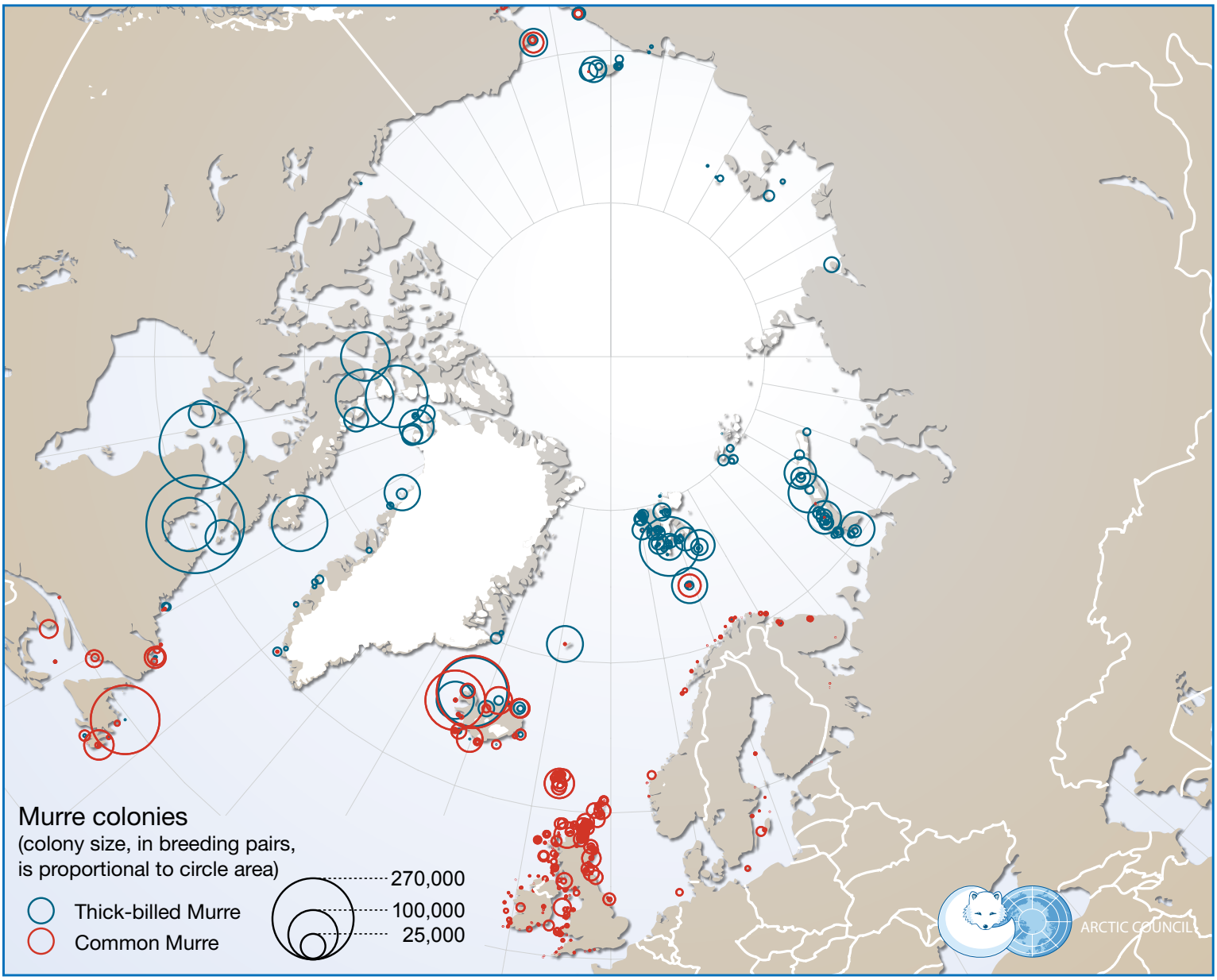
CAFF
Conservation of Arctic Flora and Fauna

CIRCUMPOLAR SEABIRD GROUP
CAFF

CAFF Strategy Series Report No. 2
March 2011

# SEABIRD INFORMATION NETWORK (SIN)

## CONCEPT PAPER



## Acknowledgements

The Conservation of Arctic Flora and Fauna (CAFF) is a Working Group of the Arctic Council.

