# THE MIGRATION OF RED-NECKED PHALAROPES: ECOLOGICAL MYSTERIES AND CONSERVATION CONCERNS

by Charles D. Duncan

Anyone who has had a car stolen will recognize the desperate feeling: you know you left it right here, RIGHT HERE, but it's certainly not here now. Our story is not one of car theft, however, but one of a million Red-Necked Phalaropes that are missing. The scene of the crime is not Boston, but a region along the border of Maine and New Brunswick, Canada, known variously as outer Cobscook Bay, Head Harbour Passage, or the Quoddy Region, comprising the waters from Eastport and Lubec, Maine, to the outer tip of Campobello Island, New Brunswick (Figure 1).

For years beyond memory, Red-necked Phalaropes gathered here in huge numbers during late summer, feeding and fattening for their migration south. Now, they are as absent as a hot-wired car. The "parking lot" looks normal to most of the summer tourists, but to those who have seen it when the birds were here, it is apparent that something is terribly wrong.

Red-necked Phalaropes, members of the shorebird order Charadriiformes, are atypical. They exhibit a breeding system based on "reverse sexual dimorphism," meaning that the females are more brightly colored than the males. The males incubate the eggs. After the breeding season, Red-necked Phalaropes behave more like seabirds than shorebirds. They spend their entire time on salt water, taking their food from the sea with no need to visit land until the next breeding season comes around.

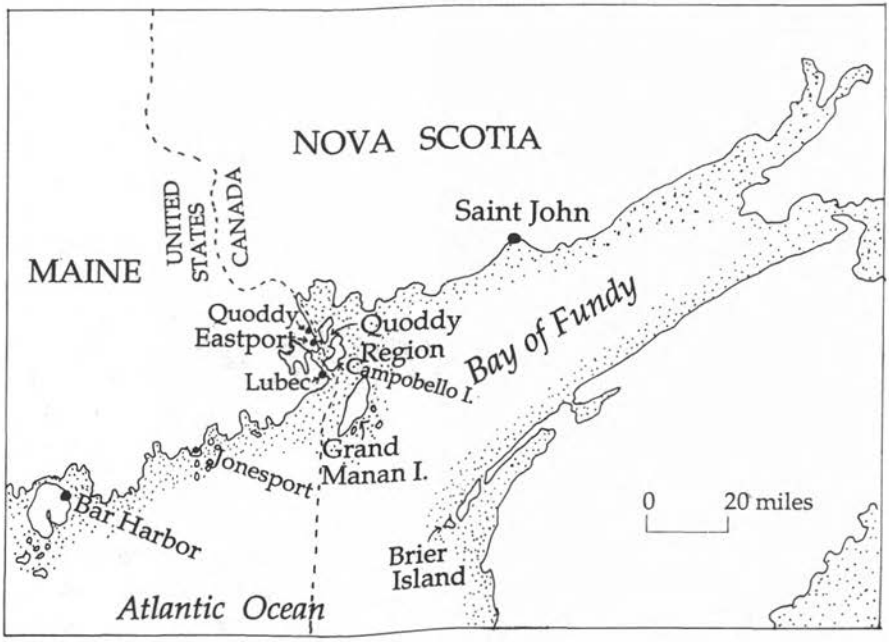
Another oddity of Red-necked Phalaropes concerns their wintering areas. While it has been known since the early 1900s (Murphy 1936) that vast flocks are found off the entire coast of Peru during the Northern Hemisphere's winter, the breeding zone for these birds is not certain. It seems certain that those individuals that breed in Alaska and western Canada end up off Peru. In contrast, the wintering grounds of the populations breeding in eastern Canada, Greenland, and even Iceland, are essentially unknown (Cramp 1983, Hayman et al. 1986). University of Guelph researchers Francine Mercier and David Gaskin (1985) suggested that the birds that pass through the Quoddy Region also winter off Peru, but this begs the question of where the birds cross to the Pacific Ocean. In fact, they are rare in the Caribbean, so the suggestion of a passage across Central America seems hard to support (Cramp 1983). There are no known wintering areas in the Atlantic. This level of ignorance about a North American breeding bird is virtually unique.

