

REPORT OF THE NORTH DISTRICT TERN WARDEN: SEASON OF 1979

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This report presents a summation of all data concerning the nesting activities of Least (*Sterna albifrons*) and Common (*S. Hirundo*) terns in the North District of the Cape Cod National Seashore for the season of 1979. An account of the protection program employed this season is included.

Each season is unique. This season will most certainly be remembered for its overall intensity and for the unprecedented productivity of the colonies.

Never has there been a greater effort made on behalf of these beleaguered birds: long hours, nights as well as days, spent on the beaches, and hard labor - hauling and planting signs, cedar posts, and electric fences. Moreover, there were compromises forged out of the needs of beach-goers, human and tern alike - and such things are never easy.

How good it is, then, to report the best season ever for the terns of the North District, and how gratifying it is to know we contributed to this success.

#### METHODS AND MATERIALS

In regard to methods, I quote from the 1978 Report of the Tern Warden a list compiled from the official position description:

- 1) Surveying and patrolling, establishing locations of all tern colonies and nesting terns.
- 2) Posting all tern colonies, as well as extra-colony posting.
- 3) Monitoring of posted areas to prevent intrusion.
- 4) Censusing of nesting terns.
- 5) Contact with the public and various media sources regarding interpretive and educational aspects of tern nesting.
- 6) Evaluation of productivity, including all relevant factors.

Additional detail and background information may be obtained in Report of the Tern Warden: 1976; Report of the Tern Warden: 1977, Report of the Tern Warden: 1978 (Minsky), and Guidelines for the Protection and Management of Colonially Nesting Waterbirds (Buckley and Buckley). All should be available at Cape Cod National Seashore headquarters, South Wellfleet, Mass.

This season, however, there has been considerable change in the methods employed due entirely to the division of the tern program into the two constituent districts of the Seashore, North and South. Each district has a tern warden and three assistants who are Student Conservation Aides.

This division allowed us to narrow our focus and concentrate our energies on a smaller number of colonies. The effect is apparent in the greater number of data sheets completed (each representing a visit to a colony - up 32% over last season), and by the larger number of visitor contacts on the beaches - roughly double last season's.

#### CENSUSING PROCEDURES

Each nest was marked with a shingle placed approximately four feet away

(always forward and to the left). On the shingle was marked a number or correlate, the number of eggs, and the date of discovery. The data could be read through binoculars for nest watches from the observation blind or vehicle.

All data collected was entered on a data sheet - one for each census - and then transferred to a master sheet for future compilation. This master sheet was for the most part composed and maintained by SCA Mark Ashton.

It cannot be denied that direct nest counts have some impact on nesting terns. For this reason we refrained from using this technique in past seasons. This year, however, we felt that we had gone such a long way towards eliminating other disturbances that our controlled incursions (i.e., only during morning hours, only under proper weather conditions) into the colonies could be justified. In addition, we saw that for the first time we had an opportunity to accurately assess the effect of our protective program. For these reasons, we went ahead with this method. I must emphasize that we do not recommend direct censusing for all colonies under all circumstances.

The direct nest counts were complemented by nest watches from a blind or vehicle. These watches determined whether nests were active (i.e., being tended). They also allowed us to make observations on nesting behavior. We attempted to determine the number of fish brought into the incubator per hour, the number of times the incubator was relieved per hour, and the number of minutes clutches were left exposed per hour. It is hoped that some day this information can be correlated with food supply and nesting success.

#### POSTING

Posting operations, too, were intensified this season. Each colony, of course, was posted with signs and twine; there was also at least one large interpretive sign (with picture and text) posted near each colony. As chicks began to appear, CAUTION: YOUNG BIRDS IN TRACKS signs were positioned at either approach to a colony.

At this point, however, it was decided that the CAUTION signs were not adequate to prevent the destruction of tern chicks by vehicles. Approximately 2.2 miles of beach, comprising 3 of the 4 Least Tern colonies in the North District, were closed to vehicles (by means of cedar posts and wire cable), and remained so for the next 32 days.

Since this closure represents an abrupt departure from normal posting operations, and since its effect on chick survival was so dramatic, I will describe in some detail the ramifications of this effort.

On July 5, after initial losses of chicks on the beach below the High Head tern colony, we began to post the area. Posting was the same as last season: cedar posts were spaced four feet apart, running from the rear dune to the high water mark. This allowed traffic by at low tides but not at high tide.

By the night of July 6 this posting was still incomplete because we ran out of cedar posts. Also, some time that evening the northside barrier was dismantled and some posts taken.

After a meeting on July 7 with Head Ranger Irving Tubbs, it was decided that complete (but temporary) closure of the High Head area would best answer the needs of drivers and terns there. (Many drivers had been confused by the earlier posting; some had experienced difficulty negotiating the lower beach.) It was hoped that this would be the only place such action would be necessary.

