PIPING PLOVER RECOVERY AND MONITORING

IN MINNESOTA

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by

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INTRODUCTION

The Lake of the Woods area is the only remaining breeding site for piping plovers in Minnesota. Several problems have arisen that threaten the Lake of the Woods plovers, including loss of nesting habitat from erosion and succession, displacement and predation of plovers from nesting and roosting gulls, and mammalian predation of plovers. From l982 to the present, investigators have monitored the reproductive success of plovers at this site, and have conducted a wide array of management activities directed at mitigating threats to piping plovers and sustaining their population. The current project covered the period from 6/24/97 through 12/31/99. This final report provides an overview of activities conducted under this project, and summarizes piping plover reproductive success. This work was partially funded by the U.S. Fish and Wildlife Service (USFWS) under the Section 6 program. (It should be noted that the whole 1997 breeding season is covered in this report, although work prior to June 24 was not funded under this project.)

OBJECTIVES

The objectives of this project were to: 1) determine piping plover population size and reproductive success annually, 2) control predation and disturbance on Lake of the Woods nesting areas, and 3) monitor and improve the quality of nesting habitat.

SUMMARY OF PROCEDURES AND RESULTS BY TASK

Task 1. Personnel assigned to this project who assisted with field observations included Project Manager Katie Haws, Technician Bruce Lenning, Assistant Zippel Bay State Park Manager Doug Easthouse, and Laborer Lance Becklund, as well as several Minnesota Conservation Corps (MCC) members.

Breeding areas at Pine and Curry Island SNA and Rocky Point were visited between mid-May and July 31. Observations were made twice weekly at Pine and Curry Island and Morris Point. In addition, temporary laborers were hired to increase management capabilities as needed (see below under Resp. 3). Observers traveled to nest sites with help of a l6' Lund boat, and 40 hp. motor. Rocky Point was visited up to 8 times each year. All observations were made with either a 20x wide Bushnell spotting scope, or 8x42 field binoculars. Plovers were observed to determine if bands were present, and to determine breeding status. Numbers of plovers seen, and age of the bird (if known) was recorded. Concerns about potential injury to birds led to the discontinuation of banding several years ago; identification of individual birds was possible only for those birds banded prior to that time. However, nesting birds are attached quite closely to their nesting site, so it is possible to distinguish among different nesting pairs.

Numbers of adult plovers observed each year at each breeding site are shown in Table 1. Over the three years of this project, the number of breeding birds was stable at 8 each year. The total number of adults observed ranged from a low of 8 in 1998 to a high of 16 in 1997. Because it is difficult to evaluate the exact numbers of unbanded non-breeders, these numbers should be viewed as approximate.

Tasks 2 and 4. Nests were located by observing the birds' behavior from a distance of about 50 meters. Incubating birds exhibit agitated behavior and remain close to the nest site. Wire mesh predator exclosures were placed around each nest on the day the nest was found to protect clutches from their inception. Exclosure cages were made of 2" x 4" mesh welded wire 4.3' in height. A circle of wire 9.8' in diameter was fastened to three steel rods which were driven into the ground. Nylon carpenter's string was tied across the top in an overlapping manner to exclude avian predators. The exclosures allowed plovers to freely pass in and out of their nest site, while serving as a barrier to mammalian and avian predators. The nests were observed twice weekly to determine hatching dates, and subsequent survival of chicks. Hatching and fledging success could then be documented. During the incubation stage, the nests were viewed from a distance of 2 meters to determine number of eggs in the nest, and to observe behavior. Fledging success was determined by observing from a distance, usually from the boat, as young plovers hide when approached closely.

Maps of nest locations and tables showing outcomes for individual nests for 1997 and 1998 can be found in the annual reports for those years. The number of nests found in 1999 at each site is shown in Figure 1. The first nest was located on May 23d, at the recently formed peninsula attached to Morris Point, formerly known as "Tern Island", and henceforth termed "Tern Point". This nest (#1) eventually contained four eggs. The second nest (#2), also at "Tern Point" was found several days later, and also eventually contained four eggs. A third nest (#3), was located at Rocky Point on May 27th. This nest eventually contained three eggs. A plover nest with 4 eggs was located at the "middle Curry" site on June 24th (#4), and a fifth nest (#5) was located on June 20th, probably a re-nest at the "Tern Point" site, it had one mis-shapen egg.

