

**Red-necked Phalarope  
Research, Monitoring, and Conservation  
Plan for the Northeastern U.S. and  
Maritimes Canada**

Version 1.1

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## **NOTE about Version 1.1:**

The only difference between Version 1.1 (February 2010) and Version 1.0 (September 2005) is the addition of a Spanish executive summary.

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**Front Cover Photo:**

Red-necked Phalarope in breeding plumage in the Arctic National Wildlife Refuge, Alaska.  
Photo by Brad Winn.

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## EXECUTIVE SUMMARY

Red-Necked Phalarope populations have declined precipitously during migration at traditional maritime sites like the Deer Island, New Brunswick, Canada, area, used by some 2 million individual phalaropes in the 1970s and early 80s. It is unclear what effect this decline may have had on the overall population of the species. Despite some evidence of local declines at breeding sites, there is insufficient information to determine the status of the population as a whole. Monitoring the population to determine its actual status is a critical component of ongoing conservation actions.

The most likely cause of the disappearance of phalaropes from the Deer Island area is severely reduced abundance of the zooplankton species, *Calanus finmarchicus*, in surface waters during the time phalaropes migrate through the area. This local decline reflects a more widespread decline of the species over the Scotian Shelf and Gulf of Maine as shown by long term oceanographic data. The cause of the decline in *Calanus finmarchicus* is unclear at present. The species is characteristic of cooler North Atlantic waters and would be sensitive to increases in sea temperatures. Temperatures have increased along the eastern seaboard of the US over the past 100+ years.

There is an urgent need to develop monitoring and research programs to determine the current status of Red-Necked Phalarope populations, and to track the trend in population size over time. This plan outlines critical steps in the development of these programs, and proposes specific actions that should be undertaken immediately. Further conservation efforts will likely be needed once these actions are completed.

## RESUMEN EJECUTIVO

Las poblaciones de *Phalaropus lobatus* han disminuido dramáticamente durante la época de migración en los tradicionales sitios marítimos, como la Isla Deer en New Brunswick, Canadá, que fueron utilizados por unos 2 millones de individuos de *P. lobatus* en la década de los 1970s e inicios de los 1980s. No está claro el efecto que esta disminución ha podido tener en la población total de la especie. A pesar de alguna evidencia de reducciones locales en sitios de reproducción, no existe suficiente información para determinar el estatus de la población entero. El monitoreo de la población para determinar su estatus actual es un componente crítico de las acciones de conservación en curso.

La causa más probable de la desaparición de los *P. lobatus* del área de Isla Deer es la reducción drástica de la abundancia de la especie de zooplancton *Calanus finmarchicus* en las aguas superficiales durante el tiempo que *P. lobatus* migra a través de esta zona. Como demuestran los datos oceanográficos, esta disminución local refleja un deterioro generalizado de la especie en la Plataforma Escocia y el Golfo de Maine. La causa de la disminución de *Calanus finmarchicus* no está clara en la actualidad. Esta especie es característica de aguas más frescas del Atlántico Norte y podrían ser sensibles al aumento de la temperatura del mar. Las temperaturas han aumentado a lo largo de la costa este de los Estados Unidos durante los últimos 100 años o más.

Existe una necesidad urgente por desarrollar programas de monitoreo y de investigación para determinar el estatus actual de las poblaciones de *P. lobatus*, y monitorear la tendencia en el tamaño de la población en el tiempo. Este plan describe los pasos críticos para el desarrollo de estos programas, y propone acciones concretas que deben llevarse a cabo de inmediato. Los esfuerzos de conservación adicionales serán necesitados una vez estas acciones están completadas.

## BACKGROUND

The dramatic loss of Red-Necked Phalaropes from their traditional migration stopover areas in the northeastern U.S. and Maritimes Provinces of Canada has led to growing concern about the overall status of the species. Many species of shorebirds are apparently declining in North America, but the declines observed for Red-Necked Phalaropes differ in two important ways. First, the decline was large and rapid. Second, it occurred at a migration stopover area, so the impact on the overall population is unclear. Numbers of breeding birds have declined in some places in the Arctic (Gratto-Trevor, 1994). Concern for the species increased dramatically following the absence of birds at their traditional migration stopover site in the Deer and Campobello Islands area of New Brunswick, Canada. Some 2 million Red-necked Phalaropes once congregated there on their July-September migration, and fed on a copepod, *Calanus finmarchicus*, brought to the surface by tidal upwellings. However, numbers declined precipitously in the mid-1980s and by 1990, the birds were gone. They have not returned.

