



Circumpolar Seabird Working Group

# Human Disturbance at Arctic Seabird Colonies



CAFF Technical Report no. 2



Conservation of Arctic Flora and Fauna

### **About CAFF**

The Program for the Conservation of Arctic Flora and Fauna (CAFF) of the Arctic Council was established to address the special needs of Arctic ecosystems, species and their habitats in the rapidly developing Arctic region. It was initiated as one of four programs of the Arctic Environmental Protection Strategy (AEPS) which was adopted by Canada, Denmark/Greenland, Finland, Iceland, Norway, Russia, Sweden and the United States through a Ministerial Declaration at Rovaniemi, Finland in 1991. The other AEPS programs were the Arctic Monitoring and Assessment Program (AMAP) and the programs for Emergency Prevention, Preparedness and Response (EPPR) and Protection of the Arctic Marine Environment (PAME). The AEPS is now integrated into the Arctic Council.

Since its inaugural meeting in Ottawa, Canada in 1992, the CAFF program has provided scientists, conservation managers and groups, and indigenous people of the north with a distinct forum in which to tackle a wide range of Arctic conservation issues at the circumpolar level.

CAFF's main goals, which are achieved in keeping with the concepts of sustainable development and utilisation, are:

- to conserve Arctic flora and fauna, their diversity and their habitats;
- to protect the Arctic ecosystems from threats;
- to improve conservation management laws, regulations and practices for the Arctic;
- to integrate Arctic interests into global conservation fora.

CAFF operates through a system of Designated Agencies and National Representatives responsible for CAFF in their respective countries. CAFF also has an International Working Group which has met annually to assess progress and to develop Annual Work Plans. CAFF is headed up by a chair and vice-chair which rotate among the Arctic countries and it is supported by an International Secretariat. When needed, CAFF also sets up specialist and experts groups to handle program areas.

The majority of CAFF's activities are directed at conserving Arctic biodiversity—the abundance and diversity of Arctic flora, fauna, and habitats—and at integrating indigenous peoples and their knowledge into CAFF. Some examples are: development and implementation of conservation strategies and action plans for a Circumpolar Protected Areas Network (CPAN), for Arctic biological diversity, for circumpolar Murres and Eiders; work on a Circumpolar Arctic Vegetation Map (CAVM) and Atlas of Rare Endemic Vascular Plants; assessing impacts of climate change and UV-B radiation on Arctic ecosystems; mapping Traditional Ecological Knowledge; developing a program for monitoring Arctic Biological diversity; etc. Most of CAFF's work is carried out through a system of Lead Countries as a means of sharing the workload. Some projects are also assigned to the CAFF Secretariat. Whenever possible, CAFF works in co-operation with other international organisations and associations to achieve common conservation goals in the Arctic.

## **CAFF PUBLICATIONS:**

### **CAFF Habitat Conservation Reports:**

- No.1 The State of the Protected Areas in the Circumpolar Arctic (1994)
- No.2 Proposed Protected Areas in the Circumpolar Arctic (1996)
- No.3 National Principles and Mechanisms for Protected Areas in the Arctic Countries (1996)
- No.4 Circumpolar Protected Areas Network (CPAN) Principles and Guidelines (1996)
- No.5 Gaps in Habitat Protection in the Circumpolar Arctic (1996)
- No.6 Circumpolar Protected Areas Network (CPAN) - Strategy and Action Plan (1996)
- No.7 Circumpolar Protected Areas Network (CPAN) Progress Report 1997 (1997)

### **CAFF Technical Reports:**

- No.1 Incidental Take of Seabirds in Commercial Fisheries in the Arctic Countries (1998)
- No.2 Human Disturbance at Arctic Seabird Colonies (1998)
- No.3 Atlas of Rare Endemic Vascular Plants of the Arctic (1999)
- No.4 Global Overview of the Conservation of Migratory Arctic Breeding Birds outside the Arctic (1998)
- No.5 AMAP/CAFF Workshop on Climate Change, Rovaniemi, 24-25 March 1998 (1998)

### **CAFF Strategies:**

- Circumpolar Protected Areas Network (CPAN) Strategy and Action Plan (March 1996)
- International Murre Conservation Strategy and Action Plan (March 1996)
- Circumpolar Eider Conservation Strategy and Action Plan (June 1997)
- The Co-operative Strategy for Conservation of Biological Diversity in the Arctic Region (June 1997)
- Strategic Plan for the Conservation of Arctic Biological Diversity (1998)

### **CAFF Program Management and Meetings:**

- CAFF Report to Ministers 1996 (1996)
- CAFF Report to SAAOs 1997 (1997)
- Report of the Working Group 1992-1993 (1993)
- Third Meeting of the CAFF International Working Group (CAFF III), Reykjavík 1994: Proceedings (1994)
- Fourth Annual Meeting of the CAFF International Working Group (CAFF IV), Moscow 1995: Summary Report (1996)
- Fifth Annual Meeting of the CAFF International Working Group (CAFF V), Rovaniemi 1996: Summary Report (1997)
- Sixth Annual Meeting of the CAFF International Working Group (CAFF VI), Nuuk 1997: Summary Report (1998)
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by

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## EXECUTIVE SUMMARY

*This report presents the results of a review of human disturbance of seabirds breeding in the Arctic and the regulations in place to control disturbance.*

*Seabirds generally breed in colonies and are particularly sensitive to the presence of humans or human activities within the colony, or in the vicinity. Human activity often results in disturbance to breeding seabirds. Reactions to human activity in the colony can take many forms including temporary changes in behaviour of the birds, changes in internal state such as increased heart rate/breathing rate, temporary abandonment of nest sites and reduced adult attendance, egg or chick loss, reduced recruitment of young birds, and even permanent colony abandonment. Many Arctic seabird colonies are remote and difficult to access, and therefore infrequently or never disturbed by humans. However, the Arctic is rapidly opening up to people, and seabird colonies are increasingly the focus of tourism developments. Interest in the potential for mineral resource extraction in the Arctic appears to be at an all-time high, and offshore oil and gas development remains a prospect.*

