WATERFOWL SURVEY - 1970

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The Canadian Wildlife Service conducts annual aerial surveys on Prince Edward Island during the autumn migratory period. A banding program is also undertaken by the Canadian Wildlife Service during the summer months but no regular waterfowl breeding survey is conducted by the Service on Prince Edward Island. The Prince Edward Island Fish and Wildlife Division has undertaken such breeding surveys using breeding pair and brood counts obtained from boats or canoes. Data obtained by using this technique are difficult to analyse due to the disturbance caused and the large number of marshes visited infrequently and irregularly. A waterfowl census technique which could be used to obtain more reliable estimates and trends in waterfowl breeding populations on Prince Edward Island appeared necessary.

Territorialism and its importance in determining distribution and density of breeding waterfowl was first studied in detail by Hochbaum (1944). Since then it has been shown that for some ducks territorial boundaries are quite clearly delineated and regularly defended, while other species tend to show less evidence of such definite boundaries. Territorialism may vary with habitat and among individuals of the same species (Souls, 1955, Mendall, 1958, Stotts and Davis, 1960, and Reed,

1964). In any case, each breeding pair of ducks usually has a certain region of the marsh where activity is concentrated during the season. If such an area is observed at regular intervals throughout the breeding season most of the pairs occurring in the region should be accounted for. This is the basis for the present waterfowl breeding survey.

Objectives:

The objectives of the study are to choose an adequate number of typical waterfowl breeding regions and in these to set up permanent census areas to determine annual trends in breeding density, species composition, and brood production.

Study Areas:

Waterfowl habitat on Prince Edward Island can be divided into three general types: (a) coastal water (b) inland tidal water and (c) inland fresh water (Bartlett, 1961). The marshes chosen for observation included all three habitat types (Figure 1.1). The coastal water is represented by barrier-beach ponds (Figures XIX - XXIX) which vary in salinity from high salinities to fresh water. The inland tidal water, which includes the tidal portions of rivers and streams and artificial impoundments, varies considerably in salinity as well, due to the presence of control structures on many of the water systems (Figures XXX - XXXVII). Inland fresh water areas observed included a natural pond and lake as well as two mill ponds (Figures XXXVIII - XXXIX).

Some of the marshes are small and easily observed but others proved too large so only a section was observed (See figures I -

XVIII).

The vegetation in many of the areas chosen for observation has been studied by graduate students or Fish and Wildlife personnel so that no attempt was made to duplicate that work. Several of the water systems, including the three main types (coastal, inland tidal water and inland fresh water), are also being examined by Dr. H. Harries of Mount Allison University for the Canadian Wildlife Service.

Methods:

Census methods and the resultant data interpretation are controversial topics. Diem and Lu (1960) suggest that "Any accurate determination of numbers of waterfowl requires basic investigations of numerous factors such as the habits and activities of waterfowl, the geographical location and topography of the area to be censused, weather conditions, seasonal vegetation developments, and the variability in aptitude of census personnel". Bearing these factors in mind, the following steps were taken in setting up the waterfowl breeding survey:

1. Permanent blinds were constructed (unless the natural vegetation appeared ample). These sites were located high above the marsh for visibility. Both the blind location and survey area were marked for use in future years (See figures I - XVIII).
2. Surveys were generally conducted between 0700 and 1100 hours Daylight Saving Time.

3. Each site was checked at approximately the same time as on previous visits (See Dwyer, 1970).
4. Observation areas were visited bimonthly during May, June, and July to obtain counts of breeding birds and broods.
5. In order to reduce observer bias the number of people conducting the survey was limited. Additional brood sightings from various regions by other observers proved invaluable for determination of brood size.
6. Each site was observed for about one hour (more if much disturbance) on each visit.
7. The census was not conducted during inclement weather. Temperatures were over 40°F and winds not in excess of 20 miles per hour.
8. Most observations were made with 7 x 35 binoculars but at some sites a telescope was used.

Estimates of areas and perimeters of the various study regions (Table I) were obtained from field observations, 1968 aerial photos, and in some cases, from the files of the Prince Edward Island Fish and Wildlife Division.

Results and Discussion:

From his work on Prairie waterfowl Dzubin (1969:218) concluded that the best time to census breeding waterfowl was from 0800 to 1200 hours, local standard time, when all species are least mobile and pairs and lone drakes are most likely to be on their waiting sites. However, many of the sites chosen for observation are also sport fishing areas, and less disturbance was encountered by starting counts somewhat earlier.

The number of waterfowl sightings in each of the observation areas is given in Table II. No attempt has been made to correlate the number of broods observed with the estimated breeding pairs for the following reasons:

1. Broods tend to move in and out of the observation areas.
2. The best times for brood sighting appear to be early morning or evening (especially in areas with much human disturbance).
3. Some species (eg. Anas rubripes) hatch earlier than others (eg. Anas discors) and broods of the former type are more likely to be seen when observing for a limited time from a blind.
4. Vegetation is higher when clutches of late nesters hatch and these brooods are more difficult to observe.

The average waterfowl brood size (Table IV) was obtained by using broods sighted on the 18 study areas as well as adjacent sites. There was no evidence of brood combination but this phenomenon has often been reported (Bennett, 1938, Wright, 1954, Mendall, 1958, and Ferguson, 1967). The average brood size observed compares very favorably with the best production reported elsewhere (See Wright, 1954, Mendall, 1958, and Beard, 1964).

The number of breeding pairs was estimated per 100 acres of marsh and per 1000 feet of water perimeter observed (Table III). It is felt that the latter figure is a more accurate estimation of breeding pairs. When large areas of water are involved the estimate of breeding pairs per 100 acres of marsh appears high.

The percentage composition of waterfowl observed is given in Table V. The number of green-winged teal (Anas carolinesis)

appears to be excessively low. However, the green-winged teal is a more secretive bird than the blue-winged teal (Anas discors) and generally nests in more remote areas. The percentage of black ducks observed appears to be somewhat lower than formerly reported (Bartlett, 1964), but it is felt that this is likely due to the marshes sampled rather than a decrease in the population.

Conclusions:

It is felt that the present technique will suffice to determine annual trends in waterfowl production on Prince Edward Island. However, if a more intensive effort is deemed necessary to observe broods, it should be concentrated in the last half of July. It may also be desirable to add two more sites to the areas observed to include more fresh water marsh.

Acknowledgements:

For financial assistance, I am grateful to the Canadian Wildlife Service and the Prince Edward Island Fish and Wildlife Division. I would like to thank Art Smith, Randy Dibblee, Wally Coulson and especially Walter Stewart for invaluable field assistance. I wish to also thank Stan Vass for enabling the survey to be conducted and for aid which he offered through his Division.

Table I - Estimates of Areas and Perimeters of Study Regions

Location	Habitat Type	Total Water Area (acres)	Total Marsh Area (acres)	Total Water Perimeter (feet)	Total Water Perimeter : Total Water Area	Water Area Observed (acres)	Marsh Area Observed (acres)	Water Perimeter Observed (feet)	Water Perimeter : Water Area Observed
Black Pond	Coastal-Barrier Beach	86.0[1]	1.5[1]	17,200	200	10	Trace	2,600	260
Campbell's Pond	Coastal-Barrier Beach	35[1]	15[1]	12,540[1]	358	10	2	5,100	510
Cow Creek	Coastal-Barrier Beach	4.0	8	5,000	1,250	2	5	3,000	1,500
Deroche Pond	Coastal-Barrier Beach	287[1]	95[1]	54,510[1]	190	7	1	2,700	386
Kildare Creek	Coastal-Barrier Beach	17	13	9,600	565	4	6	2,500	625
Rayner's Pond	Coastal-Barrier Beach	6	4	3,000	500	6	4	3,000	500
Round Pond	Coastal-Barrier Beach	34	27	12,500	368	9	9	5,000	556
Steel's Pond	Coastal-Barrier Beach	12	9	5,200	433	11	5	4,500	409

1 - Data from files of P.E.I. Fish & Wildlife Division

Table I - Continued

Location	Habitat Type	Total Water Area (acres)	Total Marsh Area (acres)	Total Water Perimeter (feet)	Total Water Perimeter : Total Water Area	Water Area Observed (acres)	Marsh Area Observed (acres)	Water Perimeter Observed (feet)	Water Perimeter : Water Area Observed
Bedeque Pond	Inland Tidal (control structures)	29	12	8,500	293	4	4	2,500	625
Indian River	Inland Tidal (control structures)	43	9	11,800	274	24	4	4,700	196
Lake Verde	Inland Fresh Water	35	2	4,800	137	35	2	4,800	137
Leccos Pond	Inland Tidal (control structures)	21	2	7,590	361	10	Trace	2,600	260
Mount Stewart Marsh	Inland Tidal (control structures)	142[1]	567[1]	51,810[1]	365	9	18	4,000	444
North River	Inland Tidal (control structures)	416[1]	53[1]	72,600[1]	175	10	4	3,200	320
Officers' Pond	Inland Fresh Water	41	13	13,000	317	10	1	3,000	300
Pisquid River	Inland Tidal	86.5[1]	208.5[1]	33,990[1]	393	26	36	7,000	269