The outcomes of each of the 1999 nests are as follows (Table 2): Nest #1 washed out sometime prior to June 10th. Nest #2 was abandoned also prior to June 10th. Nest #3 hatched approximately June 24th, (three eggs hatched). Subsequent observations on July 28th confirmed that three young fledged from this site. Nest #4 hatched around July 14th (3 eggs hatched). Two young fledged from this site. Nest #5 was unsuccessful. Reproductive outputs for 1999 by nest location are shown in Table 3.

Overall reproductive success for all years in which monitoring has been done is shown in Table 4 (Haig and Oring, 1987; Wiens, 1986 in part). Success was lowest in 1997,

when no young were fledged (see annual report for details), and highest in 1998 when 7-8 young were fledged. Over the three years, significant changes occurred in nesting habitat, with the closing of the gap between Morris Point and Pine and Curry Island, and the establishment of Rocky Point as a significant plover nesting area. In l999, only two nests reached the hatching stage (40%), compared to 75% in l998. This was most likely the result of the ready access of mammalian predators to the nesting area on Tern Point because of the closing of the Morris Point gap.

Task 3. A federal permit was obtained each year to remove Ring-billed Gulls eggs and nests from the SNA, where the birds have attempted to breed every year since l985. Gulls compete with terns and plovers for breeding space and also are potential predators on chicks and eggs. Over the three years of the study, the numbers of adult Ring-billed Gulls loafing and nesting in on Pine and Curry Island increased. In 1999, over 2000 gulls were found in the area on May 20th, and 885 eggs from 580 nests were destroyed.

In each year, a grid constructed of nylon carpenter's string and metal posts was erected in the gull breeding area. Although the string grid was quite effective in discouraging gull use of the area in the first two years, in 1999 it was less effective. In fact, even immediately after it was constructed, several gulls ventured underneath the string. In response to this situation, Lance Becklund was hired to work from May 24 through June 4. His main responsibilities were to discourage gull nesting by creating disturbance where the gulls were congregating, and also to continue collecting gull eggs. An additional 1502 eggs were destroyed during this time period. This effort discouraged gull use of the area, and there were not large numbers of them present on the site after that time. The total number of eggs taken was 2357, which exceeded the permitted number. This point was brought to the attention of permit administrator Bill Paul in a phone conversation in May. Next year we will have to apply to take a larger number of eggs on the federal permit. Bob Djupstrom, SNA Supervisor, supports continued gull deterrence efforts, because once established, a Ring-billed Gull colony is almost impossible to discourage. This has been documented at Leech Lake and Duluth harbor sites (Jeff Hines, Steve Mortenson, pers. comm).

Gull deterrents were removed from the project area at the end of July. No birds became entangled in the string, and with the additional attention described above, the grids were moderately effective at discouraging gull nesting.

Task 5. Jim Walton was hired to conduct mammalian predator trapping on Pine and Curry Island and Morris Point in each of the three years. Trapping effort and results for 1997 and 1998 are summarized in annual reports. For 1999, an average of eight sets were maintained during the period of 5/9/99 until 7/15/99, for a total of 536 trap nights.

Most of the sets were concentrated in the Morris Point area. One fox was taken from Pine and Curry Island, and one fox and four skunks were removed from Morris Point.

WATER LEVELS AND EROSION

(note: these activities were not part of the Section 6 project, but are included here because they are relevant to plover recovery in Minnesota)

A comparison of air photos from 1975, l985 and l996 revealed some very significant changes in the physiography of the island. The air photos were digitized and composites are shown in Figure 2. There has been significant erosion of the SW corner of the islands, and also some increase in size of the NW end. The total acreage lost since 1975 was 14 acres. The loss of perimeter was 5,609 feet from 1975 through 1996. (Table 5). The closing of the gap between Morris Point and Tern Island, which converted the traditional island nesting site into a peninsula, was another significant change that directly affects the plovers, as mentioned above. The gap closed in October, 1998, and remained closed during the summer of l999. The lake to the north of the old gap site is filling in rapidly with numerous logs, sand and debris. Several big pines at the west end of the islands washed away in 1999.