*In view of this, the Circumpolar Seabird Working Group (CSWG) under the auspices of the Conservation of Arctic Flora and Fauna (CAFF) program undertook to compile a review of human disturbance at Arctic seabird colonies and the various regulations or guidelines in place to limit disturbance. Information on human disturbance of Arctic breeding seabirds was received from Canada, Finland, Greenland, Iceland, Norway, Russia and the United States, in response to a questionnaire sent to CSWG country representatives.*

*Some level of human disturbance occurs at seabird colonies in all Arctic countries. Disturbance is usually limited to local areas, and most Arctic countries do not consider it to be a major conservation issue at the national level. However, several local areas where human disturbance of breeding seabirds is considered a problem are identified in the report. A range of human activities potentially or actually disturb Arctic seabirds, however, the most common appear to be hunting at the colony and eggging, tourism and recreational activities, and aircraft and industrial activities.*

*Knowledge of the full extent of seabird disturbance in the Arctic, and its effects on individuals and populations, varies between countries but is in general incomplete. The immediate and longer-term impacts of human activities in Arctic seabird colonies needs to be established. The report makes several recommendations to address the problem of lack of knowledge. Adequate regulations or guidelines appear to exist to protect Arctic seabirds from disturbance, however, some improvements in the regulations need to be made, and better surveillance and enforcement is needed. There is a general lack of understanding of the sensitivity of seabirds to disturbance, and therefore there is a need to provide information and communicate this concept to decision makers, industry, and the general public. The report makes further recommendations to address problems with existing regulations, their enforcement, and in the area of information and communications.*



## 1. INTRODUCTION

The majority of seabirds such as murres or guillemots, auks, gull, and terns nest in colonies (Lack 1968), which usually are found on islands or inaccessible mainland sites. It is widely recognised that colonies are located in such a way as to isolate them from land-based predators and the mortality and disturbance they cause. The habit of nesting at locations normally free from terrestrial predators makes seabirds particularly responsive to disturbance when it occurs. Seabirds at the colony often react strongly to seemingly minor disturbance because their most successful strategy is to avoid threats to their own survival, even at the expense of losing their eggs or chicks. This strategy tends to maximise the lifespan of the individual and thus the number of opportunities to breed.

The disturbance of breeding seabirds by humans is recognised as a potential or actual conservation concern world-wide (Vermeer and Rankin 1984, Burger and Gochfeld 1994). This implies that disturbance can affect seabird populations through negative impacts on demographic parameters such as breeding success, resulting in effects on population status (i.e., whether the population is increasing, decreasing or remaining stable). Human disturbance either adjacent to colonies or from direct intrusion into colonies can take many forms, originate from many sources, and can have a wide range of impacts from minor to major.

Typical sources of human disturbance at colonies include industrial and recreational developments, agriculture and forestry, military activity, aircraft and boat activity, ecotourism, recreation, research, fishing, and direct exploitation of eggs, chicks or adults for food. Impacts of disturbance on breeding seabirds range from temporary changes in behaviour such as alert or alarm postures and alarm calling, changes in internal state such as increased heart rate/breathing rate (Wilson et al. 1991, Nimon et al. 1995), to temporary abandonment of nest sites and reduced attendance by adults caused by flushing or panic flights (e.g., Olsson and Gabrielsen 1990). Occasionally, disturbance can result in egg or chick loss when adults flush from the nest, dislodging nest contents and leaving the egg or chick vulnerable to predation. Disturbance of ground nesting species such as gulls and terns after hatching can result in chicks wandering into adjacent territories, where they are often attacked by neighbours (e.g., Fetterolf 1983). In more extreme situations disturbance can affect the attractiveness of the colony to potential recruits or cause permanent colony abandonment (see Evans and Kampp 1991 and Barrett and Vader 1984).

The level of human disturbance experienced by seabirds in a particular region is generally related to the degree of human development in that region. Many Arctic seabird colonies are remote and difficult to access, therefore, one would expect that seabird colonies in the Arctic, with its small human population and limited development, would not be unduly impacted by human disturbance. In general this expectation was borne out by reviews of seabird conservation in Arctic countries published in 1984 (see various papers in Croxall et al. 1984), in which none with the exception of the Norwegian review (Barrett and Vader 1984) mentioned human disturbance as a significant conservation concern. However, the Arctic is rapidly opening up to people, and seabird colonies are increasingly being visited by tourists, cruise ships, and researchers. Furthermore, interest in the potential for mineral resource extraction in the Arctic appears to be at an all-time high, and offshore oil and gas development remains a prospect.

The question of whether human disturbance is a conservation concern-- meaning that it has effects at the population level-- is still open to debate. This is due to a lack of information on population-level impacts, rather than the existence of clear evidence that disturbance does not have impacts at the population level. Population-level impacts, such as effects on breeding success, adult survival or recruitment patterns, are difficult to measure, and even more difficult to attribute unequivocally to a single factor such as disturbance.

In view of the fact that Arctic seabird colonies are known to be disturbed, and given the high sensitivity of seabirds to disturbance, the Circumpolar Seabird Working Group (CSWG) under the auspices of the Conservation of Arctic Flora and Fauna (CAFF) program undertook to compile a review of human disturbance at Arctic seabird colonies and the various regulations or guidelines in place to limit disturbance. This report presents the results of the review, and provides recommendations to address the problem of human disturbance in Arctic seabird colonies.

## 2. METHODS

The issue of human disturbance in Arctic seabird colonies and the regulations or guidelines in place to limit disturbance in each CAFF country (Canada, Finland, Greenland, Iceland, Norway, Russia and the US; Sweden is not represented on the CSWG) was assessed by means of a questionnaire (Appendix 1). The questionnaire was developed by the authors and distributed to CSWG representatives from each country. At their discretion, representatives in turn solicited comment from experts in their countries before drafting responses to each question. Responses were received from all countries (see summary of responses in Appendix 2). The remainder of this report is a synthesis of those responses. Scientific names of species mentioned in this report are in Appendix 3. Countries are always mentioned in alphabetical order.

## 3. SCOPE OF HUMAN DISTURBANCE IN ARCTIC SEABIRD COLONIES

Table 1 provides a summary of locations in each Arctic countries where disturbance is considered a local problem.