Table I - Continued

Location	Habitat Type	Total Water Area (acres)	Total Marsh Area (acres)	Total Water Perimeter (feet)	Total Water Perimeter : Total Water Area	Water Area Observed (acres)	Marsh Area Observed (acres)	Water Perimeter Observed (feet)	Water Perimeter : Water Area Observed
Pisquid Pond	Inland Fresh Water	95	15	9,000[2]	95	15	1	1,400	93
Tryon Pond	Inland Fresh Water	5	4	5,500	1,100	5	3	5,200	1,040
Totals		1,394.5	1085	338,140	7,374	207	105	66,800	8,430
Averages		77.5	58.8	18,785.6	409.7	11.5	5.8	3,711.0	468.3

Percent of Total Water Area Observed = 14.8

Percent of Total Marsh Area Observed = 9.9

Percent of Total Perimeter Observed = 19.8

1 Data from files of P.E.I. Fish & Wildlife Division
2 Estimate for May

Table II - Waterfowl Sightings in Observation Areas

Location	Species	Pairs Observed	Singles Observed	Estimated[1] Breeding Pairs	Broods Observed
Black Pond	Anas rubripes	1	-	1	-
	Anas platyrhynchos	-	1	1	-
				2	
Campbell's Pond	Anas rubripes	1	-	1	-
	Anas discors	-	1	1	-
	Aythya collaris	2	1	3	-
				5	
Cow Creek	Anas rubripes	1	-	1	-
	Anas discors	2	2	4	-
				5	
Deroche Pond	Anas rubripes	1	-	1	-
	Anas discors	1	-	1	-
	Mareca americana	-	1	1	-
	Aythya collaris	1	-	1	3[2]
				4	
Kildare Creek	Anas discors	1	-	1	-
				1	
Rayner's Pond	Anas rubripes	2	-	2	-
	Anas discors	1	-	1	-
	Mergus merganser	1	-	1	-
				4	
Round Pond	Anas rubripes	2	2	4	-
	Anas discors	2	2	4	1
	Anas acuta	1	1	2	1
	Mergus merganser	1	-	1	-
				11	
Steel's Pond	Anas rubripes	2	-	2	2
	Anas discors	1	1	2	1
	Anas carolinensis	-	2	2	-
	Aythya collaris	3	-	3	1
	Mareca americana	1	1	2	1
				11	

Table II - Continued

Location	Species	Pairs Observed	Singles Observed	Estimated[1] Breeding Pairs	Broods Observed
Bedeque Pond	Anas rubripes	-	1	1	1
	Anas discors	1	1	2	-
	Aythya collaris	-	1	1	-
				4	
Indian River	Anas rubripes	1	-	1	-
	Anas platyrhynchos	2	-	2	1
	Anas discors	-	4	4	-
	Anas carolinensis	1	-	1	-
	Anas strepera	1	-	1	-
	Anas acuta	-	1	1	-
	Mareca americana	-	2	2	-
				12	
Leccos Pond	Anas rubripes	1	1	2	-
	Anas discors	1	1	2	2
	Anas carolinensis	1	-	1	-
	Mareca americana	1	-	1	-
	Mergus merganser	1	-	1	-
				7	
Mount Stewart	Anas rubripes	1	1	2	-
	Anas discors	-	1	1	-
	Anas acuta	-	2	2	4[2]
				5	
North River	Anas rubripes	2	1	3	5[2]
	Anas discors	2	1	3	4[2]
	Anas carolinensis	3	1	4	-
	Anas platyrhynchos	-	1	1	-
	Aythya collaris	2	-	2	-
	Aix sponsa	1	-	1	-
				14	
Pisquid River	Anas rubripes	2	2	4	1
	Anas acuta	1	-	1	-
				5	

Table II - Continued

Location	Species	Pairs Observed	Singles Observed	Estimated[1] Breeding Pairs	Broods Observed
Lake Verde	-	-	-	nil	-
Officer's Pond	Anas rubripes	2	-	2	1
	Anas discors	2	2	4	-
	Aythya collaris	1	1	2	-
				8	
Pisquid Pond	Anas rubripes	1	3	4	5[2]
	Anas discors	2	-	2	2[2]
	Aythya collaris	1	1	2	1
				8	
Tryon Pond	Anas rubripes	3	-	3	1
	Anas discors	2	-	2	1
	Anas carolinensis	2	-	2	-
				7	

1 Pairs Estimated = No. Pairs + No. Singles (assumed to be waiting drakes)
2 Includes broods sighted near observation area

Table III - Estimated Breeding Pairs

Location	Water Perimeter Observed (feet)	Marsh And Water Area Observed (acres)	Estimated Number of Breeding Pairs in Observation Area	Estimated Breeding Pairs per 1000 feet of Water Perimeter Observed	Estimated Breeding Pairs per 100 acres of Marsh (including water)
Black Pond	2,600[1]	10	2	0.8	20
Campbell's Pond	5,100	12	5	1.0	42
Cow Creek	3,000	7	5	1.7	71
Deroche Pond	2,700	8	4	1.5	50
Kildare Creek	2,500	10	1	0.4	10
Rayner's Pond	3,000	10	4	1.3	40
Round Pond	5,000	18	11	2.2	61
Steel's Pond	4,500	16	11	2.4	69
	28,400	91	43		
Averages for Coastal Barrier Beach Habitat	3,550	11.4	5.4	1.5	47

Table III - Continued

Location	Water Perimeter Observed (feet)	Marsh And Water Area Observed (acres)	Estimated Number of Breeding Pairs in Observation Area	Estimated Breeding Pairs per 1000 feet of Water Perimeter Observed	Estimated Breeding Pairs per 100 acres of Marsh (including water)
Bedeque Pond	2,500	8	4	1.6	50
Indian River	4,700	28	12	2.6	43
Leccos Pond	2,600	10	7	2.7	70
Mount Stewart	4,000	27	5	1.3	19
North River	3,200	14	14	4.4	100
Pisquid River	7,000	62	5	0.7	8
Averages for Inland Tidal Water	4,000	24.8	7.8	2.0	31

Table III - Continued

Location	Water Perimeter Observed (feet)	Marsh And Water Area Observed (acres)	Estimated Number of Breeding Pairs in Observation Area	Estimated Breeding Pairs per 1000 feet of Water Perimeter Observed	Estimated Breeding Pairs per 100 acres of Marsh (including water)
Lake Verde	4,800	37	0	0.0	0
Officers' Pond	3,000	11	8	2.7	73
Pisquid Pond	1,400	16	8	5.7	50
Tryon Pond	5,200	8	7	1.3	88
Averages For Inland Fresh Water	3,800	18	5.75	1.5	32
Averages For All Observation Areas	3,711	17.3	6.3	1.7	36

