1987 STATUS AND BREEDING SUMMARY OF PIPING PLOVERS AT LAKE OF THE WOODS, MINNESOTA.

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INTRODUCTION

Since 1981, the Minnesota Non-Game Program has been a leader among state and provincial agencies in the conservation of the threatened Piping Plover (Charadrius melodus). Breeding sites at Lake of the Woods and the Duluth harbor have been protected from human disturbance, habitat has been managed in Duluth to attract birds to safe breeding areas, gulls (Larus spp.) have been discouraged from breeding on Lake of the Woods sites, and mammalian predators have been removed at Lake of the Woods (Wiens 1986, Haig et al. 1987, Scientific and Natural Area Program 1986). Furthermore, detailed population parameters have been collected on individually marked Piping Plovers at Lake of the Woods since 1982 (Wiens 1986, Oring and Haig 1985, 1986). Research at Lake of the Woods now represents one of the longest term studies of Piping Plovers in North America.

This progress report summarizes Piping Plover breeding activities at Lake of the Woods during the 1987 field season. Data collected in 1987 will be briefly presented in this report, but is discussed in finer detail in a paper recently submitted to The Loon (Haig and Oring). More attention will be focused in this report on current management issues pertinent to Piping Plovers at Lake of the Woods.

METHODS

Similar to the past two field seasons, four field trips of three to four days each were made to Lake of the Woods by S. Haig and L. Oring. In 1987, observations were made of Piping Plovers at Pine/Curry Island, Morris Point, Oak Point, and Zippel Bay from 18-22 May, 7-11 June, 5-8 July, and 22-24 July. During each visit, all breeding sites were censused, marked individuals identified, reproductive status determined, and any disturbance assessed. Spot checks of nest statuses were also made on two additional visits by L. Oring.

Unmarked adults or birds that had lost their color bands were banded. Chicks were not banded until they were older than ten days in order to avoid injury to young birds' legs from bands. All Piping Plovers banded were given individual color band combinations, an aluminum Fish and Wildlife Service band, and an international flag.

RESULTS AND DISCUSSION

Banding summary--In 1987, all but one of the adults at Lake of the Woods had already been banded, hence no new adults were banded. We did replace old bands on eight adults. Seven fledglings were also marked. The remaining fledglings were not marked because, by being conservative and waiting until young birds were almost fledged, we missed banding some of them (see discussion of reproductive success).

Each year, as the population at Lake of the Woods declines, we have become increasingly more conservative with our banding practices. In three years, we have only banded eight adults. On one hand, there is increasing evidence that the presence of humans, including researchers, on Piping Plover territories causes disturbance. On the other, it is almost impossible to determine population numbers at Lake of the Woods without individually marking birds. Piping Plovers may move daily or more frequently among breeding sites, thus, censusing without identifying individuals would lead to gross over estimates of population density. Obviously, this would be a significant problem for such a fragile population. Individually marking birds also facilitates identification of immigrants into the area, emigration of Lake of the Woods birds to other breeding sites, and identification of Lake of the Woods birds in the winter (discussed in Haig 1987). Currently, our conservative policy seems to mitigate the problem of disturbance and the need to identify individuals. In the future, this policy may have to be re-evaluated.

Population estimate--In 1987, 26 adults were present on the study sites (Table 1). Censuses by the Ontario Ministry of Natural Resources indicated ten Piping Plovers (four pairs) used beach habitat on nearby Sable Island (Heyens 1987). Distribution of birds resembled previous years (Table 2), although, in contrast to previous years, the middle portion of Pine Island had breeding pairs present. Most striking among 1987 results was the

Table 1. Population censuses of Piping Plovers at Lake of the Woods, Minnesota, in 1987.