Arctic seabird colonies are usually located in remote inaccessible places which provides them with a natural level of protection from human disturbance. Many colonies are located within protected areas where disturbance is restricted (although poorly enforced: see below). However, the sensitivity of breeding seabirds to disturbance is widely recognised, and the potential for major impacts, as a result of disturbance, remains. A natural mitigation to the effects of disturbance is provided by the phenomenon of habituation whereby seabirds sometimes decrease their response to repeated disturbance. For example there is evidence that murrelets habituate to some degree to the sound of helicopters (Fjeld et al. 1988). However, there is evidence that habituation does not occur in other species as a result of certain types of disturbance (see Wilson et al. 1991).

The main sources of disturbance in Arctic seabird colonies noted in the responses to the questionnaire are dealt with in the following sections.

### *3.1. Disturbance caused by hunting at the colony and eggging*

Hunting at the colony during the breeding season and eggging occur at some seabird colonies in all Arctic countries. Hunting methods vary and include shooting, aerial netting (fleyging) and setting nets in the water. Clearly these activities are disruptive because of the adult and egg/chick mortality that results, but also because of the disturbance associated with hunting methods such as shooting, or with entering the colony for the purposes of egg collecting or fleyging. Many Arctic seabird colonies are never visited by hunters or eggers because they are remote from Arctic communities, but some are visited regularly. Historically the problem has been particularly severe in Greenland, where seabird hunting is a commercial activity, and has resulted in declines or total extirpation of some Thick-billed Murre colonies (Evans and Waterston 1976, Evans and Kampp 1991). Hunting during the breeding season in the immediate vicinity of seabird colonies still occurs in Greenland, but to a lesser extent than previously. Other Arctic countries in which hunting at the colony still occurs locally are the United States (Alaska), Canada, Finland, Iceland and eastern Russia.

**Table 1.** Locations or areas in Arctic countries where human disturbance at seabird colonies is considered to be a problem

Country	Location or area	Activity	Species affected <sup>1</sup>	Potential/ actual/ suspected
Canada	Digges Is.	Shooting at the colony and eggng	TBMU	Actual
	Prince Leopold Is. Coburg Is.	Visitation by tourists	TBMU, BLKI, NOFU	Potential
	Islands off Labrador coast	Egging	COEI	Actual (declining with less fishing activity)
	Witless Bay Islands, Newfoundland	Tour boat passage	COMU, RAZO, ATPU, BLKI	Actual (effects on behaviour), potential (effects on demography)
Finland	SW archipelago, several islands close to colonies	Spring shooting	COEI	Potential
	Rauma archipelago	Summer shooting	COEI (males)	Actual
	Eastern Gulf of Finland	Egging	Gulls	Actual
Greenland	West coast colonies near communities	Helicopter flights, hunting, eggng	TBMU, COEI, ARTE, BLKI	Actual
Iceland	No specific examples given			
Norway	Svalbard	Helicopter flights	TBMU, COMU, BLKI, COEI, geese	Actual
	Røst, Lofoten Is.	Supersonic over-flights	COMU	Suspected
Russia (east)	Chukotsk Peninsula: Arctic Ocean, northern Bering Sea	Egging, hunting, fishing	Murres, LEAU, CRAU, kittiwakes, ROGU, SAGU, eiders	Actual
	Northern Sea of Okhotsk (Gizhiginskaya Bay, Tauyskaya Bay)	Recreation, tourism, cattle grazing, eggng, hunting	Murres, BLKI, SBGU, PECO, ALTE, COEO,	Actual
	Kamchatka (Karaginsky Is. Verhoturova Is.)	Recreation, tourism, cattle	Murres, PECO	Actual
	Kamchatka: (Starichkov Is., Avachinskaya B.)	Recreation, tourism, cattle	ANMU	Actual
	Commander Is. (Toporkov Is., Ary Kamen Is.)	Egging, hunting, visits by people	BLKI, RLKI, RFCO, TUPU, GWGU	Actual
	Kuril Is.	Egging, hunting, visits by people	Murres, auklets, cormorants, petrels	Actual
	Sakhalin area (Moneron Is. Tyuleny Is.)	Egging, hunting, visits by people	Murres, RHAU, BTGU	Actual

<sup>1</sup> 4-letter codes for species; refer to Appendix 3 for common and scientific names.

*Table 1. (continued)*

Country	Location or area	Activity	Species affected <sup>1</sup>	Potential/ actual/ suspected
Russia (east) continued	Primorye (Peter the Great Bay)	Recreation, tourism, cattle grazing	SWSP, SPGU, BTGU	Actual
	Starichkov Is. Avachinskaja Bay		ANMU	Actual
Russia (west)	White Sea	Seaweed, grass and down collection, gull predation	COEI	Actual
	Kara Sea	Tourism	IVGU	Suspected
USA (Alaska)	SE Alaska	Tourism (trampling of burrows), timber harvest	FTSP, LESP, ANMU, MAMU	Potential (tourism), actual (timber harvest)
	Northern Gulf of Alaska (Prince William Sound to Kodiak)	Recreation, tourism, commercial fishing, Timber harvest	BLKI, COMU, PIGU, MAMU	Potential (recreational use, actual (timber harvest)
	Alaska Peninsula	Commercial fishing, aircraft	BLKI, COMU, STEI	Actual
	Bristol Bay	Commercial fishing, aircraft	BLKI, COMU, PECO	Actual
	Aleutian Islands	Military explosions, aircraft	Almost all species	Actual (but rare)
	Bering Sea	Egging, hunting, aircraft, industrial development, tourism	BLKI, COMU, TBMU, RLKI, PECO, RFCO, LEAU, CRAU, GWGU, SPEI	Actual, (potential in oil and gas transportation)
	Chukchi Sea	Egging, aircraft, industrial development, military explosions	BLKI, TBMU, COMU, BLGU, COEI, ARTE	Actual

<sup>1</sup> 4-letter codes for species; refer to Appendix 3 for common and scientific names.