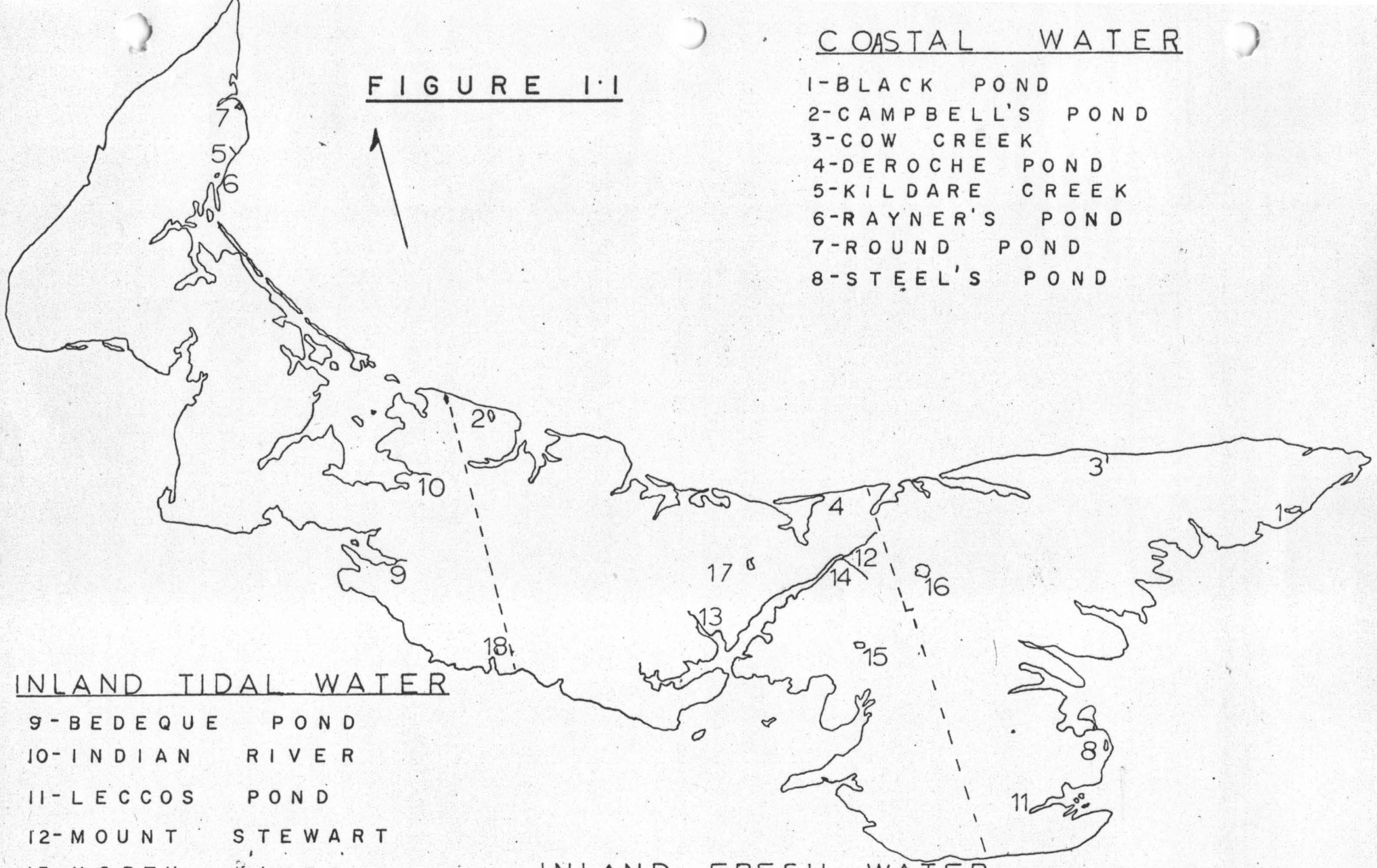
Table IV - Average Waterfowl Brood Sizes - 1970

Species	Age Class I	Age Class II	Age Class III	Average for Species
Anas rubripes	8.4(14)	6.7(12)	8.5(8)	7.8(34)
Anas discors	7.0(8)	8.8(4)	8.0(1)	7.6(13)
Aytha collaris	8.7(3)	6.5(6)	-	7.2(9)
Anas acuta	-	7.0(5)	8.0(1)	7.2(6)
Anas carolinensis	-	6.6(5)	-	6.6(5)
Mareca americana	8.0(1)	-	-	8.0(1)
Anas platyrhynchos	-	3.0(1)	-	3.0(1)
Averages for Age Classes	8.0(26)	6.8(33)	8.4(10)	

Table V - Percentage Composition of Waterfowl in Observation Areas

Species	Total Estimated No. of Breeding Pairs	Percentage Composition
Anas rubripes	34	30.1
Anas discors	34	30.1
Aythya collaris	14	12.3
Anas carolinensis	10	8.8
Anas acuta	6	5.3
Mareca americana	6	5.3
Anas platyrhynchos	4	3.5
Mergus merganser	3	2.7
Aix sponsa	1	0.9
Anas strepera	1	0.9
	113	

FIGURE 1·1



COASTAL WATER

1-BLACK POND
2-CAMPBELL'S POND
3-COW CREEK
4-DEROCHE POND
5-KILDARE CREEK
6-RAYNER'S POND
7-ROUND POND
8-STEEL'S POND

INLAND TIDAL WATER

9-BEDEQUE POND
10-INDIAN RIVER
11-LECCOS POND
12-MOUNT STEWART
13-NORTH RIVER
14-PISQUID RIVER

INLAND FRESH WATER

15-LAKE VERDE
16-PISQUID POND
18-TRYON POND
17-OFFICER'S POND

PRINCE EDWARD ISLAND

0 10 20
scale miles

FIGURE I

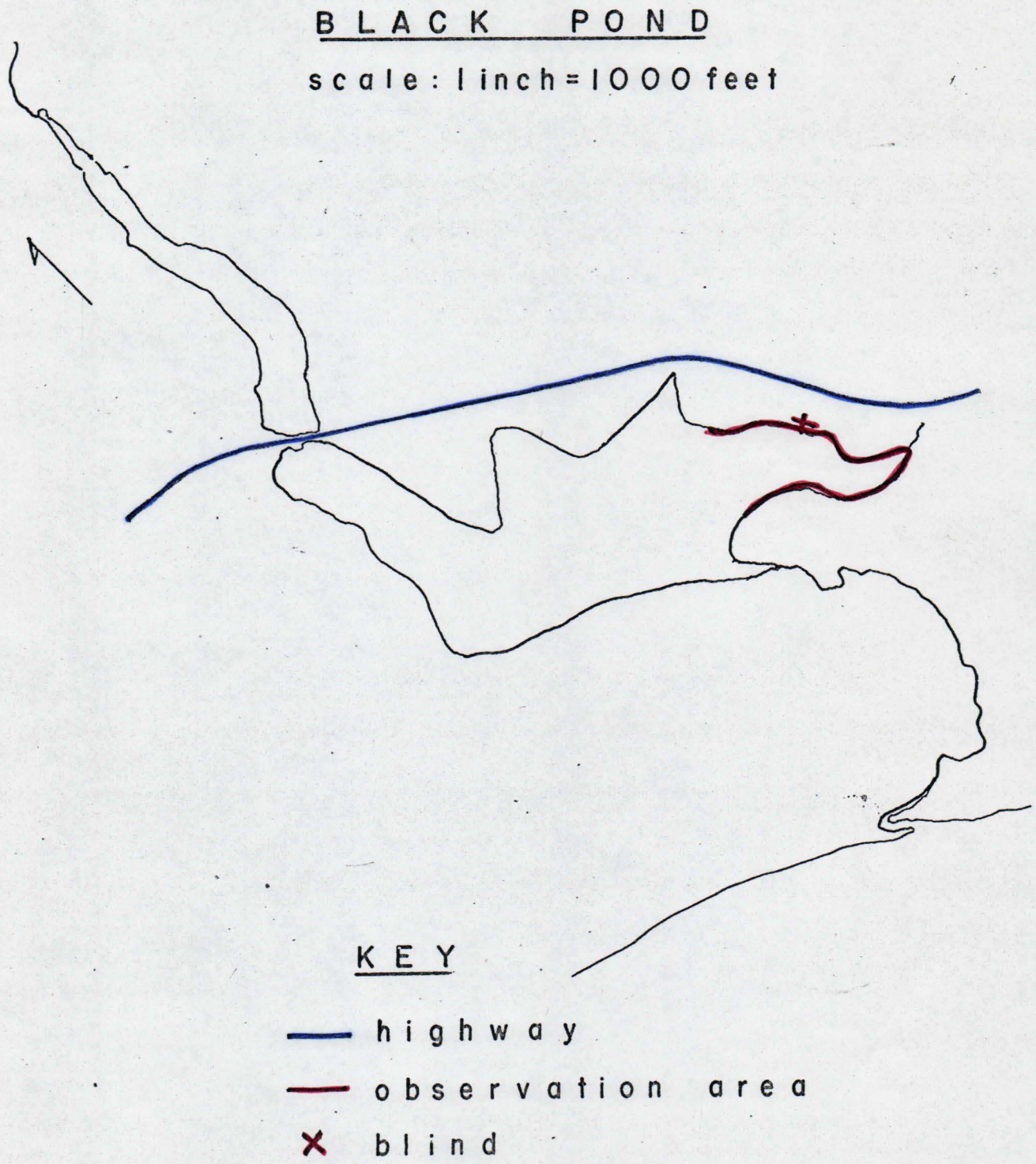
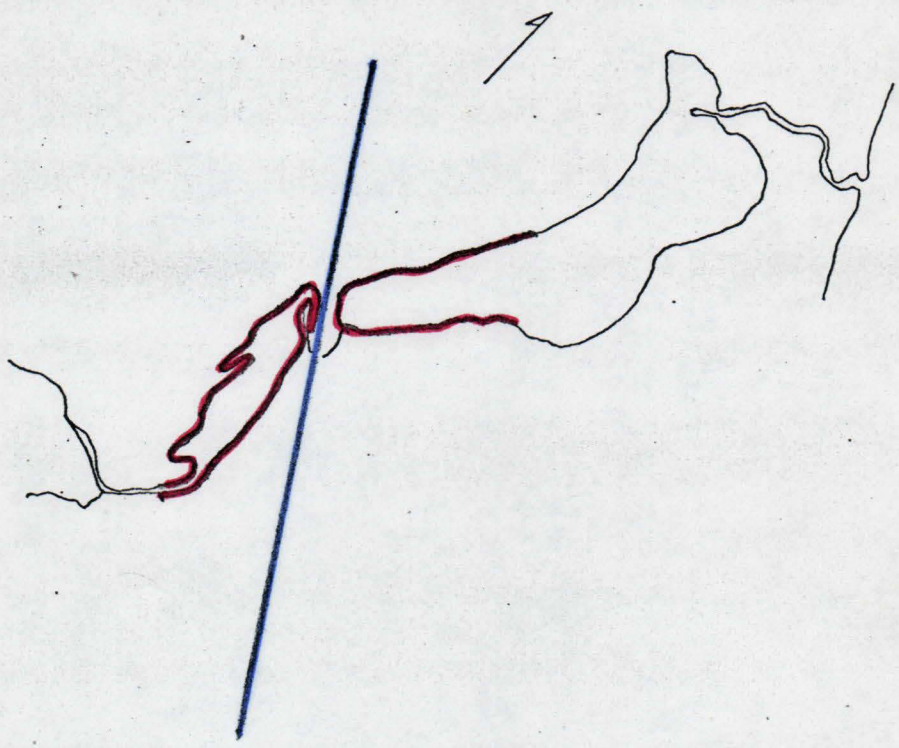