***CAFF Designated Agencies:***

- Directorate for Nature Management, Trondheim, Norway
- Environment Canada, Ottawa, Canada
- Faroese Museum of Natural History, Tórshavn, Faroe Islands (Kingdom of Denmark)
- Finnish Ministry of the Environment, Helsinki, Finland
- Icelandic Institute of Natural History, Reykjavik, Iceland
- The Ministry of Domestic Affairs, Nature and Environment, Greenland
- Russian Federation Ministry of Natural Resources, Moscow, Russia
- Swedish Environmental Protection Agency, Stockholm, Sweden
- United States Department of the Interior, Fish and Wildlife Service, Anchorage, Alaska

***CAFF Permanent Participant Organizations:***

- Aleut International Association (AIA)
- Arctic Athabaskan Council (AAC)
- Gwich'in Council International (GCI)
- Inuit Circumpolar Conference (ICC) – Greenland, Alaska and Canada
- Russian Indigenous Peoples of the North (RAIPON)
- Saami Council

This publication should be cited as:
Irons. D[1], Svoboda. M[2], Gill. M[2] and Petersen. A[3] *Seabird Information Network (SIN):Concept Paper* CAFFs Circumpolar Seabird expert group (CBird), CAFF Strategy Series Report No.2, March 2011, CAFF International Secretariat, Akureyri, Iceland. ISBN 978-9935-431-02-8

Cover Map: The distribution of thick-billed and common murre colonies in the North. Arctic Biodiversity Trends 2010: Selected indicators of change. CAFF May 2010

We would like to thank Christoph Zockler for asking the question that stimulated the initiation of the Seabird Information Network (SIN) and for his continued work on producing SIN. The Circumpolar Seabird Group is responsible for the creation of SIN, without the hard work of this group there would have been no progress made on sharing this type of information on the internet. We would also like to thank Environment Canada and the US Fish and Wildlife Service for funding. Finally, we would like to thank CAFF for their continued support to produce products like SIN.

For more information please contact:
CAFF International Secretariat
Borgir, Nordurslod
*600 Akureyri, Iceland*
*Phone: +354 462-3350*
*Fax: +354 462-3390*
*Email: caff@caff.is*
*Internet: http://www.caff.is*


CAFF Designated Area

**1. Migratory Bird Management, U.S. Fish and Wildlife Service, 1011 E. Tudor Rd. Anchorage, Alaska, USA 99503.**
**2. Environment Canada, 91780 Alaska Highway, Yukon, Y1A 5B7, Whitehorse, Canada.**
**3. Icelandic Institute of Natural History, Urridaholtsstraeti 6-8, 210 Gardabaer, Iceland.**

# The Seabird Information Network(SIN)

## Concept paper

**Authors**
David Irons
Michael Svoboda
Mike Gill
Aevar Petersen

**Editing and layout**
Tom Barry
Kári Fannar Lárusson

## Table of Contents

# 1. Introduction

Marine and coastal ecosystems are socio-economically and biologically important features in circumpolar regions. Populations of seabirds in the circumpolar region are large and diverse. About 16 species of seabirds have circumpolar distributions while several other species are shared between two or more countries. Arctic countries often share the same seabird populations. Consequently, there is a joint responsibility for the conservation of seabirds in and outside the Arctic. Arctic countries also share common population and habitat threats in marine and coastal ecosystems that seabirds depend on for their survival.