Data on Lake of the Woods (LOTW) water levels were obtained from the Lake of the Woods Control Board in Quebec. Water levels in each summer month of l999 were higher than those in the previous two years, and also higher than the average since 1982 (Table 6). In 1999, the washing out of nest #1 and abandonment of nest #2 can be attributed to high water levels and storm surge. Continued erosion was observed on the SNA.

RECOMMENDATIONS

The following are recommendations for future monitoring and management on Pine and Curry Island.

1. Continue to monitor population size, nesting, and reproductive success of Piping Plovers on Pine and Curry Island SNA, Rocky Point and Zippel Bay.
2. Continue the use of wire mesh predator exclosures around piping plover nests, and attempt to place exclosures after one egg has been laid.
3. Eliminate contract trapping in 2000. With the changing physiography of the Pine/Curry Island site, the trapping does little to eliminate predation from the traditional bird nesting site area, as it is now a part of the mainland. The money might be better spent on additional surveillance and monitoring.
4. Continue to obtain a federal permit and remove gull eggs as they occur on the SNA. Install deterrents of elevated string grids on the gull-nesting areas. Increase permit request to 3000 eggs. Closely monitor the response of the gulls

to this practice, as experience at other sites indicates that it is crucial to avoid successful nesting of the gulls.

5. Continue the sanctuary signing of all traditional use areas including Morris Point, "Tern Island", "West End", "Middle Curry"and Oak Point. Propose a re-signing project with SNA management staff to re-post the entire SNA utilizing the new black SNA signs. Also make sure wood routed sanctuary and picnic signs are in place.
6. Publish findings on island changes.
7. Continue shrub and brush removal at traditional nesting areas.
8. Adequately post Rocky Point. Advocate for the designation of Wildlife Management Area (WMA) at this consolidated conservation land site.
9. Assist in placement of a new information kiosk at Wheeler's Point.
10. Attempt to improve communication with local residents, resort owners and clientele regarding rules on the SNA, and justification for the rules. This can be accomplished by continuing individual contact, newspaper articles and working with Tourist Bureau. Also, publish one article per year in the Baudette Region paper on the plover project, and plover population.
11. Encourage enforcement of SNA rules, and the Migratory Bird Treaty Act with regards to protection of the nesting birds and their habitat.
12. Aggressively pursue funding of a more extensive study of the causes and outcomes erosion and associated hydrographic changes in the area, through the Army Corps of Engineers.

ACKNOWLEDGMENTS

This work was partially funded by the USFWS under Sec. 06 of the Endangered Species Act. Additional funding was provided by the Nongame Wildlife Program of the Department of Natural Resources. The Section of Wildlife and Scientific and Natural Areas Program, and the Division of Parks provided in-kind contributions. Bruce Lenning and Doug Easthouse provided field assistance. Jeff Dittrich and the MCC crew posted sanctuary signs in May, and removed signs in September. Bruce Lenning and the MCC crew did some brushing and tree removal on the island in September. Rick Cousins supplied us with LOTW water levels from the Springsteel Point gauge on Lake of the Woods.

REFERENCES

Haig, S. and L.W. Oring. 1987. Population studies of piping plovers at Lake of the Woods, Minnesota, I982-I987. Loon 59:113-117.

Weins, T. 1986. Nest site tenacity and mate retention in the piping plover (*Charadrius melodus)*. M.S. Thesis, Univ. Of MN, Duluth.

Table 1. Population summary of piping plovers from 1982-99 at Lake of the Woods, Minnesota./1

Year	Breeding Birds				Non-breeders	Total
	Pine/Curry Island	Morris Point	Zippel Bay	Rocky Point		
1982	24	4	0	2	14	44
1983	32	6	2	2	7	49
1984	36	8	0	0	3-6	47-50
1985	19-36	4	0	-	1-2	24-42
1986	18	4	0	1	9-10	32-33
1987	12	2	0	-	12	26
1988	18	4	0	4	4	30
1989	14	2	0	4	2	22
1990	8	2	-	2	4	16
1991	12	0	0	0	2	14
1992	10	0	0	0	3	13
1993	9	0	0	0	2	11
1994	10	2	0	0	3	15
1995	11	2	0	0	1	14
1996	10	0	0	0	0	10
1997	4	0	0	4	8	16
1998	6	0	0	2	0	8
1999	6	0	0	2	5	13

/1 1982-84 data from Wiens 1986.
1985-87 data from Haig and Oring 1987.

