OSPAR COMMISSION

Background Document for Thick-billed murre *Uria lomvia*

Biodiversity Series

2009

OSPAR Convention

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the “OSPAR Convention”) was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. It has been ratified by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom and approved by the European Community and Spain.

Convention OSPAR

La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. La Convention a été ratifiée par l'Allemagne, la Belgique, le Danemark, la Finlande, la France, l’Irlande, l’Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d’Irlande du Nord, la Suède et la Suisse et approuvée par la Communauté européenne et l’Espagne.

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Contents

Background Document for Thick-billed murre *Uria lomvia* 3
Executive Summary 3
Récapitulatif 3
1. Background Information 3
Name of species 3
Ecology and breeding biology 3
2. Original Evaluation against the Texel-Faial selection criteria 4
List of OSPAR Regions and Dinter bioegeographic zones where the species occurs 4
List of OSPAR Regions and Dinter biogeographic zones where the species is under threat and/or in decline 4
Original evaluation against the Texel-Faial criteria for which the species was included on the OSPAR List 4
3. Current status of the species 5
Distribution in OSPAR maritime area 5
Population (current/trends/future prospects) 6
Condition (current/trends/future prospects) 7
Limitations in knowledge 7
4. Evaluation of threats and impacts 7
5. Existing Management measures 9
6. Conclusion on overall status 10
7. What action should be taken at an OSPAR level? 11
Action/measures that OSPAR could take, subject to OSPAR agreement 11
Brief summary of proposed monitoring system 12
Annex 1: Overview of data and information provided by Contracting Parties 14
Summaries of country-specific information provided 15
Annex 2: References 16

Background Document for Thick-billed Murre *Uria lomvia*

Executive Summary

This background document on the Thick-billed Murre – *Uria lomvia* - has been developed by OSPAR following the inclusion of this species on the OSPAR List of threatened and/or declining species and habitats (OSPAR agreement 2008-6). The document provides a compilation of the reviews and assessments that have been prepared concerning this species since the agreement to include it in the OSPAR List in 2008. The original evaluation used to justify the inclusion of *Uria lomvia* in the OSPAR List is followed by an assessment of the most recent information on its status (distribution, population, condition) and key threats prepared during 2008 – 2009. Chapter 7 provides recommendations for the actions and measures that could be taken to improve the conservation status of the species. On the basis of these recommendations, OSPAR will continue its work to ensure the protection of *Uria lomvia*, where necessary in cooperation with other organisations. This document may be updated to reflect further developments.

Récapitulatif

Le présent document de fond sur le *Guillemot de Brünnich* a été élaboré par OSPAR à la suite de l'inclusion de cette espèce dans la liste OSPAR des espèces et habitats menacés et/ou en déclin (Accord OSPAR 2008-6). Ce document comporte une compilation des revues et des évaluations concernant cette espèce qui ont été préparées depuis qu'il a été convenu de l'inclure dans la Liste OSPAR en 2008. L'évaluation d'origine permettant de justifier l'inclusion du *Guillemot de Brünnich* dans la Liste OSPAR est suivie d'une évaluation des informations les plus récentes sur son statut (distribution, population, condition) et des menaces clés, préparée en 2008 – 2009. Le chapitre 7 recommande des actions et mesures à prendre éventuellement afin d'améliorer l'état de conservation de l'espèce. OSPAR poursuivra ses travaux, en se fondant sur ces recommandations, afin de s'assurer de la protection du *Guillemot de Brünnich*, le cas échéant en coopération avec d'autres organisations. Le présent document pourra être actualisé pour tenir compte de nouvelles avancées.

1. Background Information

Name of species

Uria lomvia, Thick-billed Murre (Brünnich's Guillemot).

Ecology and breeding biology

Uria lomvia is almost completely restricted to the high and low Arctic zones with open water and an adequate summer food supply, feeding mainly on fish, squid, and crustaceans. It is an exclusively marine species, occurring offshore and along sea coasts. It winters mostly offshore, to the edge of the continental shelf, and along seacoasts and in bays where suitable concentrations of fish and invertebrates occur. During the winter, this species is found in flocks at sea, most likely related to non-random distribution of winter prey.

