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COASTAL GREAT BLUE HERON  
POPULATIONS OF THE MICHIGAN GREAT LAKES

by

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## INTRODUCTION:

Coastal nesting Great Blue Herons choose islands and peninsulas in the Great Lakes to escape human disturbance. The very isolation the herons seek makes the knowledge of their current populations and status of interest in assessing both the health of the species and it's habitat. This study shows the changes in populations of costal and island nesting colonies of Great Blue Herons (Ardea herodias) and, incidentally, Great Egrets (Casmerodius albus) since the last complete census in 1976 and 1977 (Scharf, et al. 1978 and Scharf 1979). The realization that Great Blue Heron colony size and location is not static, but changes with the dynamics of vegetation succession hastened by bird feces has long been recognized (Weseloh and Brown 1971, Soots and Parnell 1975, Wiese 1978, Mathiesen and Richards 1978, and Scharf et al. 1978). Other factors emphasizing the need for this study are changes in land use such as urbanization, vacation home construction, and lumbering which have eliminated both inland and costal heronries.

The study area includes the entire four Michigan Great Lake coasts, the three connecting rivers, and Lake St. Clair. These coasts were searched up to 1 km inland. The location, size and changes in colonies along with the vegetation and substrate data presented here are essential to the zoning of Environmental Areas by the Michigan Department of Natural Resources, Land Resources Division.

## METHODS:

I used a Cessna 180 floatplane to locate, photograph, and count heron nests from the air. Then, at most sites, I landed to make ground counts of nests, and identify and measure nest trees. While on the ground I recorded the ground cover species assessed the condition of the nest trees, recorded the substrate, and generally evaluated the status of the colony. Click-type mechanical tallying devices were used for counting both in the air and on the ground.

Nesting phenology and behavior were estimated by previous experience and also correlated with the Southern Michigan study by Cottrille and Cottrille (1958). Latitudinal differences in nest phenology required that I begin my first visit to the southerly colonies on 18 April, 1987. My last visit to the most northerly colonies was on 08 July, 1987. In each case, the goal was to visit each colony twice. The first visit was timed from the peak of egg laying to incubation, which was usually before heavy leaf emergence which could screen the nests from view. The second visit was during the late chick-rearing, pre-fledgling period.

The problem of layering of nests, in aerial counts, which leads to hidden, uncounted nests, even without leaves, is acknowledged. However, during this season I have found that there can be difficulty with gaining a complete count of nests from the ground caused by nest layering and the

inability of the ground observer to find far-flung nest trees. It is apparent that the nest counter on the ground could miss whole portions of a colony which can be easily seen from the air. There is also a similar nest obscuring factor due to the layering of nests viewed from the ground. Therefore, the use of combined aerial and ground counts, as with most of the colonies reported here, is probably the best technique for overall accuracy.

Black and white 35 mm film with 125 ASA was used for maximum contrast of nests in aerial photography. Most photos were taken on the first or second pass over a heronry to photograph the greatest numbers of birds present in the colony. Photos were usually taken at an altitude of 150 to 250 m above the ground and the plane was banked to give as near a vertical view of the colony as possible. Over 200 exposures were taken. Thirty two of the better quality photos representing a wide variety of colonies were printed, and accompany this report (Table 5). The rest of the negatives are catalogued and available as prints upon request.

A diameter breast height (DBH) tape was used to measure nest trees. The spacing of nest trees was measured with a 10 m rope and, where applicable, the rope was used to establish 100 m<sup>2</sup> quadrants to quantify the density of the understory herbs and shrubs. The quadrant technique was used

less than anticipated this year because of the many extremely, sparsely vegetated colonies, and others which were so dense with woody vegetation that they made portions of the colonies inaccessible.

## RESULTS:

### Population Trends:

Coastal and island Michigan Great Blue Heron populations have shown a 70.8% increase (Table 1) since the last census ten years ago (Scharf et al. 1978 and Scharf 1979).

Occupancy rates in colonies were nearly complete. Seldom were there nests which could be identified as abandoned either from the air or ground (Table 4). Active nests are identified because of their fecal whitewash or the presence of eggs, chicks, or incubating adults. In addition, only two colonies have been abandoned since 1976-77. They are Stoney Island in the Detroit River, which has been changed by industrial activity and Scammon point, which may have been affected by recent residential construction in the nearby Drummond Island area (locations on Tables 1 & 2 and Figure 1).

The turnover rate (Erwin 1977 and Erwin et al. 1981) calculated for the entire study area is only 5.2% per year for the ten year interval since the last census. This turnover rate indicates a stable to growing population. I

find further analysis of the sub-regional increases by turnover rate misleading because of the large population growth in new colonies, but it can be seen, by scanning Table 1, that new colonies are concentrated in two sub-regions. One of the sub-regions of population increase extends from the Eastern Mackinaw Straits area of Lake Huron up the St. Mary's River to Bay Mills Island in Lake Superior, just west of Sault St. Marie. The other increasing sub-region includes most of the colonies numbered 27 thru 35 in Northern Lake Michigan from the Straits west to the Green Bay - Bay de Noc (Tables 1 & 2).

At colonies where increases in numbers of herons have occurred, there appear to be two mechanisms of increase within the colony. In southerly area, such as Dickinson and Hesterman Islands, which have long-lived, mature hardwood nest trees and relatively rich deep soils there has been a trend toward greater numbers of nests per tree; up to 10-12 nests in some cases. In more northern colonies, where short-lived trees are rooted in shallow, loose, sandy or rocky soils, colony expansion has been by expanding the area to more individual trees. Ultimately, however, the causes of this increase must indicate the availability of foraging habitat, and the degree of protection the species enjoys. It is unknown, at present whether the growth in coastal colonies may be at the expense of declining inland populations.



Individual Colony sites:

The results of vegetation analysis and site by site evaluation are given in Table 4.

DISCUSSION AND CONCLUSIONS

Whether or not, the present trend toward increasing coastal heron populations is due to their continuing legal protection and the maintenance of foraging habitat, or because of increasing human pressure and disturbance at inland sites, I endorse the recommended buffer zone of 250 m around nesting colony sites to support the vegetation and accessibility by the herons (Short and Cooper 1985), as a minimum comfort zone for the birds. The recommendation of a 100 m buffer around foraging areas seems logical, but the lack of documentation to support it in Michigan, and relative isolation of the wetlands involved in this study combined with other legal protection for wetlands makes specific protection for heron foraging improbable.

In some instances, the flight distances to foraging sites of the island nesting herons may be as far as 10-20 km. Gibbs et al. (1987) have shown the positive correlation between island heronries in Maine and the proximity of wetlands. They also speculate that food competition between colonies limits their size. The flight distances to forage and extreme isolation of the heronries described here serve to underscore the importance of these sites to the

maintenance of the species in Michigan coastal waters. That is, many of these colonies represent the last resort for nesting herons, if pressures develop on mainland colonies. In such a worst case scenario recreation on the islands and near the foraging areas would have to be curtailed to maintain their productivity. The absence of islands and coastal wetlands explains why the area along the central to southeastern Lake Michigan Coast has no coastal heronries.

One of the unexpected findings of this study is the apparent stability of the vegetation and age of the trees in some of the more southerly colonies. The toxic effects of feces apparently is not of great importance to long lived tree species such as oak, hickory, and maple. The shorter lived species such as aspens and birch, are more susceptible to over fertilization, and in northern areas where they are important nest trees, the soils are shallower and more porous which leads to more frequent blown downs.

The health of coastal heronries seems assured at present with a few exceptions noted in Table 4. Most of the exceptions represent the development of vacation homes, boating, fishing, and hunting activity in or near heronries. While these are acceptable human pursuits, it is doubtful whether they are necessary in area which could destroy nesting or foraging habitat of this important native bird species. Continued monitoring of this resource is important

to insure its perpetuation and stop intrusions before the damage is irreparable. Monitoring is done regularly in Maine (Gibbs et al. 1987), Minnesota (Mathieson and Richards 1978), Montana (Thompson 1982), and Pennsylvania (Dunn and Brucker 1986)..

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TABLE 1

GREAT BLUE HURON and GREAT EGRET (GE)  
COLONIES AND NUMBERS OF NESTS IN THE MICHIGAN GREAT LAKES

COLONY NAME	LAT. AND LONG.	1976-77	1987
1. Stoney Is.	4206-08308	14 + 29GE	0
2. Dickinson Is.	4237-08238	57 + 2GE	113 + 22GE
3. Hesterman Is.	4350-08326	0	125 + 6GE
4. L. Charity Is.	4400-08328	0	0 3GE
5. Bird Is.	4453-08320	0	3
6. Scare Crow	4455-08320	24	27
7. Gull Is.	4503-08314	33	55
8. South of Calcite (Rogers City)	4525-08346	0	1
9. Big St. Martin Is.	4558-08426	0	38
10. Goose Is.	4555-08426	75	87
11. Gravely Is. (Crow Is.)	4558-08414	11	9
12. Saddle Bags Is.	4557-08402	32	32
13. Gravel Is.	4556-08346	4	22
14. Scammon Pt.	4556-08338	40	0
15. Cedar Is.	4605-08345	0	28
16. Round Is.	4606-08401	39	23
17. Love Is.	4608-08359	0	35
18. Roach Pt.	4612-08409	0	12
19. Moon Is.	4613-08410	0	23
20. Gem Is.	4626-08411	43	44
21. Rock Is.	4623-08409	27	22
22. Bay Mills Is.	4627-08431	0	22
23. Williams Island	4629-08843	78	4
24. Huron Is.	4656-0880	0	53
25. Traverse Is.	4707-08816	62	89
26. Waugoshance Is.	4546-08504	33	26
27. St. Helena Is.	4552-08452	27	33
28. Hat Is.	4547-08518	3	7
29. W. Grape Is.	4547-08525	5	4
30. Squaw Is.	4551-08536	0	48
31. Epoufette Is.	4606-08513	32	21
32. L. Hog Is.	4604-08517	0	18
33. Big Gull Is.	4530-08643	0	19
34. St. Vital Is.	4548-08645	6	4
35. Round Is.	4545-08646	13	17
	TOTALS	658 + 31GE	1064 + 31GE