BLACK POND
scale: 1 inch = 1000 feet
KEY
highway
observation area
blind

FIGURE II

CAMBELL'S POND

scale: 1 inch = 1000 feet



KEY

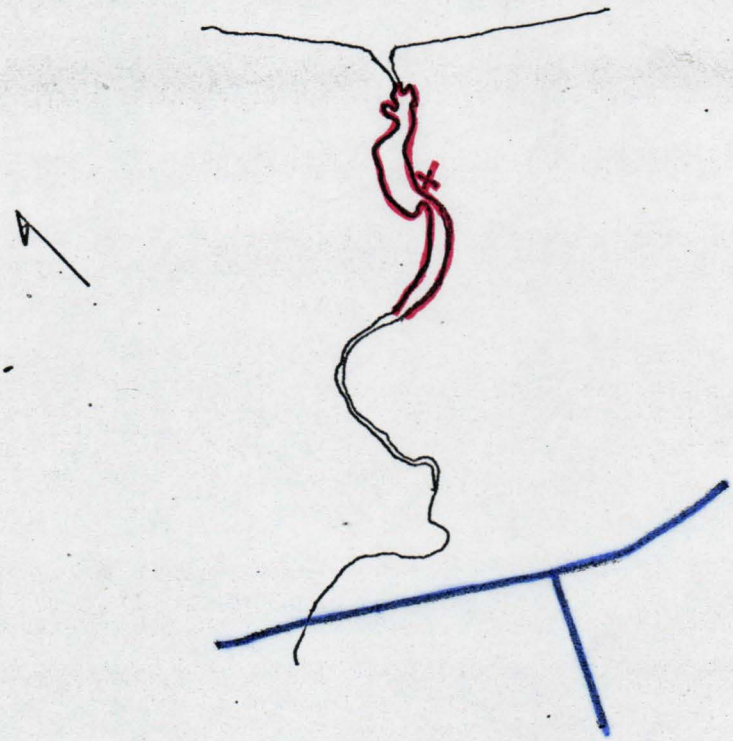
highway

observation area

FIGURE III

COW CREEK

scale: 1 inch = 1000 feet



KEY

highway

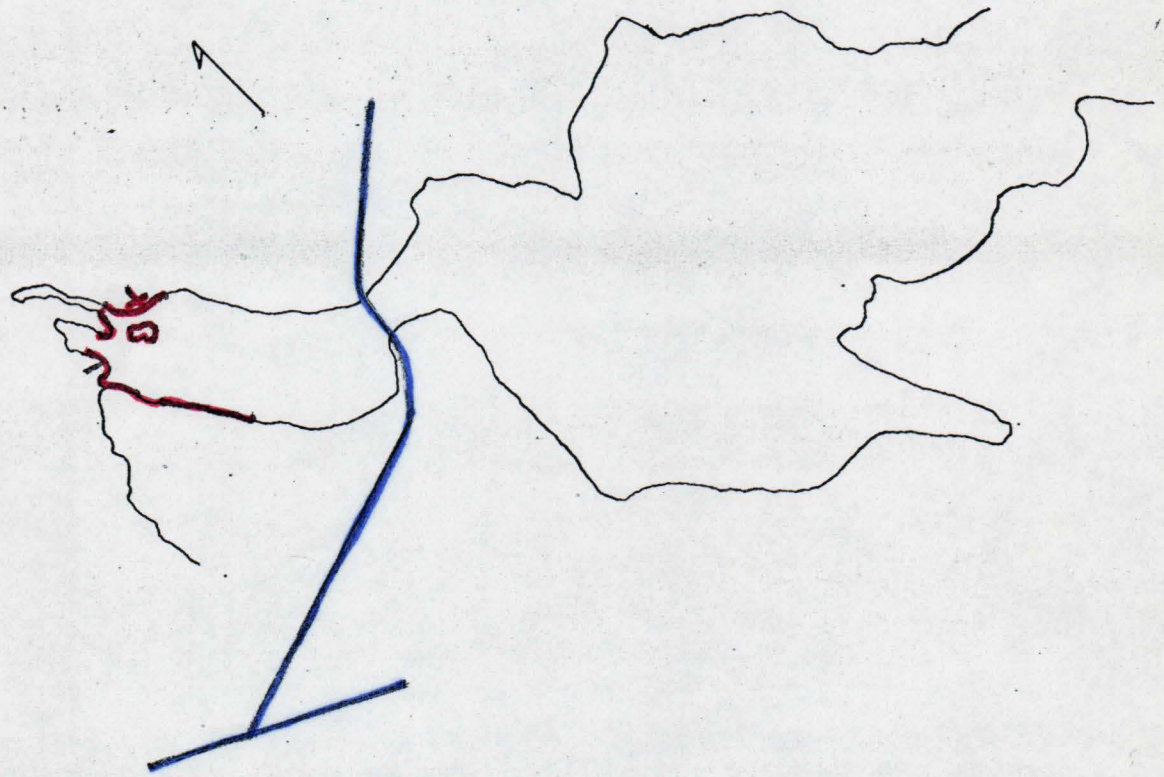
observation area

X blind

FIGURE IV

DEROCHE POND
(western section)