### *3.2 Disturbance caused by tourism and recreational activities*

Visits to Arctic seabird colonies by tourists is a rapidly growing development. Currently cruise ships visit or sail by colonies in the low and high Arctic of Canada, west Greenland, Iceland, Norwegian coast and Svalbard, eastern Russia, and the US (Alaska). Colonies chosen for visitation tend to be large and spectacular and usually are home to species such as murres, puffins, kittiwakes, and fulmars. During a colony visit passengers typically board smaller boats (usually zodiacs) from the larger ships, and cruise by colonies observing the seabirds and taking pictures. Occasionally passengers make landings at suitable colonies and view the seabirds from above or below the cliffs. At some locations such as Newfoundland, small tour boats take passengers on day-trips to local seabird colonies, where they cruise close to seabird cliffs. The degree to which these activities disturb nesting seabirds is unknown although research into the effects of the passage of small boats by some Newfoundland colonies is presently being conducted (Hearne and Chardine unpubl.).

Recreational activities such as boating and fishing cause local disturbance at colonies in several Arctic countries. In the Russian far east, coastal and lowland species such as ducks, gulls, terns and Spectacled Guillemots are frequently disturbed by visits from recreationists (often with dogs). In Finland, leisure boating is on the increase and poses a problem for almost all colonies in the Baltic archipelagos. In an earlier paper, Barrett and Vader (1984) reported that seabird colonies on islands

along the southern coast of Norway were severely disturbed by pleasure crafts, which resulted in major declines in guillemot, puffin, gull and tern colonies.

### ***3.3 Disturbance caused by air traffic and industrial developments***

Aircraft, particularly helicopters are noisy and produce a variety of sounds that are disturbing to seabirds (Fjeld et al. 1988). Helicopters cause panic flights and can lead to egg loss particularly in murres, which do not build a nest and incubate their eggs on their feet. Non-breeders flush more readily than breeders. Fixed wing aircraft and helicopters are used for routine flights around the Arctic and in mineral exploration and extraction developments. Some areas in the Arctic are over-flown by supersonic jet aircraft on flight training missions. These aircraft sometimes produce sonic-booms which can disturb breeding seabirds. Oil development is proceeding in the US (Alaska) and some other Arctic nations and can cause disturbance as well as the risk of oil and fuel spills. Timber harvest of old-growth trees can reduce nesting habitat for one Beringian seabird, the Marbled Murrelet. With the increase in industrial development in the Arctic, the use of aircraft, particularly helicopters, will also increase. The problem of disturbance caused by helicopters appears to be particularly significant in Svalbard (Norway) and Greenland. Breeding murres and eiders appear to be sensitive to this type of disturbance.

Industrial developments in the Arctic have a significant potential to disturb breeding seabirds through effects such as noise, human presence, air pollution, and aircraft overflights. This potential depends on the proximity of the development to the colony and on the particular activities associated with the development. Many areas of the Arctic are opening up to mining developments and these are likely to pose the greatest potential threat to breeding seabirds, unless the developments are situated sufficiently distant from colonies.

## **4. LEGAL AND OTHER MECHANISMS TO PROTECT BREEDING SEABIRDS FROM HUMAN DISTURBANCE**

Recognising the importance of reducing human disturbance to a minimum in seabird colonies, all Arctic countries have some regulations to control disturbance. Regulations are normally set at the national level of government. Canada, Finland, Norway and Russia also have regulations set by regional and/or local levels of government to reduce disturbance and protect local colonies. In most countries, regulations differ between colonies and commonly depend on the protective status of the site.

Most countries provide some level of protection from disturbance to seabird colonies located outside areas officially designated as protected. Inside protected areas, regulations are more wide-ranging, stringent, and usually better enforced. All circumpolar countries have restrictions that are in place for specific time periods during the year, that depend on the location and species of seabird involved.

### ***4.1 Types of human activities prohibited or restricted***

Disturbance at Arctic seabird colonies is most commonly controlled by limiting access to colonies during the breeding season. Human visitation is usually prohibited or severely restricted in colonies with protective status; in Iceland this applies only to eider colonies. Access to colonies without specific protective status is not generally prohibited so long as disturbance to seabirds does not occur. Permits to allow access to seabird colonies for purposes such as research are issued by management agencies in most Arctic countries. In Iceland permits are only required if seabirds are to be captured and/or banded. In Canada, some provinces issue permits to conduct research in protected colonies but there is no permit requirements under federal law, unless the colonies are federally protected.

All Arctic countries have regulations that prohibit human activities that both disturb breeding seabirds or cause their death. Some countries prohibit the disturbance of breeding seabirds specifically, while others prohibit the disturbance of their eggs and nests (e.g., Canada). In Canada, regulations prohibit disturbance of the nest or eggs of all migratory birds but do not specifically prohibit disturbance of individual seabirds themselves, so long as the disturbance does not involve pursuit, capture or death of birds (defined as hunting in the legislation). Nor do Canadian

regulations specifically prohibit disturbance of chicks. In the US, only disturbance that results in death of birds or eggs is prohibited, except that endangered species receive broader protection. However, inside Canadian National Wildlife Areas and Migratory Bird Sanctuaries, and US National Wildlife Refuges any disturbance of seabirds is illegal.

In most Arctic countries most or all activities that are disturbing to seabirds at colonies are prohibited. Regulations tend to focus on disturbance associated with intrusion into the colony such as killing of adults and chicks, eggging, research in colonies, recreational/ tourist visitation, and farming. Activities that may disturb breeding seabirds but that do not involve direct intrusion into the colony (e.g., development outside colony) are not often specifically addressed in regulations, with the exception of boat/aircraft disturbance.

#### ***4.2 Regulations controlling disturbance caused by boats or aircraft***

Disturbance caused by boats or aircraft is usually controlled by distance or altitude regulations in protected areas and advisory restrictions elsewhere. Sometimes boat activities such as use of horns is restricted. Table 2 gives distance/altitude restrictions currently in place in each Arctic country. Canada, Finland, Greenland, Russia, and the US restrict the distance boats can approach breeding seabirds, but restrictions apply only to specific protected areas. Distance restrictions range from 15 m for unmotorised boats in some reserves within Newfoundland, Canada, to 1000 m in reserves in Russia. In Newfoundland, distance restrictions are greater off some large murre colonies than off smaller mixed species colonies and greater for motorised compared to unmotorised boats. Distance restrictions in the US (Alaska) depend on the colony and its protective status. Boat speed restrictions when in the vicinity of some seabird colonies are in place in Norway and Greenland. In Greenland, speed restrictions apply to mineral development activities only. Boat sirens cannot be used within 1 km of Svalbard (Norway) colonies or around Frantz-Joseph Land (Russia). With the exception of Finland, all Arctic countries restrict the altitude below which aircraft cannot fly over a seabird colony. In general minimum altitudes are in the range of 300-500 m but are higher over some reserves in the US (700 m) and Russia (2000 m). In Canada some seabird colonies or large concentrations of birds are marked on flight charts, however, no explanation is given on the charts as to what the symbols mean or the minimum altitudes. Canadian flight manuals advise a minimum altitude of over 600m (2000 feet) when flying over bird concentrations. In Greenland, advisory rules are in place restricting disturbance to wildlife caused by mineral resource exploration and extraction (directed mainly at helicopters).