2. Original Evaluation against the Texel-Faial selection criteria

List of OSPAR Regions and Dinter bioegeographic zones where the species occurs

OSPAR Region I

Dinter biogeographic zones:	Dinter biogeographic zones: Cold-temperate waters, Cold-Arctic waters, Cold-temperate pelagic waters, Norwegian Coast (Finnmark), Norwegian Coast (Westnorwegian), South Iceland - Faroe Shelf, Southeast Greenland, North Iceland Shelf, - Northeast Greenland Shelf (incl. NEWP), High Arctic Maritime, Barents Sea

List of OSPAR Regions and Dinter biogeographic zones where the species is under threat and/or in decline

All where it occurs.

Original evaluation against the Texel-Faial criteria for which the species was included on the OSPAR List

U. lomvia was nominated for inclusion on the OSPAR List with particular reference to the regional importance, decline, and sensitivity criteria, with additional information provided on threat. The species was first listed by OSPAR 2008.

Regional importance. At the time of listing, the OSPAR breeding population for this species, though numerous, was concentrated in a relatively small number of colonies on Greenland, Iceland, Norway, Svalbard and the westernmost areas of Franz Josef Land (all within OSPAR Region I). Also, it largely occurred within just 10 of the numerous Important Bird Areas (IBAs) within the OSPAR Maritime Area[1], and three of these (Hælavíkurbjarg – Iceland; Bear Island and Hopen Island – Svalbard) held very large concentrations of this species.

Decline. The OSPAR breeding population was broadly stable between 1970 – 1990, but suffered declines over 1990 – 2000. The large population in Svalbard remained broadly stable overall, but the species suffered declines in Greenland [0 – 19%] and Iceland [30 – 49%], declining at an overall rate that, if sustained, would equate to a large decline [>30%] over 3 generations (BirdLife International, 2004).

Sensitivity. This species was classified as sensitive at the time of listing. Its life history characteristics (relatively long-lived, and slow to reproduce) suggest a low *resilience*, meaning that it would take a long time for a population to recover from any adverse effects from human activity. Age at first breeding is estimated at 5 years (infrequently 3 or 4 years during periods of colony expansion), and birds lay only one egg per clutch. However, where measured, breeding success is usually high with 70 – 80% of eggs laid producing fledglings (del Hoyo *et al.,* 1996). The species also has a low *resistance* to threats including oil pollution, by-catch in and competition with commercial fisheries operations, and is a target for hunting – particularly in Greenland (Gaston and Hipfner, 2000). The species was also considered sensitive to climate change and warming in the Arctic (Gaston *et al.,* 2002).

Threats. Hunting in Greenland, particularly that which occurs during the winter season[2], was considered a potentially serious threat to the species. Other threats identified included disturbance

[1] Excluding purely terrestrial or inland IBAs.

[2] The now-illegal summer hunt actually posed a much greater threat than the winter hunt, as the winter hunt takes mainly young birds, from several different populations (including the Canadian population).

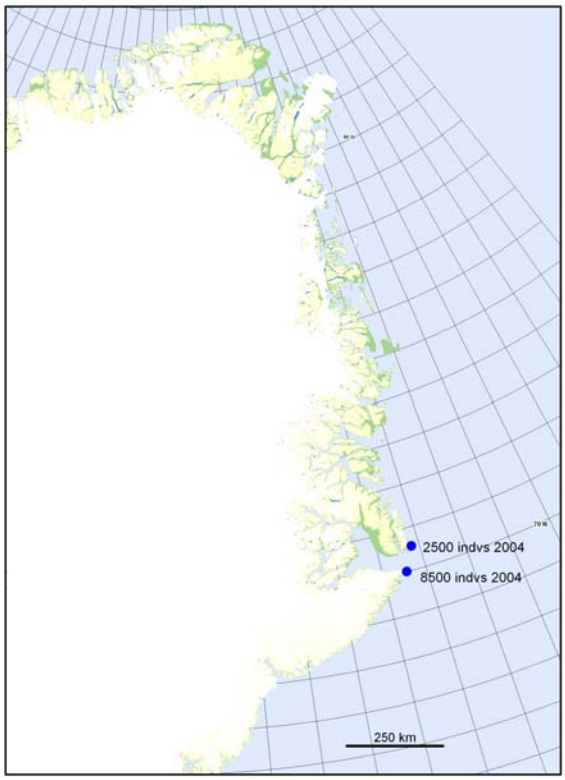
from hunting activity (separate from hunting mortality), egg-harvesting in some colonies, incidental kills in fishing nets, competition with commercial fisheries (particularly relevant to Iceland), and chronic oil pollution and oil spills. Climate change was also considered a potential threat for *U.lomvia.*