A workshop was held in October of 2004 to bring together experts from a variety of backgrounds (shorebird ecology, whale biology, zooplankton specialists, ocean scientists, etc.), in a small workshop atmosphere to define our current state of knowledge of phalarope populations in North America and related oceanographic issues. The workshop addressed several major research and monitoring needs, including (1) assessment of the causes of the precipitous population declines of Red-necked Phalaropes on their traditional pelagic migration stopovers in the Northeast; and (2) the impact of these changes on the hemispheric population of the species. All the principal biologists working on shorebird conservation in the northeastern U.S. and Maritimes region of Canada were invited to the 2-day workshop, which was held in St. Andrews, New Brunswick in October 2004. Academic experts on pelagic seabird ecology and marine copepods were also invited, as were others such as whale-watch tour operators, to provide an interdisciplinary inquiry into phalarope biology, status, and possible causes for declines.

The group also attempted to define future research and monitoring needs in light of population declines and changes in migration habits. The workshop proceedings formed the basis for this monitoring and research plan for Red-necked Phalaropes specifically targeted at the species' conservation. Although the species also occurs in western North America, primarily during migration stopovers at saline lakes, this plan addresses only the northeastern U.S. and Maritimes Canada populations where dramatic declines have been observed. The participants jointly produced the following approaches to monitoring the species, including such diverse projects as targeted aerial surveys and volunteer networks of commercial vessels working in the former range of the species. The proceedings also identified specific research needs on the species and its habitat and food resources, and proposed initial considerations that will be important in the design and coordination of these various research projects.

## MANAGEMENT STATUS AND NATURAL HISTORY

The Red-necked Phalarope is one of only three species of phalaropes worldwide, the only shorebirds that swim more than they wade and the only shorebirds that are largely pelagic outside of the breeding season. The Red-necked Phalarope breeds in the Arctic tundra, and many individuals migrate south through the northeastern United States and Maritimes region of Canada after nesting (Rubega et al. 2000). Historically, very large concentrations of many thousands to millions of birds used staging sites in the Bay of Fundy and Gulf of Maine (Mercier and Gaskin 1985), where planktonic food was abundant, principally the copepod *Calanus finmarchicus* (Brown and Gaskin 1988). Numbers of phalaropes have declined dramatically at traditional key stopover sites around Deer and Campobello Islands, New Brunswick (Figure 1), from 1-2 million in the early 1980's to virtually none since the early 1990's (Duncan 1996). The causes for the decline are unknown, as are the effects of the loss of stopover sites on the population of phalaropes (Rubega et al. 2000). These questions have resulted in the Red-necked Phalarope being classified as a species of "highest priority" in the Atlantic Northern Forest Bird Conservation Region (BCR), the BCR that comprises these migration stopovers for the species. The Red-Necked Phalarope is also listed as being of "High Concern" and "High Responsibility" in the BCR, because of the likelihood that the region's stopover resources are critical to the sustainability of hemispheric populations.

Despite some evidence of local declines at breeding sites, there is insufficient information to determine the status of the population as a whole. Monitoring the population to determine its actual status is a critical component of ongoing conservation actions. The most likely cause of the disappearance of phalaropes from the Deer Island area is severely reduced abundance of *Calanus finmarchicus* in surface waters during the time phalaropes migrate through the area. This local decline is a reflection of a more widespread decline of the species over the Scotian Shelf and Gulf of Maine as shown by data from the Continuous Plankton Recorder. The cause of the decline in *Calanus finmarchicus* is unclear at present. The species is characteristic of cooler North Atlantic waters and would be sensitive to increases in sea temperatures. Temperatures have increased along the eastern seaboard of the US over the past 100+ years.

### TAXONOMY

The Red-necked Phalarope is closely related to the other two phalarope species, Red Phalarope, *Phalaropus fulicarius*, and Wilson's Phalarope, *Phalaropus tricolor* (Rubega et al. 2000). There are no recognized subspecies or populations with genetic differentiation (Haig et al. 1997). The connections between eastern and western arctic breeding areas and eastern and western migration stopovers are assumed, but unknown. Red-necked Phalaropes were called Northern Phalaropes in the older literature.