Table 2. Nest initiation dates and nest fates of piping plovers breeding at Lake of the Woods, Minnesota, 1999.

Nest location	Approximate nest initiation date	Nest fate
1. Tern Point Gap	23 May	flooded/abandoned
2. Tern Point Gap *middle*	25 May	abandoned
3. Rocky Point	27 May	3 eggs hatched, 3 fledged
4. Middle Curry Island	24 June	3 eggs hatched, 2 fledged
5. Tern Point Gap *re-nest*	20 June	1 egg, none hatched

Table 3. Reproductive success by breeding location for piping plovers, 1999.

	Rocky Point	Morris Point	Tern Point Gap	West End Plus	Middle Curry	Oak Point	Total	
							No.	%
No. nests	1	0	3	0	1	0	5	--
No. eggs laid	3	0	9	0	4	0	16	--
No. successful nests	1	0	0	0	1	0	2	
No. eggs hatched	3	0	0	0	3	0	6	
No. chicks fledged	3	0	0	0	2	0	5	

Table 4. Reproductive success of piping plovers at Lake of the Woods, Minnesota from 1982-1999.[a]

Year	No. Nests	Chicks fledged	Chicks fledged/pair
1982	24	26	1.7
1983	22	44	2.1
1984	27	13	0.6
1985	--	7-10	0.4-0.5
1986	--	9	0.8
1987	7	2-21	0.3-3
1988	13	12-15	1.0-1.25
1989	10	1	0.1
1990	7	4	0.7
1991	6	2-4	0.3-0.7
1992	5	4	0.8
1993	6	9	1.8
1994	7	4-7	0.7-1.2
1995	8	7-8	1.0-1.1
1996	9	4-6	0.8-1.2
1997	3	0	0
1998	4	7-8	2.3-2.6
1999	5	5	1.25

[a] 1982-1984 data from Wiens 1986.
1985-1987 data from Haig and Oring 1987.

Table 5. Area of Pine/Curry Island S.N.A. (Including Morris Point) from 1975, 1985 & 1996 aerial digitized photography, 4":1 mile scale

Year	Area in Acres	Perimeter in Feet
1975	136.0	51,094.27
1985	109.38	48,528
1996	122	45,485

Table 6. Monthly mean water levels (ft. above sea level) at Lake of the Woods, 1982-1999.

	May	June	July	August	Mean
1982	1059.3	1060.0	1060.1	1060.3	1059.9
1983	1058.7	1059.0	1059.8	1059.7	1059.3
1984	1058.9	1059.6	1060.5	1060.6	1059.9
1985	1060.3	1061.0	1061.5	1061.0	1060.9
1986	1060.6	1060.6	1060.5	1060.1	1060.4
1987 /1	--	--	--	--	
1988	1057.8	1057.9	--	1057.9	1057.9
1989	1059.6	1060.5	1061.5	1060.9	1060.6
1990	1058.1	1059.3	1060.0	1059.4	1059.2
1991	1058.5	1059.4	1060.0	1059.7	1059.4
1992	1060.3	1060.3	1060.5	1060.4	1060.4
1993	1058.9	1059.3	1060.0	1060.0	1059.6
1994	1058.5	1059.0	1060.0	1060.4	1059.5
1995	1059.1	1059.0	1059.2	1059.2	1059.1
1996	1060.2	1061.1	1060.9	1060.5	1060.7
1997	1059.8	1059.7	1060.0	1059.7	1059.8
1998	1058.90	1059.54	1059.62	1059.32	1059.34
1999	1060.55	1060.95	1060.76	1060.49	1060.69
Mean	1059.3	1059.8	1060.3	1060.0	1059.8

/1 1987 data are not available.