#### ***4.3 Regulations controlling shooting at colonies***

Most Arctic countries allow seabird shooting at the colony during the breeding season, and some restrict the distance from the colony that shooting can take place. This allowance applies only to native people in Canada and the US (Alaska). Hunting at the colony in Iceland cannot occur past 10 May, thereby limiting the impacts on breeding activities. In Greenland, seabird hunting cannot take place closer than 5 km from alcid, fulmar, kittiwake and cormorant colonies with more than 10 pairs, and not closer than 200 m from eider, tern, Black Guillemot, and gull colonies. In Iceland shooting is not allowed closer than 200 m from seabird colonies, while hunting from land and 500 m while hunting from sea. However, landowners in Iceland are allowed to shoot at colonies during the breeding seasons to control what are locally considered pest species such as gulls, Ravens, and jaegers (skuas). No shooting is allowed closer than 2 km from registered eider colonies in Iceland during the breeding season. Although native people are allowed to hunt seabirds during the breeding season in Canada, Finland, and the US, there are at present no restrictions on how close to the colony they can shoot. However, in Canada, regulations covering disturbance of nests and eggs of migratory birds would generally prohibit shooting at the colony because of the disturbance that hunting activities normally cause. Laws governing harvest of migratory birds by Native people in the US and Canada are undergoing revision, as a result of recent treaty amendments. Harvest will continue with some changes in regulations.

**Table 2.** Distance and sound restrictions in place to limit disturbance of seabird colonies by boats or aircraft in Arctic countries (may not apply to all areas within country). Distances are often given in feet or nautical miles. Non-metric distances and speeds converted to metric units for comparative purposes. A blank means that there is no restriction in place.

Country	Boat distance-closest approach	Boat speed-max.	Aircraft altitude-minimum	Use of boat siren
Canada	20 m (motor), 15 m <sup>1</sup> (no motor) 100 m or 50 m off murre colony		300 m- 1 Apr-1 Sep in NF province reserves. Most large colonies marked on aeronautical charts	Not explicitly restricted but not allowed if disturbance is caused
Finland	150 m (for some protected islands)			
Greenland	500 m (for a few protected colonies)	18 km/h <sup>3</sup>	500 m	
Iceland			150 m	Illegal in vicinity of colony but distance not specified
Norway		9 km/h	300 m	
Svalbard			1852 m <sup>4</sup>	Not within 1852 m of colony
Russia	1000 m		2000 m <sup>5</sup> 300 m <sup>5,6</sup>	Prohibited near Frantz-Joseph Land
USA	100 - 1600 m		500-700 m	

<sup>1</sup>Provincial regulation; Gull Island, Witless Bay- mixed Atlantic Puffin, Black-legged Kittiwake, Common Murre colony. Boat tour operators presently exempt

<sup>2</sup>Provincial regulation; Green Island- large Common Murre colony (a few hundred TBMU). Boat tour operators presently exempt

<sup>3</sup>Restriction in place for mineral exploration activities only

<sup>4</sup>equals 1 nautical mile

<sup>5</sup>Applies to reserves

<sup>6</sup>Landing of helicopters

#### 4.4 Enforcement and communication

The national or federal police enforce wildlife regulations including those involving seabird disturbance in most Arctic countries. In some, local police, wildlife officers, wardens, and refuge managers enforce disturbance regulations. In all circumpolar countries there are penalties in the form of fines and/or prison terms for disturbing seabirds. However, a very common problem in all Arctic countries is that charges for disturbing breeding seabirds are rarely if ever laid. This problem is due to the remoteness and inaccessibility of many Arctic colonies and to insufficient provision of funds to employ adequate numbers of wildlife officers or wardens to protect colonies. Also there is a general lack of understanding of the potential harm people can do by simply entering a seabird colony.

In most countries some effort is given by management agencies to inform the general public and private sector about seabird colonies and the impacts that disturbance can have, although more needs to be done in the area of communications. Communications are usually in the form of pamphlets or brochures. In the US and Canada, some tour boat operators are briefed regularly on the potential impacts of their activities.

#### ***4.5 Other mechanisms to protect Arctic seabirds***

Native people in some Arctic countries control access to seabird colonies, independently of other regulations in place. There are several examples of this in the Arctic. In Chukotsk Territory, Russia permission to enter a colony is required from native governments or other native agencies. This also applies to seabird colony locations that occur within "Class A" lands in Nunavut Territory, Canada, and to all of St. Lawrence Island, US (Alaska).

### **5. PRIORITIES AND RECOMMENDATIONS TO ADDRESS HUMAN DISTURBANCE PROBLEMS IN ARCTIC SEABIRD COLONIES**

The consensus amongst Arctic countries is that human disturbance at seabird colonies is a local, not national problem. However, disturbance in Arctic colonies is widespread (see Table 1) and it is well known that seabirds are particularly vulnerable to disturbance. One factor hampering efforts to address disturbance problems is lack of knowledge. In most Arctic countries we do not know how widespread disturbance is, nor in many cases do we know the types of disturbance occurring, or the effects of disturbance on behaviour (individual level) and demography (population level). This applies particularly to the rapidly growing Arctic tourism industry. Awareness of the sensitivity of seabirds to disturbance is not generally well known outside "seabird circles", and there is a need to provide information and communicate this concept to decision makers, industry, and the general public.