To understand both the historic pattern of Red-necked Phalarope migration, including the abundance of birds in the Quoddy Region, and the mystery of their current absence, it is worth examining the species' ecology in more detail. Red-

necked Phalaropes are circumpolar breeders, nesting on tundra, usually near pools, and often far from the sea. The southern limit of breeding is about 50oN (i.e., southern Labrador). Adult females leave the nesting ground at the end of June or early July, barely a month after arriving. Adult males depart after the eggs have hatched, followed lastly by a third wave, the juveniles.

It has been known for many years that the coastal area along the Maine-New Brunswick border hosted very large numbers of southward-migrating Red-necked Phalaropes in late summer and autumn. Knight (1897) quoted early Maine naturalist George A. Boardman, of nearby Calais, saying there were "plenty spring and fall." Norton (1907) described "thousands feeding" between Deer Island and Campobello Island, New Brunswick. Palmer (1949) characterized them more precisely as regular from the third week of July to September 22, with several hundred thousand present throughout August at West Quoddy Head, Maine. These localities fit in a circle only twelve miles in diameter. The density of so many birds in this area is hard to describe. Flocks ranged from hundreds to many thousands, resembling thin streams of smoke from a distance, rising from one feeding area and resettling on the water's surface at a new one as the tide changed.

Curiously, the closely related Red Phalarope has virtually never been found in these waters during July to October. It seems to prefer to stage some fifty miles to the southeast, off Brier Island, Nova Scotia. The exclusion is not mutual, however. Red-necked Phalaropes, sometimes in significant numbers, can indeed be found among the more numerous Red Phalaropes off Brier Island.



Mercier and Gaskin (1985) accomplished an admirably thorough study of the ecology of Red-necked Phalaropes in the Quoddy Region area during the time when no decline in numbers had yet occurred. They identified the major food of the birds as *Calanus finmarchicus*, a planktonic copepod, and showed that the flocks of phalaropes shift position to stay in the areas of greatest copepod density. They carefully estimated the total number of Red-necked Phalaropes passing through the area in 1992 at approximately one million individuals, according reasonably well with birdwatchers' guesses over the years. These guesses ranged from hundreds of thousands to a high of two million during 1976 and 1977 (Finch 1977, Vickery 1978, Forster 1984).

Of interest is a little-known study of plankton by Charles Fish and Martin Johnson (1937), part of the program of the International Passamaquoddy Fisheries Commission. (Passamaquoddy is the name of the tribe of Native Americans living in this area. It derives from *"Pestumokadyik,"* meaning "people who spear Pollack." Passamaquoddy Bay is the large body of water extending from Head Harbour Passage northward past St. Andrews, New Brunswick.) The Commission had the charge of investigating how fisheries might be affected by the construction of an ambitious series of hydroelectric dams to harness the tides for electrical generation, a project championed by Franklin Roosevelt. Although Passamaquoddy Bay is a remarkably rich ecosystem, Fish and Johnson found that the density of plankton in the water column was, in fact, higher in other places along the Maine coast where phalaropes do not mass and the fisheries are not so productive. They found, however, that in those areas the abundant plankton was not so available to surface feeders, such as phalaropes or, in fact, herring. Copepods normally perform a daily vertical migration, coming to the surface only at night. In the Quoddy Region, tides ranges to 24 feet (i.e., a foot of vertical change every fifteen minutes). The turbulence of the rising and falling tide apparently overpowers the normal vertical migration of the copepods, bringing them to the surface during daylight hours, "against their will." (Richard G.B. Brown has raised an interesting question: do phalaropes feed at night? While many species of shorebirds do, I don't think that anyone knows for phalaropes.) Taken together, the studies of Mercier and Gaskin (1985) and Fish and Johnson (1937) tie the presence of phalaropes to the availability of plankton at the surface. This conclusion is reinforced by a study showing that offshore of Brier Island, Nova Scotia, Red Phalaropes are found precisely where there are upwelling currents concentrating plankton at the surface (Brown 1980). By about 1984, then, the staging of Red-necked Phalaropes seemed well understood. Unfortunately, this was anything but the case.

There had been ups and downs in the numbers of phalaropes staging in the Quoddy Region, even the "bad" years had tens of thousands of birds (Vickery 1978). The magnitude of the migration is suggested when the mid-August

concentration of 300,000 individuals in Passamaquoddy Bay could be described as "lower than normal" (Forster 1984). A search of the literature revealed no evidence of any cyclic nature to the population.