TABLE 2

LOCATION OF GREAT BLUE HURON COLONIES  
BY TOWNSHIP AND RANGE  
AND DNR AERIAL MAP AVAILABILITY

	<u>COLONY NAME</u>	<u>MAP</u>	<u>T-R</u>
1.	Stoney Is.		
2.	Dickinson Is.	NO	T2N, 15E
3.	Hesterman Is.	NO	T17N, 9E
4.	L. Charity Is.	NO	19N, 8E
5.	Bird Is.	YES	29N, 9E
6.	Scare Crow	NO	29N, 9E
7.	Gull Is.	YES	31N, 10E
8.	South of Calcite (Rogers City)	NO	34N, 6E
9.	Big St. Martin Is.	YES	41N, 3W
10.	Goose Is.	YES	41N, 1W
11.	Gravelly Is. (Crow Is.)	YES	41N, 5E
12.	Saddle Bags Is.	YES	41N, R3E
13.	Gravel Is.	YES	41N, 5E
14.	Scammon Pt.	YES	41N, R6E
15.	Cedar Is.	YES	43N, R5E
16.	Round Is.	YES	43N, R3E
17.	Love Is.	NO	43N, R4E
18.	Roach Pt.	YES	44N, R2E
19.	Moon Is.	YES	44N, R2E
20.	Gem Is.	NO	47N, 2E
21.	Rock Is.	NO	46N, 2E
22.	Bay Mills Is.	NO	47N, 2W
23.	Williams Island		
24.	Huron Is.	NO	53N, R29W
25.	Traverse Is.	YES	54N, 31W
26.	Waugoshance Is.	NO	39N, 6W
27.	St. Helena Is.	YES	40N, 5W
28.	Hat Is.	YES	40N, 8W
29.	W. Grape Is.	NO	39N, 9W
30.	Squaw Is.	YES	40N, 10W
31.	Epoufette Is.	YES	42N, 7W
32.	L. Hog Is.	NO	42N, 8W
33.	Big Gull Is.	NO	38N, 12W
34.	St. Vital Is.	NO	39N, 20W
35.	Round Is.	NO	39N, 20W

TABLE 3  
GREAT BLUE HERON  
NEST TREES

<u>COLONY NAME</u>	<u>NEST TREES</u>
1. Stoney Is.	None
2. Dickinson Is.	White Oak, Red Oak, Shagbark Hickory, Elm (dead)
3. Hesterman Is.	Ash, Birch (dead), Red Maple, White Oak
4. L. Charity Is.	Plum
5. Bird Is.	Ash (dead)
6. Scare Crow	Ash
7. Gull Is.	Cherry, Ash
8. South of Calcite (Rogers City)	Elm (dead)
9. Big St. Martin Is.	Red Maple, Quaking Aspen
10. Goose Is.	Birch (dead & live), Quaking Aspen, Ash, Balsam Poplar
11. Gravely Is. (Crow Is.)	Ash, Birch
12. Saddle Bags Is.	Birch, White Cedar
13. Gravel Is.	Birch, Ash, Aspen
14. Scammon Pt.	All trees down
15. Cedar Is.	Birch, Ash, Aspen
16. Round Is.	Birch (live & dead), Balsam Poplar
17. Love Is.	Birch & Ash, Spruce & Cedar
18. Roach Pt.	Balsam Poplar, Cottonwood
19. Moon Is.	Balsam Poplar, Ash
20. Gem Is.	Elm (dead & live)
21. Rock Is.	Elm (dead & live), Birch
22. Bay Mills Is.	Red Oak
23. Williams Island	Spruce (live & dead), Quaking Aspen (live), Birch (dead)
24. Huron Is.	White Pines
25. Traverse Is.	Birch (live & dead), Red Maple, Quaking Aspen
26. Waugoshance Is.	Yellow Birch, Quaking Aspen
27. St. Helena Is.	White Birch (dead), Quaking Aspen
28. Hat Is.	Birch
29. W. Grape Is.	Ash
30. Squaw Is.	Birch (dead & live), Quaking Aspen
31. Epoufette Is.	Aspen
32. L. Hog Is.	Aspen & Birch
33. Big Gull Is.	Birch
34. St. Vital Is.	Cottonwood
35. Round Is.	White Cedar (dead) & Birch

TABLE 4  
 VEGETATION QUALITY AND POTENTIAL BUFFER ZONE INTRUSIONS  
 for  
 COASTAL MICHIGAN GREAT BLUE HERON COLONIES, 1987

<u>COL #</u>	<u>NEST TREE SPECIES AND MEAN SIZE. (SAMPLE SIZE)</u>	<u>UNDERSTORY</u>	<u>BUFFER ZONE</u>
1.	-----	-----	-----
2.	Red Oaks 60.9 cm DBH (4) White Oak 73.6 cm DBH Elm 47.4 cm DBH (3) Shagbark Hickory 55.8 cm DBH (12) Tree height: 23-30 m	Prickly Ash, Muscle Wood, Bedstraw, Moss, Violets, Nettle, 15cm water under trees in April dry by June.	Deer browsing; hunters blinds Highly popu- lous area; Presently adequate, but needs to be monitored
3.	Red Maple 48.2 cm DBH (5) Ash 33.0 cm DBH (2) Dead Birch White Oak 35.5 cm DBH (1) Tree height: 20-28 m	Moss, Iris, Open water up to 60 cm deep, May Apple, Nettles, Grape Vines, Prickly Ash. Many Snakes	Seems safe, except for possible il- legal harass- ment by the population of sport- fisherman.
4.	Wild Plum 10.1 cm DBH (1) Tree Height: 7 m or less	Nettle, Burdock, Herb Robert	(+,-) 24 Herring Gulls found shot here; presum- ably this has neg. impact on herons and egrets too.
5.	Probably Ash about 20 cm DBH Tree height: 15 m	Bare Cobble	Even though most trees are dead here, there are plenty that could hold more Great Blue Heron nests. No threat is imminent to this colony.



6. Ash and Elm  
17.7 cm DBH (2)  
Tree height: 15 m
- Bare cobble  
a few Nettles  
and Burdock.  
is done
- Commercial  
harvest of  
Carp trapping  
here,  
but that is  
after the  
nesting season  
The Double-  
crested Cormo-  
rants have  
gone from  
zero to 137  
nests since  
1976, but the  
herons have  
also increased  
A few (2-3)  
Black-crowned  
Night Heron  
usually nest  
here too.
7. Cherry 16 cm DBH; and  
Ash 18-35 cm DBH  
Tree height: 4-12 m
- Varies from  
sand and cobble  
to Ground Hem-  
lock and small  
Choke Cherry.
- Much of the  
former woody  
vegetation on  
this island is  
blown down;  
present nest  
trees are dy-  
ing and Cor-  
morants are  
taking others;  
therefore, re-  
cent increases  
in Great Blue  
Herons may be  
only temporary  
The island  
seems fairly  
safe from most  
human intru-  
sions.

- |     |   |   |   |
|-----|---|---|---|
| 8.  | Single large, dead Elm<br>Tree height: 10 m   | Edge of a marsh with some open water.   | This nest appears to be abandoned but the foraging area and abundance of suitable nest trees make this site an attractive one for recolonization.   |
| 9.  | Red Maple<br>Quaking Aspen 15-40 cm DBH<br>Tree height: 10-15 m   | Surrounded by Cedar swamps; Some standing water.  | No threats to this heronry are evident; the farm at the northern part of the island seems to have ample fire wood, and the heronry would not be suitable for logging.                         |
| 10. | Live and dead Birch<br>35 cm DBH, some<br>Dead Aspen 28.7 cm DBH<br>Ash, Balsam Poplar<br>Density 25 stems/100 m <sup>2</sup> ,<br>and 3-4 stems Aspen/100 m <sup>2</sup> | Some water to a depth of 45 cm; Jewelweed<br>Nettles, Cow Parsnip, Red Elder, high bush Cranberry, White Cedar, Red Osier Dogwood, other areas are bare because of over-fertilization with feces. | The Great Blue Heron nesting area on this island has expanded greatly from 1976-77; the takeover of Cormorants of nest trees on the South end has forced the herons north to healthier trees; |

- |     |  |  |  |
|-----|--|--|--|
| 10. | Continue --  |  | I completely disagree that there is a zone which could allow a structure to be built here without significant negative impact on the bird populations. |
| 11. | Ash and Birch  | See Detailed map - this report.  | Two of the nests look abandoned here   |
| 12. | Birch and White Cedar  | See Detailed map - this report.  | Despite the structure on this land, the heron population persists.   |
| 13. | Birch, Ash, Aspen  | See Detailed map - this report.  | Population has increased 5 times 1976-77 numbers.  |
| 14. | All trees down   | -----  | The demise of this heronry could be from the nearby residential development.   |
| 15. | Birch 26.5 cm DBH (5)<br>Ash 28 cm DBH<br>Aspen 25 cm DBH<br>Balsam Poplar 22.3 cm DBH | Dense Balsam (8/100 m <sup>2</sup> ), plus Choke Cherry, White Cedar tangle, Moosewood, Currant, Violets; and Ferns; Jewelweed and raspberry under trees where whitewash hits. | Deer and beaver are eating the woody vegetation here; possibly a moose present here too! No threat to this isolated area.                              |

16. Elm (dead) about  
30.5 cm DBH;  
Birch about 25.4 cm DBH  
Red Maple about  
32 cm DBH  
Tree height: 15-17 m

Border of  
White Cedar  
tangle of  
Canada Yew and  
fallen trees  
in interior  
where heron  
nests are;  
See map in  
this report.

This is one of  
the few colonies  
which is  
declining in  
numbers; the  
decline is attributed  
to the loss of  
nest trees due  
to the death  
and blow down  
of the birch  
and elm; this  
seems to be a  
natural successional  
sequence which  
is exaggerated  
because of the  
shallow soils  
on the island.  
If further  
human development  
is prevented,  
however, this  
colony should  
persist in its  
reduced state  
for some time  
in the future.  
The rise of  
the Love Is.  
(#17) colony  
is probably a  
result of the  
decrease at  
this colony.  
That is, as  
the trees at  
one become unsuitable  
the birds moved to  
the most suitable  
nearby  
colony.

- |     |   |  |   |
|-----|---|--|---|
| 17. | Dead (15 of 30 trees)<br>or dying White Birch<br>20-30 cm DBH<br>A few nests in Black<br>Spruce and White Cedar<br>Tree height: 10-15 m | -----  | This is probably the "new" colony began after decline of the previous one (#16); Cedar as the dying Birch nest trees go down there is about 1/3 of the island left to place nests in, and the herons are also nesting in the Conifer species too. |
| 18. | Live Cottonwood 31 cm DBH<br>Balsam Poplar 28.3 cm DBH<br>(2)<br>Tree height: 18-20 m   | Nettle, Raspberry, Bedstraw sedge, Jewelweed, Choke Cherry, May flower, and Sweet Cicely. A border of Cedar Balsam and Alder surrounds the point and the nest tree area. | The decline in numbers in this colony is probably due to several of the large nest trees being broken in a storm. This has produced a few openings in the wooded canopy of 30-40 m <sup>2</sup> .   |
| 19. | Ash 22.8 cm DBH (2)<br>Balsam Poplar 25.1 cm DBH<br>Tree height: 12-16 m  | Red Osier Dogwood, Sand Bar Willow, Jewelweed and bare sand-muck. See map in this report.  | This is a classic example of the shift from one colonial species (Ring-billed Gulls) which are declining as the Great Blue Herons are increasing with the succession to trees.  |

19. Continue --

However, this dredge material island which is subject to much wash by passing ship traffic is rapidly washing away and is only 20-30 m' wide. How long this colony will exist depends on the speed of erosion of the island. Beavers have cut down some trees at this site too.