Traditionally, conservation, management, and research activities for seabirds in the Arctic have been poorly coordinated in terms of common direction, concerns, field methods, reporting and information exchange. Existing governmental and non-governmental seabird groups are organized at a regional level. Therefore, seabird activities have been poorly coordinated in a circumpolar context. The Circumpolar Seabird Group (CBird), an expert group under the CAFF working group of the Arctic council, helps ensure that scientists and managers interested in northern seabirds have a common forum to promote, facilitate and coordinate conservation, management, and research activities of mutual concern. The location and health of seabird colonies is becoming of more and more interest to scientists, managers, decision makers, environmental groups and others as the recognition of seabirds as indicators of changes in the health of the oceans becomes more widespread. Seabirds themselves are an important international resource that needs protection. Information on seabirds is therefore also important to commercial entities such as shipping interests, the International Maritime Organization, environmental consultants, Regional Fisheries Management Organizations, contingency planners for offshore oil and gas development, wind farm representatives, harbour authorities, and aquaculture representatives to name a few. As more commercial fish stocks are over-fished, as ocean temperatures increase and pH decreases, as oil rigs explode and pour millions of gallons of crude oil into the sea, people want to know if their oceans are healthy and seabirds provide a highly visible barometer of ocean change.

One means to enhance seabird conservation is by viewing the seabird resources in the circumpolar region as a single resource rather than a series of seabird colonies divided by countries. To facilitate this broad-scale approach it is necessary to know where seabird colonies exist in the Arctic countries. Some countries have national databases of seabird colony locations, but these databases have never been joined to allow a cohesive view of the seabird resources. Along with knowing where the seabird resources are, management agencies, scientists, and the public is interested in the status of seabirds.

Often seabirds have regional reproductive failures or even worse protracted population declines. At present, it is difficult to bring data together from more than one country to address the question - how widespread was the reproductive failure or population decline and were there common drivers for the declines across regions? A solution to this problem would be to make this information available for the circumpolar Arctic on the internet, with easy tools to view the Arctic seabird colonies and their status. There is a recent example of the Circumpolar Seabird Group combining data from the Arctic to write a paper on the effects of climate shifts on seabird populations (Irons *et al*. 2008). The paper was unprecedented because the group was able to bring data together from the entire circumpolar region in order to reveal a strong relationship between seabird population trends and shifts in sea surface temperature. This paper attracted much attention because of the circumpolar geographic scope. To be able to show climate effects at a hemispheric level is very powerful indeed. Had CBird not existed or not been willing to share their data, this knowledge would not have been uncovered. The Circumpolar Seabird Group has also written a Framework for a Circumpolar Arctic Seabird Monitoring Network, which suggests species that should be monitored for productivity and population trends in the Arctic (Petersen 2008).

The purpose of this concept paper is to propose objectives, means, details of data ownership, and initial analytical tools of sharing seabird information across the Arctic on the internet. New technologies within the Internet offer user-friendly and efficient means to share and depict biological information, thus improving our ability to make informed and timely management decisions. It is not the intention to detail solutions to the integration and interoperability of every national database and servers, but rather focus on describing what is possible within the current arctic seabird management structures.

# 2. DATA SHARING GOALS AND OBJECTIVES

## 2.1 Goal

The development of a coordinated circumpolar seabird data management system that improves regional and national seabird data sharing, access, integration, and interpretation.

## 2.2 Objectives

- To create a distributed seabird data portal to support seabird monitoring, management, and conservation while minimizing changes to current national business practices.
- To facilitate exchanging and publishing seabird information of mutual interest to scientists and managers in the circumpolar countries.
- To facilitate development and coordination of cooperative research and management projects and conservation plans for circumpolar seabirds of mutual concern in the Arctic.

## 2.3 Short term tasks

- Create an internet based Circumpolar Seabird Colony Register.
- Create an internet based Circumpolar Seabird Productivity Index.
- Create an internet based Circumpolar Seabird Population Trend Index.
- Create an internet based Circumpolar Seabird Mortality Event Register.
- Create a web portal called the Seabird Information Network (SIN) to display these seabird metrics and other types of related data such as sea surface temperature, shipping lanes, land ownership, etc.

**Black Guillemot by Mario Gavrilo**

# 3. DEVELOPMENT OF TASKS

## 3.1 Circumpolar Seabird Colony Register

Some countries have existing seabird colony registers, these registers are in various states of development. Some are currently on the internet for public display and others reside only in the computers of scientists. Formats and fields of the registers may be different.