## **POPULATION ESTIMATES AND TRENDS**

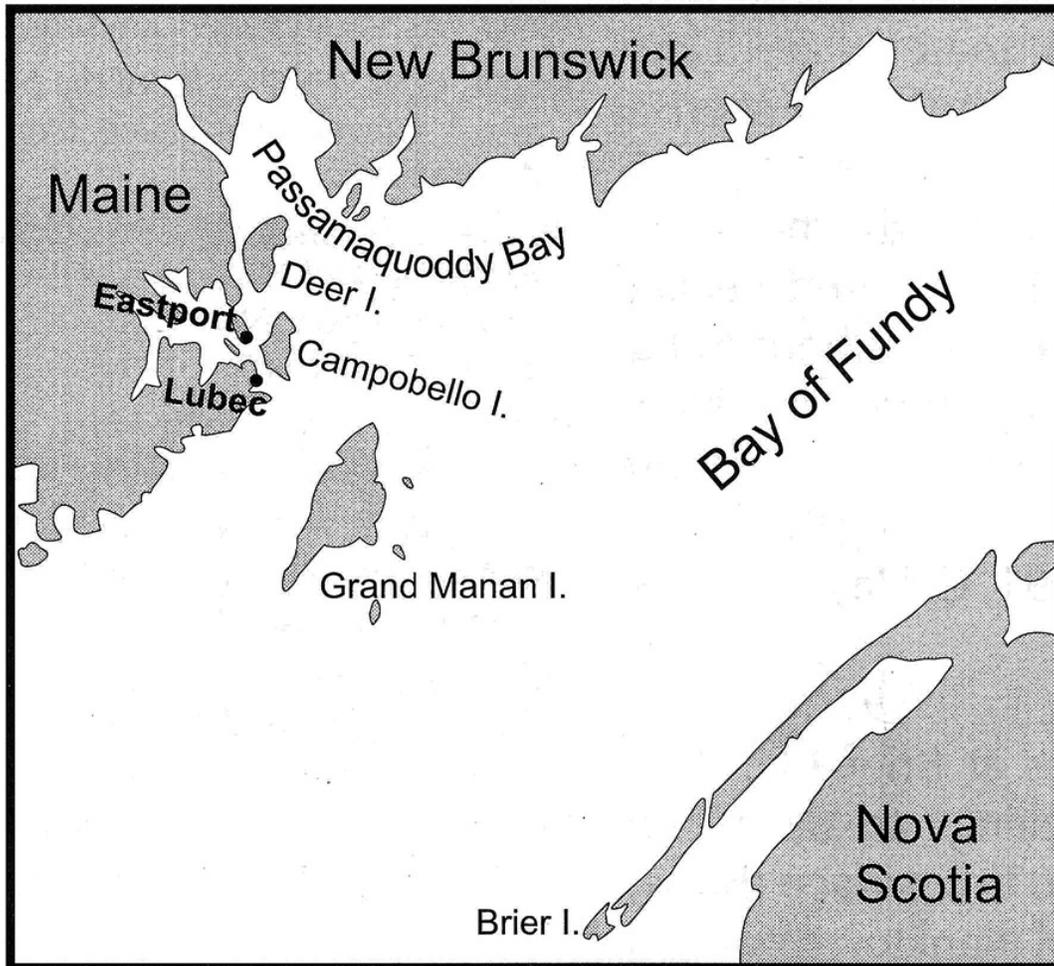
Morrison et al. (2001) estimated the total North American population of Red-necked Phalaropes at 2,500,000, but noted that significant uncertainty existed about the status of the population. No information is available about current population trends, because existing surveys are insufficient to provide reliable data. The impacts of the apparent loss of appropriate stopover habitat conditions in the Northeastern United States and Maritimes Canada are unknown.

## **DISTRIBUTION AND ABUNDANCE**

In the New World, Red-necked Phalaropes breed extensively across the low arctic from Alaska to the coast of Newfoundland (Rubega et al. 2000). The species winters at sea, with large concentrations known from the Pacific coast of South America, especially off the coast of Peru (Murphy 1936). Whether birds from the eastern migratory stopover sites winter in other locations, perhaps in the Atlantic Ocean, or join western birds in the Pacific, is unknown. The near complete absence of records from Central America argues against the latter possibility. The species is also distributed widely outside the western hemisphere, and is a circumpolar breeder, with significant wintering areas in the Arabian Sea and the Philippines (Rubega et al. 2000).

## **MAJOR HABITATS**

Red-necked Phalaropes are unusual among shorebirds because they use both terrestrial and pelagic habitats. Arctic breeding habitat includes tundra and tundra-forest transition vegetation, with nests commonly located near water such as lakes, marshes, or small tundra pools (Rubega et al. 2000). Migration stopover habitats include both inland freshwater habitats and marine and nearshore coastal areas. Offshore sites with large concentrations are associated with upwellings caused by currents which bring prey items near the surface, such as the traditional stopover sites in the Bay of Fundy (Fig. 1). Wintering sites are primarily at sea (Rubega et al. 2000).



