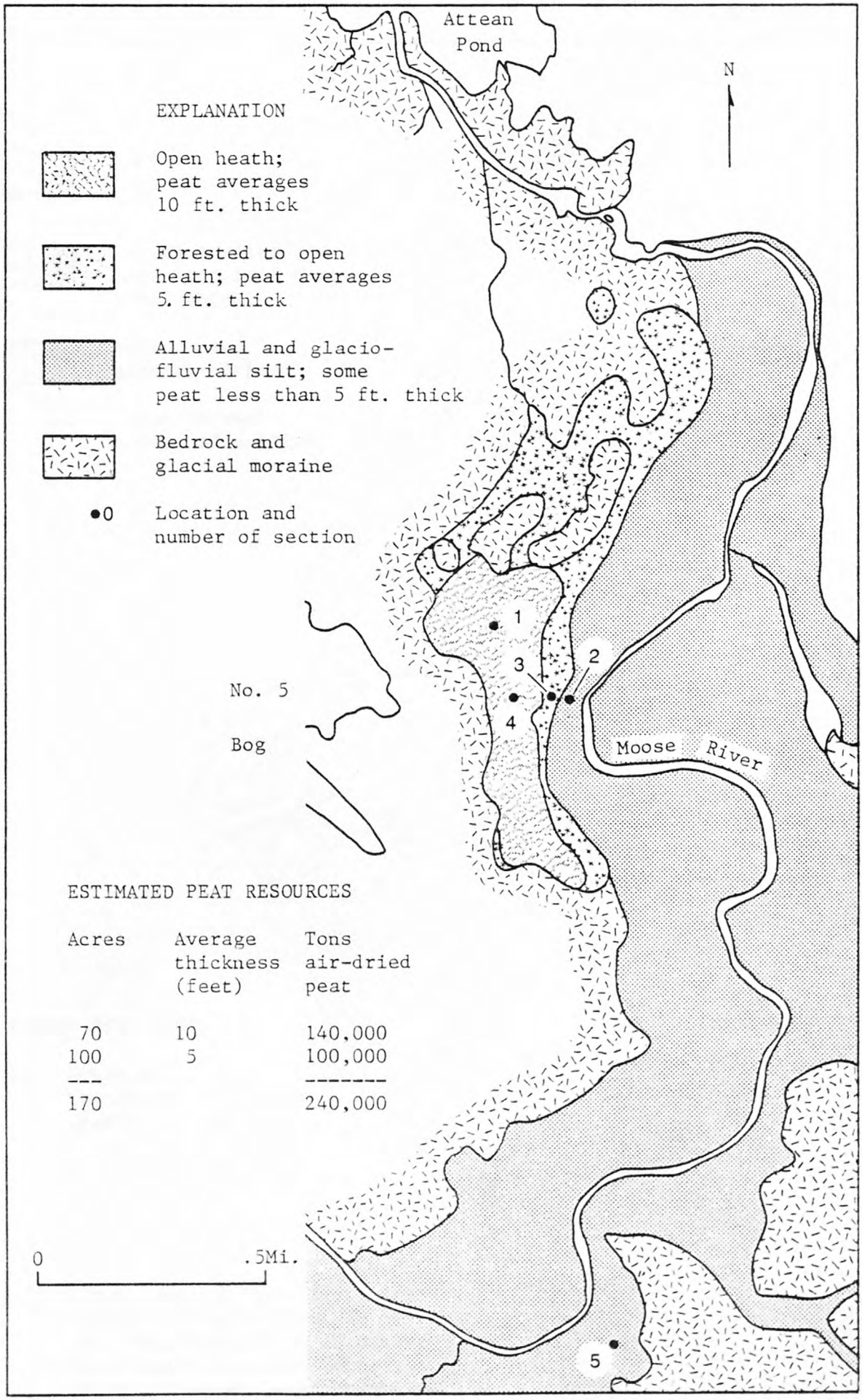


Figure 34. Sketch map of the Moose River area east of No. 5 Bog, T4 R7 BKP WKR (Bradstreet Twp.), Attean and Long Pond 15 minute Quadrangles, Somerset County, Maine. (Number 33 on Index Map).

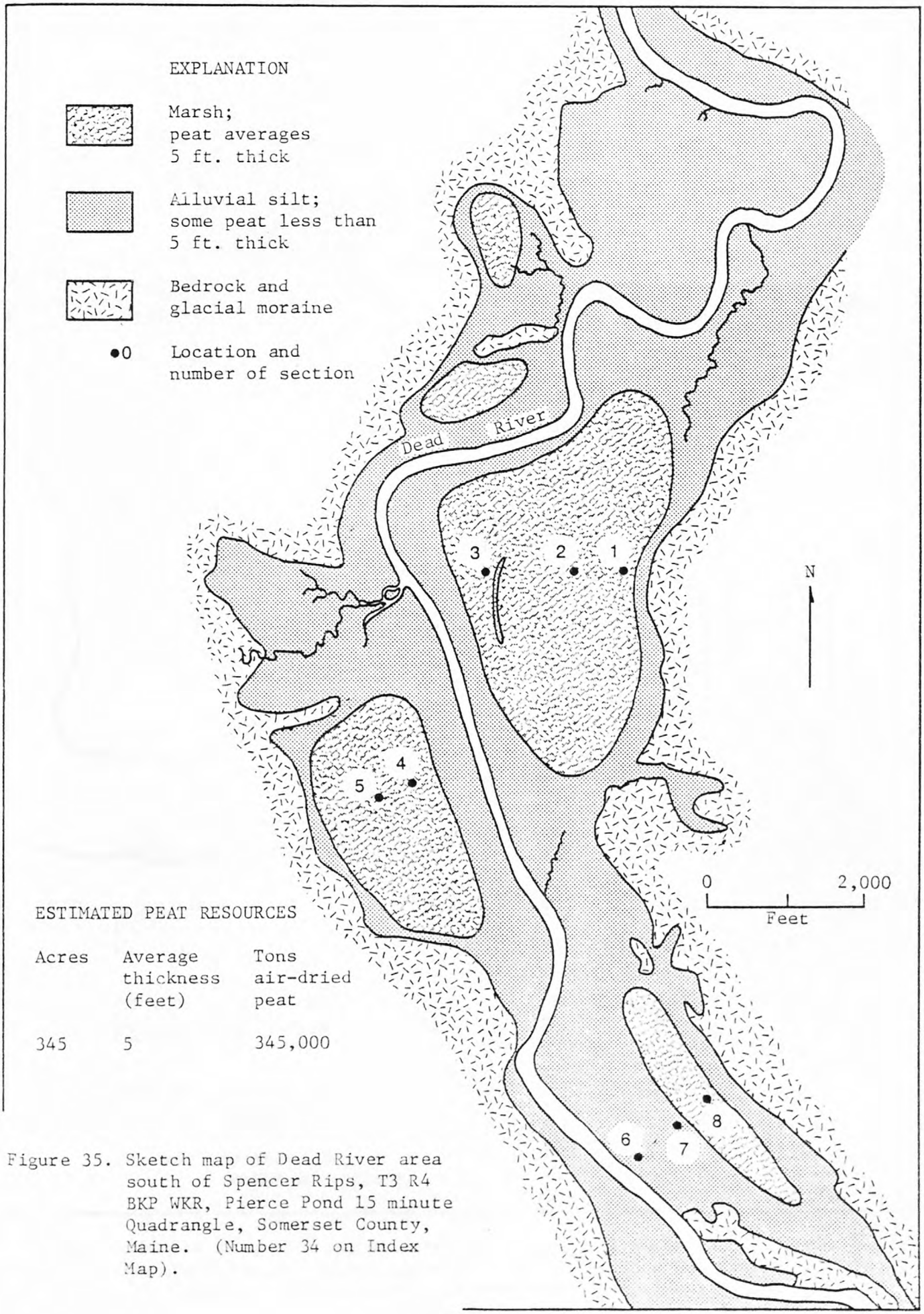


Figure 35. Sketch map of Dead River area south of Spencer Rips, T3 R4 BKP WKR, Pierce Pond 15 minute Quadrangle, Somerset County, Maine. (Number 34 on Index Map).