In the mid-to-late 1980s, I spent many days birding this area in late summer, often aboard Captain Butch Huntley's 48-foot charter vessel, M.V. *Seafarer*. I kept field notes of each day's sightings, with very approximate estimates of the maximum numbers of phalaropes seen each day. Reviewing those field notes now makes it clear that by 1986 a significant drop-off in numbers was occurring. Where my one-day maximum in 1985 was 20,000, by 1989, it was 20! At first, on days when I found only scant phalaropes, I rationalized, saying things like "we must have been there on the wrong stage of the tide," or "well, we just never bumped into the really big flocks." By 1989, either Captain Huntley alone, or frequently both of us were in the area virtually daily during the entire period of phalarope migration. We have confidence in our estimates, now convinced that we were not overlooking birds. Instead, numbers were genuinely and alarmingly low. This decline has continued unabated to the present. Where annual totals (not one day counts) reached one or two million during the 1970s and early 1980s, they have not exceeded a few hundred individuals in the 1990s. It is even possible that in some years literally no Red-necked Phalaropes have staged in the Quoddy Region.

In 1989 my concern over the decline was such that I wrote a "red-flag" letter to researchers and resource managers to let them know of my counts. Because the birds using the Quoddy Region staging area represented a significant percentage of the world population of Red-necked Phalaropes, the possibility, even if remote, of a global crash could not be eliminated. I suggest three possible hypotheses for the causes of the decline.

**1. The crash is prey-related.** Densities of *Calanus* have been measured several times in this area. Current densities should be measured and compared with those of Mercier and Gaskin (1985) and even to Fish and Johnson (1937). This hypothesis is supported by the observations (Duncan and Huntley, unpublished) that when small flocks of phalaropes were found in the late 1980s, they were gone by the next day, as though arriving, sampling the area, and finding it unsatisfactory. Equally troubling, the concentrations of Bonaparte's Gulls, found for years at certain stages of tide off Deer Island Point, New Brunswick, also failed to reach historic levels. During the 1970s and early 1980s, flocks were estimated to reach 20,000 individuals. In 1989, there were seldom even 1000. There have been many guesses, some wild, about putative causes for a (still unproven) decline in plankton. These have included increasing shipping traffic into Eastport, increased salmon aquaculture, pesticide runoff, and even an increase in foggy days, changing the amount of sunlight reaching the water's surface. The possibility also exists that the abundance of plankton may be unchanged but that its availability may have decreased for some reason,

or that water quality may have been affected in some other fashion.

**2. The crash is unrelated to conditions here.** The possibility of problems associated with the breeding grounds across the Canadian low Arctic and sub-Arctic or the wintering grounds may be difficult to confirm or reject. The breeding grounds are vast, and the wintering area is uncertain. The number of northward-moving spring migrants if reliably tracked, may shed light on the subject.

**3. The fall staging concentration has not collapsed, simply shifted slightly to less visible areas.** Substantial numbers of Red-necked (and Red) Phalaropes occurred on the eastern and southern sides of Grand Manan Island, New Brunswick, during the 1970s and 1980s. Unfortunately these areas, less than twenty miles from the Quoddy Region, are not routinely visited by birdwatchers. The area around Mount Desert Rock, Maine, about ninety miles distant, has occasionally hosted flocks of up to a few thousand Red-necked Phalaropes in fall. Whale-and birdwatching boats do regularly make observations here.

In the years after I made these hypotheses, little progress has been made, although Red-necked Phalaropes have maintained their absence in the Quoddy Region with a vengeance. Systematic comparison of plankton density has not yet been accomplished. Richard Brown of the Canadian Wildlife Service (personal communication) made some surface plankton measurements in August 1990 and found very little zooplankton of any sort. Nonetheless, Captain Huntley, with Professor M. Gayle Kraus, a colleague of mine at the University of Maine at Machias, found plankton to be almost staggeringly abundant in the Quoddy Region during October 1990. They observed masses of plankton from the surface to below fifty feet! Unfortunately, this finding has been misrepresented in some newspaper and radio publicity as indicating that the plankton were exclusively at depth and out of reach of the phalaropes. This was not at all the case. Of greater significance is the date which is, in fact, ***after*** the migration of phalaropes has finished. The possibility that plankton have not disappeared but merely shifted by two or three months in their abundance could explain the paucity of staging phalaropes, but lacks convincing proof.