On July 8, after further evidence that significant numbers of chicks were being lost at two other colonies, the decision was made to expand the total (but temporary) closure.

On July 9, the barriers went up. At the same time, a circular was distributed to all fee booths and the oversand booth in the North District. Every oversand driver received a copy.

July 10. A group of night-fisherman came to the High Head Ranger Station to register their displeasure. At that time, a meeting was set up for the following day to discuss the matter.

Only 11 individuals showed up, but they assured us that they could have mustered many more... "over 150 buggies up here within an hour" one promised. Of the 11, one man assumed the role of spokesman though it should be emphasized that the fishermen are in no way sufficiently organized as to be represented or spoken for by a single individual or group.

The meeting lasted four hours in which time the fishermen presented their arguments against the closure. They maintained, first of all, that the north end of the closed area represented the best fishing on the Back-shore. Further, they said many people, unaware of the recent closure, had travelled great distances to fish the full-moon tides in this area. They continually stressed their financial investment in equipment, in vehicles one individual even referred to his \$35,000 condominium here. No mention was made of the economic aspect of their catches.

Initially, some concern for the terns was voiced: "The terns are the fishermen's friends. . . . We have coexisted with them for years." But from the start, the group was defensive: "As a surfcaster, I'm beginning to feel like an endangered species myself . . ."

Our response to the fishermen was at all times sympathetic. I explained, however, that while working nights dealing with the fox situation, we had discovered how widespread was the phenomenon of chicks spending the night on the lower beach. Also, we were finding these chicks crushed in vehicle tracks. I pointed out that it was our obligation under the law to prevent such losses and that complete closure of the beach was the only way to guarantee this.

As the meeting continued, the fishermen's feelings for the terns dramatically diminished: ". . . losing 7 birds a day won't cause them to go extinct. . . ." ". . . vehicles might hurt them somewhat, but won't wipe them out . . . ." "If a couple of chicks are lost, so what?"

At this point we realized the situation was beginning to deteriorate. We were "winning the battle, but losing the war," as Ranger Tubbs said. Our

firm resolve was polarizing the group, and this seemed to be a potentially harmful situation.

Ultimately, we presented the group with a compromise plan: each night, two hours before high tide, park personnel would remove one post from the barrier at Exit #9 and escort the fishermen's vehicles along a designated trail making certain that no young birds were in the track. This compromise plan was to be operated on a trial basis only for the next five nights at which time an assessment of its success would be made. A log follows.

July 12. Twelve vehicles were escorted through the area; a total of 18 chicks were safely removed from the track. The fishermen seemed to be impressed that the park would actually go to such lengths. Many realized for the first time that young terns were on the beach at night and they learned to recognize and look out for them. On the negative side of the ledger, a check the next day revealed that one vehicle drove beyond the protected area and one chick was found crushed in its tracks.

July 13. Only four vehicles were escorted but many people fished on foot. Twelve chicks were saved. A check the next day revealed no losses.

July 14. No vehicles showed up for escort, however tracks indicated that a vehicle had gone around the barrier earlier. The next day we found a dead chick in these tracks. It was almost fledged.

July 15. No vehicles showed up for escort. There was evidence that a single vehicle had gone through, but no dead chicks were found.

July 16. No vehicles showed up for escort, and there were no losses.

The concensus was that no appreciable night-fishing would occur again until the next full moon in August. The escort was suspended. Barriers were removed on August 10.

#### OTHER POSTINGS

Electric fences were installed at two colonies in response to fox predation. The High Head (N) colony fence was charged; the Exit #9 colony fence was not. In neither case, from the day they were put up until they were partially dismantled later in the season, did fox tracks ever cross these fences. Fox tracks abounded elsewhere on the beach.

The two fenced colonies were within two miles of each other, so it is thought that the one charger sufficed for the two fences; that is, the foxes learned their lesson on the charged fence (put up first) and avoided the uncharged one as a result. These fences greatly enhanced the productivity at these two colonies.

Another posting operation was the placement of shelter boxes to provide shade and protection from the elements for young tern chicks. These were wooden pint-sized strawberry boxes with openings cut out which were up-turned and staked in the sand with shards of shingles. They were immediately accepted by the young birds and had a positive effect on their survival and fledging.

Table 1: Number of Censuses (Data Sheets Completed), Season of 1979

<u>Colony</u>		<u>Also:</u>	
High Head (N)	70	25 nest watches	
Charlies	55	5 fox watches (night)	
Exit #9	62	5 vehicle escorts	(night)
Wood End Inside	25		
Wood End Outside	<u>43</u>		
Total	255		

Table 2: Number of Recorded Visitor Contacts, Season of 1979

POSITIVE*:	219		
NEGATIVE:	164		
Negative Breakdown re cause:	Dog	15 (9%)	
	Vehicle	91 (56%)	
	People	57 (35%)	

\*does not include organized interpretive activities (walks, talks, etc.)