scale: 1 inch = 1000 feet



KEY

highway

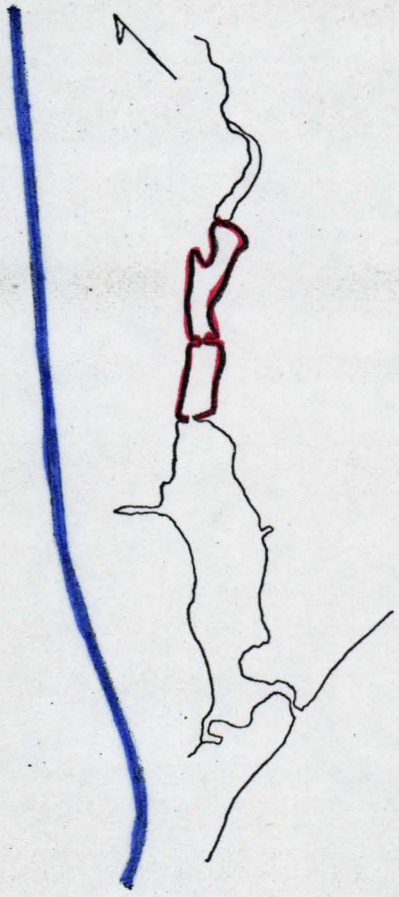
observation area

blind

FIGURE V

KILDARE CREEK

scale: 1 inch = 1000 feet



KEY

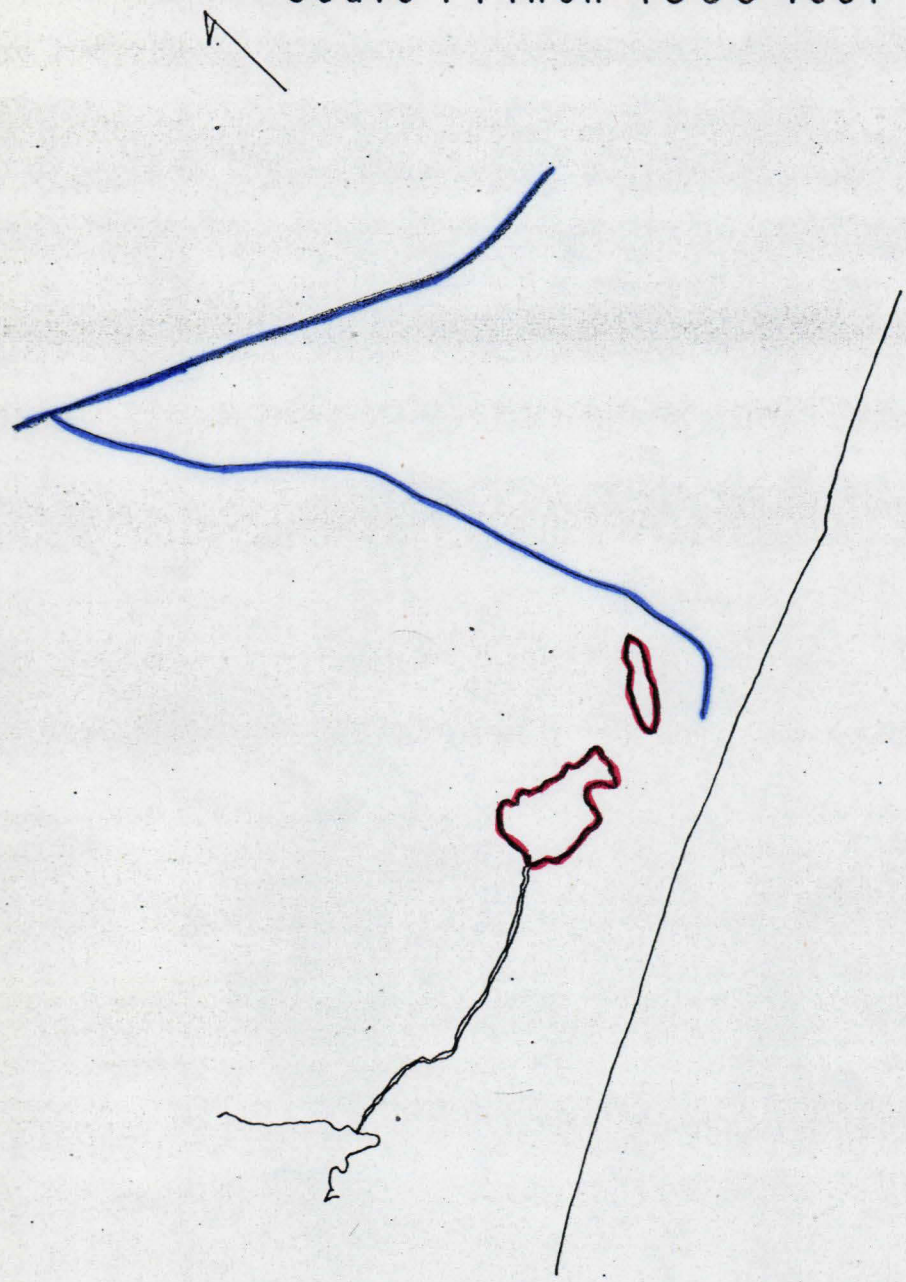
highway

observation area

FIGURE VI

RAYNER'S POND

scale : 1 inch=1000 feet



KEY

highway

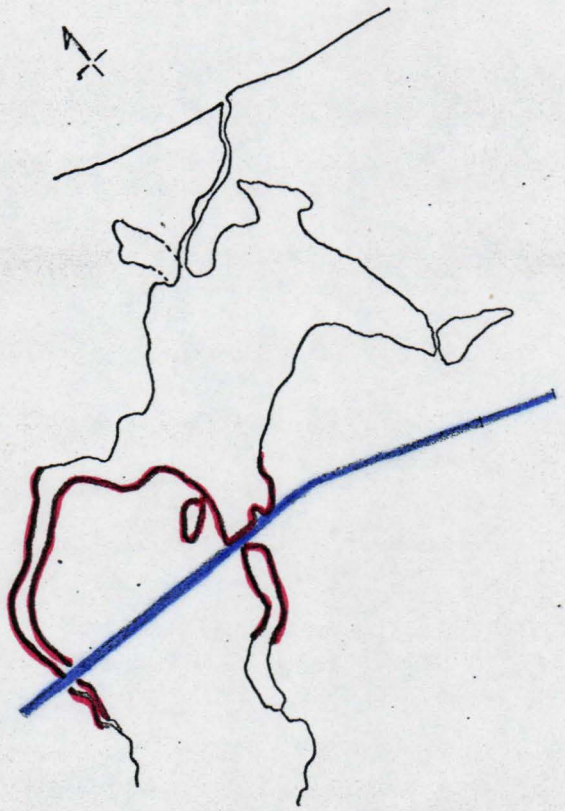
trail

observation area

FIGURE VII

ROUND POND

scale : 1 inch = 1000 feet



KEY

highway

observation area

FIGURE VIII

STEELE'S POND

scale: 1 inch = 1000 feet

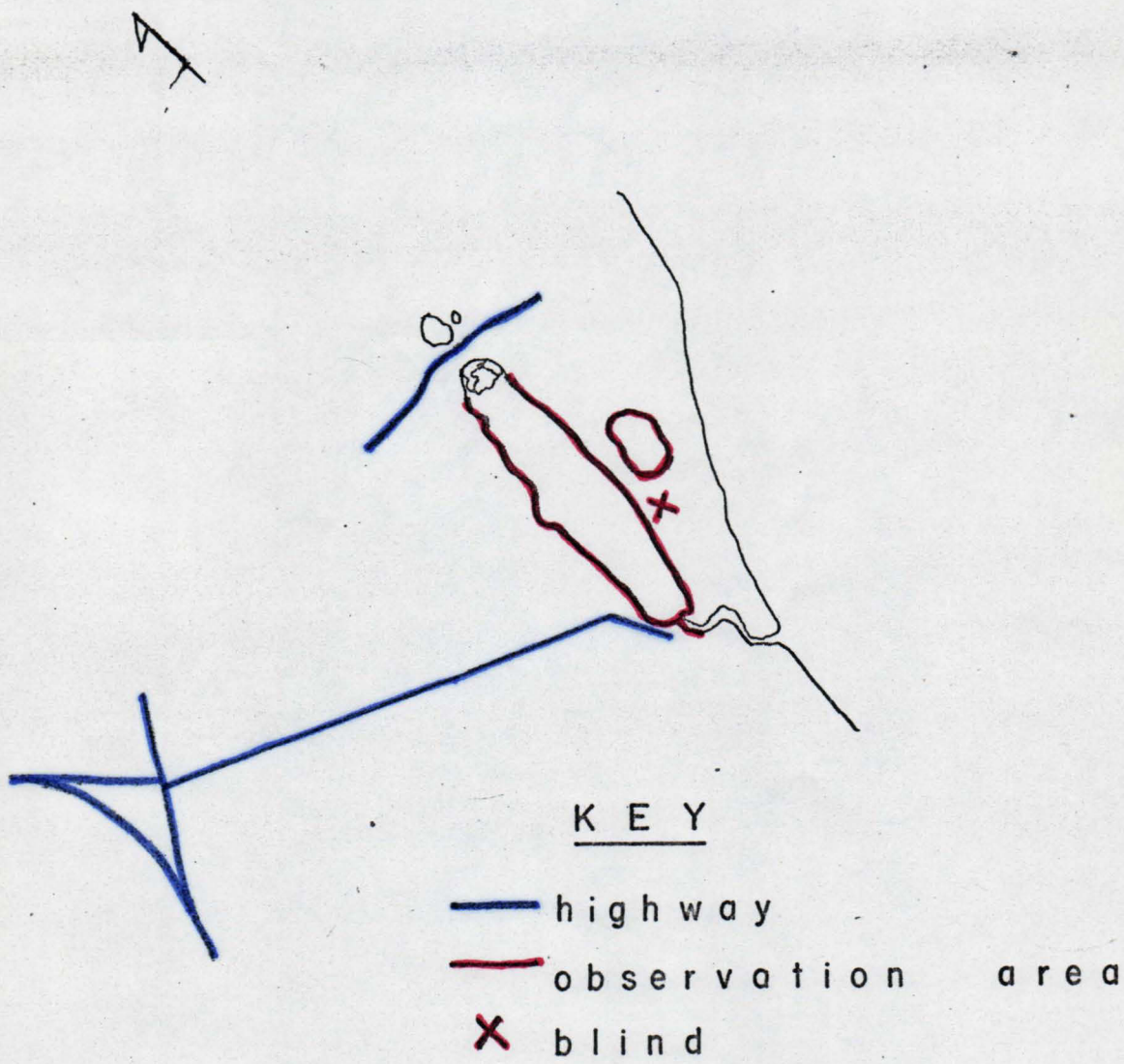
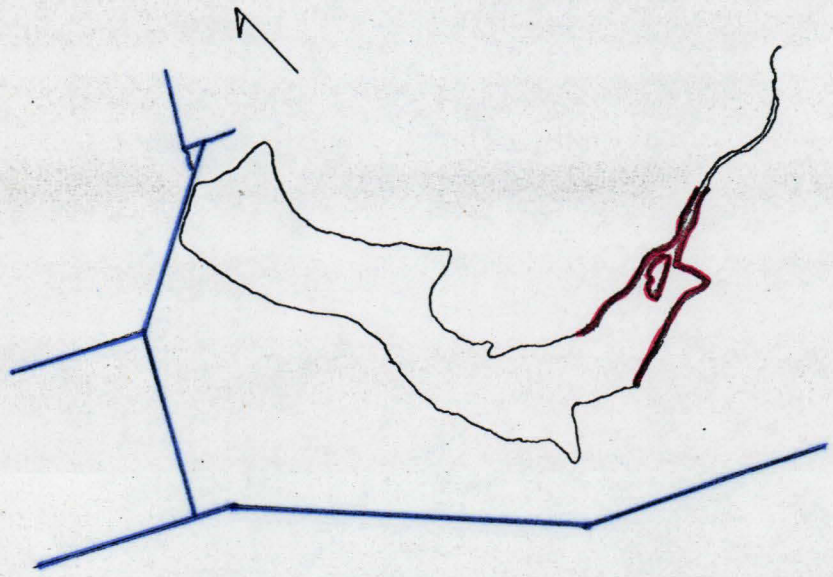