#### ***5.1 Lack of knowledge of the effects of disturbance***

Despite the remoteness of most Arctic seabird colonies, they are increasingly being impacted by the activities of people. Although we are aware of the level of human activity in and around some Arctic colonies, we know little about human activities around many others. Furthermore, at colonies known to be disturbed, we do not generally know the immediate impacts of the human activities on behaviour, factors affecting disturbance, and the longer term impacts on demography and population status. This sort of information is needed for the effective conservation of Arctic seabirds.

##### Recommendations:

- At colonies where disturbance is suspected, evaluate the causes, types, and level of disturbance occurring, and the behavioural reaction of the birds (disturbance should be suspected if human activities are audible at the colony, or activities are visible within 1 km from the colony, or birds become alert or fly from the colony due to an activity).
- Studies at representative colonies should be conducted wherever disturbance is suspected to be unusually great.
- Studies should measure overt behavioural reactions of seabirds in the presence of disturbance. Observations can focus on individuals or on sampling plots. Measures should be taken of the same sampling units before, during, and after the disturbance event.
- Differences in behaviour, population trends, and breeding success also can be recorded in disturbed and undisturbed colonies or parts of the same colony.
- Studies should aim to establish dose-response relationships between disturbance and its effects. In some cases, study design may need to take into account various components of the disturbing stimuli. Different impacts can result from variations in speed and size of visual stimuli, decibel levels of audible stimuli, and frequency with which stimuli are repeated.
- Internal physiological reactions to disturbance should be included in studies, where possible, since heart rate and other parameters may be strongly affected in the absence of any outward behavioural change.

- Impacts of disturbance on breeding success should be assessed. Also, more subtle effects of disturbance on recruitment of young birds may need to be investigated.
- Cumulative effects of repeated disturbance (over months or years) need to be assessed, which would include studies of habituation.
- Studies should take advantage of "natural experiments" whenever possible. However, controlled disturbance events may be needed in order to obtain the necessary range of impacts and responses during the study.

## ***5.2 Regulations, enforcement, monitoring and communications***

In general there appears to be adequate regulations in place in all Arctic countries to control disturbance caused by activities such as hunting and eggging, industrial development, and tourism. However, regulations are not adequately enforced. Lack of enforcement is due to factors such as too few enforcement officers covering too large an area, remoteness of Arctic seabird colonies, and a lack of understanding of the potential seriousness of disturbance.

In general, restrictions on seabird colony disturbance are not well known by the public or by many wildlife officers. Exceptions are in Svalbard (Norway), where restrictions appear to be well known, and in the US (Alaska) and Canada where at least boat tour operators appear to be well informed. However, there is a need to increase the general awareness of the sensitivity of seabirds to disturbance. Information on altitude restrictions in the vicinity of colonies is often not clearly communicated to pilots. There is a need to increase the level of enforcement and surveillance at colonies known to be disturbed, and at optimum times of year when disturbance is likely to cause most damage. As many Arctic seabird colonies are remote, posting wardens or enforcement officers at colonies is not easy and will be costly. An alternative in the case of Arctic tourism is to require that a warden accompany tourists on cruise ships, at least when particularly sensitive areas are visited.

### **Recommendations:**

- Where hunting at the colony and eggging cause unacceptable levels of disturbance, regulations should be brought into force to reduce disturbance. This may involve restricting certain methods of hunting such as shooting or limiting the season during which hunting can occur.
- Colonies that are known to be disturbed at unacceptable levels should be targeted for increased enforcement. Programs should be initiated to communicate conservation concerns to people causing the disturbance.
- Where needed, a program to communicate the potential seriousness of disturbance at seabird colonies should be initiated. Target audiences are decision makers, enforcement authorities, pilots, industry, military, and the general public. Mechanisms include the production and distribution of video material and pamphlets/brochures.
- Where feasible place wardens at colonies visited by tourists and recreationists, and in the company of tourist groups during colony visits. Wardens could monitor human activity and its effect on the birds.
- Where needed establish altitude restrictions for aircraft flying over seabird colonies, and improve the communication of existing altitude restrictions to aviation authorities and pilots.
- Tour operators and managers of seabird colonies should jointly develop conservative guidelines or a code of conduct for the activities of tourists and tour boats, designed to reduce disturbance to the absolute minimum. Results of studies should provide information necessary to develop such guidelines.
- Arctic tour operators should be encouraged to establish an association similar to the International Association of Antarctica Tour Operators (IAATO), which would be self-regulating and could monitor activities of members. This would also provide an efficient

method of communicating with the Arctic tourism industry and provide the industry with a single voice.

- The precautionary approach dictates that in the absence of direct evidence of population-level effects of human disturbance, management agencies responsible for the conservation of Arctic seabird colonies should nevertheless make every effort to minimise the effects of human activities in and around those colonies.

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## APPENDICES

**Appendix 1.** Questionnaire sent to representatives of Circumpolar Seabird Working Group in each CAFF country

### **DISTURBANCE AT SEABIRD COLONIES:**

A Questionnaire On Protection Measures in CAFF Nations

#### **A. DISTURBANCE PROBLEMS**

1. Is disturbance a problem at Arctic seabird colonies in your nation?
2. What species are most affected and at what locations?
3. What types of disturbance affect your seabirds?
4. What is the effect of disturbance on the birds? How serious is the problem?

#### **B. LEGAL PROTECTION**

5. What level of government issues the regulations? (international, national, regional, municipal)
6. Do regulations restricting disturbance differ among colonies?
7. What types of disturbance are restricted? (e.g., disturbance resulting in avoidance behaviour by seabirds, or resulting in death of seabirds)
8. What activities are restricted? Include the following details:
  - i. Types of activities restricted (e.g., visits by people on foot, pets, research, agriculture (grazing), construction, boats, aircraft, explosions)
  - ii. Are some groups (e.g. commercial tours) restricted more than others (e.g. researchers, military)?
  - iii. Are some types of boats (e.g. motorised boats, fishing boats, tour boats) restricted more than others (e.g. non-motorised boats, recreational boats)?
  - iv. Are some types of boat activities restricted? (e.g., engine noise, speed, horns)
9. How far must various disturbing activities stay from colonies? Include the following details:
  - i. Are boats restricted to a certain distance from the colony? (motorised vs. non-motorised)
  - ii. For aircraft, are there horizontal and vertical restrictions on distance from the colony?
10. Are there temporal restrictions on disturbing activities? (e.g., during certain months of the year)
11. Do permits exist to allow disturbance in special cases? (e.g., for researchers, commercial tours, or oil exploration)
12. Does extra protection exist for special areas (such as reserves) or certain species (such as endangered species)?
13. Enforcement of disturbance restrictions:
  - i. Who enforces the disturbance restrictions?
  - ii. Are there penalties for disturbance?
14. Are there other issues that are relevant to legal protection from disturbance in your country?