20. One dead Elm 78.2 cm DBH holds 27 of 44 nests.  
Live Elm 35.5 cm DBH has 14 of 44 nests.  
2 Ash and 1 White Birch hold other nests, 25 cm DBH  
Tree height: 14-18.5 m

Red Osier Dogwood, Nettle & Jewelweed. See map in this report.

It is only a matter of time until the two main nest trees fall and cause a few years of decline until the other trees grow larger. No threats are seen to this colony other than tree loss.

21. 12 of 22 nests in Dead Elm 60.4 cm DBH  
4 of 22 nests in Live Elm 26.1 cm DBH  
3 more in Live Birch 20 cm DBH  
3 more in smaller Live Elm  
Tree height: 12-16 m

Cow Parsnip  
Red Ostier  
Dogwood, Nettle and Jewelweed.  
See map in this report.

The only threat to this colony is loss of trees.

22. Red Oak 36.8 cm DBH (4)  
A few Birch 22 cm DBH  
Tree height: 16.5 m
- June berry,  
Choke Cherry,  
Thimble berry,  
Red Elder,  
Ground Hemlock,  
Striped Maple,  
Soloman's Seal,  
Cow Parsnip,  
and Bane berry.
- The proximity of this island to Bay Mills tribal residences and fishing docks as well as the fact that fishing boats frequently seek lee moorings at the island make it possible to be disturbed unduly. However, the colony seemed very vigorous this season.
23. Live and Dead Aspen  
Tree height: 12 m
- See photo showing proximity of the cabin in this report.
- Summer home in proximity of colony maybe responsible for the drop in numbers here. Further development of residences will probably cause more damage to the herons.
24. White pine 45.2 cm DBH  
Tree height: 15-17 m
- Bear berry,  
June berry,  
Choke Cherry,  
Dwarfed Balsam,  
and bare granite rock.
- Two groups of nests (as many as 6 per tree) 18 on west colony and 3 on east of Middle Island. 4 more nests are on Eastern smaller island. The undisturbed quality of this colony seems assured by the status as a National Wildlife Refuge.

25.	White Birch (many dead) 30.5-35.5 cm DBH Quaking Aspen 25-30 cm DBH Red Maple Tree height: 12-16 m	Spinulose tree fern, Mountain Maple, Mountain Ash, Red Elder, Canada Yew, Raspberry, Currant, Pin Cherry.	Herons have lost much habitat at the southwest point where Cormor- ants have taken over, but the herons have responded by moving North- easterly and splitting into at least 3 sub- colonies. Many former heron nest trees have blown down near the south- central portion of the island, still the col- ony continues to increase. The line for the Environ- mental Area shown of the DNR map should be re-drawn. A recent campsite was located near the central part of the heron colony along the shore.
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26.           Quaking Aspen 40.3 cm DBH  
               Yellow Birch 44 cm DBH  
               White Birch 35 cm DBH  
               Tree height: 15-17 m
- Much ground dead; some bare ground, large patches of Hounds Tongue, Wood Nettle, and Yellow Rocket. Some Columbine and Chickweed, Violets, moss, and Jack-in-the-pulpit.
- Many trees blown down. This is probably what caused this colony to move to the northwest quarter of the island. The understory shows much stress from whitewash which is probably killing trees too. Fishing pressure is very high in this area. Even though it is State Park land, I have found Terns shot here before, and presumably that could happen with herons also.
27.           Dead White Birch  
               Live Quaking Aspen  
               Tree height: 16-18 m
- Red Elder, Raspberry, Canada Yew, Jewelweed, and border of Cedars between the edge of the colony and the cobble shore.
- As long as this island stays in an undeveloped state the continuance of the herons seems assured. They have already moved from the East end in 1976 because some of the woods either burned or were blown down.

- |     |   |  |  |
|-----|---|--|--|
| 28. | 4 Birch 30 cm DBH<br>contain 7 nests<br>Tree height: 10-12 m                            | Toothwort,<br>Columbine,<br>Cow Parsnips,<br>Choke Cherry,<br>Red Osier Dog-<br>wood, Red El-<br>derberry. | The herons are<br>assured safety<br>by the owners,<br>Nature Conser-<br>vancy, who have<br>restricted<br>access to the<br>island. The<br>only threat<br>would be the<br>loss of nest<br>trees.   |
| 29. | Large Choke Cherry,<br>Elm, Ash; less than<br>30 cm DBH<br>Tree height: 6-10 m          | Bare sand and<br>stone, some<br>Burdock and<br>Cow Parsnip   | The take over<br>of nest trees<br>by 127 Double-<br>Crested Cor-<br>morants has<br>probably<br>discouraged the<br>herons and<br>killed many<br>nest trees.<br>The biggest<br>threat here is<br>high water and<br>waves that wash<br>over this<br>island<br>occasionally. |
| 30. | Quaking Aspen 26.9 cm DBH<br>(4)<br>White Birch 23.4 cm DBH (3)<br>Tree height: 12-15 m | Red Elder,<br>Jewelweed,<br>Canada Yew,<br>Balsam Fir.<br>See photos in<br>this report.                    | I see no threat<br>to these herons<br>as long as<br>development by<br>humans is<br>avoided.  |
| 31. | White Birch<br>Quaking Aspen  | Limestone rock<br>Shelf substrate<br>See photo in<br>this report.  | The rocky<br>nature of this<br>island seems to<br>preclude future<br>development.<br>Colony is<br>separated into<br>13 nests on<br>East & 8 on<br>West.  |
| 32. | White Birch<br>Quaking Aspen  | -----  | This colony has<br>no known threat<br>to it.   |

- |     |   |   |   |
|-----|---|---|---|
| 33. | White Birch (a few dead)<br>25.7 cm DBH (3)<br>Tree height: 12-16 m       | Rich ground cover, Spinulose Wood fern, Red Elder, Smartweed, Squirrel corn, White Cedar, Black Spruce. Photo in this report. | This large island seems safe large numbers of Canadian Geese live in interior, and a campsite was noted there.        |
| 34. | Cottonwood 38.1 cm DBH<br>Tree height: 16 m                               | Some sand, wet-marshy. See map in this report.  | No threats known.   |
| 35. | Dead White Birch 27 cm DBH<br>Dead White Cedar<br>Tree height: 8.3-11.6 m | Large clear area with blown down White Cedar. Cow Parsnip, Nettles, Jewelweed, Canada Thistle. See photo in this report.      | The chief threat to this heronry is the dead and dying trees which seem to blow down very easily in the shallow soil. |

TABLE 5

## KEY TO 8X10 BLACK AND WHITE PHOTOGRAPHS

<u>COLONY NAME</u>	<u>DATE OF PHOTOS AND (NUMBER)</u>
1. -----	-----
2. Dickinson Is.	18 April, 1987 (2)
3. Hesterman Is.	18 April, 1987 (2)
4. L. Charity Is.	18 April, 1987
5. -----	-----
6. Scare Crow	02 May, 1987; 06 June, 1987
7. Gull Is.	02 May, 1987 (2); 06 June, 1987
8. -----	-----
9. -----	-----
10. Goose Is.	10 June, 1987
11. -----	-----
12. -----	-----
13. -----	-----
14. -----	-----
15. Cedar Is.	16 May, 1987
16. Round Is.	16 May, 1987
17. Love Is.	16 May, 1987
18. Roach Pt.	16 May, 1987
19. Moon Is.	16 May, 1987
20. Gem Is.	30 May, 1987 (2)
21. Rock Is.	30 May, 1987
22. Bay Mills Is.	30 May, 1987
23. Williams Island	03 July, 1987
24. Huron Is.	30 May, 1987
25. Traverse Is.	24 May, 1987
26. -----	-----
27. St. Helena Is.	01 May, 1987
28. Hat Is.	01 May, 1987
29. -----	-----
30. Squaw Is.	01 May, 1987 (2); 10 June, 1987
31. Epoufette Is.	24 May, 1987
32. L. Hog Is.	24 May, 1987
33. Big Gull Is.	24 May, 1987
34. -----	-----
35. Round Is.	24 May, 1987