To create a Circumpolar Seabird Colony Register, data from the participating countries will be brought together to allow the Arctic seabirds to be viewed on one map. To do this there are two means available to us. Create a single database containing all the Arctic seabird data or link the existing databases via interoperability, which would harmonize all databases to be viewed as one. Either of these or a combination of these methods is feasible to create a portal that would display all the data as if they were in one database on one computer. However, the latter option is more efficient as a new, single database would not need to be developed and the task of keeping the information up-to-date stays at the national level in closer contact to those that organize the collection of data in the field.

It is likely, given the various states of the national seabird colony registers, that a combination of these two methods will be used. Some of the participating countries have hired a private company, Axiom Consulting, to create the SIN and to populate it with the Circumpolar Seabird Colony Register. To participate in this exercise each country will need to provide an example of their colony registers to Axiom so that they can harmonize the various registers so they can be viewed as one. Each country will be responsible for the quality control of their data. All participating countries will have to agree on the data fields of the register. Currently we recommend:

- country
- state or province
- latitude and longitude of colony location
- species
- population size
- data contributor, (with contact information)
- data observer, (with contact information)
- data entry contact, (with contact information)
- date data collected
- attached reference documents

National colony registers may have other data that is not used for the Circumpolar Register. Appropriate reports or publications may be attached and archived in the register.

**Razorbill**

## 3.2 Circumpolar Seabird Productivity Index

The Circumpolar Seabird Productivity Index was created because of the need to get information on extent of seabird colonies failures out to the managers, scientists, and public in an expedient and rational way. It is also useful because many scientists do not want to put their data on the internet before they are published and Circumpolar Seabird Productivity Index requires no data to be put on the web, just a category (high, moderate, low). Other uses of this information include: informing users of problem areas and species that may require more research, allowing large-scale patterns of productivity to be identified that could lead to more research, allowing patterns of seabird productivity to be compared with several other parameters such as chlorophyll production, or oil spills, which could lead to further research.

The productivity index is based on the proportion of young fledged (or nearly fledged) from nests. We use the modal clutch size to determine the maximum number of chicks that can be fledged. For example, murres, which have a modal clutch size of one, would get a high rating if they produced more than 50 chicks at 100 nest sites. But kittiwakes, which have a modal clutch size of two, would have to produce more than 100 chicks at 100 nest sites to get a high rating.

Using the modal clutch size to determine the maximum number of chicks that could be fledged, the ratings for the productivity categories are as follows:

- High: > 50% of the maximum number of chicks fledged
- Moderate: 10% to 50% of the maximum number of chicks fledged
- Low: < 10% of the maximum number of chicks fledged

The quality of data used to categorize productivity data is quite variable. Therefore we will have two categories of data; those where the data contributor has "high confidence" and those with "low confidence". The decision to choose high or low confidence will be up to the contributor, but generally high confidence would come from studies where birds were watched during the entire field season, or in the case of cliff nesting birds like kittiwakes, when the number of nests and chicks can be carefully counted. Low confidence might be when only a small portion of a colony was examined once or twice during the breeding season.

## 3.3 Circumpolar Seabird Population Trend Index

The needs for the Circumpolar Seabird Population Trend Index are similar to the needs for the Circumpolar Seabird Productivity Index. The main issue is to get information out quickly rather than to wait until scientists publish their data and are then willing to share it on the internet.

The Population Trend Index will be based on abundance data collected at a colony over a number of years. Population trends will be examined at the decadal scale for the most recent decade. To determine if the size of a colony changed would require at least two data points 5 or more years apart within a 10 year period. If there were enough data a simple natural log-transformed regression would be sufficient to calculate the percent change in 10 years. If the colony increased 30% or more in 10 years, the colony would be considered increasing, if the colony declined 30% or more in 10 years, the colony would be considered decreasing. If the colony changed less than 30% in either direction, the colony would be considered stable. See table below.

| **Population Change in 10 Years** | **Population Trend** |
|---|---|
| *≥ +30%* | *increasing* |
| *< 30%* | *stable* |
| *≥ -30%* | *decreasing* |

The quality of data used to categorize population trends data is quite variable. Therefore we will have two categories of data; those where the data contributor has "high confidence" and those with "low confidence". The decision to choose high or low confidence will be up to the contributor, but generally high confidence would come from studies where birds were counted for four or more years in a decade.  Low confidence might be when counts were made in only two or three years during the decade.