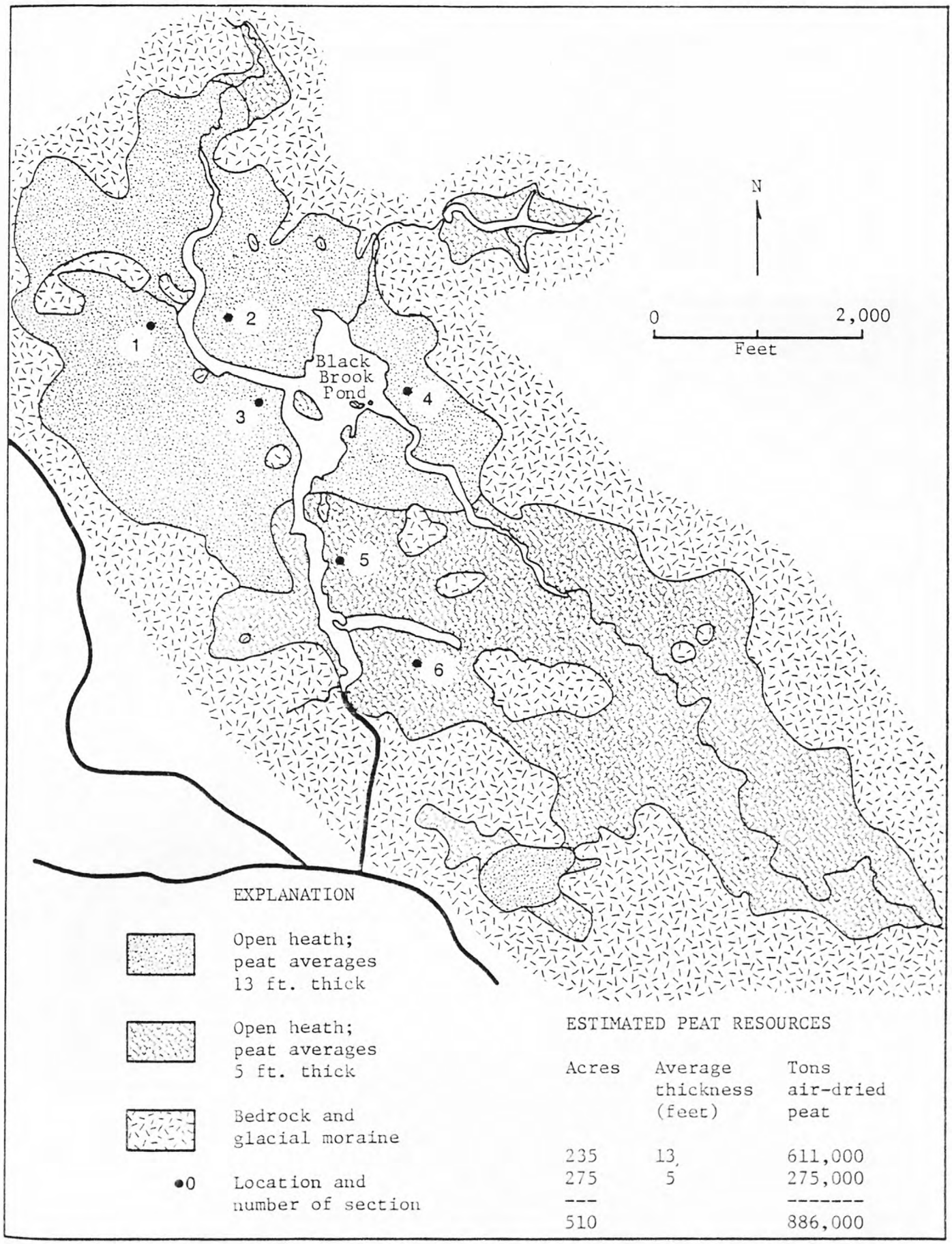


Figure 36. Sketch map of bog at Black Brook Pond, T2 R4 BKP WKR (Pierce Pond Twp.), Little Bigelow Mountain 15 minute Quadrangle, Somerset County, Maine. (Number 35 on Index Map).

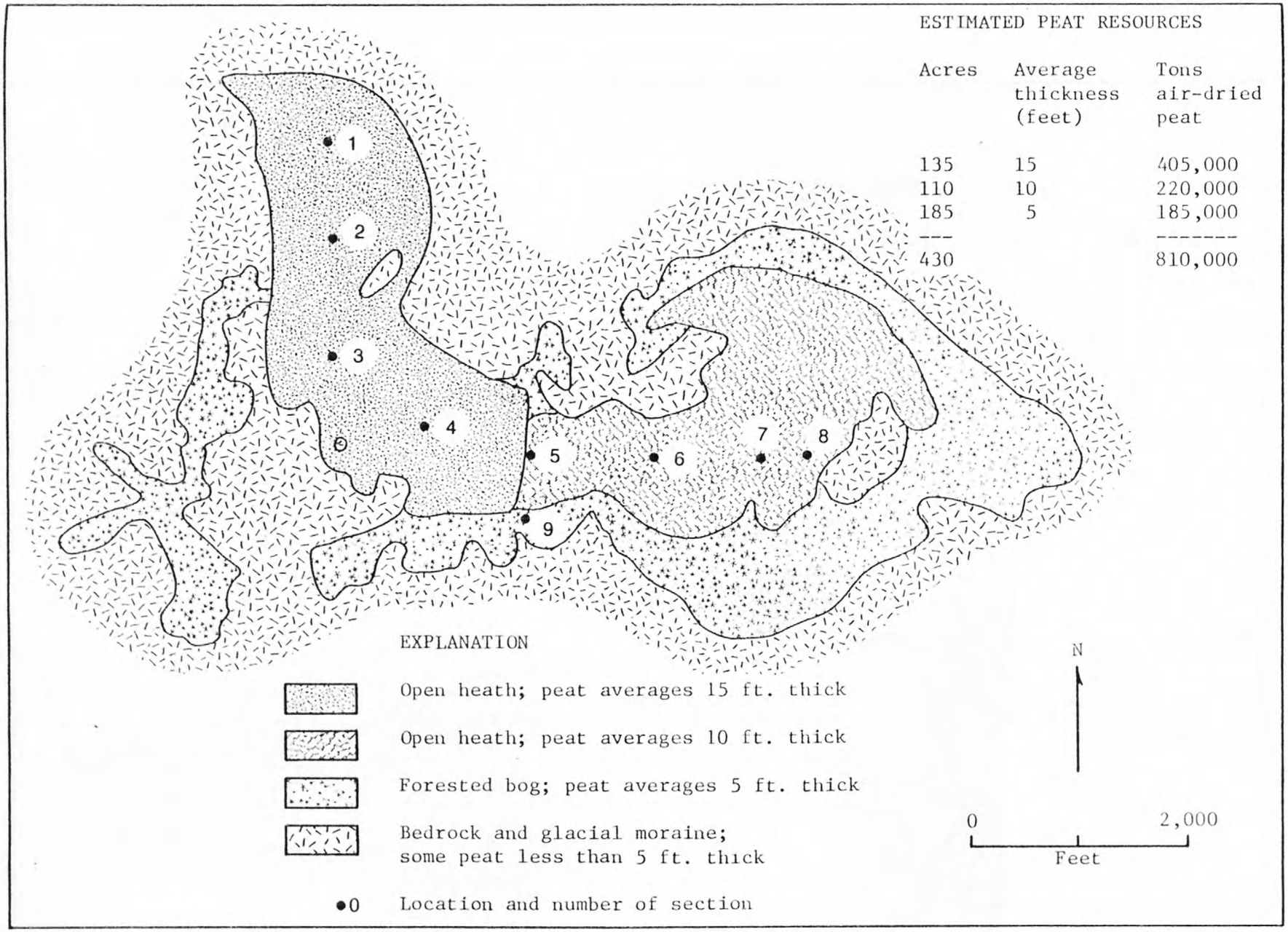
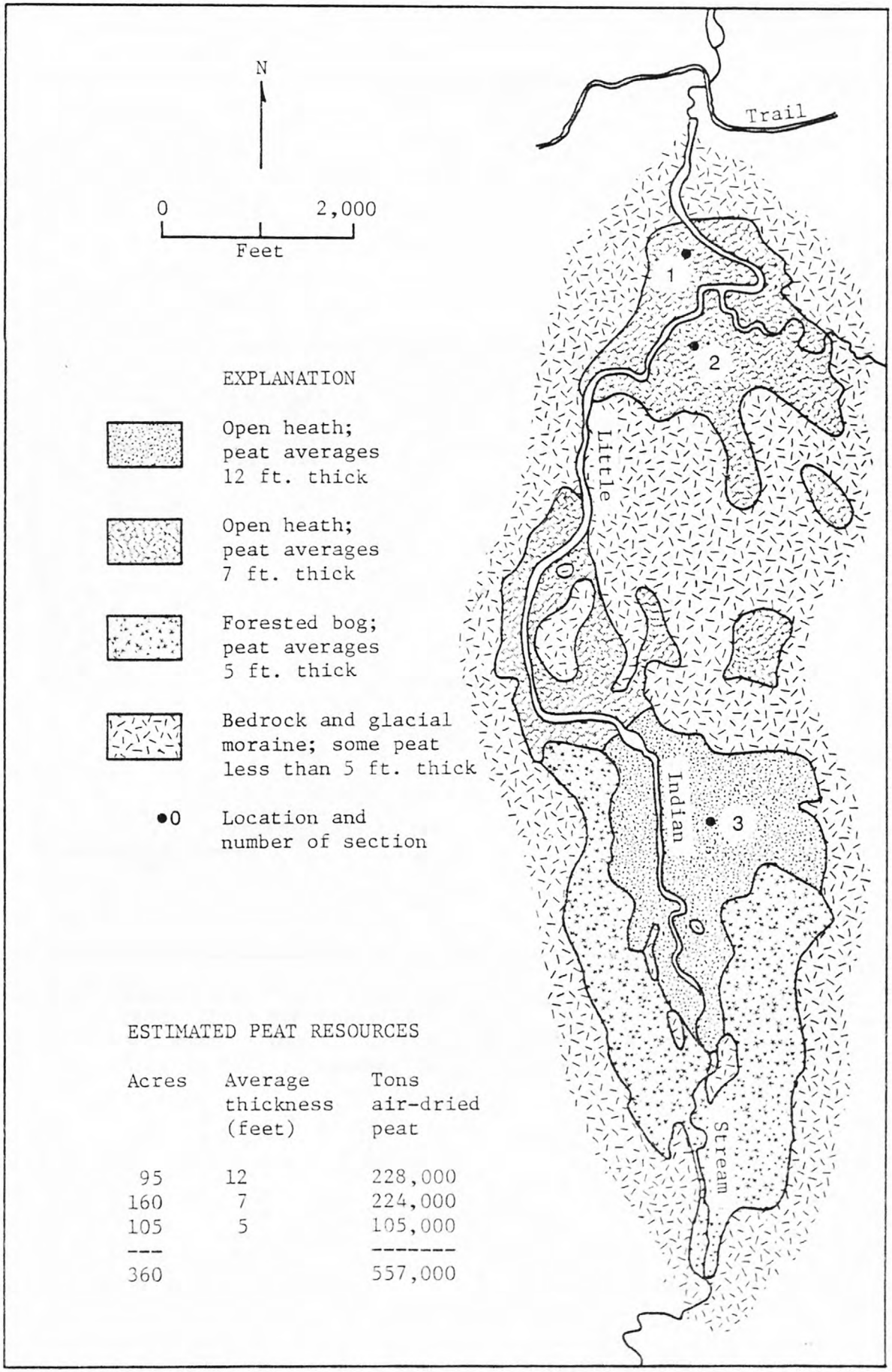