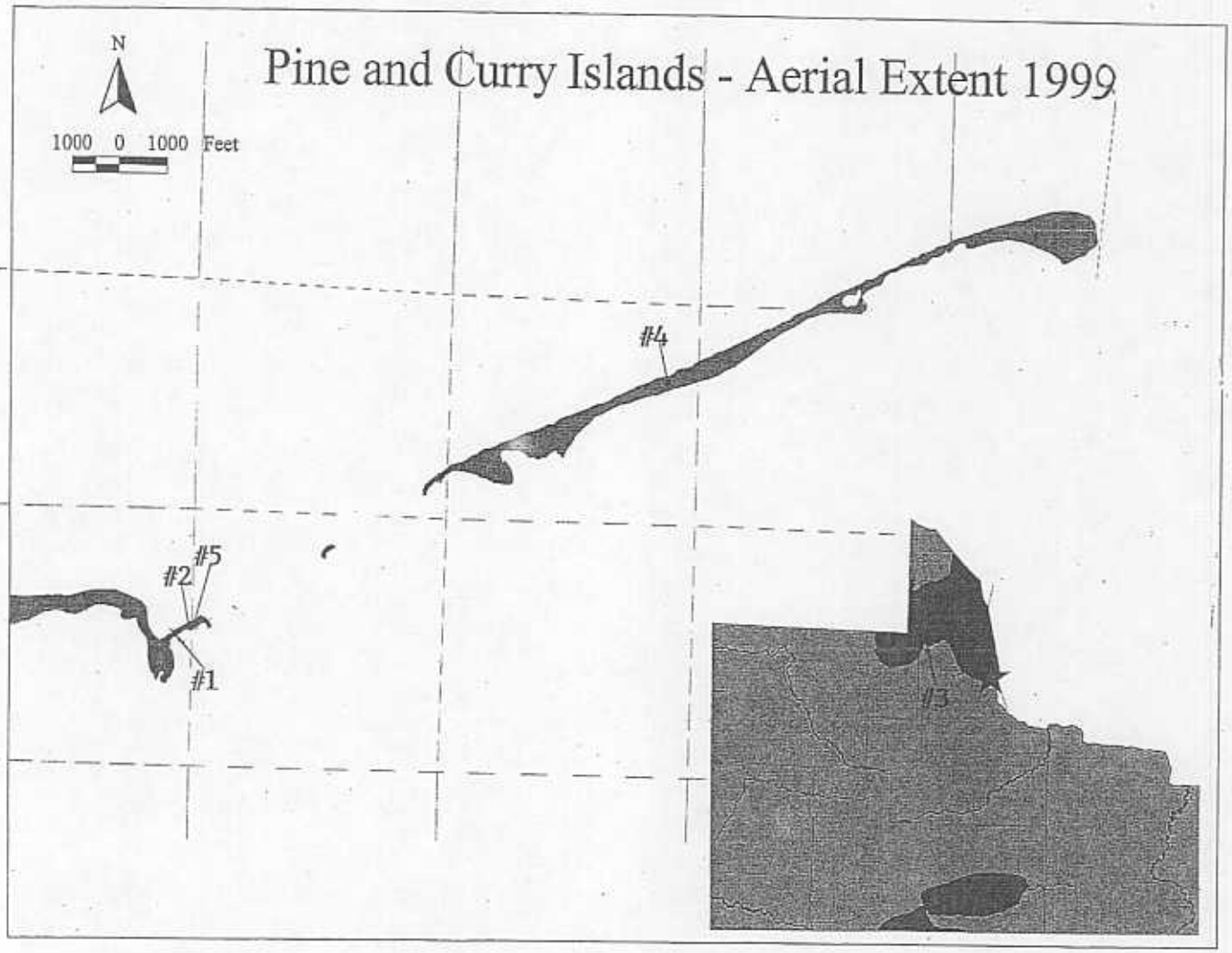
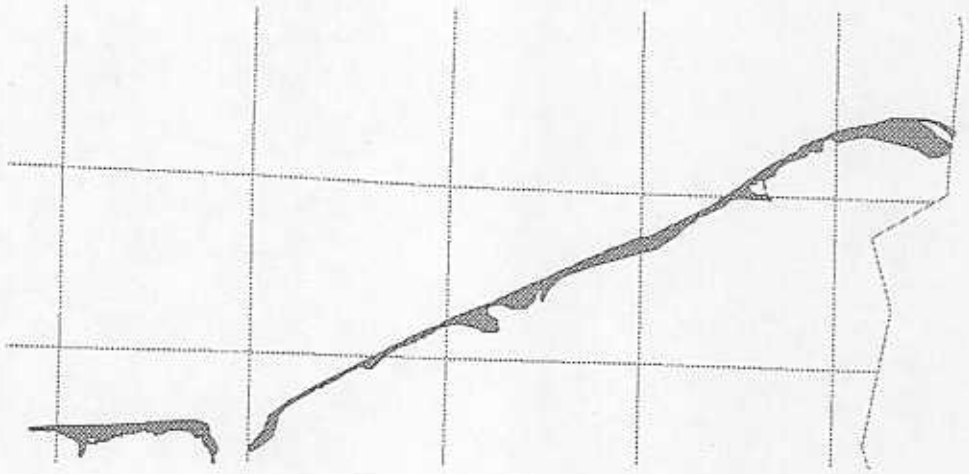