### RESULTS AND DISCUSSION

The justification of, and rationale for, all our monitoring and censusing is the accumulation of data. This information enables us to assess the well-being of tern populations within the district, to discern trends from year to year, and to gauge the effects of our protection program.

This season's increased efforts have provided us with the most precise census data ever. We are now at the point of attempting to upgrade our abilities to analyze this more sophisticated data so as to properly evaluate all the complex factors involved in nesting success or failure. It is hoped that this report may elicit comments and suggestions for improvement from the scientific community.

The conclusions we are able to make are heartening. Indeed, 1979 has been a "bumper year" for Least Terns in the North District. Not only has there been a significant increase in the number of breeding pairs (see table 3), but the productivity of these birds is the best on record (see table 4).

Table 3: A Survey of the Base Number of Least Tern Nests (= Pairs) in the North District (Excluding Renesters), Seasons of 1976 - 1979.

<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>
107	124	90	163

Table 4: Comparison of North District Least Tern Data, Seasons of 1976, 1977, 1978, 1979

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>
initiated nesting	5/20	5/21 (storm)	6/4	5/26
first hatch	6/23	7/1	7/1	6/22
peak hatch	7/14	7/15	7/21	7/2
productivity	84	55	74	195

It is tempting to ascribe these increases to the effects of the Seashore's protection program, and certainly there is some correlation. Are we finally beginning to see the fruits of our efforts? The work of future seasons will tell us. At the same time it must be recognized that 1976 was the last productive year for Least Terns in the Seashore (largely at one enormous colony at North Beach, Orleans). The young from that year would only now, three years later, be returning as mature breeding adults. The possibility that this year's increase is a short-term one-time phenomenon can not be overlooked.

Also, this season there was an abundance of the small bait-fish which constitute the Least Tern's food supply. Although this factor was not quantified, the surf-fishermen of the Backshore were unanimous in their reports of increased numbers of these fish. Too, many of these fish were found discarded in all the tern colonies we visited, something not observed in past seasons. Dr. Ian Nisbet of the Massachusetts Audubon Society has repeatedly correlated nesting success with food supply. Certainly, this abundance was a major factor in this season's success. Since fluctuations of these fish are cyclic and beyond our control, we may not expect or rely on them for future seasons.

Least Terns this season were most fortunate in that they were largely spared a major storm. This season's single storm occurred after the vast majority of birds had finished nesting (on August 11). Loss of nests due to washout is estimated to be about 2% (see table 5). This storm also caused some nests to be abandoned (less than 11%), but in both cases the affected nests had little hope of producing young. These percentages are in vast contradiction to those of past seasons. Storms and attendant high tides are perhaps the single greatest mortality factor for nests, eggs and chicks in normal years. Once again, this is a factor over which we have no control and on which we cannot depend.

Another cautionary note to temper our elation over this season's success is this: while the numbers of breeding pairs of Least Terns did expand this season, the numbers of their nesting colonies continued to contract. There were 12 North District Least Tern colonies in 1976 and only 4 this season. While it is not possible to pinpoint the causes of this contraction, I continue to believe that the effects of human recreation constitute the chief potential factor. The fact that almost half of the district's Least Terns nested in one large colony (Wood End Outside), relatively isolated from beachgoers and vehicles by the Wood End Cut, supports this argument. This trend, i.e., the Least Tern population concentrating in fewer, larger colonies, presents a potentially negative situation for their future. Not only do these larger colonies theoretically present a more attractive target for predators, their losses are proportionately higher than those of smaller, dispersed colonies. The same principle applies to storm and high-tide damage. Predation is always a significant mortality factor.

Predation certainly was in evidence this season. Over 29% (see table 5) of the total nests are taken by predators, almost exclusively Red Fox (Vulpes fulva); the Great Horned Owl (Bubo virginianus) was present only early in the season with little overall impact. But the effect of this predation was lessened through a combination of good fortune and protective efforts. Fortunately the largest colony (once again, Wood End Outside) experienced almost no predation--just 2%, and this due to ants

killing newly hatched chicks. It may be that the parent birds did not protect their young in these few cases. The other three colonies were severely affected by fox predation. Red Fox, whose presence was barely noticed last season, was common in the dunes and on the Backshore. Fox tracks were everywhere. Individuals were consistently seen foraging during the day, evidence that their numbers have risen. Many of these were in poor condition.