To gain information about the situation away from the Quoddy Region, I placed notices in several birding magazines and *The Ornithological Newsletter* (received by all subscribers to professional ornithological journals in the United States and Canada) seeking information on nesting success or changes in migration routes or numbers from other locales. Responses were few but indicated no changes in the small number of nest sites surveyed by respondents or in migration numbers on the west coast of the United States. Observations in the spring along the coast of Maine, where flocks of several hundred Red-necked Phalaropes are often found, seem not to have diminished over the years, a hopeful sign.

Perhaps the most tantalizing datum is from Raymond d'Entremont, a contributor to *Nova Scotia Birds*, after a May 1991 fishing trip to Georges Bank. He wrote to Richard Brown: "May 16 was definitely a phalarope day. From the first light of dawn, they began passing by. At noon small flocks were passing by all around. By sundown the procession had not slackened a bit. On May 17, it was more of the same, and they kept passing by until dark. On May 18 a few scattered flocks passed but the main movement was over. All that came close enough to be identified were Red-necked Phalaropes, but that is not to say that there were no Reds among them . . . During these two days my shipmates were amazed at the number of little birds that passed through." In a nutshell, although d'Entremont's observation was after Red-necked Phalaropes had vanished from the Quoddy Region during fall, there were still plenty moving northward in spring. This amazing passage is probably our best evidence that the collapse along the Maine-New Brunswick border doesn't indicate a collapse of the entire eastern Canadian and Greenland breeding populations.

Efforts to find a new staging area, as in my third hypothesis, have yielded only a little fruit. I have contacted charter boat captains from Bar Harbor to Eastport, Maine, who take visitors bird- and whalewatching, and requests for information have been sent to a variety of birding publications in the United States and in the Canadian Maritimes, without result. Counts at Mount Desert Rock, Maine, and Grand Manan, New Brunswick, have paralleled the decline at the Quoddy Region (Table 1). The story at Brier Island, Nova Scotia, is a little

**TABLE 1. Fall Counts of Red-necked Phalaropes**

| Year | Mount Desert Rock, Maine | Grand Manan, New Brunswick | Brier Island, Nova Scotia |
|---|---|---|---|
| 1987 | 4000 | NR | NR |
| 1988 | NR | NR | NR |
| 1989 | 164 | 2000 | 30 |
| 1990 | 124 | NR | 20,000 |
| 1991 | NR | very few | 250 |
| 1992 | NR | 50 | NR |
| 1993 | NR | NR | 100,000[a] |

Other data from American Birds (New England and Maritime Regional Reports. NR = No report. [a] = Includes both Red-necked and Red phalaropes, "both abundant" (R.G.B. Brown, personal communication)

more intriguing, although not particularly regular. In at least two years, large numbers of Red-necked Phalaropes have been seen on the western side of the Bay of Fundy, opposite from the typical areas.

Can Brier Island be the new staging ground? If so, where were the birds in 1989 and 1991, well into the crash at the Quoddy Region? If indeed there has been a shift in the staging area rather than a collapse of the population, what caused it? Moreover, the number of birds at Brier Island still does not seem to account for all the phalaropes once found in the Quoddy Region. Are there other new still undiscovered staging areas? It seems premature to exonerate completely problems elsewhere. The huge James Bay Hydroelectric Project sponsored by Hydro-Quebec has inundated large areas where Red-necked Phalaropes nest. What effect has this had on the eastern Canadian population of Red-necked Phalaropes? And finally, where ***do*** these birds winter, and how do they get there from the Bay of Fundy?

I wish this story had a neat and convincing ending, and maybe some day it will. For the moment all I can offer beyond the facts is the same thing a Boston police officer told me when my car was stolen: "It's gonna take a lotta luck ta solve dis one. Don't getcha hopes up."

## References


Brown, R.G.B. 1980. Seabirds as Marine Animals. In Burger, J., Olla, B.L., and H.E. Winn (eds.), *Behavior of Marine Animals. Volume 4, Marine Birds.* New York: Plenum Press.

Cramp, S. (ed.). 1983. *Handbook of the Birds of Europe, the Middle East and North Africa: the Birds of the Western Palearctic. Vol 3: Waders to Gulls.* Oxford: Oxford University Press.

Finch D.W. 1977. The Autumn Migration, New England Regional Report, *American Birds* 31(2):225-232.

Fish, C.J., and M.W. Johnson. 1937. The Biology of the Zooplankton Population in the Bay of Fundy and Gulf of Maine with Special Reference to Production and Distribution, *Journal of the Biological Board of Canada* 3(3):189-322.