3. Current status of the species

Distribution in OSPAR maritime area

U.lomvia is almost completely restricted to the high and low Arctic zones with open water and an adequate summer food supply. Within the OSPAR area it breeds in Greenland (see Figure 1), Iceland, and Norway (largely Svalbard and Jan Mayen Island). Northernmost Europe accounts for less than a quarter of its global breeding range (BirdLife International, 2004), with the OSPAR Region comprising less than this.

Figure 1. Known breeding colonies of *U.lomvia* in east Greenland (provided by David Boertmann)



U.lomvia feeds mainly on fish, squid and crustaceans and almost entirely in waters less than 8° C. A significant proportion of OSPAR's breeding population of *U. lomvia* winters in and around south-west Greenland[3] – the area being particularly important for birds from Svalbard (an estimated 75% of its breeding population), Iceland, and northern and southern Greenland (Boertmann et al., 2006)[4], and large numbers of birds also winter in the waters off Newfoundland (Lyngs, 2003). It winters mostly offshore, in the northernmost ice-free areas, to the edge of the continental shelf, and along seacoasts and in bays where suitable concentrations of fish and invertebrates occur (Gaston and Nettleship, 1981; Gaston and Hipfner, 2000).

[3] *U.lomvia* arrive in September and October and typically remain far from the shore during the early autumn. Later in the year in late October and November many move closer to the coast and this is reflected by an increase in the shooting bag.

[4] Boertmann *et al.* (2006) estimated that 1.5-3.5 million *U.lomvia* winter off southwest Greenland, just outside the OSPAR area.

Population (current/trends/future prospects)

In the early 1980s, the world population of *U.lomvia* was estimated at *ca*. 6.8 million breeding pairs (Evans and Nettleship, 1985), of which *ca*. 75% occurred in the Atlantic region (Gaston and Jones, 1998). The latest estimate of the global population is of c. 22 000 000 individuals (del Hoyo *et al.,* 1996). However, estimates for the numbers within national marine territories vary between authorities (Tables 1 and 2 below), but the OSPAR total is probably in the region of 1 542 000 – 2 113 000 breeding pairs, and over 1 000 000 wintering birds.

Table 1: The estimated size of different *Uria lomvia* populations. The estimates refer to different years according to country. In some cases, numbers of birds are listed (B), in other cases pairs (P), from CAFF (2004).

Country	Number birds (B) or pairs (P)	Reference
OSPAR Contracting Party		
Greenland (to Denmark)	535,000[5] (B)	Kampp *et al.,* 1994; Boertmann *et al.,* 1996
Iceland	579,450 (P)	Gardarsson, 1995
Jan Mayen (to Norway)	75,000 (P)	Snow and Perrins, 1998
Svalbard (to Norway)	850,000 (B)	Bakken and Pokrovskaya, 2000; Barrett and Golovkin, 2000
Norway	1,000-2,000 (P)	Bakken and Pokrovskaya, 2000; Barrett and Golovkin 2000
Non-OSPAR Party		
USA	6,000,000 (B)	USFWS, 1992
Canada	1,454,000 (P)	Nettleship and Birkhead, 1985
Russia	500,000-1,000,000 (B)	Yu. Krasnov (unpubl.) cited in CAFF 2004

Table 2: Populations of breeding and wintering *U.lomvia* in European waters, from BirdLife International (2004)

Country	Breeding (pairs)	Wintering (individuals)
OSPAR Contracting Party		
Greenland (to Denmark)	350 000 – 400 000	1 000 000 – 5 000 000
Iceland	341 000 – 861 000	10 000 – 1 000 000
Norway (coast)	1000 – 2000	
Svalbard (to Norway)	850 000 – 850 000	
Total	1 542 000 – 2 113 000	>1 000 000
Non-OSPAR Party		
Russia	250 000 – 500 000	
Total (approx)	1 800 000 – 2 600 000	>1 000 000

[5] NB that the main part of this population exists outside the OSPAR Area, in West Greenland.