Figure 37. Sketch map of Johnson Bog, West Forks Plantation, Pierce Pond 15 minute Quadrangle, Somerset County, Maine. (Number 36 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
95	12	228,000
160	7	224,000
105	5	105,000
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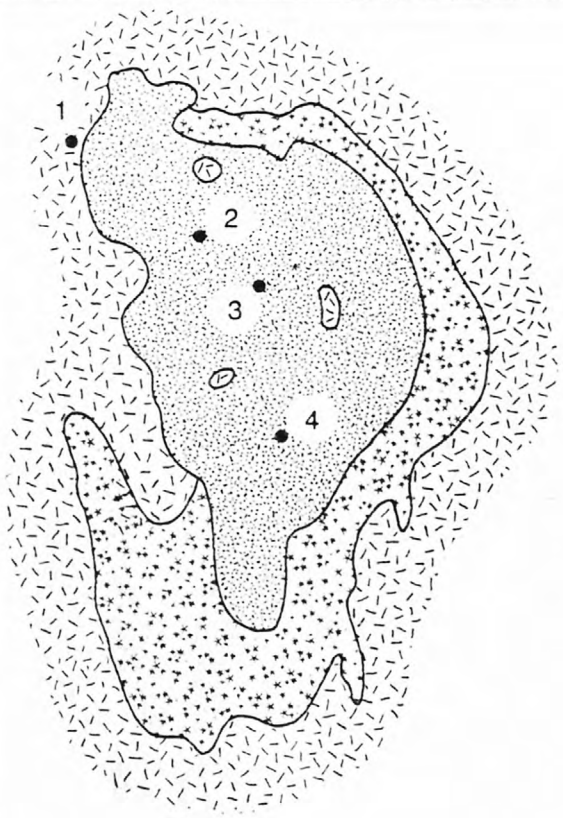
360		557,000

Figure 38. Sketch map of Little Indian Bog along Little Indian Stream, T1 R6 BKP EKR (Indian Stream Twp.), The Forks 15 minute Quadrangle, Somerset County, Maine. (Number 37 on Index Map).



N

EXPLANATION

Open heath; peat averages 13 ft. thick

Forested bog; peat averages 5 ft. thick

Bedrock and glacial moraine. Some peat less than 5 ft. thick

•0 Location and number of section

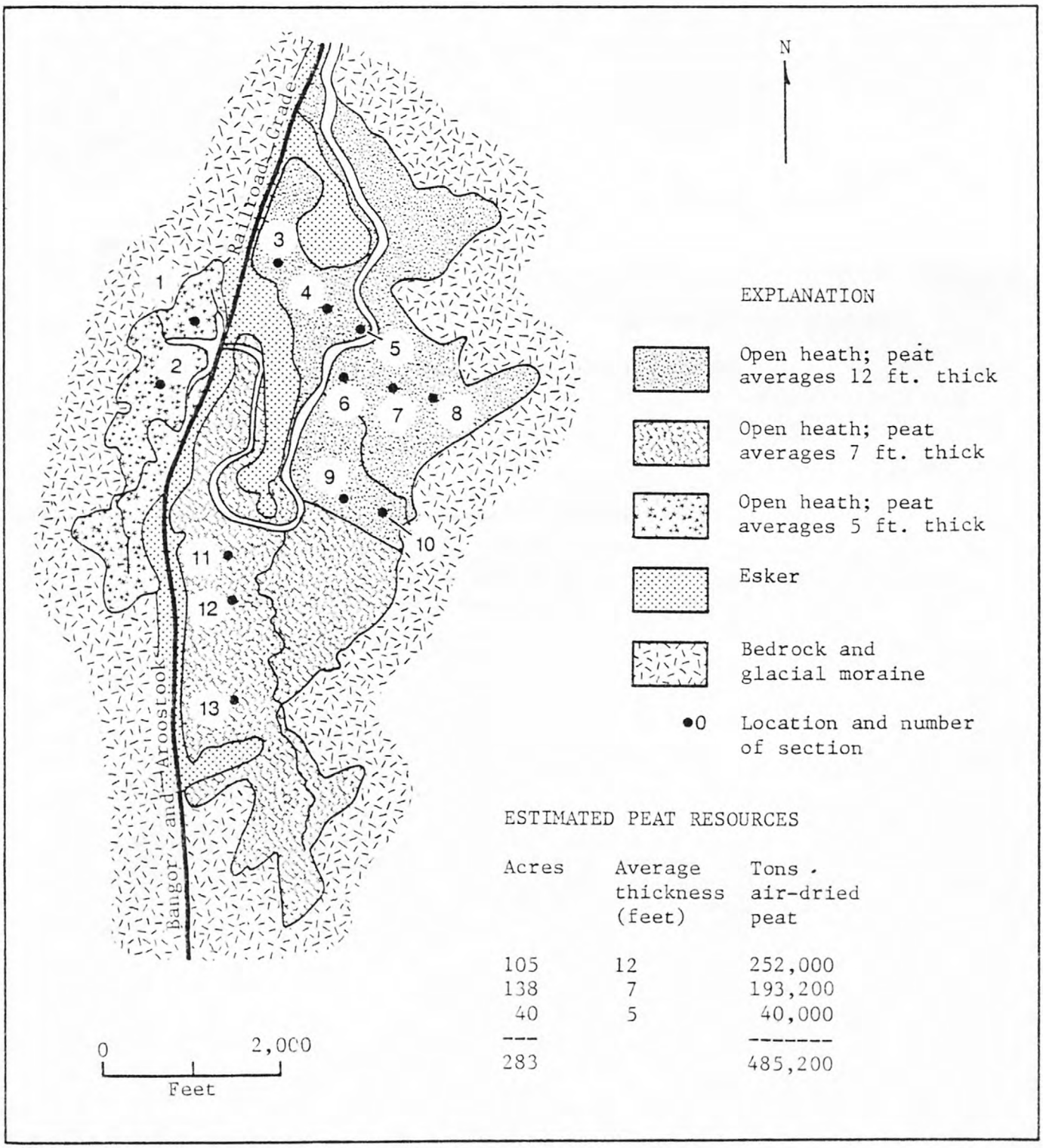
0 2,000

Feet

ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
110	12	264,000
65	5	65,000
175		329,000

Figure 39. Sketch map of bog southeast of Harris dam at outlet of Indian Pond, T1 R6 BKP EKR (Indian Stream Twp.) and T2 R5 BKP EKR (Squaretown Twp.), The Forks I5 minute Quadrangle, Somerset County, Maine. (Number 38 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
105	12	252,000
138	7	193,200
40	5	40,000
283		485,200

Figure 40. Sketch map of bog one mile south of Greenville Junction, T3 R5 BKP EKR (Little Squaw Twp.), Greenville L5 minute Quadrangle, Piscataquis County, Maine. (Number 39 on Index Map).