	Piping Plovers observed					
Date	Morris Pt.	Pine Is.	Mid-Pine	Oak Pt.	Zippel Bay	Total
19 May	5	9	0	2	0	16
8 June	3	12	0	5	0	20
5 July	2(4)	13(12)	4	3(1)	0	22(17)
27 July	0	1(1)	2(4)	1(1)	0	4(6)
Total Breeding	2	8	2	2	0	14
Non-Breeders	3	4	2	3	0	12

() indicates number of chicks present.

Table 2. Population summary of Piping Plovers from 1982-87 at Lake of the Woods, Minnesotaa.

	Breeding birds					
Year	Pine/ Curry Is.	Morris Point	Zippel Bay	Rocky Point	Non-breeders	Total
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

a1982-84 data from Wiens 1986.

19-21% decline in the overall number of Piping Plovers present compared to 1986. Not only are numbers of birds down, but the number of breeding pairs (n=7) has declined 36% from 1986. Finally, the number of non-breeders has increased from nine to twelve since last year, and the ratio of breeders to non-breeders has decreased from 3.6:1 in 1986 to 2.2:1 in 1987.

These values do not indicate a stable situation for Piping Plovers at Lake of the Woods. One positive note, however, is that for the first time since 1984 water levels at Lake of the Woods were down by one meter in 1987. Lower water levels enhanced exposure of hundreds of meters of open beach at all study sites thus providing more and better breeding habitat. Piping Plovers were observed moving into different territories than had previously been used. If habitat conditions continue to improve, it is possible some of the non-breeding birds may come to use these new areas.

Breeding site fidelity/natal philopatry--Previously banded adults and chicks made up 96.2% of the Piping Plovers at Lake of the Woods study sites in 1987 (Table 3). Of birds found on Sable Island, seven were banded on Minnesota sites (Heyens 1987). Returns to Minnesota sites represent an 11% increase over 1986 returns and is the highest value reported among Piping Plover studies (Haig 1987). While debate continues over the value of returning to familiar sites versus dispersal away from relatives (Shields 1982), the fact remains that few new birds are moving into the Lake of the Woods area and the number of birds is

Table 3. Breeding site fidelity and natal philopatry among Piping Plovers at Lake of the Woods, Minnesota from 1983-87a.

New birds banded		N Obs. 1983	N Obs. 1984	N Obs. 1985	N. Obs. 1986	N. Obs. 1987
Adults in 1982:	37	26	16	13	3	3
Chicks in 1982:	26	9	5	2	2	2
Adults in 1983:	8	-	7	4	3	1
Chicks in 1983:	44	-	6	11	1	3
Adults in 1984:	2	-	-	0	0	0
Chicks in 1984:	14	-	-	4	5	1
Adults in 1985:	6	-	-	-	5	5
Chicks in 1985:	10	-	-	-	7	0
Adults in 1986:	0	-	-	-	-	0
Chicks in 1986:	9	-	-	-	-	1
Unidentified returnees		-	-	-	-	9
Total return		35	34	34	26	25
Resident population		49	47	35-42	32	26
Percent return		71.4	72.3	80.9-97.1	81.3	96.2

a1982-1984 data from Wiens 1986.

declining. Considering the decline of birds on the Great Lakes (Haig et al. 1987) and the low number of birds nesting in nearby Manitoba, lack of immigration into the area may become a serious threat when residents die off.

Reproductive success--During 1987, clutches of eggs were laid in the following distribution: one at Morris Point, four at the west tip of Pine Island, one in the middle of Pine Island, and one on Oak Point. All of these clutches hatched, with the exception of one clutch on Pine Island. Ten days after hatch, the brood at Morris Point had four chicks, three broods on Pine Island had four chicks, and the brood at Oak Point had one chick. The brood in the middle of Pine Island hatched at least two chicks on 22 July.

