UNITED STATES GOVERNMENT

memorandum

DATE: Date: September 9,1985

REPLY TO ATTN OF: Vernon Byrd, Wildlife Biologist, AMNWR-Homer

Alaska Maritime National Wildlife
202 Pioneer Ave.
Homer, Alaska 99603

SUBJECT: Trip Report - Kotzebue and Cape Lisburne, 1985

TO: Refuge Manager, AMNWR-Homer

I. Purpose

The period July 25 to August 1 was set aside to visit the Ann Stevens-Cape Lisburne sub-unit of the Alaska Maritime National Wildlife Refuge. Refuge Biologist Byrd was accompanied by Univ. of Alaska researcher Alan Springer, a refuge volunteer for the trip.

The purpose of the visit was to gather information about breeding kittiwakes and murres as part of a refuge-wide seabird monitoring program (see refuge inventory plans). Intensive observations of seabird populations have been made at Cape Lisburne in the past by Alan Springer and others. Our plan in 1985 was to visit the site at about the time of hatching so that we could judge generally if kittiwakes and murres were having a "boom" or "bust" year. We have planned to count birds and nests (for kittiwakes) on 10 "monitoring" plots, chosen in previous years by Springer et al., several times over the scheduled 6-day work period. Unfortunately we were forced to remain at Kotezebue from 25-28 July due to high winds at Cape Lisburne. As a result of the delay we reduced the scope of our work to fit the shortened time available.

II. Activities

Itinerary

July 25	Travel to Kotzebue
July 26-28	Remain in Kotzebue due to high winds
July 29	Travel to Cape Lisburne. At Lisburne collect birds, plankton samples and water temperatures; check kittiwake productivity plots; and count birds in population plots.

July 30 — Process some of the birds collected, collect plankton samples and water temperatures, count birds on population plots, and photograph monitoring plots.

July 31 — Complete processing of specimens, pack equipment (boat and motor stored at the site warehouse), and depart.

While in Kotzebue we were able to spend time with refuge personnel assigned to Selewik NWR (Kent Hall and Mike Spindler). We used the time to plan the logistics for future trips to other refuge sites in the Chukchi Sea Unit (e.g. Chammiso and Puffin islands, Cape Thompson). In addition, I spent time testing several computer programs used by Selewik NWR and reviewing the documentation for three statistical programs that may be available for refuge use in the near future.

To determine changes in populations of cliff-nesting birds at Cape Lisburne from year-to-year, a series of plots should be censused several times during the mid-incubation to early chick-rearing period. The replicate counts are desired because of daily variations in attendance of murres and kittiwakes. Variation in counts are minimized somewhat by restricting all counts to the afternoon period, when numbers of birds present are most stable. As mentioned above we were unable to complete our plan of counting 10 plots several times each. Instead we counted birds in four plots just once. These were done from two beaches just east of the Cape called "Tiny" and "Kittiwake" beaches locally (Figure 1). Both observers counted murres once or twice and all counts were recorded. Individual kittiwakes and nests were also counted.

A second aspect of the seabird monitoring program involved some measure of productivity. This was not possible for murres which do not build a nest, but for kittiwakes, a reflector on the end of an extension pole was used to check nests from the beach. The number of eggs or chicks were recorded for each nest.

Further, a sample of murres and kittiwakes was collected to determine their physiological condition (e.g. fat deposits, weight, etc.), stage of incubation (i.e. brood patch condition), and food items in the stomachs. When compared among years this information provides an indication of the role of food in variations in reproductive success. Birds were taken as they returned from feeding areas northeast of Cape Lisburne.

Finally, vertical tows were taken to assess the stocks of zooplankton in the water column, and sea water temperatures were recorded to compare with other years. These tows and measurements were made from an inflatable boat within 2 miles of shore along the north coast.

III. Results

Table 1 provides the average counts of murres on each of the four plots we censused in 1985. As shown, counts were somewhat higher than in 1984, but only 13% higher than the 8-year average. Without replicate counts we can not tell if the differences are significant. We were not able to count enough kittiwake plots for meaningful comparisons of numbers with past years.

In 1985 only 20.5% of the 117 kittiwake nests which we checked had eggs, up from the <5% estimated to contain eggs in 1984. Nests with eggs contained 1.08 eggs on the average in 1985. Table 2 shows the data on kittiwake productivity recorded in 1985 compared to previous years. The statistic that is comparable among years (i.e. clutch/brood size at about the time of hatch) indicates that black-legged kittiwakes had their second straight poor year at Cape Lisburne. The 1985 productivity was potentially higher than that in 1984, but it was still poorer than all previous years except 1976, (another very late spring phenologically). We have no quantitative measure of murre productivity at Cape Lisburne, but we noted that there were lots of eggs at the time of our visit.

No kittiwake chicks were seen at the time of our visit, so we could not estimate laying or hatching peaks. We viewed about 50 murre eggs and did not see a chick, but a small percentage had probably hatched judging from the number of adults carrying fish and those in our sample with refeathering brood patches. Apparently the timing of the murre hatch was roughly similar to 1984, a late year phenologically (i.e. hatching probably began in late July and would have peaked sometime during the first 10 days of August).