Figure 1. Nesting locations of Piping Plover, 1999.

Pine and Curry Island Scientific and Natural Area

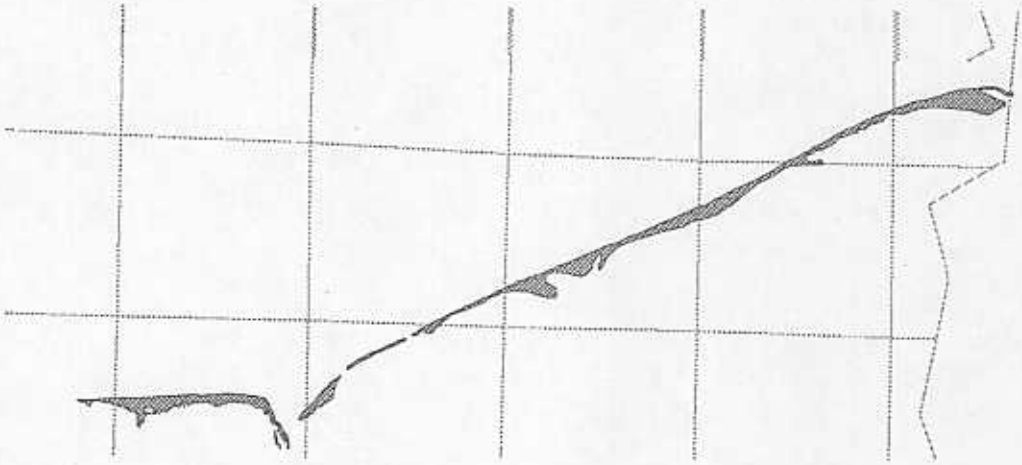
Source: Digitized from geo-referenced, rectified DNR Forestry air photos circa 1975, 1985, and 1996. USGS DRGs and DOQs served as references in the rectification.

0 0.25 0.5
Miles



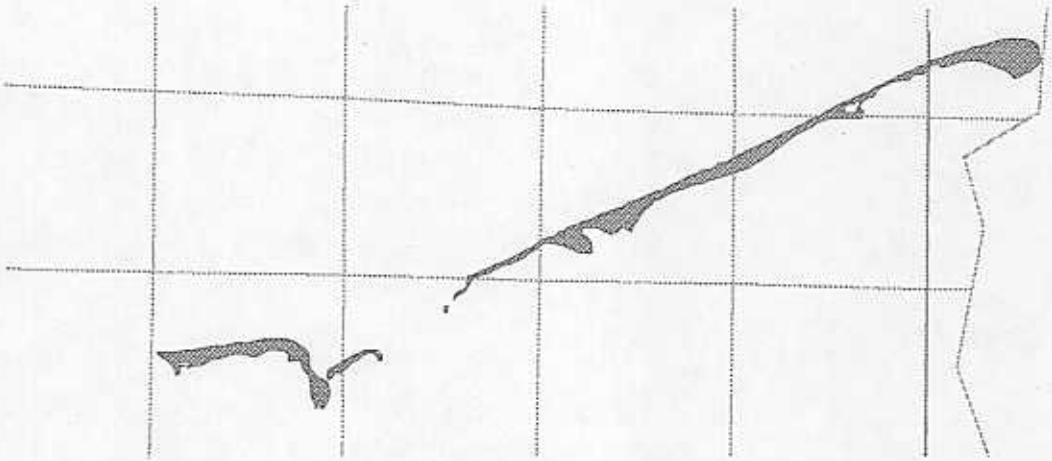
1975

136.0 acres



1985

109.4 acres



1996

122 acres

Figure 2. Comparison of aerial photography 1975, 1985, and 1996.