Published results have shown a dramatic decline in *U.lomvia* populations in both Greenland and Iceland from the mid-eighties to 2005; on Iceland at a rate of nearly 7% per annum. In Greenland this decline is thought to be due to overhunting and (former) bycatch in salmon nets (Garðarsson, 1995; Garðarsson, 2006; Falk and Durinck, 1991; Falk and Kampp, 2001). In Iceland, Garðarsson, 2006 suggests that long-term changes in *U.lomvia* are most likely to be caused by large scale changes in their food supply associated with global climate change. Overhunting at wintering grounds in Greenland waters may have also contributed to the declines to some extent. Recent unpublished work on Iceland suggests that the decline is continuing (Garðarsson *in litt*. 2008). In Norway, counts at Bjørnøya in 2006 indicate that the population of U.lomvia has increased since 1986/1987 (Anker-Nilssen *et al.,* 2007), and the current estimate for mainland Norway is put at <1500 pairs (Barrett *et al.,* 2006). Population changes appear to be less pronounced elsewhere[6].

Condition (current/trends/future prospects)

Little information is available on current condition of *U.lomvia* populations within the OSPAR region. Studies undertaken as part of the SEAPOP programme in Norway found a fledging success of 0.72 (n=61) at Bjørnøya in 2006, and adult survival was estimated at 93% (n=78) (Anker-Nilssen *et al.* 2007). Where measured, breeding success is usually high and breeding failure has not been reported and once breeding has commenced, breeding propensity is high (about 95%) (ICES 2007). Despite hunting and other pressures, measured apparent survival rates in some Canadian and Greenland populations are high (88 – 90%; Gaston and Hipfner, 2000).

Limitations in knowledge

There are reliable data describing the threats to and declines of this species within some areas of the OSPAR Region. However, more data would be useful to fully assess trends in eastern Greenland and Iceland. A more accurate and up-to-date assessment of the total population within the OSPAR area would be valuable, but this is difficult because of lack of information about the movement of birds around Greenland coast (the OSPAR boundary divides the island in two).

The effect of natural variability on population trends of this species has not been estimated – however the rates of decline seen in some areas *e.g.* Iceland, Greenland, seem to lie outside the realm of natural variability in population size.

4. Evaluation of threats and impacts

Hunting (including disturbance effects), marine pollution and incidental capture in fishing nets are considered the main threats that are directly linked to human activities. Human activities are also likely to have an indirect impact on the species via climate change effects.

U.lomvia is the most popular game bird in Greenland, where seabird hunting is important not only for recreation but also culturally. Most birds are killed in the winter months by hunters sailing in small fast dinghies. The highest number killed reported to the bag-record system during the 1994 – 2003 period was 255 000 birds in 1996, but these are mainly birds taken from western and south-west Greenland (outside the OSPAR Region). The winter hunt is not spatially regulated and no coastline is more than a few hours away from towns and small settlements in a fast dinghy. However, in recent years the reported numbers hunted have fallen as the number of professional hunters has dropped. There is

[6] In Murman, Russia, counts at some of the largest colonies in 1999 – 2005 suggest that the present population of *U.lomvia* is in the region of 2000 – 3000 pairs (Krasnov *et al.,* 2007), which is similar to the 3000 pairs given in Anker-Nilssen *et al.* (2000), suggesting little change over recent years.

also illegal summer hunting of *U.lomvia* at its northern colonies on Greenland which has apparently caused huge declines and is considered unsustainable (Boertman *et al*., 2006). Disturbance caused by hunting activities, e.g. sailing of dinghies, is also considered a serious threat. Declines in Icelandic *U. lomvia* have been related to the winter hunting in south-west Greenland (Boertmann *et al.,* 2006).

The impact of chronic oil pollution in the OSPAR Region on the *U.lomvia* population is less well known but believed to be significant[7].