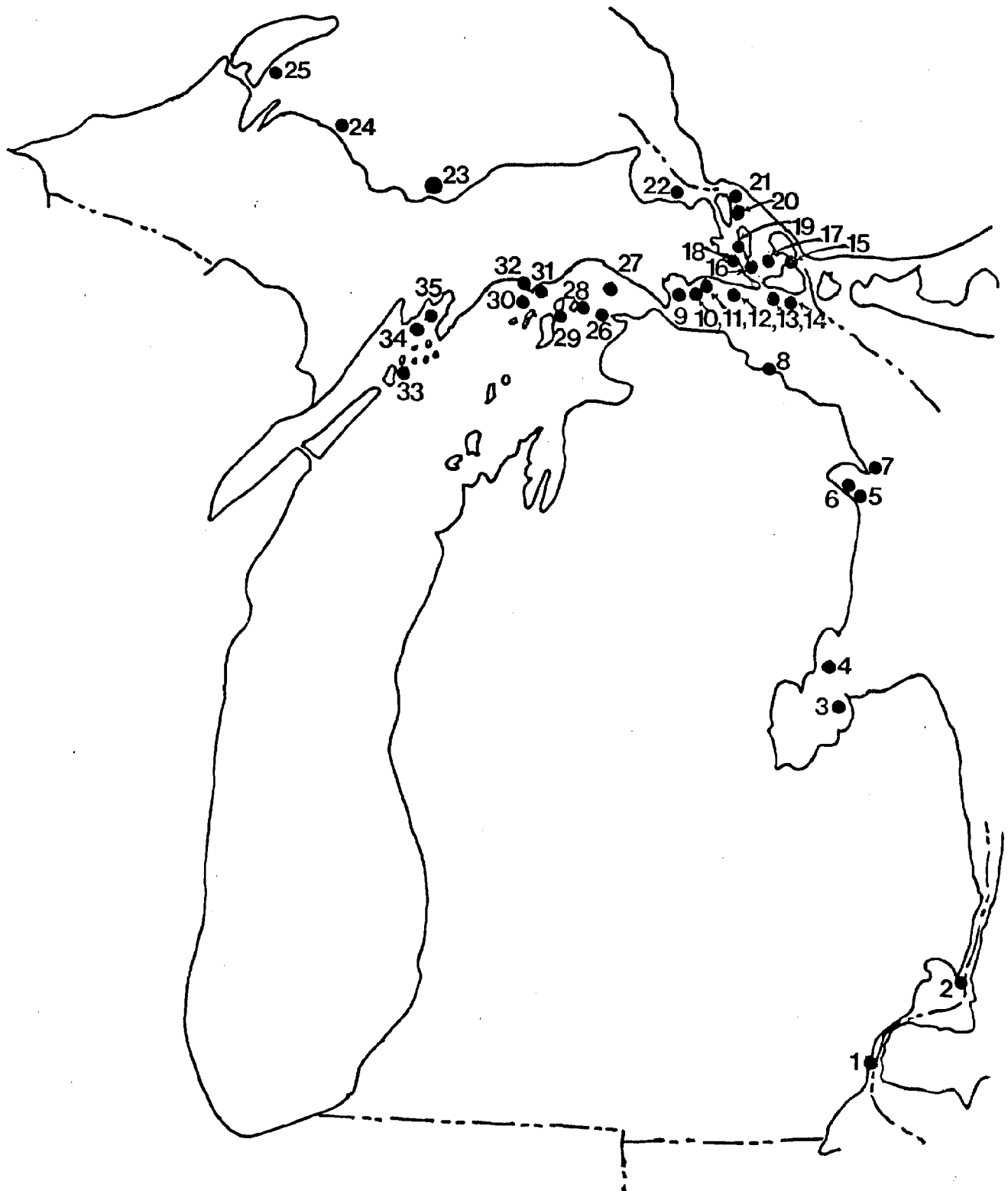
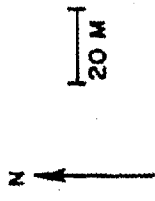
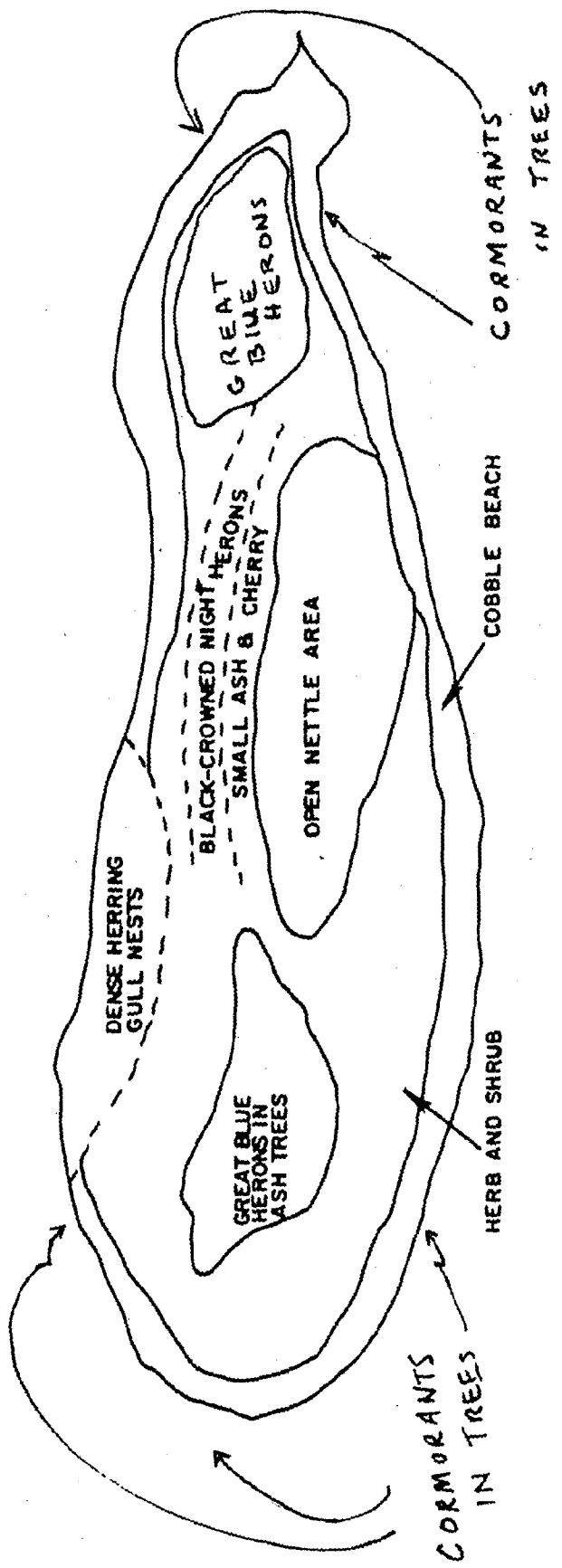