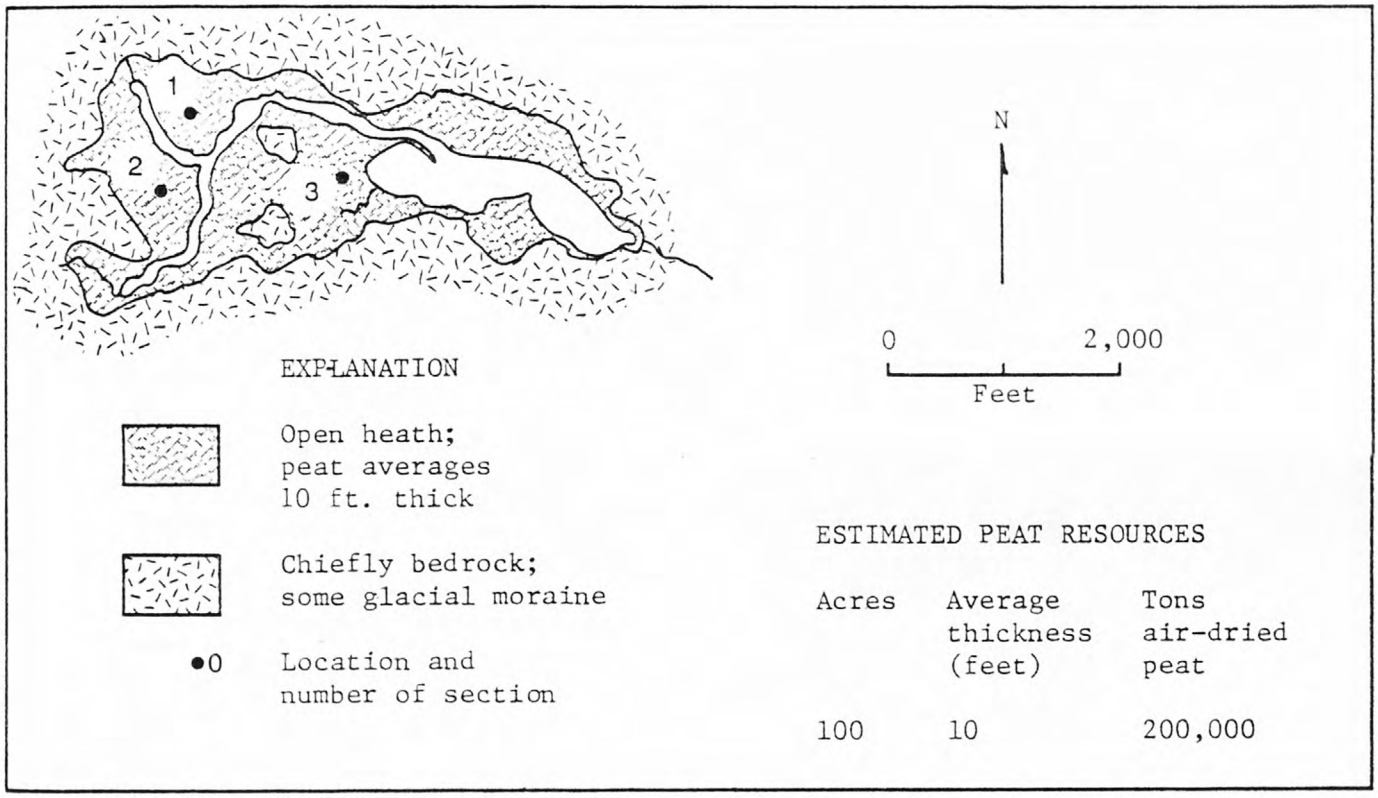


Figure 41. Sketch map of Ira Bog, T3 R5 BKP EKR (Little Squaw Twp.), Greenville 15 minute Quadrangle, Piscataquis County, Maine. (Number 40 on Index Map).

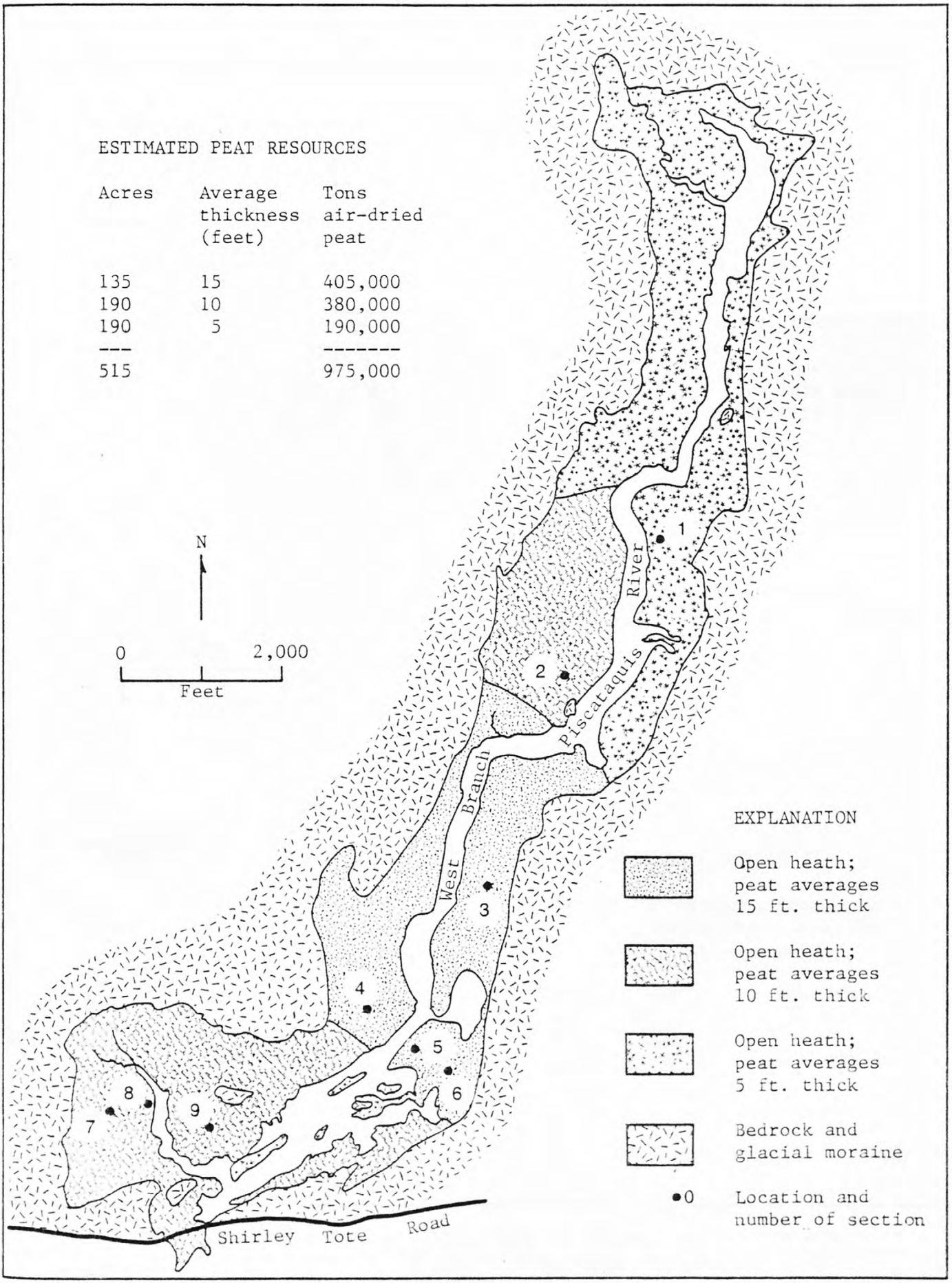
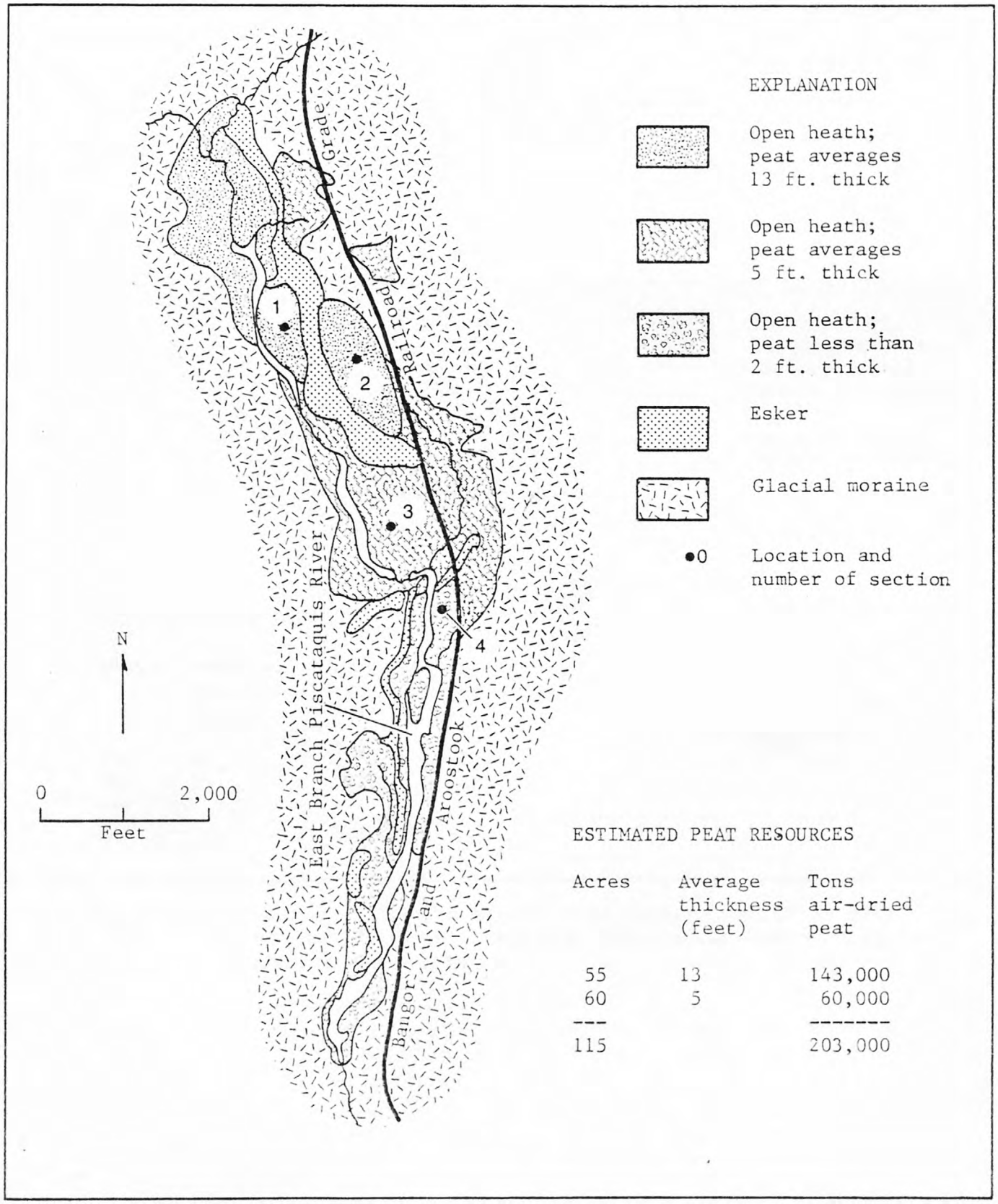