FIGURE IX

BEDEQUE POND

scale: 1 inch = 1000 feet



KEY

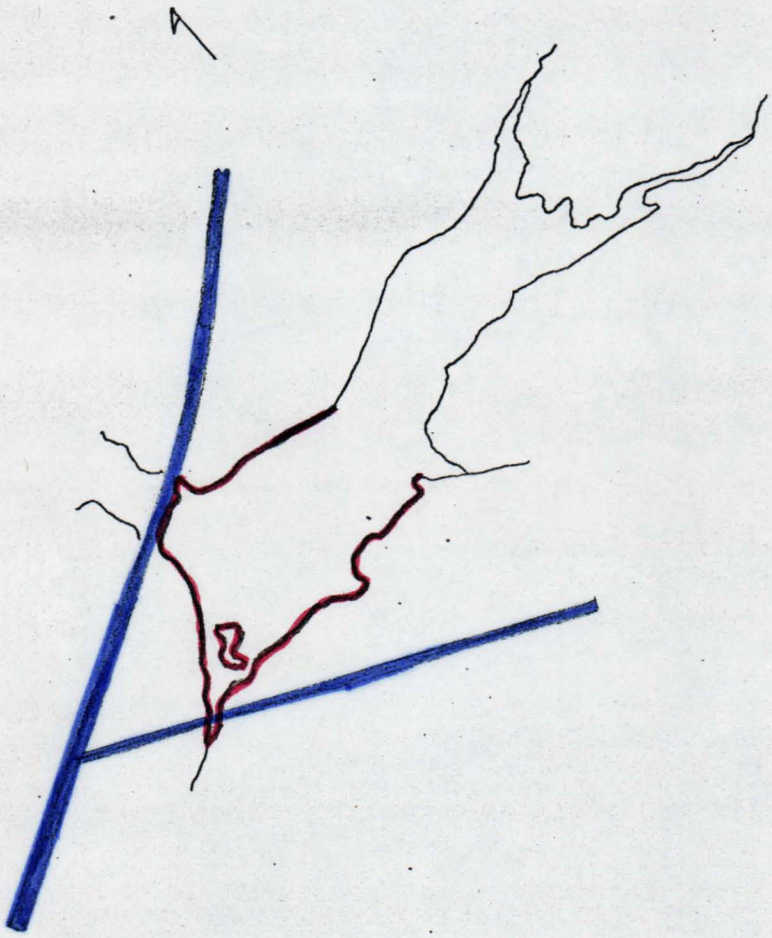
highway

observation area

FIGURE X

INDIAN RIVER

scale: 1 inch = 1000 feet



KEY

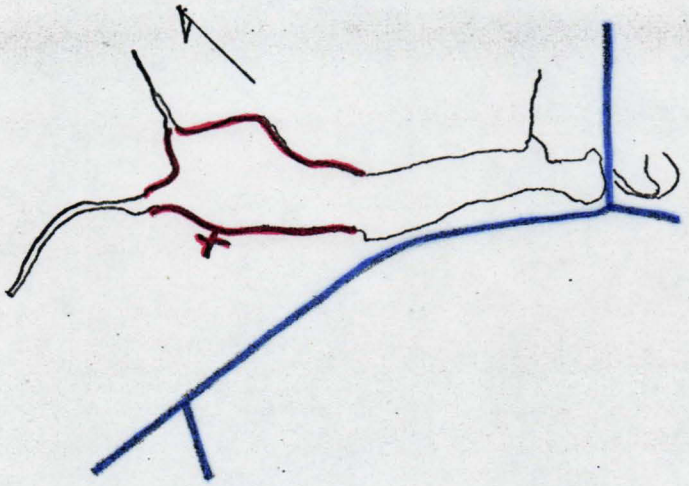
highway

observation area

FIGURE XI

LECCOS POND

scale : 1 inch = 1000 feet



KEY

highway

observation

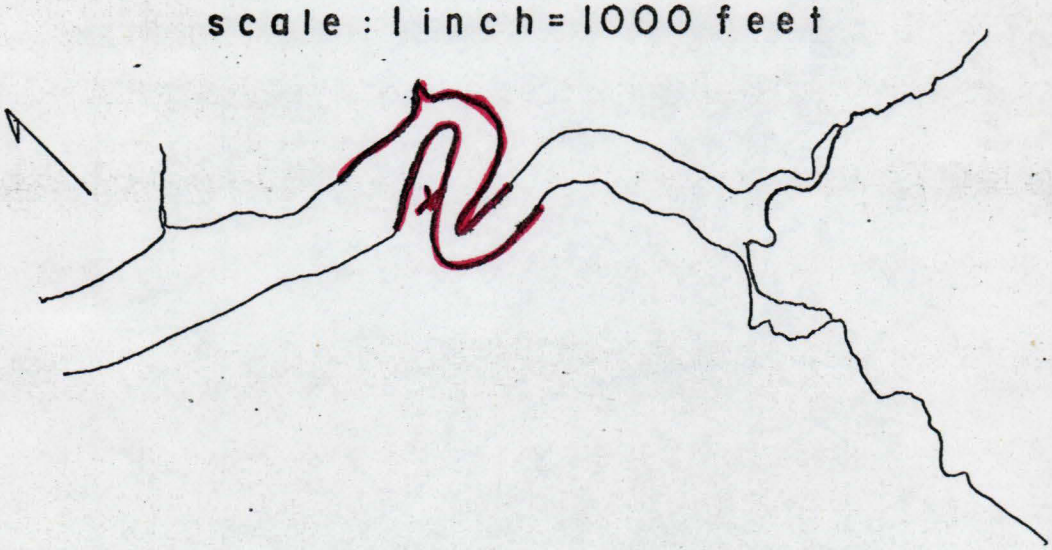
blind

FIGURE XII

MOUNT STEWART

(upper section)