Previously, (in the early 1970s), offshore and nearshore drift-net fisheries for Atlantic Salmon *Salmo salar* took huge numbers of *U.lomvia* off south-west Greenland, mainly in late autumn, but this bycatch problem has now declined to insignificant levels, due in part to the closure of the commercial salmon fishery.

Climate change is also considered a potential threat for *U.lomvia.* A recent paper speculated that the long-term declines seen for this species in colonies throughout Iceland could have been caused by large-scale changes in their food supply associated with global climatic change (Garðarsson, 2006). The combination of increased daily temperatures and increased parasitism from mosquitoes resulting from warming in the Arctic has also been suggested as having a direct effect on increasing mortality of Arctic seabirds such as *U.lomvia* (Gaston *et al.*, 2002)[8]. Climate change most likely affects bird survival via indirect effects on prey availability. For *U.lomvia* on Hornøya, Norway, this has been established quantitatively, with survival increasing with the combined abundance of Herring *Clupea harengus* and Capelin *Mallotus villosus* prey which, in turn, declined with sea surface temperature (SST) (Sandvik *et al.,* 2005). Populations of *U.lomvia* have been found to increase when the SST increased slightly, but react negatively following the stronger changes in SST (mean SST differing more than 0.5°C from that in the previous regime), regardless of whether the temperature changes were positive or negative (Irons *et al.* in press, quoted in ICES 2008)[9]. This response, with the magnitude of the shift being more important than its direction, suggests that the largest shifts were causing the most severe and long-lasting changes to the food webs these birds rely on. Current information suggests that continued warming should benefit birds breeding on the northern limit of the species range, while adversely affecting reproduction for those on the southern margin, and that the probable result will be an eventual northward displacement of the population. However, the research by Irons *et al.* (in press) illustrates the complexity of how climate change will impact seabird populations, and emphasizes that extreme care is needed when projecting observed, short-term trends to the longer-term climate change scenario.

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[7] The impact of oil pollution off the Newfoundland coast, where some of the *U.lomvia* from Greenland, Norway and Iceland winter, has been assessed by Wiese *et. al*. (2003, 2004a). Estimates of annual seabird mortality due to this pollution includes 160,000 to 275,000 *U.lomvia.* Wiese *et al.* (2004b) estimated that this mortality would have reduced population growth in *U.lomvia* colonies in the eastern Canadian Arctic by 2.5%/year.

[8] At Coats Island, northern Hudson Bay, in the low Arctic, the date of egg-laying has advanced since 1981, simultaneous with a decrease in summer ice cover in surrounding waters. Lower ice cover in this region is correlated with lower chick growth rates and lower adult body mass, suggesting that reduction in summer ice extent is having a negative effect on reproduction (Gaston *et al.,* 2005). Conversely, at Prince Leopold Island, in the High Arctic, there has been no trend in summer ice cover and no detectable change in timing of breeding, but reproduction is less successful in years of late ice than in years of early ice break-up (Gaston *et al.*, 2005).

[9] At two colonies the Canadian Arctic., timing of breeding for *U.lomvia* was positively correlated with summer ice cover, which was determined by winter and spring temperatures. Spring temperatures also modified the effects of ice conditions on timing of breeding (Gaston *et al.,* 2005).

5. Existing Management measures

There is evidence of a global population decline (del Hoyo *et al.*, 1996), but the species is not believed to approach the thresholds for the population decline criterion of the IUCN Red List (i.e. declining more than 30% in ten years or three generations). For these reasons, the species was evaluated by BirdLife International (2004) as of 'Least Concern'. However, within Europe the species rates a SPEC category 3[10] and is listed as 'Vulnerable' (Criteria A4b) on the European IUCN Red List Category (BirdLife International 2004, 2007). The Greenland Red List evaluates the species as 'Vulnerable'.