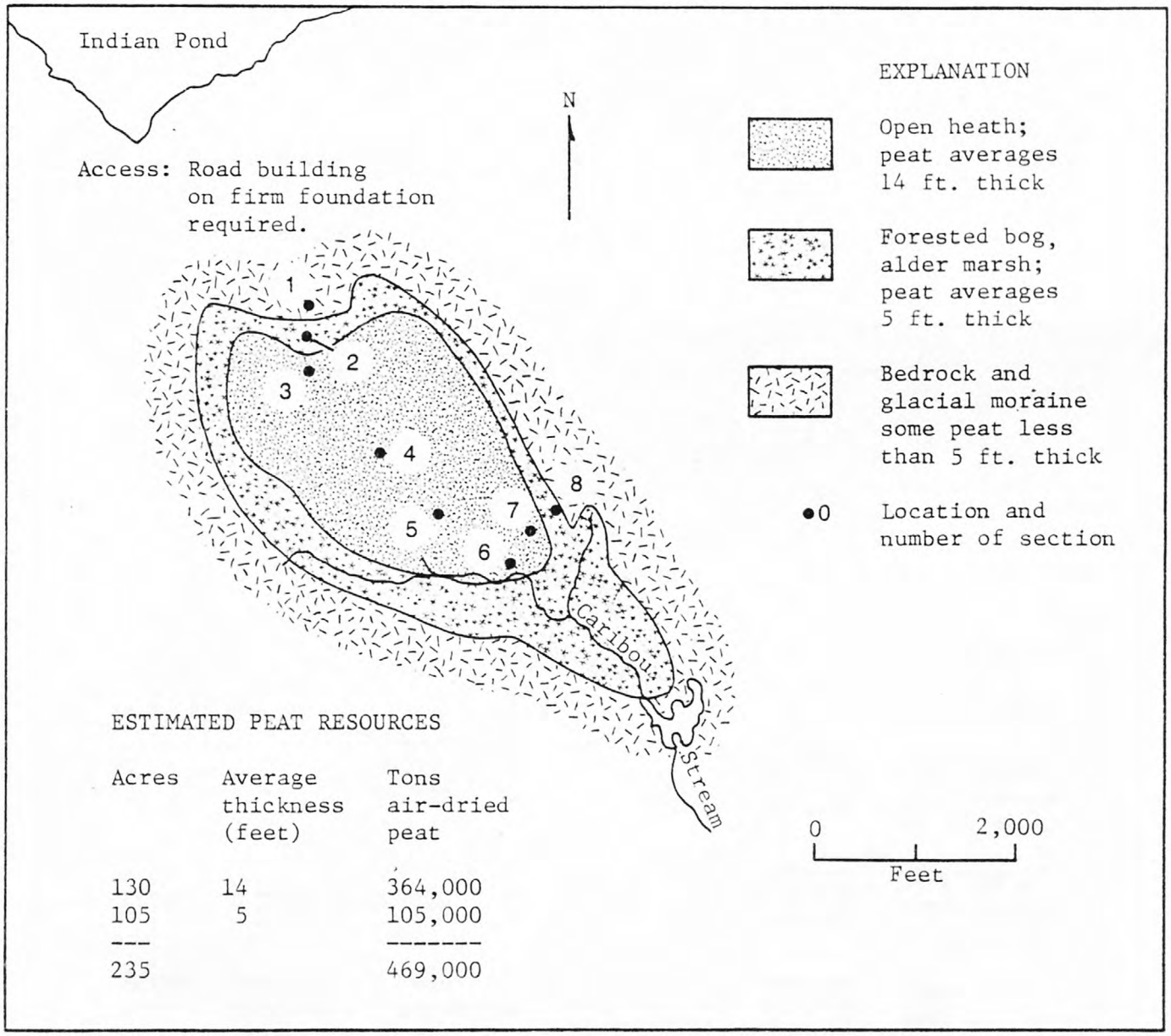
Figure 42. Sketch map of West Shirley Bog, T3 R5 BKP EKR (Little Squaw Twp.), Greenville 15 minute Quadrangle, Piscataquis County, Maine. (Number 41 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
55	13	143,000
60	5	60,000
115		203,000

Figure 43. Sketch map of East Shirley Bog, T3 R5 BKP EKR (Little Squaw Twp.), Greenville 15 minute Quadrangle, Piscataquis County, Maine. (Number 42 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
130	14	364,000
105	5	105,000
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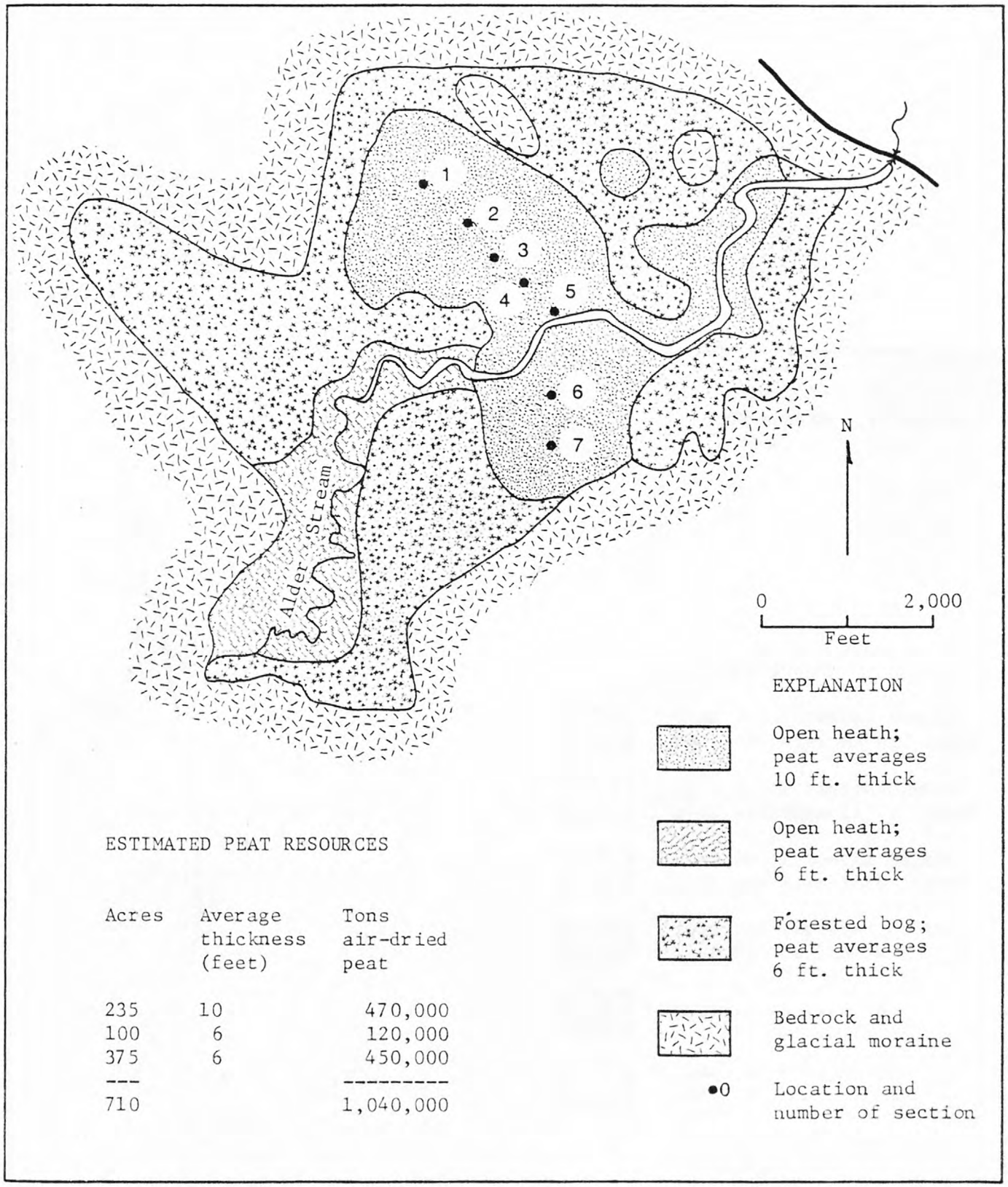
235		469,000