scale: 1 inch = 1000 feet



KEY

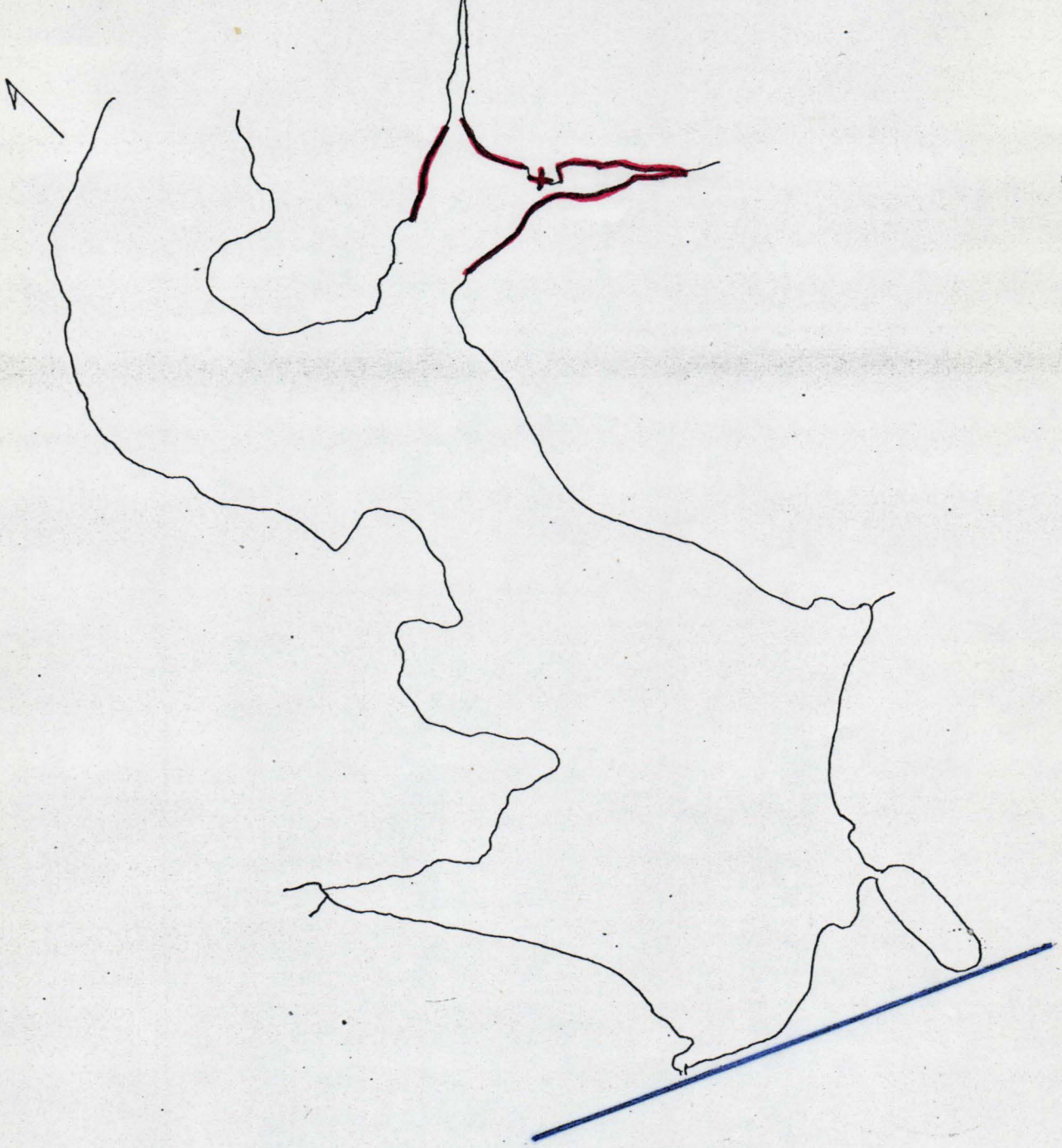
observation area

× blind

FIGURE XIII

NORTH RIVER

scale: 1 inch=1000 feet



KEY

trans canada

observation area

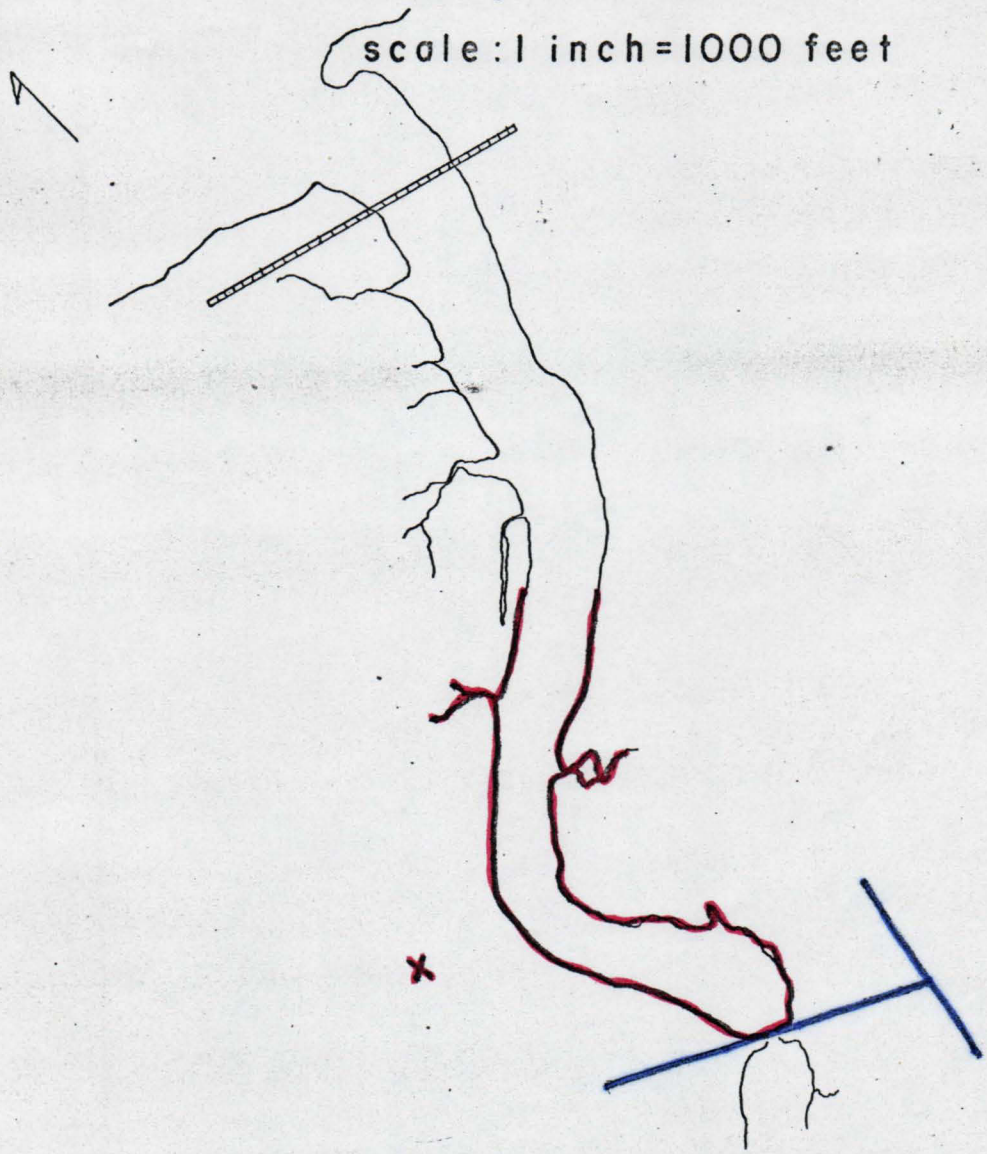
× blind

FIGURE XIV

PISQUID RIVER

(section between route 21 and railway bridge)