Fig. 1. Coastal Great Lakes Great Blue Heron Colonies - Michigan 1987

GBH = .33 ha  
 HG = .91 ha  
 BCNH = .12 ha  
1.36 ha

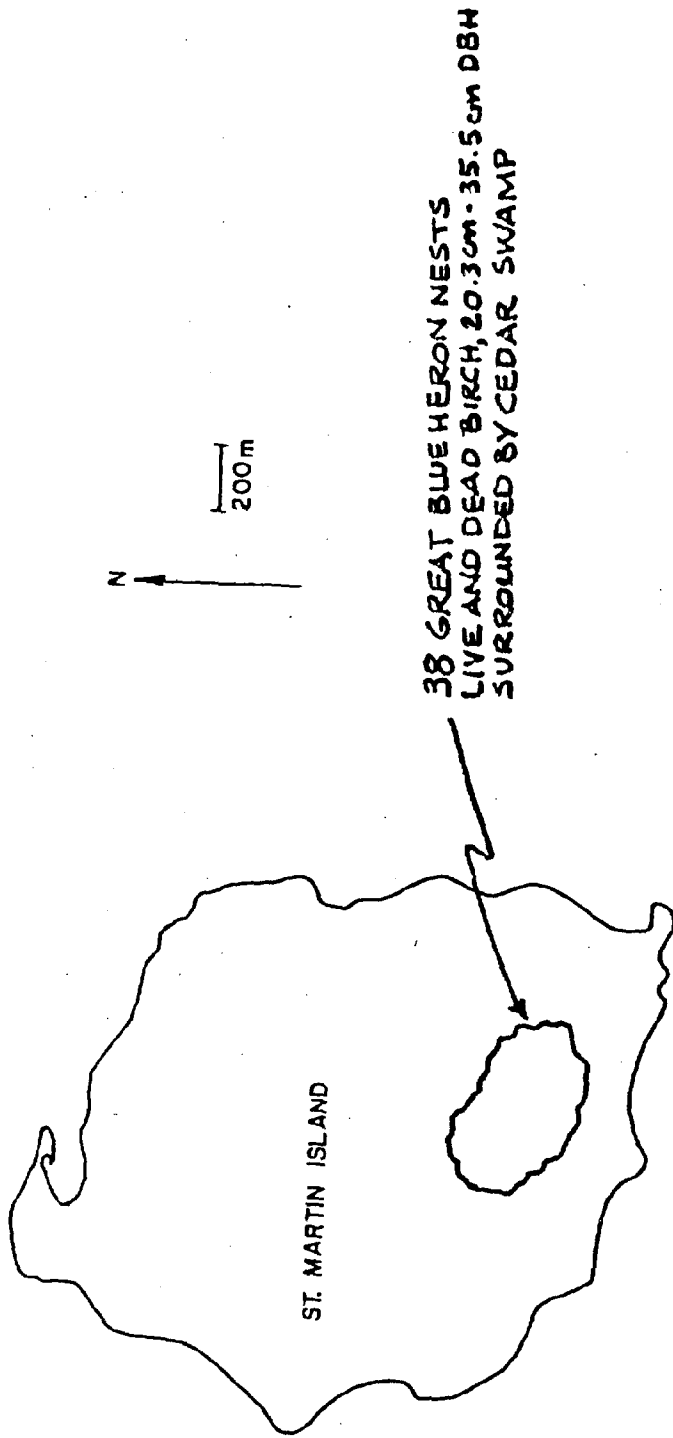


ALPENA, MI. 8 KM



HERRING GULLS NESTS DISPERSED OVER ISLAND

GULL ISLAND-7



38 GREAT BLUE HERON NESTS  
LIVE AND DEAD BIRCH, 20.3cm - 35.5cm DBH  
SURROUNDED BY CEDAR SWAMP

ST. MARTIN ISLAND

ST. MARTIN ISLAND - 9

40° NE TO  
MARQUETTE ISLAND  
3 km

- OPEN BEACH
- ▤ DECIDUOUS VEGETATION
- ▨ WHITE CEDAR
- ▩ PONDS, FLOODED AREAS

1 BCNH NEST

779 HG NESTS DISPERSED OVER ISLAND

9 BCHN NESTS

87 GBH NESTS



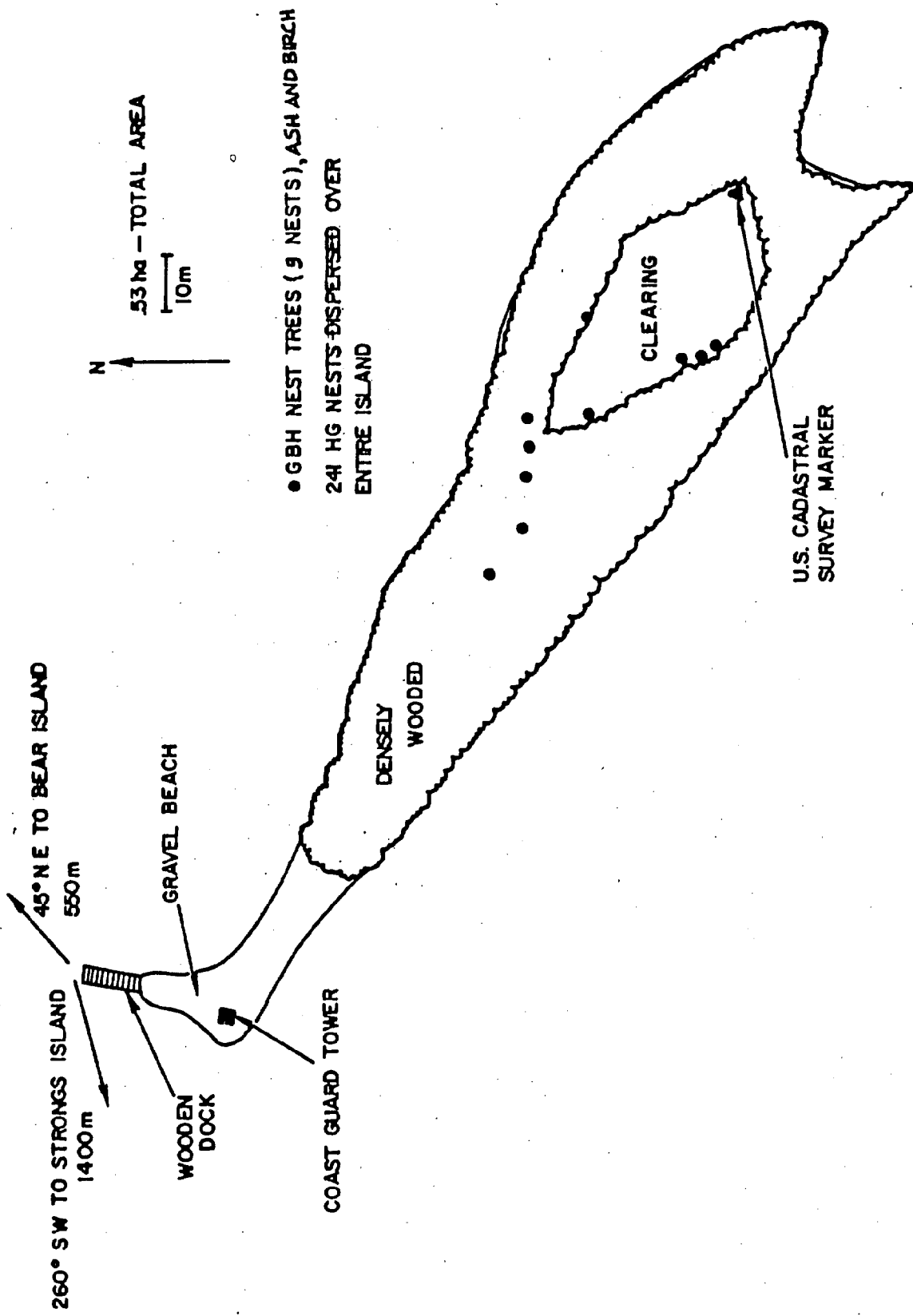
13.84 ha - TOTAL AREA

100m

CORMORANTS IN TREES

# GOOSE ISLAND





45° NE TO BEAR ISLAND  
550 m

260° SW TO STRONGS ISLAND  
1400 m

GRAVEL BEACH

WOODEN DOCK

COAST GUARD TOWER

53 ha - TOTAL AREA

10m

N

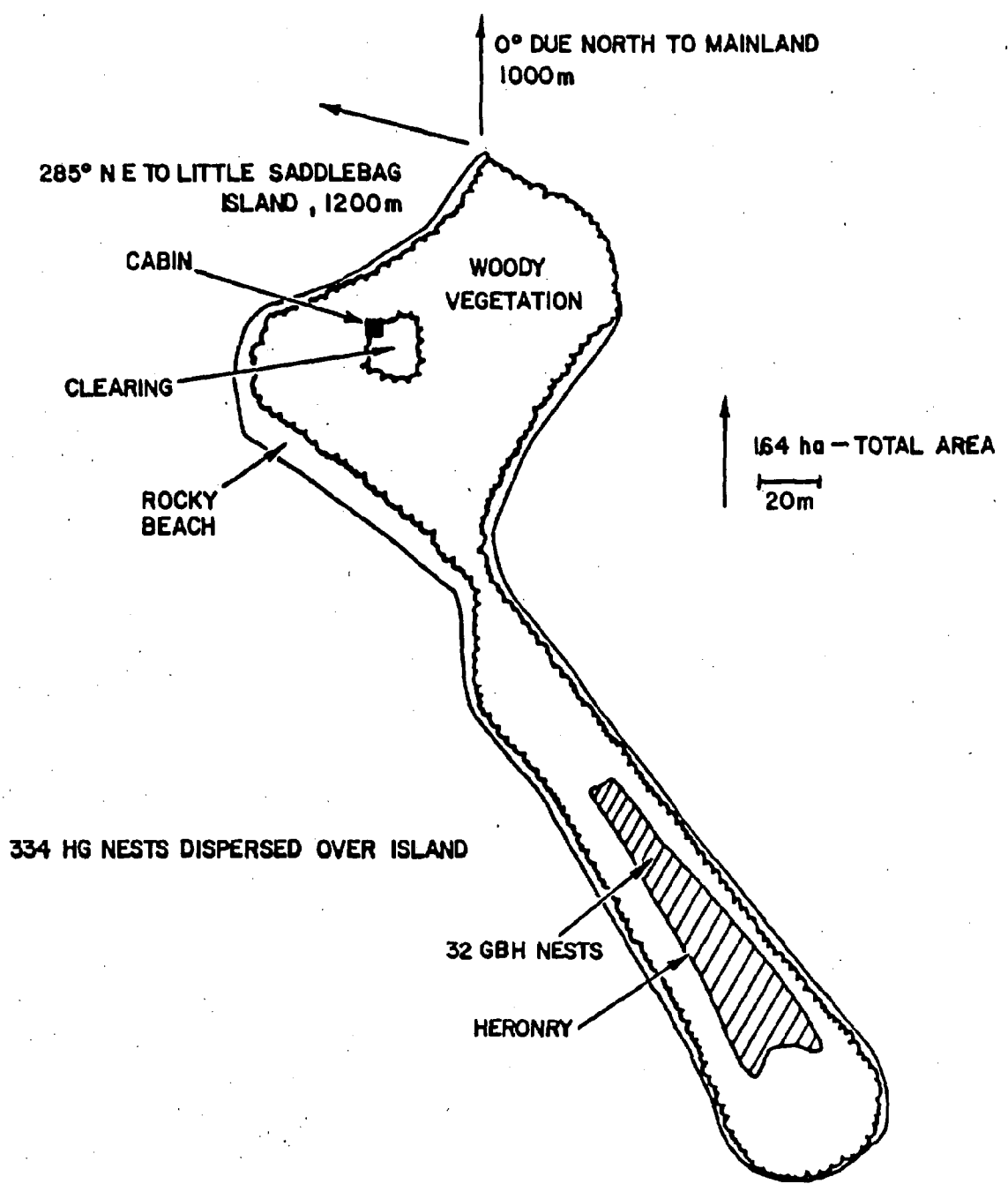
● GBH NEST TREES (9 NESTS), ASH AND BIRCH  
241 HG NESTS DISPERSED OVER ENTIRE ISLAND