Figure 44. Sketch map of Caribou Bog south of Indian Pond, T7 R9 NWP, Sebec Lake 15 minute Quadrangle, Piscataquis County, Maine. (Number 43 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
235	10	470,000
100	6	120,000
375	6	450,000
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710		1,040,000

Figure 45. Sketch map of bog along Alder Stream 2 miles northeast of Atkinson Mills, Atkinson Twp., Dover-Foxcroft 15 minute Quadrangle, Piscataquis County, Maine. (Number 44 on Index Map).

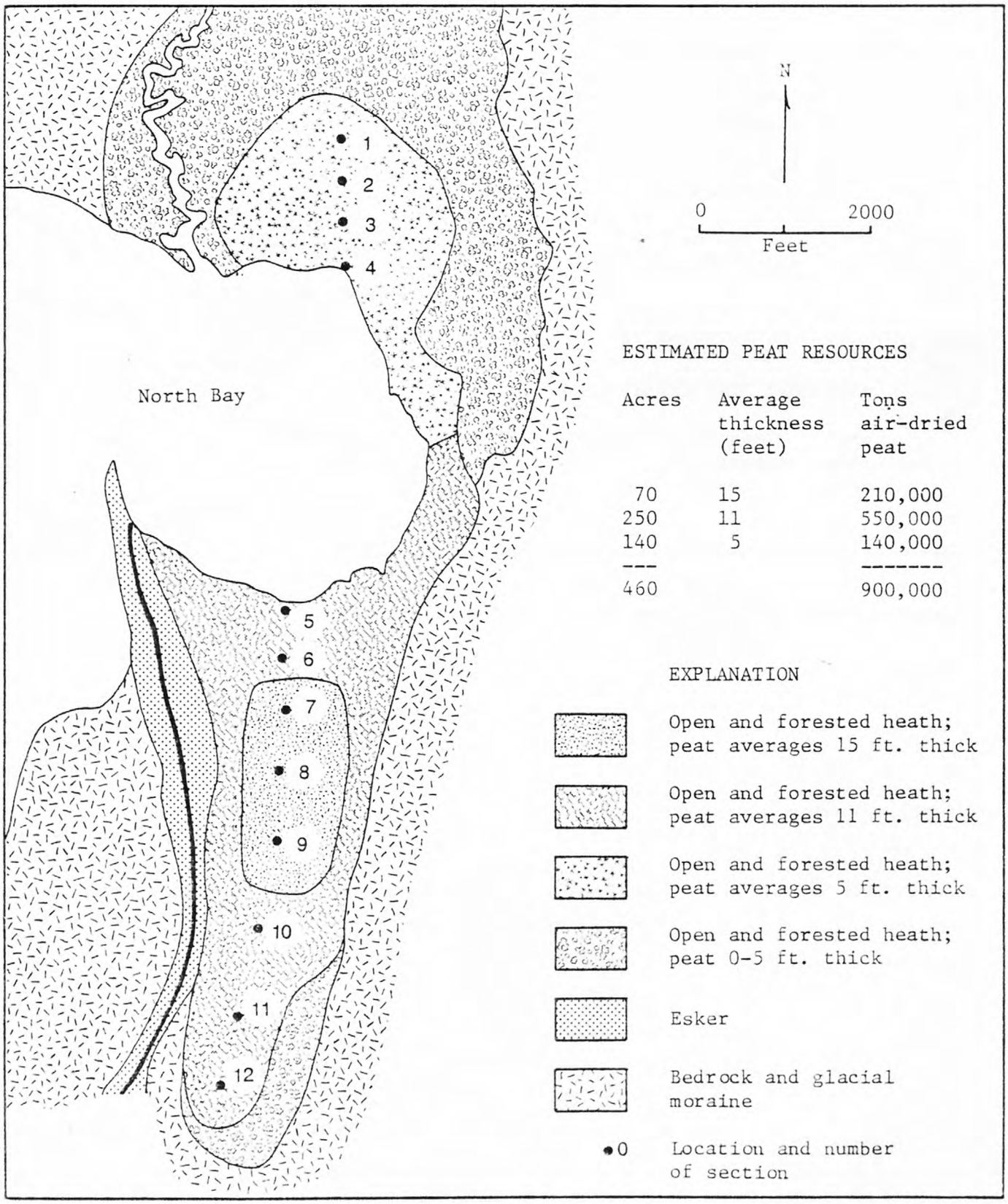


Figure 46. Sketch map of bogs adjacent to North Bay and west of Varney Hill and Bickford Hill, Smithfield and Belgrade Twps., Norridgewock 15 minute Quadrangle, Somerset and Kennebec Counties, Maine. (Number 45 on Index Map).