scale: 1 inch = 1000 feet



KEY

highway

railway

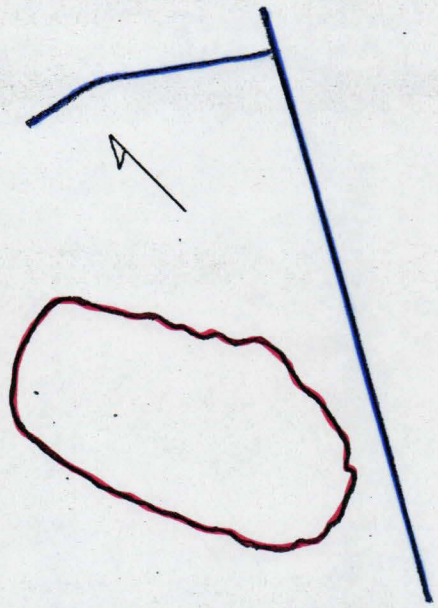
observation area

blind

FIGURE XV

LAKE VERDE

scale : 1 inch=1000 feet



KEY

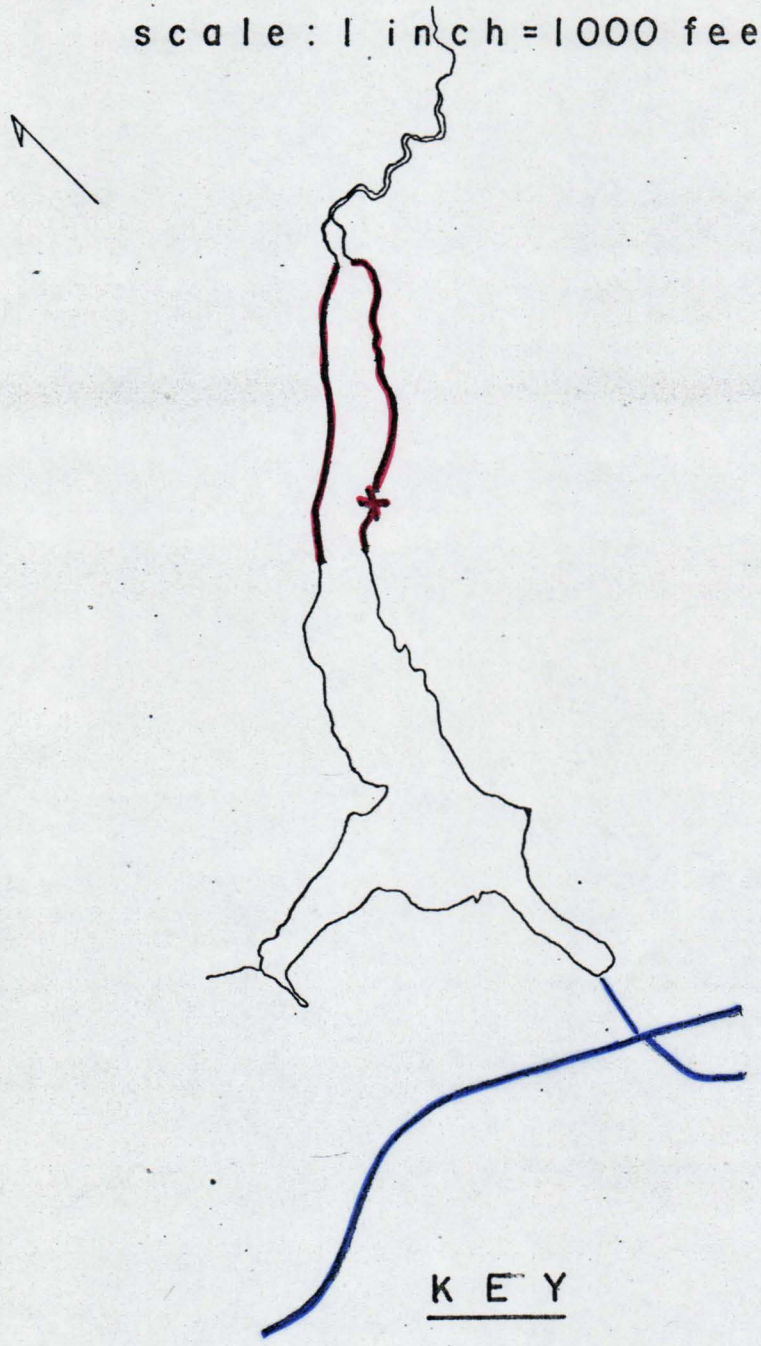
highway

observation area

FIGURE XVI

OFFICER'S POND

scale: 1 inch = 1000 feet



KEY

highway

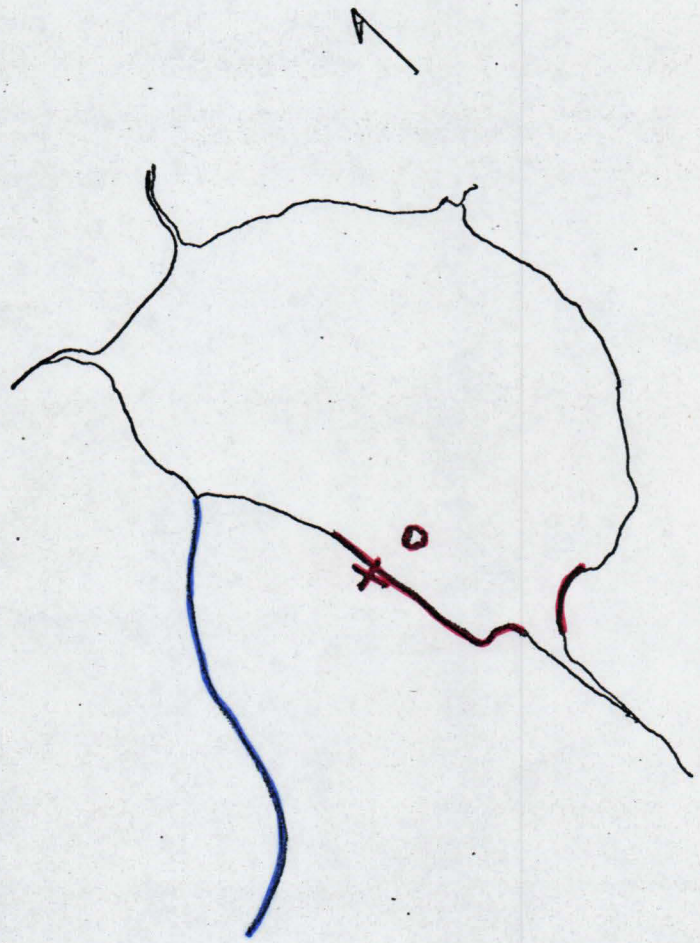
observation area

x blind

FIGURE XVII

PISQUID POND

scale: 1 inch = 1000 feet



KEY

trail

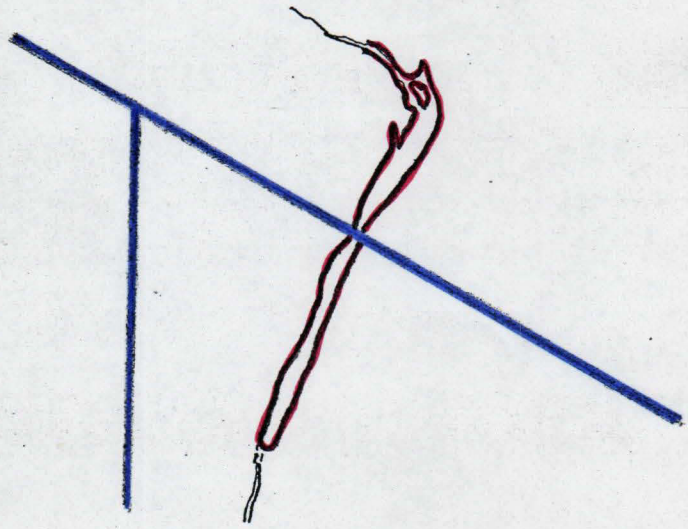
observation area

blind

FIGURE XVIII

TRYON POND

scale: 1 inch=1000 feet



KEY

highway

observation area

Figure XIX - Black Pond - Shoreline West of Blind (July 11, 1970)

Figure XX - Black Pond - Shoreline East of Blind (July 11, 1970)

Figure XXI - Campbell's Pond - South of Highway (July 23, 1970)

Figure XXII - Campbell's Pond - North of Highway (July 23, 1970)

Figure XXIII - Cow Creek - Area North of Blind (July 11, 1970)

Figure XXIV - Cow Creek - Region South of Blind (July 11, 1970)

Figure XXV - Deroche Pond - Islet South of Blind (May 26, 1970)

Figure XXVI - Kildare Creek - Western Section of Observation Area (July 30, 1970)

Figure XXVII - Rayner's Pond (July 3, 1970)

Figure XXVIII - Round Pond - West Run (July 30, 1970)

Figure XXIX - Steel's Pond (July 9, 1970)

Figure XXX - Bedeque Pond (July 16, 1970)

Figure XXXI - Indian River (July 23, 1970)

Figure XXXII - Leccos Pond - East of Blind (July 15, 1970)

Figure XXXIII - Leccos Pond - West of Blind (July 15, 1970)

Figure XXIV - Mount Stewart Marsh - East of Blind (May 28, 1970)

Figure XXXV - Mount Stewart Marsh - West of Blind (May 28, 1970)

Figure XXXVI - Pisquid River - North of Blind (June 12, 1970)

Figure XXXVII - Pisquid River - East of Blind (June 12, 1970)

Figure XXXVIII - Officer's Pond - Western End - (June 13, 1970)

Figure XXXIX - Tryon Pond - North of Highway (June 16, 1970)

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