The hunting of *U.lomvia* in Greenland has been regulated by national executive order since 1988, and in recent years the hunting season has been reduced mainly in the vulnerable spring season[11]. The most recent revision of the hunting seasons took place in February 2008 (Home Rule Order no. 5 of 29 February 2008) details of which can be found at www.lovgivning.gl/gh.gl-love/dk/2008/bkg/bkg_nr_05-2008_dk.htm (D. Boertmann *in litt.* 2008). The open season was shortened in 2002 apparently leading to a reduction of about 50% in the harvest to a level apparently around 100 000 birds hunted/year (Greenland Home Rule Harvest statistics is based on a hunter reporting system, Piniarneq, www.nanoq.gl/fangst and F. Merkel pers. com. quoted in ICES 2007). Hunting is allowed in East Greenland from 1 September to 28/29 February and, apart from urban areas, hunting can take place almost anywhere, and there are no refuges for wintering birds. Professional hunters may take 30 *U.lomvia*/day. In addition, the breeding sites for *U.lomvia* in East Greenland (only two) are protected as seabird breeding sites, where shooting and other activities that disturb the birds are not allowed within 5000 meters of the colony[12]. Some municipalities on Greenland have employed wildlife rangers to enforce hunting and fishing regulations. However, overall, the regulations are not considered sufficient for protection (D. Boertmann *in litt.* 2008) and a network of effective hunting-free reserves in coastal areas would be beneficial for the wintering seabirds. Information on the legal protection of the species in Norway and Iceland was not available.

Within the three key OSPAR countries for this species (Greenland (Denmark), Iceland and Norway), there are 24 IBAs listed where *U.lomvia* is reported to occur - 11 on Greenland, 2 on Iceland and 11 on Norway, including those on Svalbard and Jan Mayen Island (BirdLife International, 2007)[13]. Three of these – Hælavíkurbjarg (Iceland), Bear Island (Norway), and Hopen Island – Svalbard (Norway) - are considered particularly important due to the numbers of breeding *U.lomvia* present, and should be considered as priority candidates for protection as OSPAR Marine Protected Areas. Hælavíkurbjarg IBA (Iceland) is already designated at the national level, as a national nature reserve (for landscape). However, none of the three sites yet has any international protection. Several other IBAs on Svalbard are listed as national protected areas (Forlandet National Park; North-east Svalbard Nature Reserve; North-west Spitsbergen National Park; South Spitsbergen National Park; and South-east Svalbard

[10] Species whose global populations are not concentrated in Europe, but which have an Unfavourable conservation status in Europe.

[11] However, pressure from politicians and the hunting organisations for more liberal hunting regulations has been intense, which has led to the hunting regulations being changed at least five times over the past 20 years.

[12] In west Greenland (outside OSPAR Region), some of the breeding colonies have additional protection as 'bird protection sites', where access is prohibited in the breeding season. One colony in west Greenland is located within a Ramsar site, so has enhanced protection (Ydre Kitsissut in Qaqortoq Municipality).

[13] The IBAs listed for East Greenland (to Denmark) are: Kap Brewster and Raffles Ø. For Iceland, the IBAS are: Hælavíkurbjarg; and Látrabjarg. For coastal Norway: Makkaurhalvøya (Syltefjordstauran), and for Svalbard and Jan Mayen Islands: Alkhornet; Bjørnøya (Bear Island); Forlandet National Park; Fuglefjella; Hopen island; Ingeborgfjellet; Jan Mayen island; North-east Svalbard Nature Reserve; North-west Spitsbergen National Park; South Spitsbergen National Park; and South-east Svalbard Nature Reserve. BirdLife International (2007) also lists one IBA for (European) Russia - Bezymyannaya and Gribovaya Bays and adjoining waters.

Nature Reserve) but it is not clear how important these sites are for breeding *U.lomvia*. It is particularly important to gather more information about the status and distribution of this species along the east Greenland coast. None of the east Greenland IBAs are presently monitored and monitoring should be set up for these sites, and research undertaken to pinpoint other important sites along the rest of the coast (these sites could then be monitored and/or protected as appropriate). Areas holding recurrent concentrations in winter are difficult to designate for this species as they tend to vary in time and space according to the distribution of their pelagic prey, which are governed by oceanographic features, however there are a few particular areas where *U.lomvia* concentrate regularly – often at upwelling sites or fjord mouths with strong tidal movements.