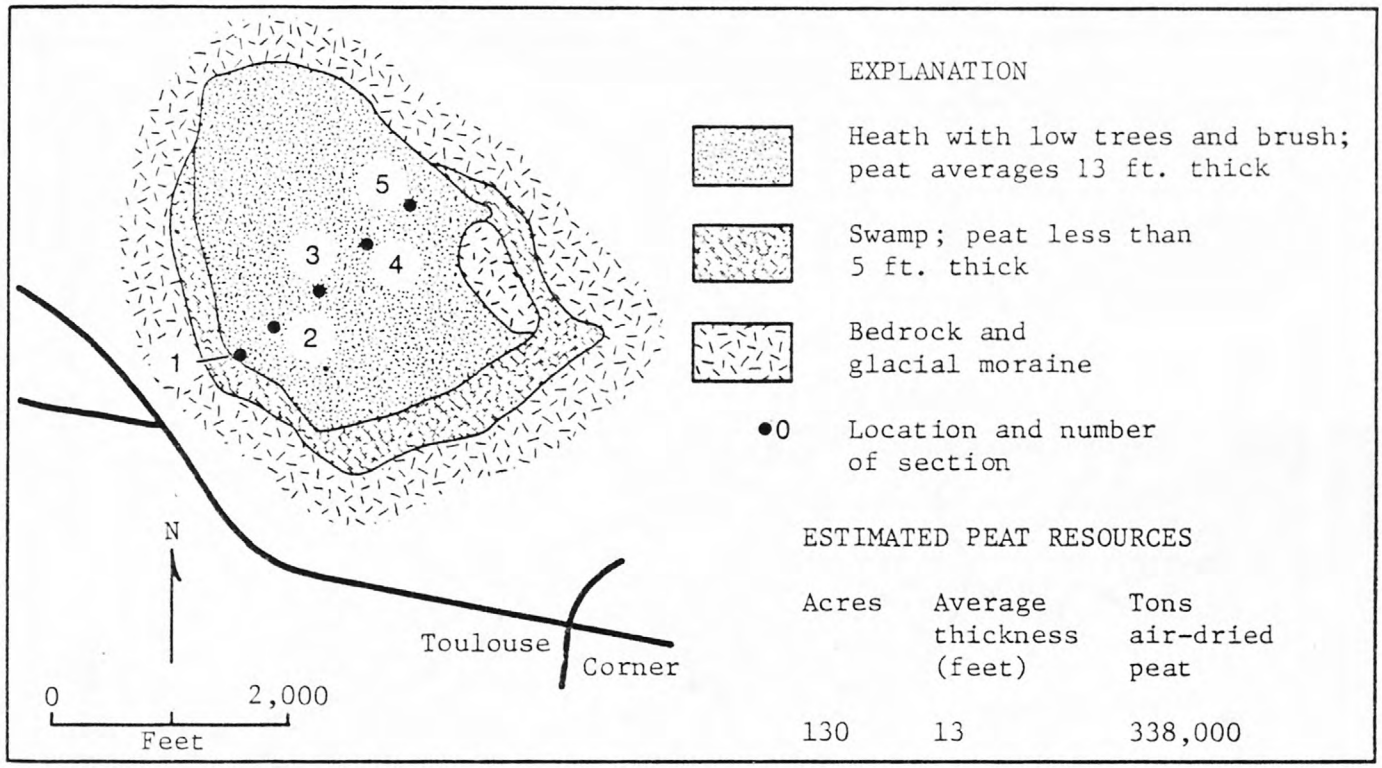


Figure 47. Sketch map of bog northwest of Toulouse Corner, Fairfield Twp., Waterville 15 minute Quadrangle, Somerset County, Maine. (Number 46 on Index Map).

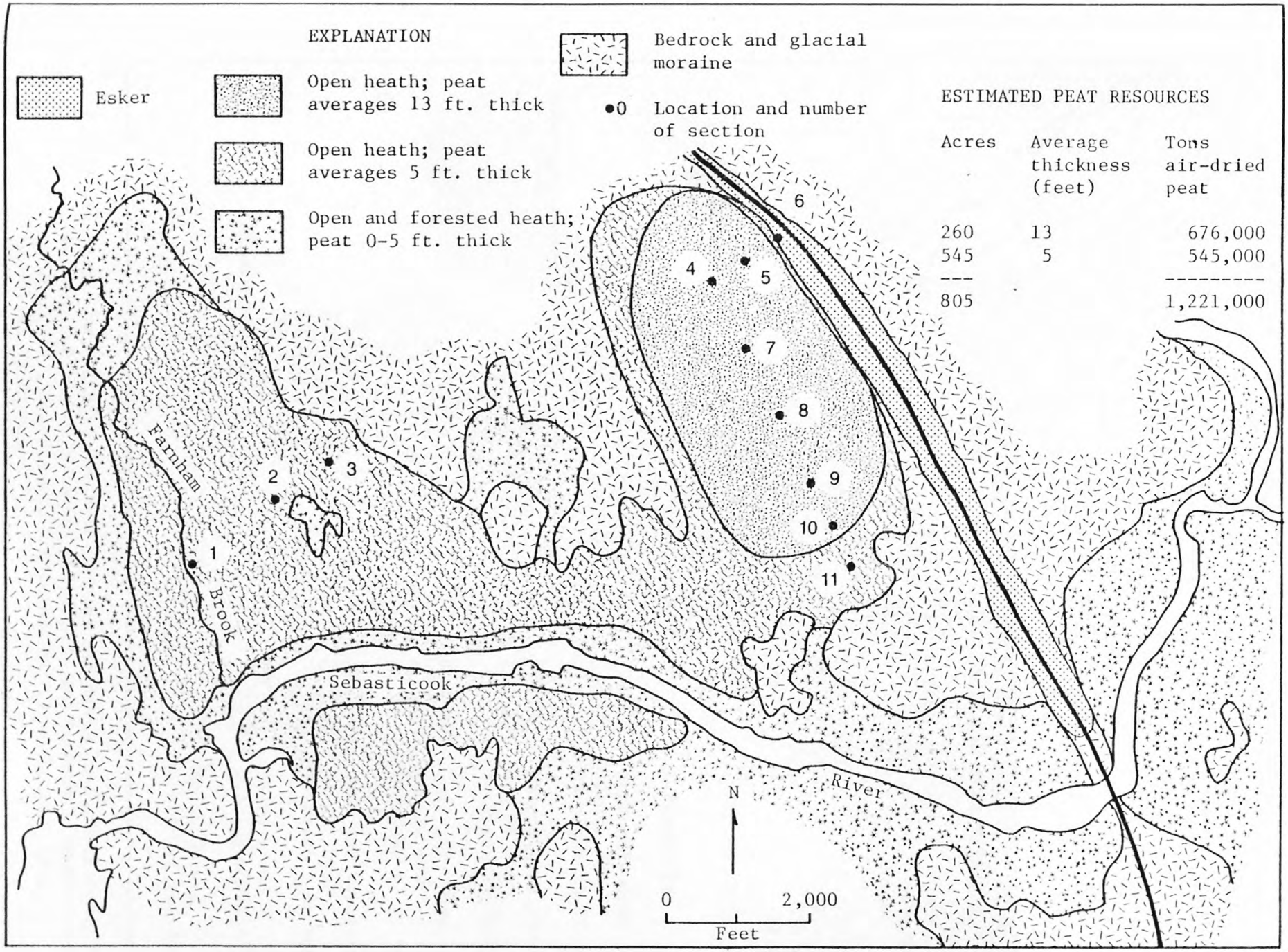


Figure 48. Sketch map of Big Meadow Bog south of Pittsfield, Pittsfield and Detroit Twps., Pittsfield 15 minute Quadrangle, Somerset County, Maine. (Number 47 on Index Map).