### **C. PROTECTION OTHER THAN LAWS AND REGULATIONS**

15. Are there advisory (non-binding) restrictions on disturbance near colonies (e.g., as found on many aeronautical charts)?
16. Are there information programs for the public by the government or others? (e.g., informational signs, brochures, videos)
17. Do native peoples administer their own wildlife protection? If so:
  - i. Do native peoples require permits to enter or disturb colonies on their lands?
  - ii. Do native peoples provide any other protection for seabird colonies?

### **D. DISTURBANCE ISSUES THAT NEED TO BE ADDRESSED**

18. Are the restrictions on disturbance effective? Are they adequately enforced?
19. Are restrictions on disturbance adequately known by the public?
20. Do the public and politicians support protection of birds from disturbance?
21. What measures against disturbance could be improved?
22. Are there any other issues that need to be addressed in your country?

**Appendix 2.** Summary of responses to the questionnaire on human disturbance in Arctic seabird colonies. Numbers refer to specific questions (Appendix 1)

*A. Questions concerning disturbance problems*

Country	Is there a disturbance problem in your country? (1)	Species affected and locations (2)	Types of disturbance (3)	Effects of disturbance (4)
Canada	Local problems; not national issue. Problem could grow with increase in Arctic tourism	Alcids (Digges, Coburg, NF colonies), BLKI (NF colonies), COEI (all)	Hunting, research incl. air traffic, expedition cruises, human visitation	Egg/chick loss, adult mortality
Finland	Local; not national issue	Alcids, CATE, COEI	Recreational boating, camping, fishing	Egg/chick predation by gulls/crows, abandonment
Greenland	Yes except for remote areas in north and east	TBMU, ARTE, BLKI, COEI	Boats, hunting, egging, helicopters	Reduced breeding success, extirpation from some areas
Iceland	Widespread but not a major conservation issue	Fulmar, Larids, Alcids, gannets, cormorants	Legal and illegal shooting, legal and illegal trapping of adults and young, tourism	Short-term disturbance effects only
Norway	Local problems; not national issue	Murres	Air traffic and associated noise, tourism, egging	Short-term disturbance, reduced attendance, increased predation
Norway: Svalbard	Local problem	Murres	Helicopter traffic and associated noise	Reduced attendance, increased predation
Russia west	Local problems, not national issue	COEI (White Sea)	Human activity in colonies- seaweed, down collection	Reduced attendance of off-duty/non-breeders
Russia east	Cliff nesters: Local problems	Alcids, kittiwakes, cormorants, petrels	Egging and hunting	Reduced size of colonies, reduced attendance, increased predation
	Lowland/coastal species: Significant problems	Seaducks, Laridae	Egging, hunting, fishing, dogs, cattle, tourists, recreation	Affects sensitive Spectacled Guillemots and is problem for rare seabirds in area
US	Local problem; many colonies too remote to be disturbed regularly	Petrels, cormorants, Larids, Alcids, eiders	Tourism, harvest, construction and industry, aircraft, vessel traffic, fishing, research	Local, temporary disturbance of breeders

**B. Questions concerning legal protection**

Country	Level of gov't that issues regs (5)	Regs differ between colonies? (6)	Disturbance restricted (7)	Activities restricted (8)	Distance restrictions (9)
Canada	Federal and provincial (reserves)	Yes; depends on protective status	Physical disturbance of nest or eggs, killing of birds.	Physical disturbance of nest or egg	Depends on location and colony: 20 m for motorized boats, 15 m for un-motorized; 100/50m from murre colony; 300 m alt. ceiling for aircraft
Finland	Federal (seabirds), provincial (colonies)	Yes; depends on landowner and purpose of protection	Disturbance and "taking"	All, but some allowance for spring shoot	150m for some protected colonies; no alt. restrictions for aircraft
Greenland	Home rule gov't and municipalities; resources-Denmark	Yes; depends on species, size of colony and protection	Disturbance, hunting, eggng	Hunting within certain distance of colony; aircraft noise	No shooting <5 km for alcids, fulmar, corms. 200m for eiders, terns; 500m alt. ceiling; 500m for boats in some protected colonies
Iceland	National	Yes; regs very stringent at certain reserves	Disturbance and direct killing	Noise, shooting	Restrictions limit hunting distance from colonies; 150m alt. restriction for aircraft
Norway	National, regional	Yes; depends on protective status	All types; eggng allowed in kittiwake and gull colonies	Colony entry, livestock, habitat change, camping, boat traffic, fishing w/ nets, aircraft activity	Boat speed limit 9 km/h; 300m alt. restriction for aircraft
Norway: Svalbard	National, Svalbard governor	Yes; depends on protective status	Disturbance and hunting	Colony entry, helicopter flights, no settlement establishment, no new species	1 km from nesting for shooting and ship siren; 1824 m alt. ceiling for aircraft
Russia	International (?), federal, regional and local	Yes; depends on protective status	Disturbance and hunting	Human activity in reserves; boat traffic, aircraft	Boat distance 1000m from some colonies; 300-2000m alt. restrictions for aircraft
US	Federal (but no regs prohibiting non-lethal disturbance, except for endangered spp.)	Yes; depends on location and protective status	Only disturbance that results in death of bird; disturbance of endangered spp.	All types	100-1600m for boats; 500-700m alt. ceiling for aircraft