Alan Springer collected 10 black-legged kittiwakes, 8 common murres, and 26 thick-billed murres in 1985. The main food being used by kittiwakes was cod (arctic or saffron), but polychaetes and euphausiids were also found. Common murres also contained mostly cod. Thick-billed murres were taking cod and euphausiids, as well as lesser numbers of sculpins, shrimp, and other invertebrates. No sand lance were seen in stomachs. Apparently this fish is very important for kittiwakes to be able to rear chicks.

Most kittiwakes and thick-billed murres had moderate to heavy subcutaneous and mesenteric fat indicating good energy reserves. Although our sample was rather small, it appeared common murres had light to moderate fat deposits, perhaps indicating slightly poorer feeding conditions for them than for other species. It is also possible that a higher percentage of this species had chicks, and therefore were expending relatively more energy than the other species which were still incubating. More detailed analyses must wait until funds are available for sorting and identification of fish otoliths and invertebrates.

A sampling station about 1 mile north of the air force site was sampled on July 29 and 30. The depth was about 6 fathoms (10-15 m), and the temperature was probably fairly constant in the water column. We recorded near-surface (2-3 m deep) temperatures of 4.5 degrees C on July 29 and 5.5 C on July 30. This was colder than the temperatures recorded a week later in the same location in 1984 (7-8.5 degrees C, August 4-8, 1984).

Interestingly, we noted an obvious current from a different water mass than the one near shore moving past the Cape on July 30. We took the inflatable boat to about 2 miles north of the Cape and found water temperatures of 8.5 degrees C in that current, but 5.5C was still the temperature 200 m closer to the coast. A similar surge that came past Lisburne while we were there in 1984 also had warmer temperatures (but only by 1 degree) than the nearshore mass north of the station.

A gross comparison of plankton in samples showed that the colder water in the embayment north of the air force station contained much higher densities of zooplankton than did the warmer water. Detailed analyses of samples and comparisons with past years must await funding.

IV. Conclusions and Recommendations

It appears 1985 was another "late" spring at Cape Lisburne. Kittiwakes apparently had better success at egg laying in 1985 than in 1984, but it is unknown if they raised chicks in 1985. Numbers of murres were similar to the average counts from past years, and they apparently were having a relatively successful year reproductively. Evidence suggests that murre populations have remained relatively stable at Cape Lisburne since at least 1976. This is in contrast to colonies at Cape Thompson, south of Lisburne in the Chukchi Sea, and Bluff, in the northern Bering Sea, where murres have apparently declined in recent years.

Data from Lisburne and other colonies will help managers understand the relationships between environmental conditions, fluctuations in food resources, seabird reproductive success, and ultimately long-term population changes. As one of the more stable colonies in the Bering and Chukchi seas, Cape Lisburne is particularly interesting for comparisons with conditions at declining colonies.

I recommend that annual visits continue to Cape Lisburne. Trips should be extended to 10-14 days to allow for weather-related delays and to provide enough time to collect kittiwake population data and murre reproductive data. Annual monitoring should consist of 3-4 replicate counts of the four plots on Tiny and Kittiwake beaches. The plots should be divided into subareas for ease of counting. Several murre ledges should be designated as productivity plots and these should be viewed until all nest sites are located on photographs. A comparison of the number of eggs or chicks among years may provide some indication of relative success. Collections of birds, plankton, and water temperatures should continue, and analysis of food items should be funded (about $4,000/year). One way to accomplish the objectives would be to contract with the University of Alaska, through the Cooperative Wildlife Research Unit, to provide one researcher to help a refuge employee and one volunteer conduct field work, and to work up and report data from food habits, plankton, and physical oceanographic studies. We could probably do the annual monitoring for less than $10,000.

Table 1. Raw count's of murres (both species) on monitoring plots at Cape Lisburne, Alaska 1976 - 1985.

	PLOT				
Year	65	66	70	72	Total
1976	1275	1250	900	750	4175
1977	2010	1335	1205	845	5395
1979	1915	1568	1290	960	5733
1980	2160	1750	1580	930	6420
1981	2208	1450	1135	642	5435
1983	2345	1820	1953	985	7103
1984	1800	1325	1240	690	5055
1985	1809	1723	2014	1024	6570
				Average =	5736

Data for 1976 - 1983 from A. Springer, University of Alaska, Fairbanks; 1984 - 1985 from Springer and V. Byrd, Alaska Maritime National Wildlife Refuge, Homer

Table 2. Productivity of black-legged kittiwakes at Cape Lisburne, Alaska 1976 - 1985.

Year	Average clutch/brood about the time of hatch.
1976	0.10
1977	0.60
1978	0.79
1979	1.83
1980	1.53
1981	1.33
1983	1.61
1984	0.03
1985	0.22

Data for 1976 - 1983 from A. Springer, University of Alaska, Fairbanks; 1984 - 1985 from A. Springer and V. Byrd, Alaska Maritime National Wildlife Refuge, Homer.