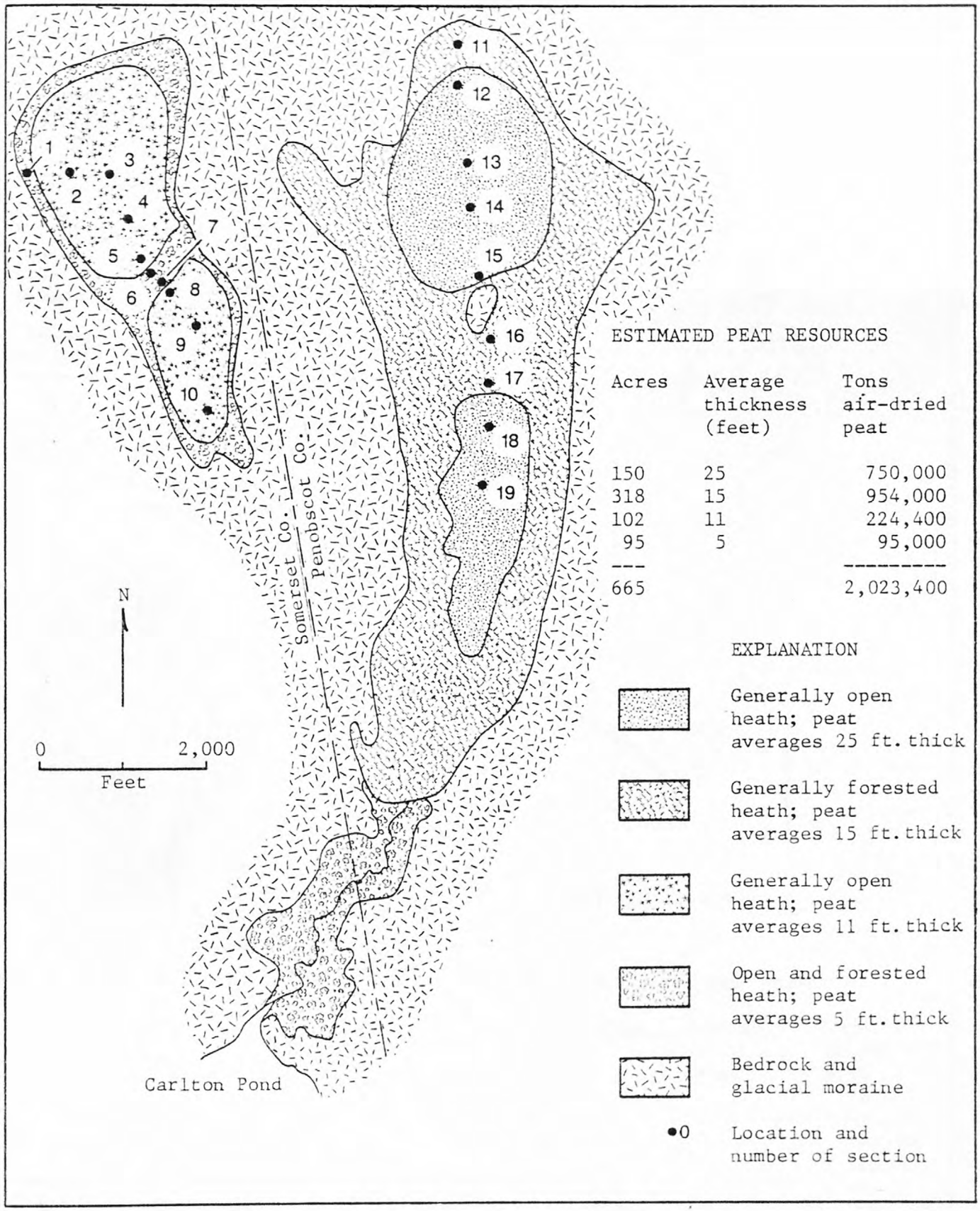
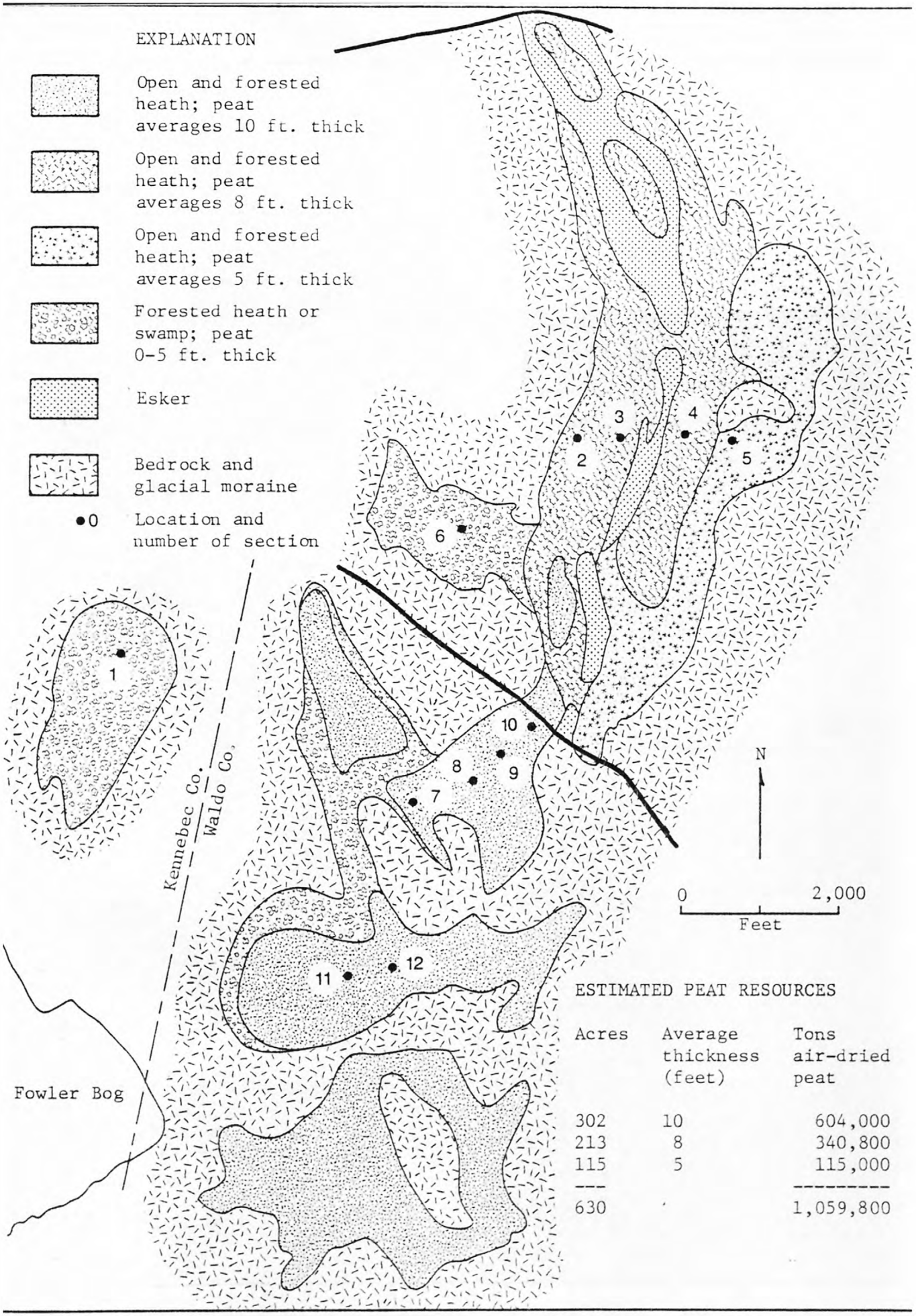


Figure 49. Sketch map of bogs south of Detroit and north of Carlton Pond, Detroit and Plymouth Twps., Pittsfield and Burnham 15 minute Quadrangles, Somerset and Penobscot Counties, Maine. (Number 48 on Index Map).



ESTIMATED PEAT RESOURCES

Acres	Average thickness (feet)	Tons air-dried peat
302	10	604,000
213	8	340,800
115	5	115,000
630		1,059,800

Figure 50. Sketch map of bogs north and east of Fowler Bog, Unity Twp., Burnham 15 minute Quadrangle, Kennebec and Waldo Counties, Maine. (Number 49 on Index Map).

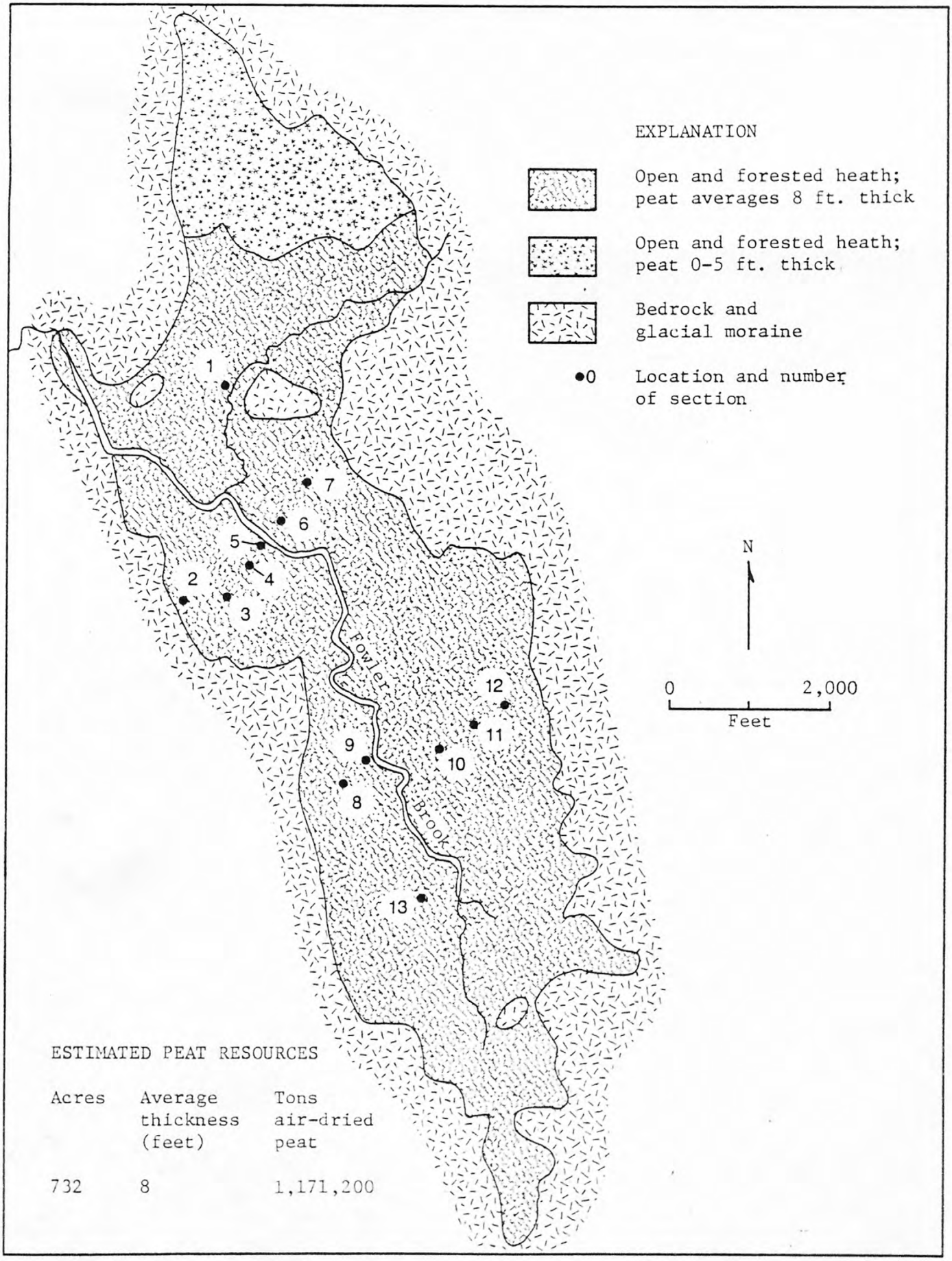


Figure 51. Sketch map of Fowler Bog, Albion and Unity Twps., Burnham 15 minute Quadrangle, Kennebec and Waldo Counties, Maine. (Number 50 on Index Map).