## 3.4 Circumpolar Seabird Mortality Event Register

A Circumpolar Seabird Mortality Event Register would be used to enumerate the location and number of unusually high seabird mortality events. Seabird wrecks are uncommon but attention commanding incidents. By quantifying mortality events in the Arctic the frequency, patterns, and the species affected could be determined and used to conduct more in-depth research on the potential causes of such events.

## 3.5 Data Release Codes and Credit to Contributors

Representatives from each country will have to decide on a data release code for data. There are three categories:

- Restricted – Results of data (e.g., colony site) may be viewed on a map but not downloaded, to access data you must contact the contributor.
- Provisional – Results of data may be viewed on a map and may be downloaded but not used in peer-reviewed scientific journals without consent of contributor.
- Unrestricted – Results of data may be viewed on a map, downloaded, and used in peer-reviewed scientific journal without contacting the contributor, but contributor should be cited as appropriate.

# 4. SUMMARY

## 4.1 Summary

The Seabird Information Network (SIN) Web Portal will be the website where pooled circumpolar seabird information would reside and would be part of CAFF's Circumpolar Biodiversity Monitoring Program's (CBMP) broader Biodiversity Data Portal. The many layers of information that the CBMP are collecting and making available via their Data Portal would be available to be overlaid on the seabird data layers, thereby increasing the power of all the data sets. The CBMP's Data Portal is being designed to allow users to customize the interface, thus allowing users the ability to only display the data layers they are interested in and also allowing password protection for networks such as CBIRD to post and share data that they may not want to share beyond their own network. The CBMP Data Portal is being developed and designed to serve scientific networks (e.g., allowing access to multiple biotic and abiotic data layers to facilitate analysis and investigate patterns and correlations), decision makers (e.g., analytical and depiction tools to allow environmental assessors, land-use planners, etc. to access information on important biological resources and their locations) and the public (e.g., broader biodiversity indices and indicators to provide quick summaries of the state of the Arctic's biodiversity). The SIN Web Portal is not only an important element of the broader CBMP Data Portal but has been serving as a pilot to inform the CBMP on how to build in other data layers.

As the SIN Web Portal develops, and better sooner than later, a written agreement needs to be developed with the future server supplier, on the running of SIN, data ownership (both by SIN and the data suppliers), any potential use, etc.

# 5. LITERATURE CITED

D. Irons, T. Anker-Nilssen, A. J. Gaston, G. V. Byrd, K. Falk, G. Gilchrist, M. Hario, M. Hjernquist, Y. V. Krasnov, A. Mosbech, B. Olsen, A. Petersen, J. B. Reid, G. J. Robertson, H. Strøm, & K. D. Wohl. 2008. Fluctuations in circumpolar seabird populations linked to climate oscillations. Global Change Biology 1455-1463.

A, Petersen, D. Irons, T. Anker-Nilssen, Y. Artukhin, R. Barrett, D. Boertmann, C. Egevang, M. V. Gavrilo, G. Gilchrist, M. Hario, M. Mallory, A. Mosbech, B. Olsen, H. Osterblom, G. Robertson, and H. Strøm (2008): Framework for a Circumpolar Arctic Seabird Monitoring Network. CAFF CBMP Report No. 15. CAFF International Secretariat, Akureyri, Iceland

For further information and additional copies contact:

**CAFF INTERNATIONAL SECRETARIAT**
**Borgir**
**Nordurslod**
**600 Akureyri**
**ICELAND**

Telephone: +354 462 3350
Fax: +354 462 3390
E-mail: caff@caff.is
Internet: http: //www.caff.is

ISBN NUMBER: 978-9935-431-02-8

Prentstofan: Stell