Five of the initial 17 chicks were banded at age ten days, the remaining were left to be banded until they were closer to fledging. Upon returning to the study sites when unbanded chicks should have been fledging, we did not find any of the chicks or their parents. Two events could have occurred to explain these observations. Either the chicks fledged earlier than we predicted and moved with their parents, or intense thunder storms the week we were not present wiped out the chicks and the parents left without them. We meticulously searched all nesting areas for carcasses but did not find any. Obviously, this is a difficult puzzle to solve, however, if the chicks did fledge (which is entirely possible), Piping Plovers at Lake of the Woods

will have had the most productive year since 1983 (Table 4)! Resighting of banded chicks in future years may resolve the dilemma.

Predator management--Two predator management techniques were practiced on Pine Island this year. First, all clutches of Ring-billed Gulls (Larus delawarensis) were removed to prevent settling of the gulls on Piping Plover breeding areas. Numbers of gulls on study sites appeared to be down from previous years, although it is difficult to separate the effect of removing eggs from more gull habitat being available on other islands due to lower water levels. In any event, the technique is not labor intensive and should be continued in years to come.

The second technique was to trap all mammalian predators that occurred on the west tip of Pine Island. A trapper hired by the DNR continued to trap foxes (Vulpes vulpes), mink (Mustela vison), and weasels (Mustela erminea) throughout the summer. Once again, it is difficult to evaluate success of the technique, however, only one nest, at most, was lost to predators in 1987. In 1986, predators were responsible not only for loss of eggs but for depredation of incubating adults. Clearly, the trapping should continue in future years.

Human disturbance--Posting of the SNA areas continued in 1987. There was little evidence of human disturbance at most sites. Motorcycle and three-wheeler tracks were found, however, on three occasions at Morris Point. It may be worthwhile to continue a public relations campaign with area resort owners that

Table 4. Reproductive success of Piping Plovers at Lake of the Woods, Minnesota from 1982-87a.

Year	Chicks fledge	Chicks fledge/pair
1982	26	1.7
1983	44	2.1
1984	13	0.6
1985	7-10	0.4-0.5
1986	9	0.8
1987	2-21	0.3-3

a1982-84 data from Wiens 1986.

keeps them up to date on the plovers (i.e. let them know birds were successful and it is worthwhile to protect the areas.), the importance of Lake of the Woods to the entire species, and reminds them of fines they can incur if trespassing occurs. Many times it seemed that just our presence at the resorts and on the study sites reminded people that the DNR was serious about protecting the birds.

Publications resulting from Lake of the Woods research--In addition to writing annual progress reports, data collected from this research have been submitted in 1987 for publication in The Loon and Behavioral Ecology and Sociobiology. In addition, the data are presented in S. Haig's dissertation (Haig 1987) and are an important addition to the U.S. Fish and Wildlife Service Piping Plover Recovery Plan (Haig et al. 1987). It may be worthwhile for the DNR to use information from progress reports to issue press releases on progress at Lake of the Woods.

Future research--Given the importance of Piping Plovers at Lake of the Woods, we suggest that the birds continue to be monitored on an annual basis. Censusing, habitat protection, and predator management should account for 95% of the work and should be carried out in the least number of days possible to decrease disturbance to the area. Censusing and banding occasional chicks could be carried out three times a summer utilizing two days per visit (weather permitting). Even if research activities are cut to shorter visits, it will be important to inform resort owners

(primarily at Morris Point Resort where vehicle access to nest sites is easiest) that researchers are frequently present and will be concerned about trespassing on study sites.

The Ontario Ministry of Natural Resources (L. Heyens) and Canadian Wildlife Service (P. Goossen) will continue their interest in Lake of the Woods Piping Plovers in Ontario. Future collaboration with them will enhance both Ontario and Minnesota's conservation efforts in the area.

CONCLUSIONS

1987 represented the sixth year of Piping Plover research at Lake of the Woods, Minnesota. While numbers of birds in the area once again decreased, it is probable that pairs hatching chicks were quite successful. Lower water levels, removal of gull eggs, mammalian predator trapping, and continued restriction of humans from study sites may account for some of the reproductive success in the area. Continuation of these management practices may insure better reproductive success and possibly draw new breeding birds into the area in the future.

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