**Figure 1.** Location of Deer, Campobello, Grand Manan, and Brier Island in the Bay of Fundy. From Duncan et al. 2001.

## CONSERVATION SITES

Because Red-necked Phalaropes use pelagic stopover sites, the traditional site-based approach for protecting shorebirds during migration must be modified to address their conservation. There are some critical pelagic sites that routinely provide appropriate stopover habitat, which should be protected much like traditional migratory stopover sites are protected under the existing Western Hemisphere Shorebird Reserve Network (WHSRN). Brier Island, New Brunswick, Canada, appears to be a good candidate for this approach, and the working group supports exploring its nomination as a WHSRN site. In addition, however, there may be areas where appropriate conditions for Red-necked Phalarope foraging occur unpredictably at widely scattered areas, and creative approaches will be required to address these situations.

Finally, there are known sites where phalaropes once occurred, most especially the areas around Eastport and Lubec, Maine, and Deer and Campobello, islands, New Brunswick, which should also be protected in the event that future conditions make them suitable once again.

## **CONSERVATION THREATS**

Red-necked Phalarope breeding habitat is poorly studied, and the impacts of changes that may result from global climate change are unknown. Surveys under the Program for Regional and International Shorebird Monitoring (PRISM) in areas where phalaropes breed, particularly at long-term sites visited regularly, should be used to study potential impacts from habitat change on breeding success of Red-necked Phalaropes.

It is unclear what caused the loss of *Calanus finmarchicus* from traditional migratory stopover areas. Further research is needed to determine the mechanisms that control Calanus abundance, as detailed below.

## **CONSERVATION STRATEGIES AND ACTIONS**

The most pressing conservation actions for this species are determination of status and trend, and determination of the connections between breeding areas and the stopover sites where birds are missing. These actions will form the basis for site-specific conservation activities to follow. Appropriate research and monitoring actions are detailed below. In addition, known sites such as Brier Island that host large concentrations during migration should be protected as WHSRN sites.

## **CURRENT OR POTENTIAL PROGRAM/PROJECT COLLABORATORS**

- United States Fish and Wildlife Service (USFWS), Region 5, South Hadley, Massachusetts, U.S.A
- Canadian Wildlife Service, Sackville, New Brunswick, Canada
- United States Geological Survey (USGS), Orono, Maine, U.S.A
- Manomet Center for Conservation Sciences, Manomet Massachusetts, U.S.A
- University of Connecticut, Storrs, Connecticut, U.S.A

## RESEARCH AND MONITORING NEEDS

### 1. MONITORING PLAN FOR RED-NECKED PHALAROPES

Monitoring programs are being developed to address the goal in the U.S. and Canadian Shorebird Plans of determining the status and population trends of all shorebird species that occur in both countries (Brown et al. 2001). However, because of their pelagic habits in migration, there is presently no monitoring program in place to determine numbers or population trends of migrating phalaropes. None of the existing, omnibus monitoring programs, such as the International Shorebird Survey, the Maritimes Shorebird Survey, the Quebec bird checklist program called *Étude des populations d'oiseaux du Québec* (EPOQ), or the surveys developing under the Program for Regional and International Shorebird Monitoring (PRISM) can provide useful population information about this pelagic species away from the breeding grounds. PRISM is expected to provide measurements of breeding population size for arctic nesting species, and indications of population trends during the 10-20 year proposed interval between breeding surveys. However, a critical component of PRISM is a parallel survey in migration that can confirm trends detected in the arctic. For most species, these additional data will be available from migration surveys. For Red-necked Phalaropes, a separate effort will be necessary to monitor populations on migration.