DENSELY WOODED

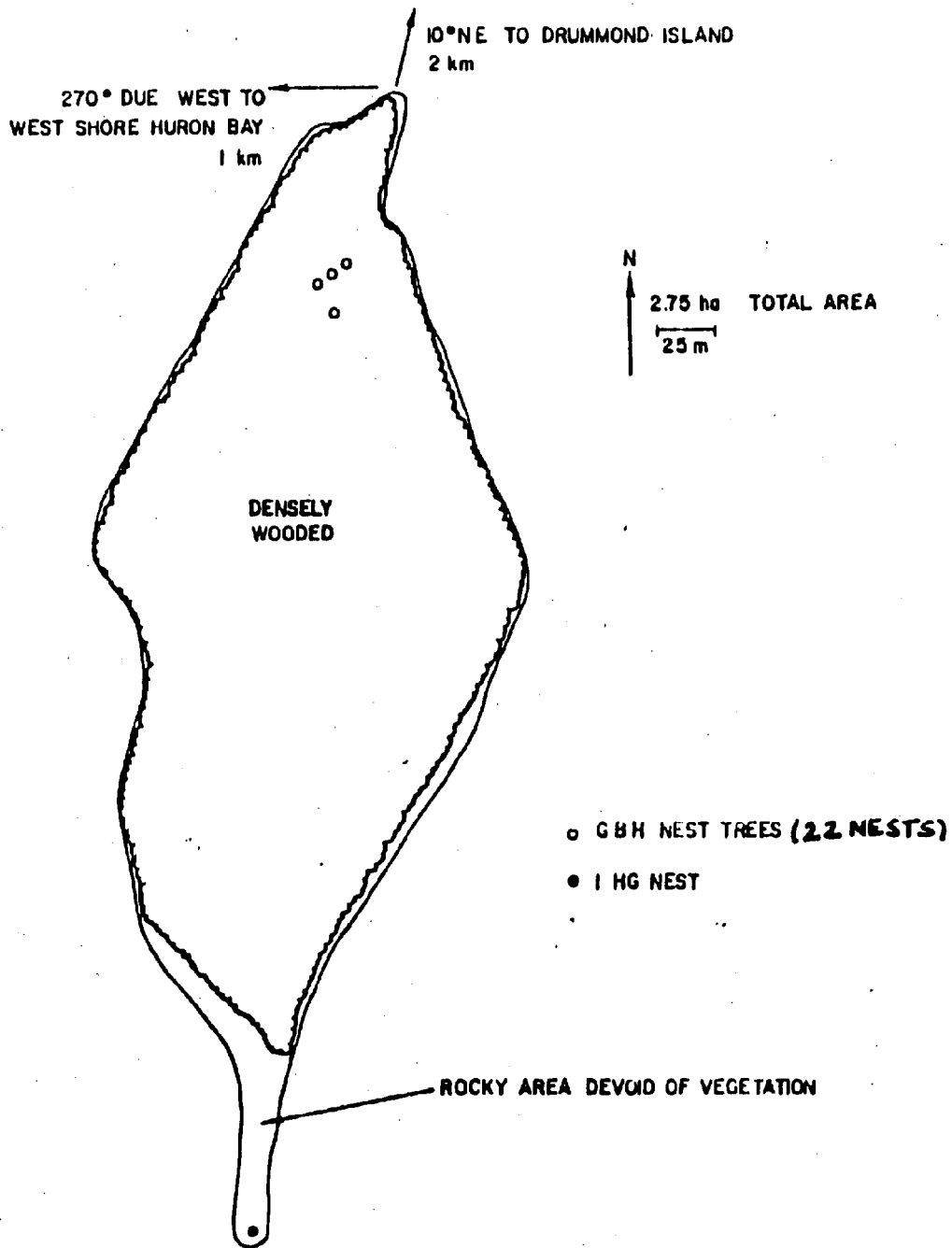
CLEARING

U.S. CADASTRAL SURVEY MARKER

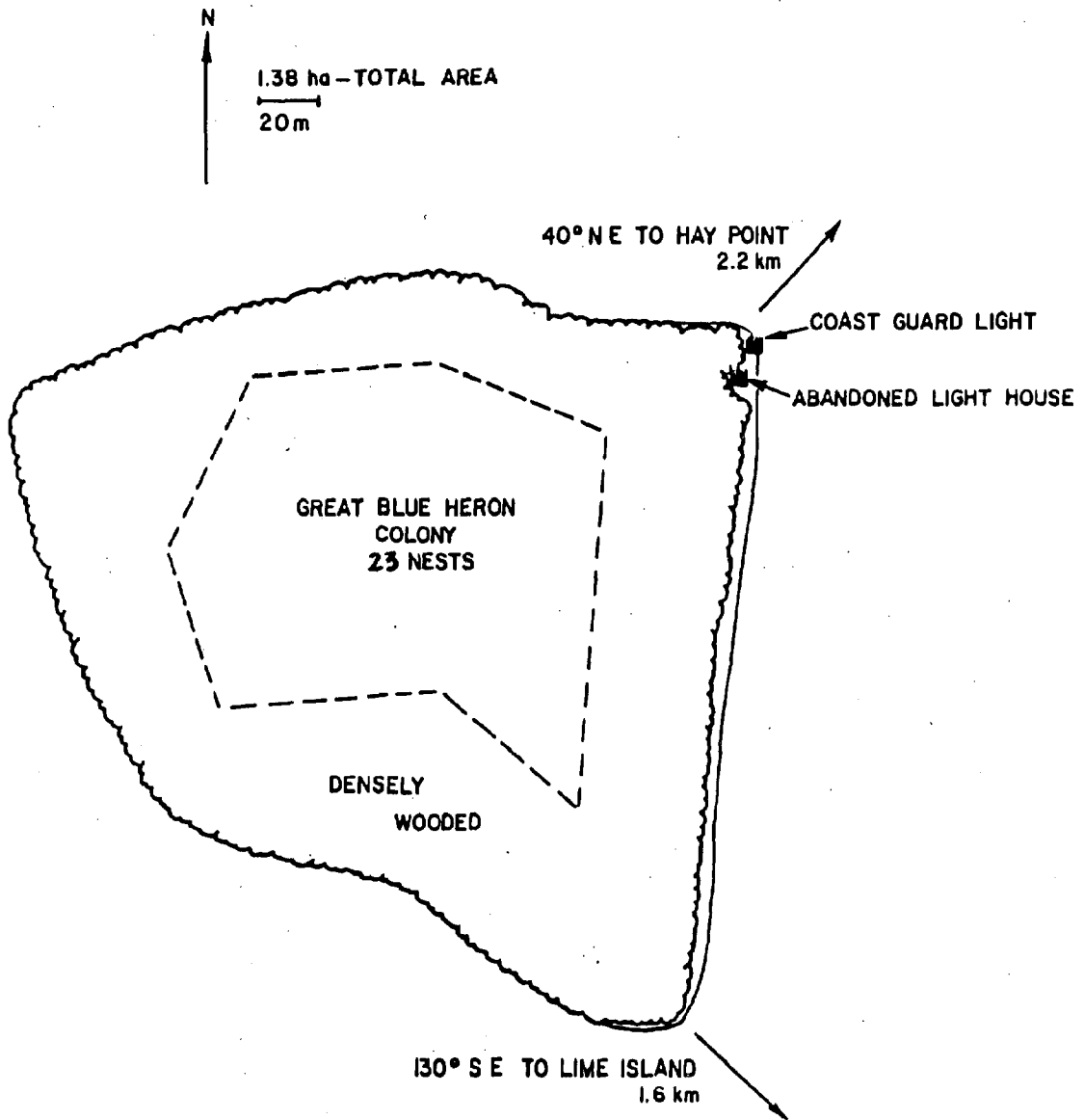
CROW ISLAND - 11



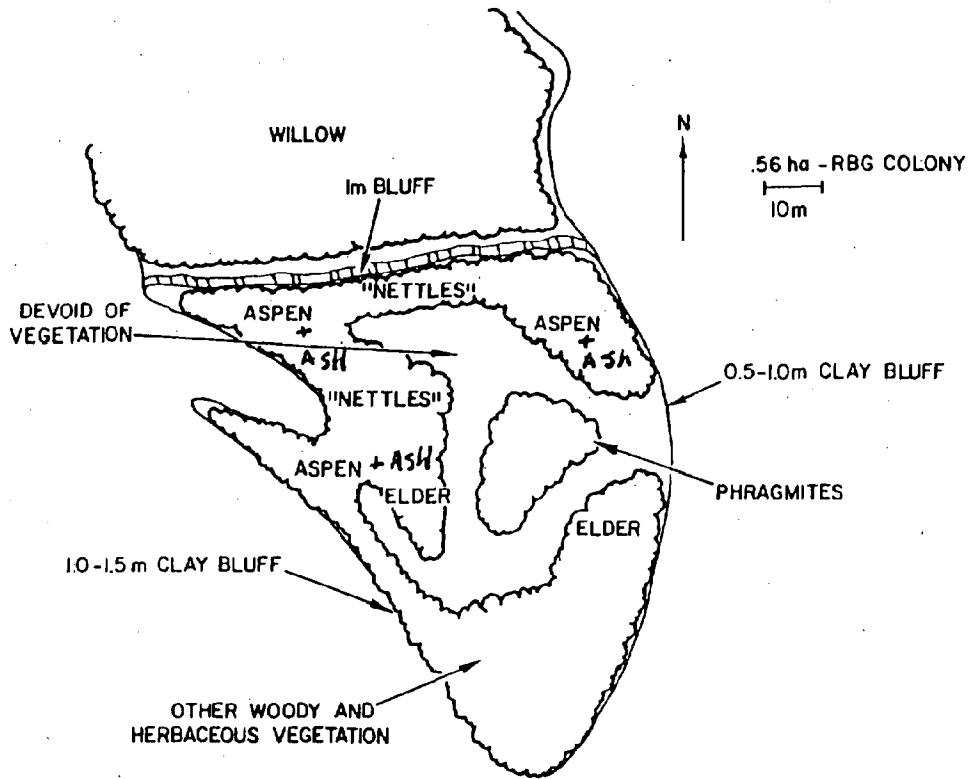
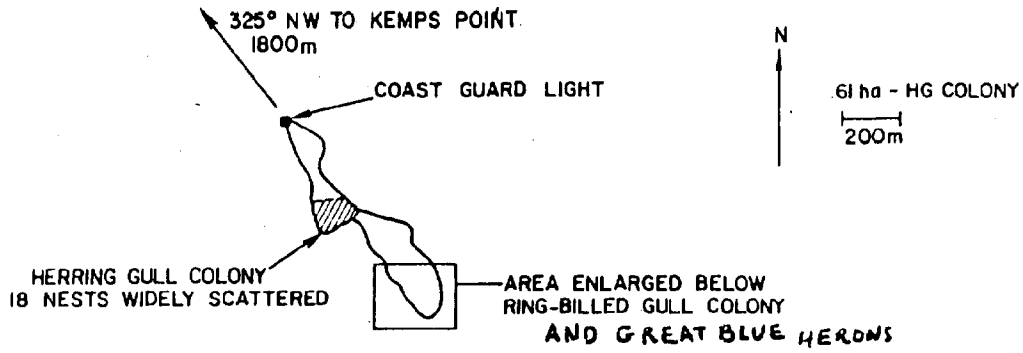
**SADDLEBAG ISLAND-12**