Forster, R.A. 1984. The Autumn Migration, New England Regional Report, *American Birds* 38(2):175-179.

Hayman, P., J. Marchant, and T. Prater. 1986. *Shorebirds, an Identification Guide to the Waders of the World.* Boston: Houghton Mifflin Company.

Knight, O.W. 1897. *A List of the Birds of Maine.* Bulletin Number 3, University of Maine, Department of Natural History, Augusta.

Mercier, F.M., and D.E. Gaskin. 1985. Feeding Ecology of Migrating Red-necked Phalaropes *(Phalaropus lobatus)* in the Quoddy Region, New Brunswick, Canada, *Canadian Journal of Zoology* 63:1063-1067.

Murphy, R.C. 1936. *Oceanic Birds of South America, Volume 2.* New York: Macmillan Company and American Museum of Natural History.

Norton, A.H. 1907. Phalaropes Near Campobello Island, New Brunswick, *Journal of the Maine Ornithological Society* 9:81.

Palmer, R.S. 1949. *Maine Birds.* Bulletin of the Museum of Comparative Zoology, volume 102, Cambridge, Massachusetts.

Vickery, P.D. 1978. The Autumn Migration, New England Regional Report, *American Birds* 32(2):174-180.
Vickery, P.D. 1979. The Autumn Migration, New England Regional Report, *American Birds* 33(2): 154-158.

**CHARLES D. DUNCAN** is director of the Institute for Field Ornithology and professor of chemistry and environmental studies at the University of Maine at Machias. He is an avid birder and sound recordist with an interest in avian conservation issues in the United States and tropical America. He is a councilor of the Association of Field Ornithologists. Charlie would like to acknowledge the participation of many Institute for Field Ornithology workshop students along with instructors Wayne R. Petersen and Peter D. Vickery in many of the phalarope counts. Richard G.B. Brown and David Gaskin freely shared information. Captain Edwin "Butch" Huntley of Lubec was most gracious in allowing the author to accompany him many days, and kept reliable notes on phalarope abundance on days when the author could not join him. Without his generosity it would not have been possible to acquire the data herein presented.

## SPECIAL HAWK WATCH PROGRAM

William S. Clark, one of the world's leading authorities on hawk identification, will be the special guest speaker at the annual meeting of the Eastern Massachusetts Hawk Watch on Friday, September 8, 1995. Clark, author, along with Brian Wheeler, of *A Field Guide to Hawks* and the new *Photographic Guide to North American Raptors*, will give a slide presentation on "Advances in Raptor Field Identification." Bill will be happy to autograph his books, copies of which will be available that evening. Doors open at 6:30, with refreshments provided for a social hour. A brief business meeting will begin at 7:30 PM followed by Bill's presentation. The program will be held at the Nature Center of the Massachusetts Audubon Society's Drumlin Farm Sanctuary in Lincoln. The public is invited, free of charge. For more information, call 617-483-4263.

## VOLUNTEERS SOUGHT FOR FALL HAWK WATCH

The Eastern Massachusetts Hawk Watch (EMHW) will conduct coordinated hawk watches on Wachusett Mountain in Princeton and Mount Watatic in Ashburnham this fall. We seek volunteer observers (no experience necessary) to help cover these sites on any day from the beginning of September to mid-November, with special emphasis on weekdays in September and weekends thereafter. We also seek volunteers willing to hawkwatch anywhere in eastern Massachusetts on any fall date. If you would like more information on participating in a hawk watch, or on submitting reports of what you see, contact: Paul M. Roberts, 254 Arlington Street, Medford, MA 02155; telephone 617-483-4263 after 7 PM.

If you would like a copy of the Fall 1994 EMHW Report, complete information on the Fall 1995 watch, and fliers on "Where and When to Watch Hawks in Eastern Massachusetts" and "A Guide to Books on Hawks," please write Paul Roberts at the address given above and include a check for $2 (made out to EMHW) to defray costs.

## BIRDER'S EXCHANGE

Manomet Observatory's Birder's Exchange collects new and used optics and field guides for distribution to Latin American ornithological groups. The Observatory has many pending requests for equipment, but our supplies are running low. Donations may be dropped off at our displays at: Partners in Flight Workshop and Exhibition, October 1 and 2, 1995, Convention Hall, Cape May, New Jersey, or the Massachusetts Audubon Birders' Meeting, November 18, 1995, Stonehill College, Easton, Massachusetts.