The workshop participants jointly developed a plan to provide monitoring data necessary to understand phalarope population status and trends. The plan includes four major components, all of which must be implemented to attain an accurate assessment of population status on migration.

a. Aerial surveys during migration to determine location and approximate size of current stopover concentrations. Aerial surveys should be conducted from the Orono, Maine, USA USGS office, which provides aerial surveys for other projects and is well-equipped to conduct surveys in this region. Pilot surveys should be conducted first to help determine the appropriate placement and spacing of transects, visibility of phalaropes from the air, and photography techniques useful in conducting detailed counts. Target dates for the surveys are August 1 and 15 and September 1 and 15. The surveys should include Deer Island to confirm the current lack of birds there, and Head Harbour Passage because Calanus biologists predict that copepods could return in the next few years, which could potentially result in returning birds. There is a need for pilot work on the development of counting techniques and estimation methods, including turnover rates of migrants (see Research Plan).

b. Focused boat surveys at known locations to better estimate population sizes. These surveys should be conducted to provide accurate estimates of the number of birds remaining at sites where they still occur. Transects should be established along the 50-fathom contour lines around sites such as Brier Island, using lobster/fishing boats. The dates should

follow the aerial survey dates listed above, but also include bi-weekly surveys from 15 July through September. There is a need for pilot work with digital video to avoid errors from recounting and estimating birds.

c. Citizen science approaches to supplement formal surveys.

There are multiple opportunities to conduct citizen science projects to assist with development of sound information on phalarope populations during migration. One promising approach is to include volunteer observers on commercial whale-watch boats, which frequently conduct trips in areas used by phalaropes. There is a need for a coordinator to organize observers, contact potential collaborating boats, and collect local information from observers.

d. Full implementation of PRISM surveys

The goal of PRISM's arctic breeding surveys is to provide status and trend estimates for all arctic breeding shorebirds through periodic arctic-wide surveys. When implemented, these will likely provide the only data on the population impacts of the declines/shifts already observed on migration. This is a critical aspect of monitoring Red-necked Phalarope population status.

## **2. RESEARCH PLAN FOR RED-NECKED PHALAROPES**

In addition to monitoring needs, the workshop identified several key research projects that will be essential to determine what factors limit the populations of Red-necked Phalaropes. The highest priority projects are listed here:

a. A radiotelemetry study to determine connections between source areas and stopover sites in the Maritimes. At present, we do not know the breeding areas of the birds that are found on migration in the northeastern U.S. and the Maritimes region of Canada. Radio-marking birds during PRISM surveys in areas already being studied will provide the first opportunity to determine whether birds from those breeding areas pass through the migration stopover areas where declines have been observed.

b. Stable isotope analyses of museum specimens and new collections to determine connections between breeding and stopover areas.

The group consensus was that the use of stable isotope techniques would be among the most promising approaches to determining the wintering locations of birds using the Bay of Fundy. This is critical, since there is at present no information about the wintering location of these birds. This must be determined before it will be possible to study wintering conditions and possible limiting factors that may be present on the wintering grounds. There are significant uncertainties to resolve, including timing of molt, and specific isotopes to explore.

c. Studies of turnover rates for migrating birds

Turnover studies are critical to determine the number of birds actually observed during the monitoring surveys described above. The group consensus was that the best approach to studying turnover rates would be using radio-telemetry and fixed listening stations in locations like the Mt. Desert, Maine, lighthouse, Gannet Island, N.B., and Machias Seal Island. Listening from fixed wing aircraft will also be necessary due to small transmitter size and limited range.

d. Shorebird Research Group of the Americas Working Group.

The workshop participants agreed to form a species focal group under the Shorebird Research Group of the Americas. This working group will take on the many tasks associated with design and implementation of these and other related research projects to help determine what limits the population of Red-necked Phalaropes.

### **3. RESEARCH ON CHANGES IN THE ABUNDANCE OF *CALANUS FINMARCHICUS***

It is clear that *Calanus finmarchicus* has declined by a factor of 10 in the surface waters around Deer and Campobello Islands since surveys were last done in the early 1980s. The source of *C. finmarchicus* in this area is from "spill-over" from adjacent deep areas where the species diapauses over the winter. This local decline around Deer Island is likely reflective of a geographically broader decline of the same order of magnitude observed on the Scotian Shelf and Gulf of Maine. *C. finmarchicus* and feeding phalaropes are still found off Brier Island, Nova Scotia, probably because spill-over of the copepods from deep basin sources is much more likely due to the proximity of Brier Island to these sources.

The workshop breakout group that focused on the biology of *C. finmarchicus* proposed several research projects that are central to understanding the population reductions of Calanus, and therefore possibly the loss of Red-necked Phalaropes in the region. Key research projects that were identified include:

a. Exploration of archived plankton samples collected during herring surveys, to determine if abundances can be measured to provide historical data and trends.

b. Bird stomach content analysis from existing collected stomachs, and determination of whether additional collections are necessary.

c. Determination of stage (C5 or C6) and sex of *Calanus finmarchicus* found in surface waters of Deer Island area and Brier Island.

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