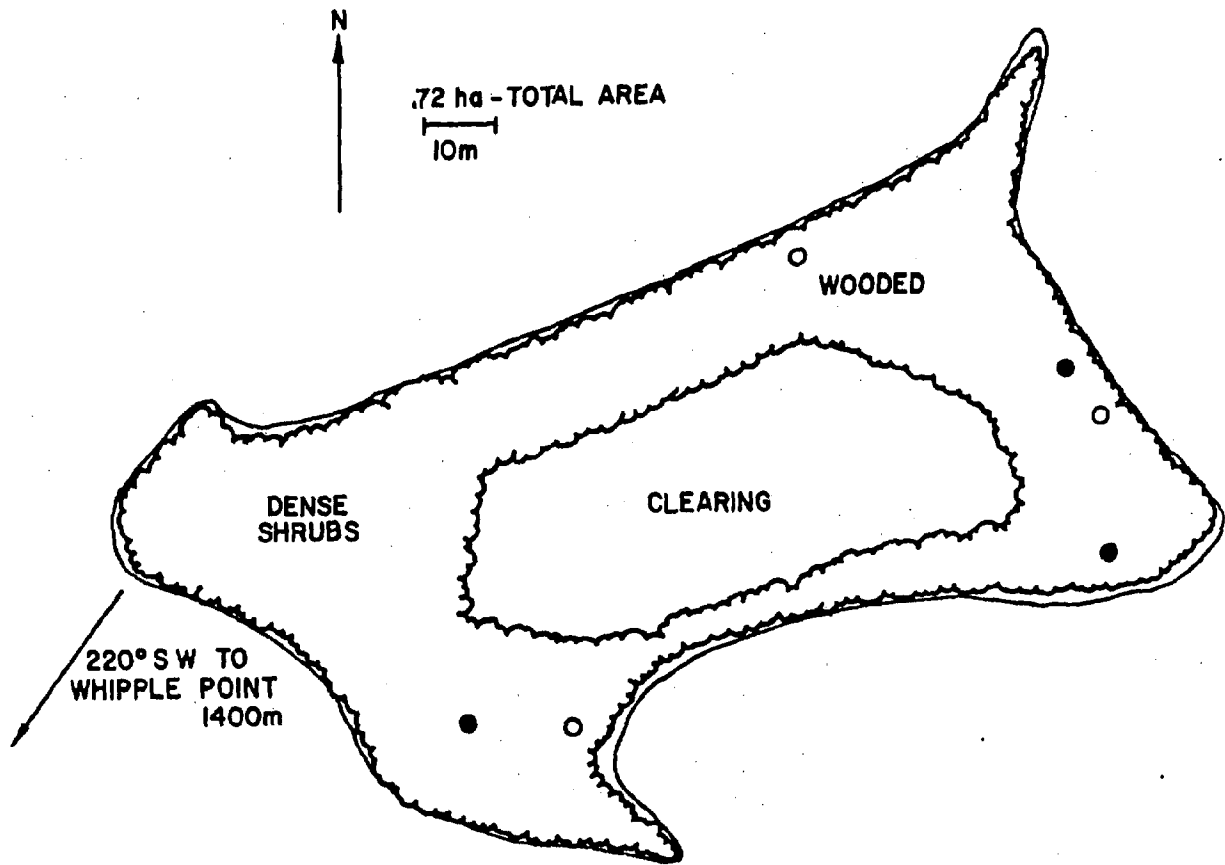
GRAVEL ISLAND-13



ROUND ISLAND - 16



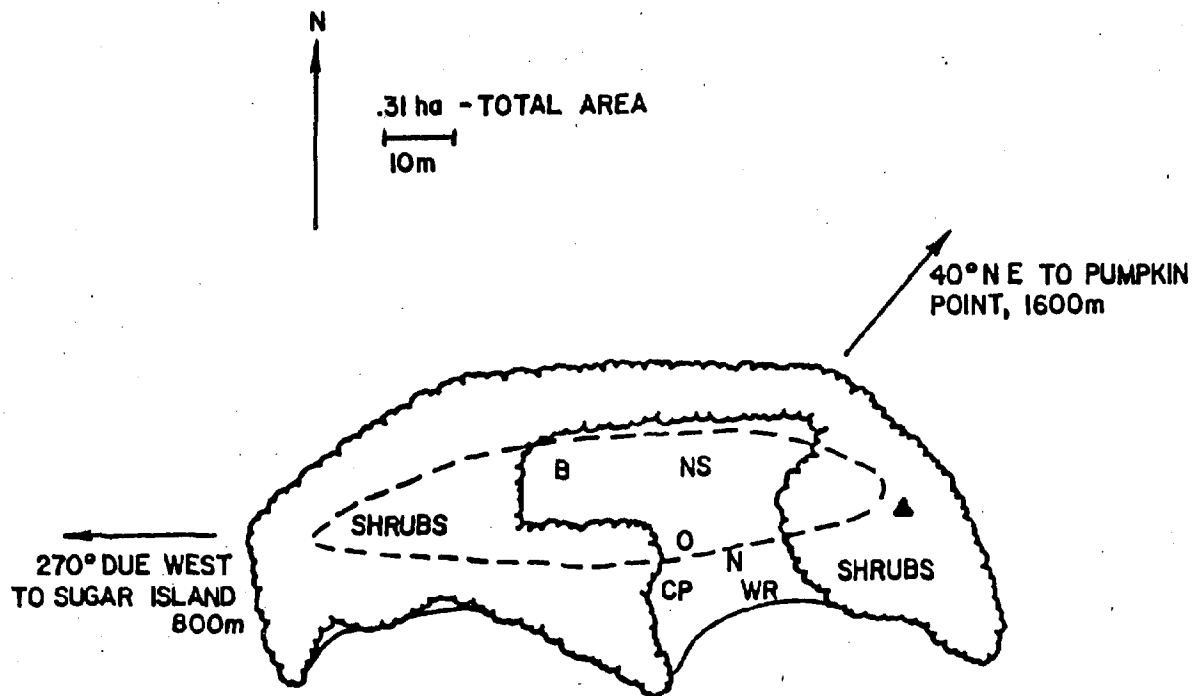
MOON ISLAND-19



- AM. ELM
  - WHITE BIRCH
- } GBH NEST TREES (44 NESTS)

27 HG NESTS DISPERSED OVER ENTIRE ISLAND

## GEM ISLAND-20



O AM. ELM - GBH NEST TREE (22 NESTS)