On the night of June 16, the foxes struck the High Head (N) colony. Nineteen nests were lost in that single raid. For the next five nights we patrolled with flashlights, preventing further losses while we mobilized the electric fence. The fence was erected on June 22. For the remainder of the season, losses due to fox only occurred outside the fence. The fourth colony, Charlies, was not afforded this protection and it continued to lose nests (74% of the total nests) to the foxes throughout the season. It was not our intent to use this colony as a control; we simply did not have the resources for another fence.

The other important factor in tern nesting success is human disturbance. It is frustrating that there is little we can say, quantitatively, about this pressure. Obviously, it would be very difficult to measure the negative impact of adults being kept off their eggs and young in the mid-day sun.

Because of our intense patrolling this season, we did find many more chicks crushed in vehicle tracks this year, but here, too, quantification is difficult since most of the evidence is ground into the sand, picked up by foraging gulls, or lost to intervening tides. The best evidence we have to support the argument that human pressure is significant is a comparison, once again, of the relatively isolated Wood End Outside colony with the three other more accessible colonies.

The parameter being compared here is Survival Rate (see table 5), that is, the total number of chicks fledged in relation to the total number of eggs hatched. This comparison for the most part eliminates the effects of predation and washouts, both of which are more significant at the egg-stage.

Wood End Outside's rate of 0.81 greatly exceeds the rates of the others: High Head = 0.42, Charlies = 0.08, and Exit #9 = 0.36. Part of the explanation for this disparity must lie in the relative absence of the human factor beyond the Cut. The fact that Wood End Outside exhibits the highest rate of abandoned eggs, greater than 15% as compared with 9%, 4%, and 4% for High Head, Charlies, and Exit #9, respectively, may be simply because there were more eggs to abandon; that is, in the absence of losses due to predation, vehicles, etc., a certain rate of abandonment is natural. All of the above data applies to Least Terns only. Common Terns, nesting in grassy areas, are more difficult to observe without undue disturbance; hence, we know less about them.

The only North District Common Tern colony, Wood End Inside, consisted of 18 nests on June 29. We estimate that 8 young fledged there. But on August 6 there were still 13 nests with eggs, indicating earlier failure or many late-nesting birds. This colony remains a mystery. A single Common Tern nest amid the Least Tern nests at Wood End Outside apparently produced two fledged young.

Table 5: Fate of Least Tern Nest and Eggs, Season of 1979

COLONY:	<u>High Head (N)</u>	<u>Charlies</u>	<u>Exit #9</u>	<u>Wood End Out*</u>	<u>District Total</u>
<u>Original Nests:</u>					
hatched	19.66 - 36%	2 - 13%	9 - 75%	59.5 - 74%	
predation	34 - 61%	13 - 87%	3 - 25%	0.5 - 1%	
abandoned	1.33 - 2%	-	-	16.5 - 20%	
washed out	1 - 2%	-	-	1 - 1%	
<u>Renests:</u>					
hatched	11 - 52%	4 - 33%	18 - 51%	37 - 77%	
predation	4 - 19%	7 - 58%	15 - 43%	2.5 - 5%	
abandoned	5 - 24%	1 - 4%	2 - 6%	4 - 8%	
washed out	1 - 5%	-	-	3 - 6%	
<u>Total Nests:</u>					
hatched	30.66 - 40%	6 - 22%	27 - 58%	96.5 - 78%	160.16 - 58%
predation	38 - 49%	20 - 74%	18 - 38%	3 - 2%	79 - 29%
abandoned	6.33 - 8%	1 - 4%	2 - 4%	20.5 - 17%	29.83 - 11%
washed out	2 - 3%	-	-	4 - 3%	6 - 2%
<u>Eggs from Original Nests:</u>					
hatched	40 - 40%	4 - 15%	19 - 76%	117 - 75%	
predation	55 - 55%	23 - 85%	6 - 24%	1 - 1%	
abandoned	3 - 3%	-	-	30 - 19%	
washed out	2 - 2%	-	-	2 - 1%	
<u>Eggs from Renests:</u>					
hatched	20 - 54%	8 - 35%	34 - 49%	69 - 77%	
predation	6 - 16%	13 - 57%	31 - 45%	4 - 4%	
abandoned	9 - 24%	2 - 9%	4 - 6%	7 - 7%	
washed out	2 - 5%	-	-	6 - 6%	
<u>Eggs from Total Nests:</u>					
hatched	60 - 44%	12 - 24%	53 - 57%	186 - 76%	311 - 60%
predation	61 - 45%	36 - 72%	37 - 40%	5 - 2%	139 - 27%
abandoned	12 - 9%	2 - 4%	4 - 4%	37 - 15%	55 - 11%
washed out	4 - 3%	-	-	8 - 3%	12 - 2%
<u>Survival Rate: total chicks fledged per total eggs hatched:</u>					
	0.42	0.08	0.36	0.81	0.63

\* 4 nests outcome unknown, not included

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