**B. Questions concerning legal protection (continued)**

Country	Temporal (10)	Permits (11)	Extra protection (12)	Enforcement (13)	Other (14)
Canada	Breeding season- regs apply to nests and eggs	Research permit for disturbance and/or handling of birds	Yes, in sanctuaries and NWA; wardens in some prov. sanctuaries	CWS, RCMP, prov.; penalties up to \$50,000/6 mo, seizure of equipment; few cases prosecuted	
Finland	Yes; vary according to timing of breeding	Research, photography	Surveillance used in some areas	Coast Guard and police; penalties rarely levied	Need more funds for surveillance
Greenland	Yes	Yes	Yes	Police, wildlife rangers/ wardens; few charges	
Iceland	Yes	Research/ banding permits in nature reserves	Yes, in eider colonies	Police	General nature conservation laws
Norway	Yes; breeding season	Permits for research, education, attending to private property		Local/regional environmental authorities	No
Norway: Svalbard	Yes; 1 Apr.- 31 Aug.	Research and other activities	Generally no	Governor of Svalbard; fines or prison 1 yr.	
Russia	Breeding season: 1 Apr-30 Sep			Nature protection officers	
US	Yes, in NWRs	Special use permits in NWR; incidental take permits for endangered species work; scientific collecting requires permit, except fed. gov't.	Regulations for heterospecifics (e.g. mammals) sometimes affords extra protection	Law enforcement agents and refuge managers; few cases prosecuted	

*C. Questions concerning protection other than legal*

Country	Advisory restrictions (15)	Information programs (16)	Aboriginal protection (17)
Canada	To pilots- major colonies are marked on flight charts although minimum alt. not mentioned; signs are placed at some colonies	Information and educational program to tour boat operators in coop with province	Permission required to enter class "A" Nunavut lands
Finland	No	Yes in national parks; on navigation charts	No
Greenland		Yes, brochures	All restrictions apply equally
Iceland	Guidelines to pilots	Local communities sometimes install signage	No native element in Iceland population; landowners can restrict activities in colonies on their land
Norway	Yes, to aircraft	Yes, brochures and pamphlets	
Norway: Svalbard	Yes, on air traffic maps- 2000' alt. ceiling; 1nm around colony for ships	Brochures for tourists	No
Russia	None		Chukotsk territory, special permission for research needed
US	Yes, to aircraft	With PSG published brochure on disturbance; briefings to tour boat operators	

***D. Questions on issues that need to be addressed***

Country	Effective (18)	Public awareness of restrictions (19)	Support for restrictions (20)	Improvements (21)	Other (22)
Canada	No; lack of enforcement	Not known by many; tour operators appear well informed	Yes, as long as personal activities not curtailed (e.g., traditional visitation to colonies)	More enforcement; warden placement, education	Effects of tour boat operations in Newfoundland and Arctic needs to be studied
Finland	Not with late breeding species	Known but neglected	Yes	More trained wardens	
Greenland	No; enforcement not adequate	No?	Probably not enough	More information, education, enforcement	
Iceland	Most restrictions considered guidelines	Good in eider colonies, and to some degree in murre colonies; concept of colony not well understood	Generally yes; perception that seabirds have increased and may threaten fisheries	Tourist operators need to be better informed	Studies of effects of disturbance need to be carried out at some locations
Norway	In most cases; enforcement not adequate	Improving	Yes, except gull colonies	More standardisation of protection measures	Reduced protection due to changes in human habits
Norway: Svalbard	Not very effective	Yes	Yes	New regs will improve situation once accepted	Tourism-regulations are in prep.
Russia	Seems to be effective	Limited understanding of need to restrict activities		Establishment of new protected areas (by municipalities)	
US	Restrictions effective now because problem is small; not adequate if increases in tourism occur	Not adequately known by public; tour boat operators appear well informed	Yes, as long as personal interests not directly affected; politicians not supportive if conflicts with business interests occur	Define harassment in the regulations; better education and information program to general public and aviators	

**Appendix 3:** Scientific names, 4-letter codes and common names for seabirds mentioned in this report

Common name	Scientific name	Code
<b><i>Procellariiformes</i></b>		
Swinhoe's Storm-Petrel	<i>Oceanodroma monorhis</i>	SWSP
Fork-tailed Storm-Petrel	<i>Oceanodroma furcata</i>	FTSP
Leach's Storm-Petrel	<i>Oceanodroma leucorhoa</i>	LHSP
Northern Fulmar	<i>Fulmarus glacialis</i>	NOFU
<b><i>Pelecaniformes</i></b>		
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>	PECO
Red-faced Cormorant	<i>Phalacrocorax urile</i>	RFCO
<b><i>Charadriiformes</i></b>		
Black-legged Kittiwake	<i>Rissa tridactyla</i>	BLKI
Red-legged Kittiwake	<i>Rissa brevirostris</i>	RLKI
Ross's Gull	<i>Rhodostethia rosea</i>	ROGU
Ivory Gull	<i>Pagophila ebernea</i>	IVGU
Sabine's Gull	<i>Larus sabini</i>	SAGU
Slaty-backed Gull	<i>Larus schistisagus</i>	SBGU
Glaucous-winged Gull	<i>Larus glaucescens</i>	GWGU
Black-tailed Gull	<i>Larus crassirostris</i>	BTGU
Arctic Tern	<i>Sterna paradisaea</i>	ARTE
Aleutian Tern	<i>Sterna aleutica</i>	ALTE
Black Guillemot	<i>Cepphus grylle</i>	BLGU
Pigeon Guillemot	<i>Cepphus columba</i>	PIGU
Spectacled Guillemot	<i>Cepphus carbo</i>	SPGU
Thick-billed Murre (Brünnich's Guillemot)	<i>Uria lomvia</i>	TBMU
Common Murre (Common Guillemot)	<i>Uria aalge</i>	COMU
Razorbill	<i>Alca torda</i>	RAZO
Atlantic Puffin	<i>Fratercula arctica</i>	ATPU
Tufted Puffin	<i>Fratercula cirrhata</i>	TUPU
Rhinoceros Auklet	<i>Cerorhinca monocerata</i>	RHAU
Least Auklet	<i>Aethia pusilla</i>	LEAU
Crested Auklet	<i>Aethia cristatella</i>	CRAU
Ancient Murrelet	<i>Synthliboramphus antiquum</i>	ANMU
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	MAMU
<b><i>Anseriformes</i></b>		
Common Eider	<i>Somateria mollissima</i>	COEI
Spectacled Eider	<i>Somateria fischeri</i>	SPEI
Steller's Eider	<i>Polysticta stelleri</i>	STEI