B BRAMBLES

NS NIGHTSHADE

CP COW PARSNIP

N NETTLES

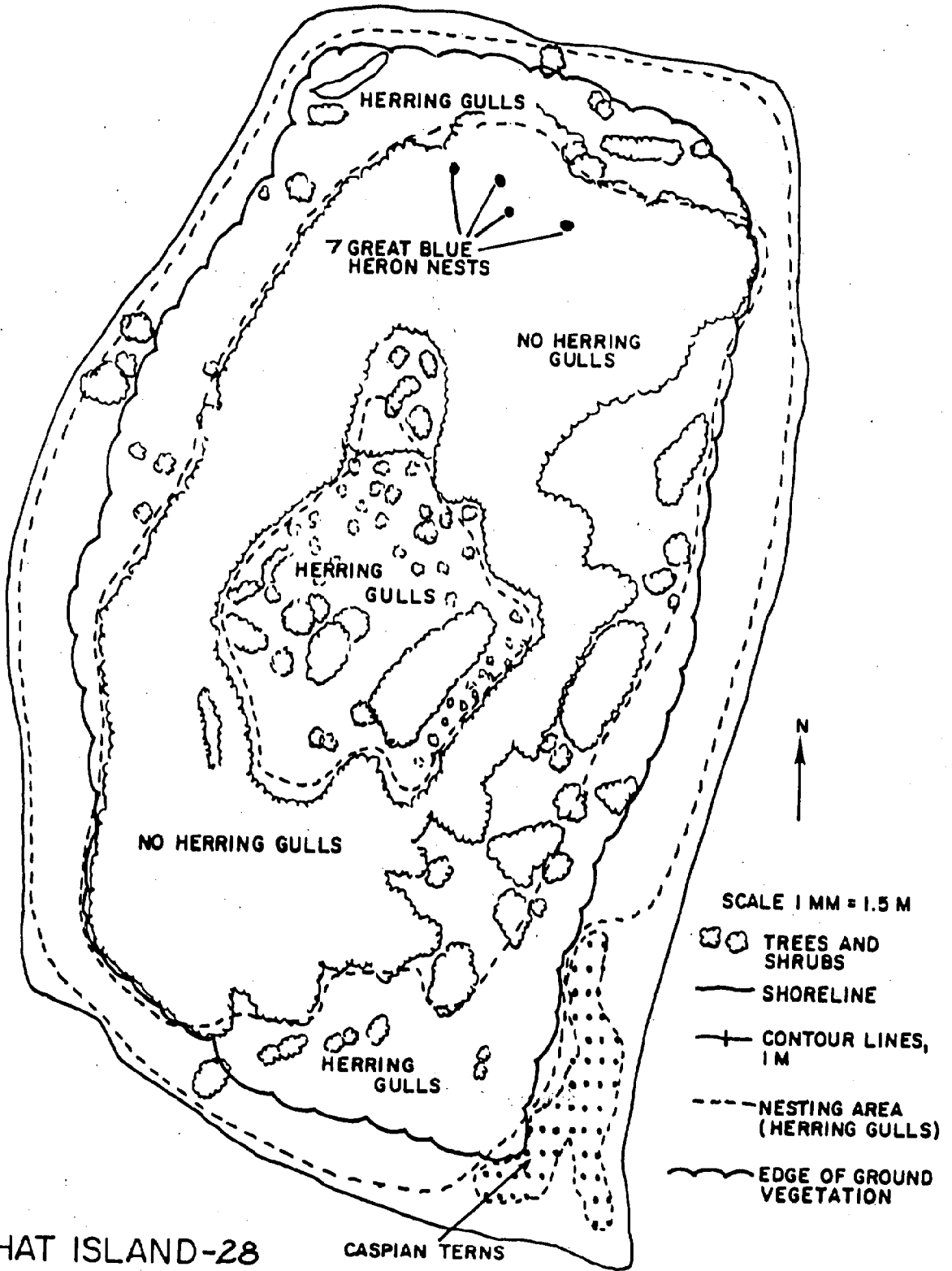
WR WILD RYE

○ BOULDER RIDGE

▲ INT'L. BOUNDARY COMM. MARKER

53 HG NESTS DISPERSED OVER ENTIRE ISLAND

## ROCK ISLAND-23



HAT ISLAND-28



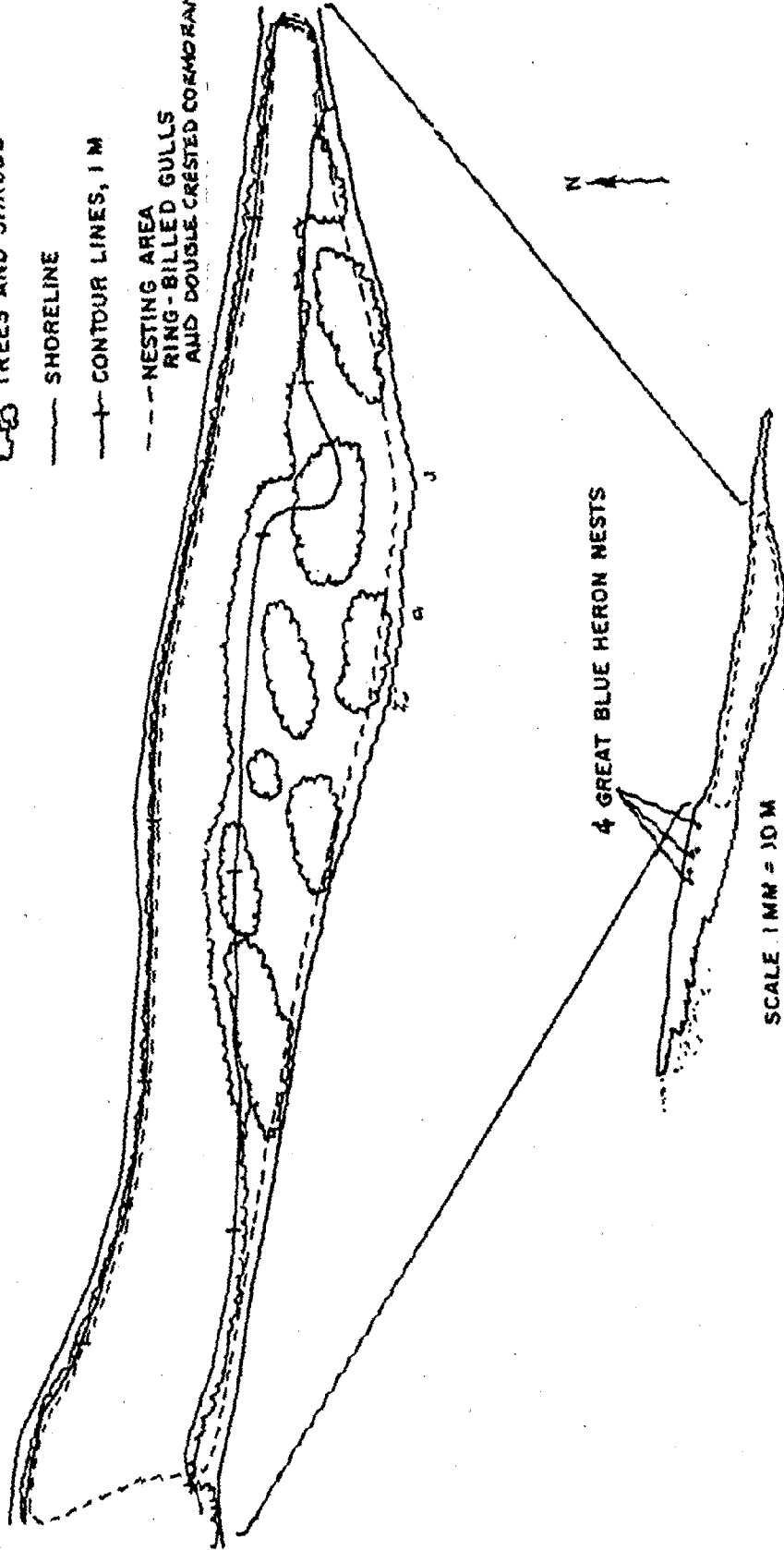
SCALE 1MM = 1 M

TREES AND SHRUBS

SHORELINE

CONTOUR LINES, 1 M

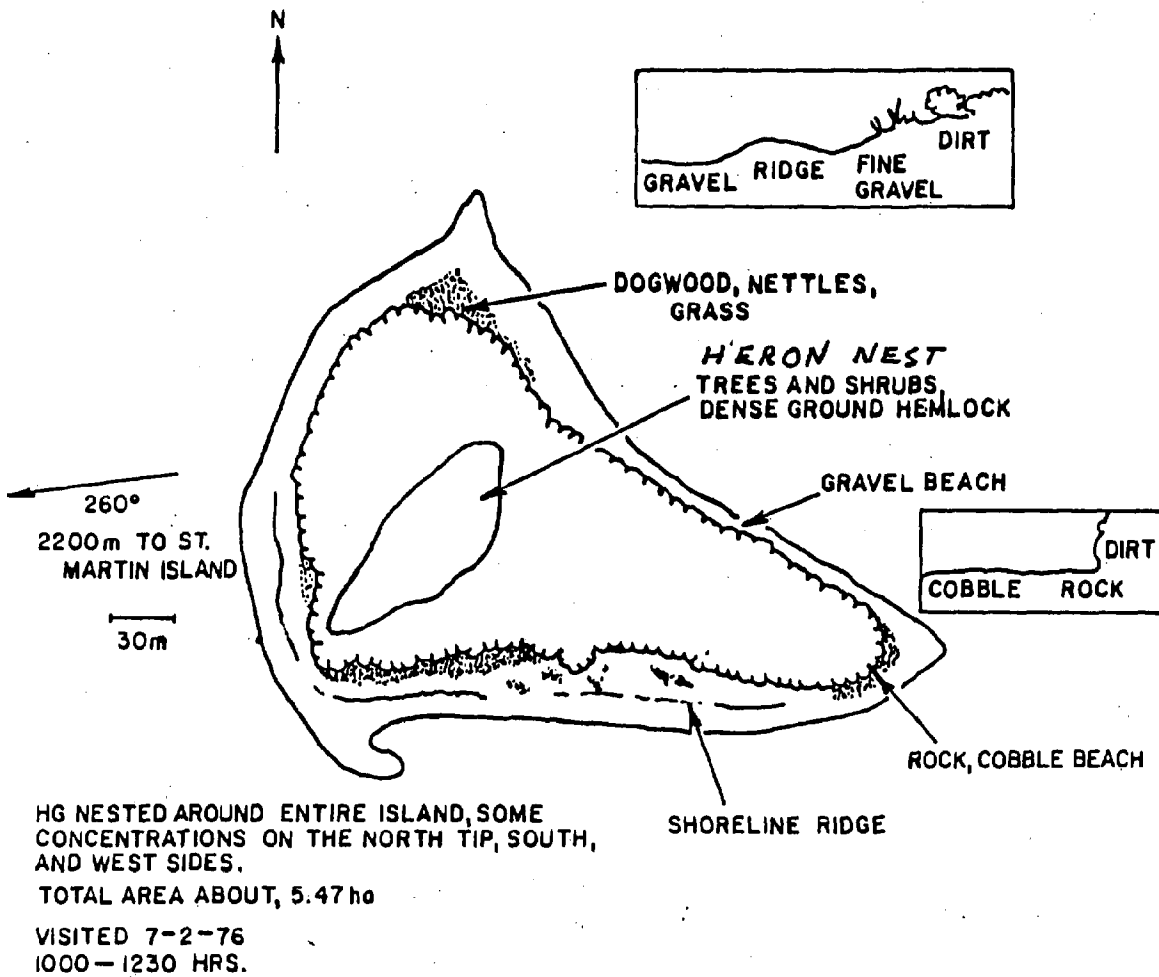
NESTING AREA  
RING-BILLED GULLS  
AND DOUBLE-CRESTED CormorANTS



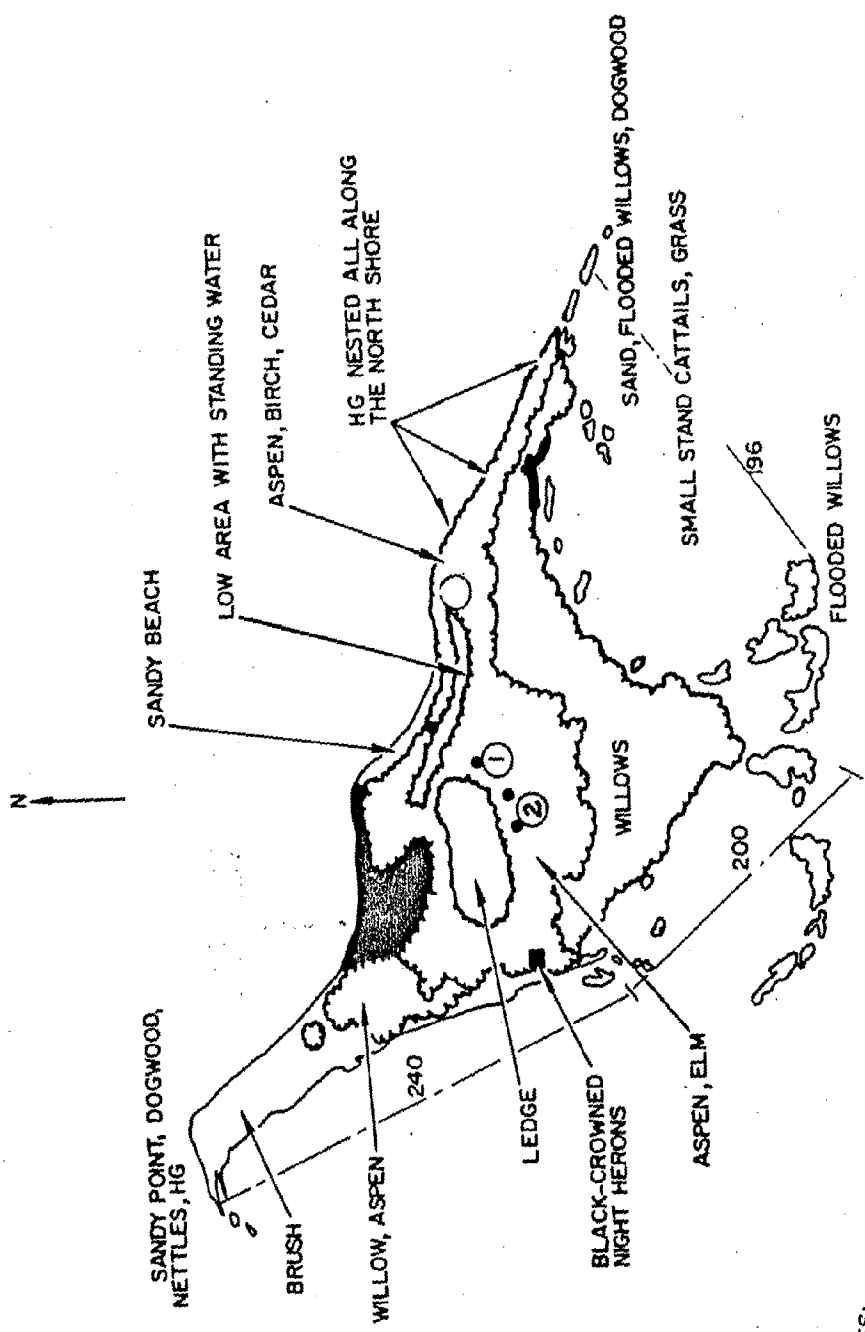
4 GREAT BLUE HERON NESTS

SCALE 1MM = 10M

WEST GRAPE ISLAND - 29



## GULL ISLAND -33

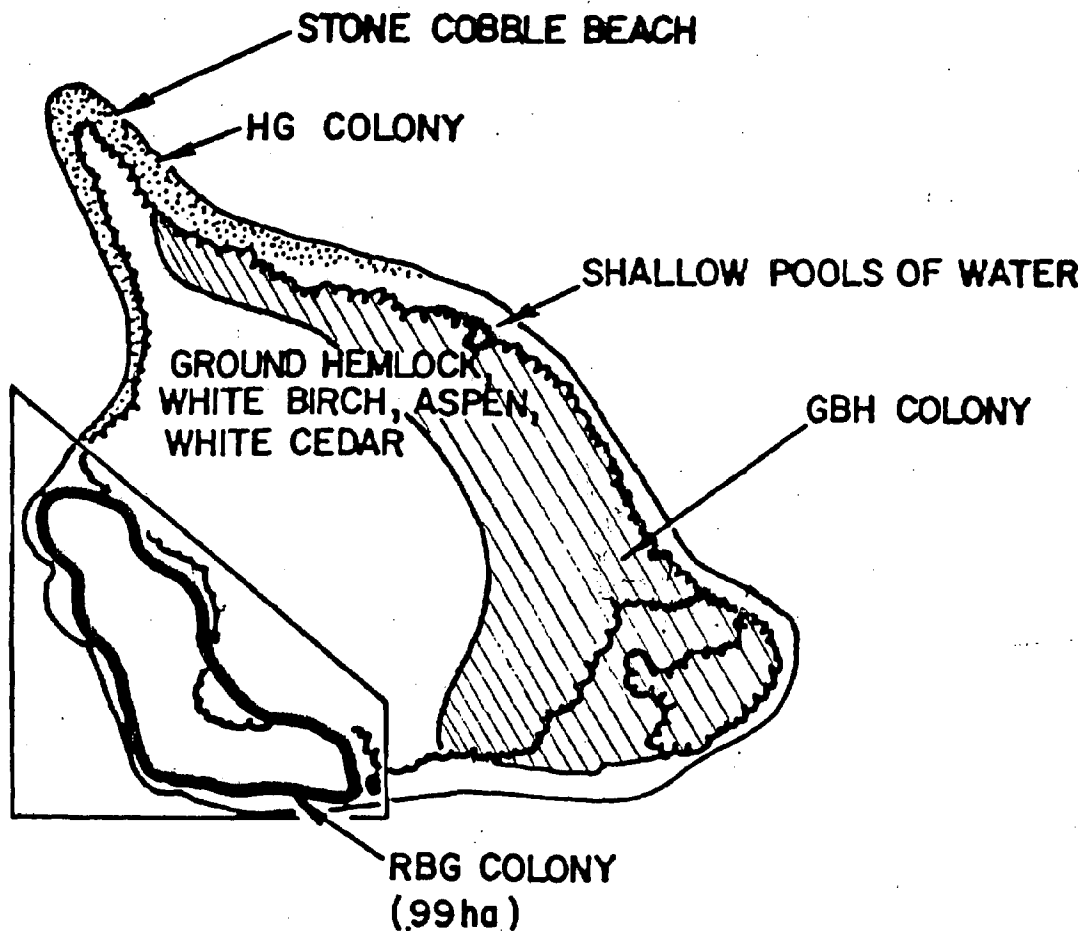


LOCATED: 45° 48' - 86° 45'  
 TOTAL AREA(EST): 9.76 ha  
 DELTA COUNTY, MICH.

SOIL SAMPLES:

- ① GREAT BLUE HERON COLONY
- ② GREAT BLUE HERON COLONY

ST. VITAL ISLAND-34



TOTAL AREA(EST.)-9ha  
LOCATED:45°45'-86°46'

## ROUND ISLAND-35

NOAA COASTAL SERVICES CENTER LIBRARY



3 6668 14104 8415