There is no overall coordinated monitoring of *U.lomvia* within the OSPAR Region. However, there are national initiatives, and various banding activities have been undertaken in the circumpolar countries during recent decades. These data have been compiled into a common database, which is being analysed through the Circumpolar Seabird Group (CBird), an expert subgroup of CAFF. In addition, there is a CAFF proposal - the "*Circumpolar Murre Banding Programme"* - to develop a co-operative banding project (banding is recognized as an integral part of the International Murre Conservation Strategy and Action Plan (1996)), between the Arctic countries (CAFF, 2004), which are responsible for the total breeding population of *Uria lomvia*. In Norway, including Svalbard and adjacent marine areas, seabird monitoring and mapping is also carried out as part of the SEAPOP (SEAbird POPulations) programme (see www.seapop.org)[14], which was established in 2005 (Anker-Nilssen *et al.,* 2007). The SEAPOP programme focuses on 6 major sites: Spitsbergen, Bjørnøya, Hornøya, Hjelmsøya, Anda and Røst, with annual counts of many different seabird species breeding at each site, including *U.lomvia*, and collects data on breeding parameters such as adult survival, chick food, chick growth and breeding success.

Other than control of hunting and some monitoring, there is very little current management targeted specifically for this species. However, the Conservation of Arctic Flora and Fauna programme of the Arctic Council (CAFF) drafted an International Murre Conservation Strategy that is being implemented by CAFF Member Countries, including Arctic countries in the OSPAR region – Norway, Greenland (Denmark) and Iceland (CAFF, 1996), although this was developed in the mid-1990s and needs to be updated to reflect recent research on the likely impact of climate change across the Arctic and other threats.

6. Conclusion on overall status

The OSPAR breeding population for this species, though numerous, is concentrated in a relatively small number of colonies in Greenland, Iceland, Norway, Svalbard and the westernmost areas of Franz Josef Land. In addition, the species is largely restricted to fewer than 10 IBAs within the Region. In particular, three IBAs for this species within the OSPAR Maritime Area (Hælavíkurbjarg – Iceland; Bear Island and Hopen Island – Svalbard) hold very large concentrations of this species.

The OSPAR population is probably in the region of 1 542 000 – 2 113 000 breeding pairs, and over 1 000 000 wintering birds. The OSPAR breeding population was broadly stable between 1970 – 1990, but evidence suggests suffered declines over 1990 – 2000. The large population in Svalbard remained broadly stable overall, but the species suffered declines in Greenland and Iceland, declining at an

[14] The SEAPOP programme aims to provide and maintain base-line knowledge of seabirds for an improved management of this marine environment. The data analyses aim to develop further models of seabird distribution and population dynamics using different environmental parameters, and to explore the degree of co-variation across different sites and species, which will allow scientists to distinguish human influences from those caused by natural variation.

overall rate that, if sustained, would equate to a large decline [>30%] over 3 generations (BirdLife International, 2004).

Unfortunately, its life history characteristics (relatively long-lived, and slow to reproduce) mean that it probably takes a long time for a population to recover from any adverse effects from human activity, although breeding success is usually high with 70 – 80% of eggs laid producing fledglings. However, the species is susceptible to oil pollution, by-catch in and competition with commercial fisheries operations, and is a target for hunting – particularly in Greenland. The species is also considered sensitive to climate change and warming in the Arctic, although the effects are complicated, and most likely affects bird survival via indirect effects on prey availability.

Other than control of hunting, there is very little current management targeted specifically for this species. An International Murre Conservation Strategy was published in 1996 by CAFF, but this should be updated.

Therefore, this species still qualifies under the OSPAR criteria of regional importance, as a high proportion of the total breeding population is confined to a small number of locations all within OSPAR Region I, and decline. The species is also sensitive (being long-lived, and relatively slow to reproduce) to various threats, including hunting, oil pollution, competition with and bycatch in commercial fisheries, and climate change. Current conservation measures do not yet adequately address all the threats facing this species.

7. What action should be taken at an OSPAR level?

Action/measures that OSPAR could take, subject to OSPAR agreement

OSPAR Actions

Communication: OSPAR should contact the Arctic Council (CAFF), NEAFC and authorities in non-OSPAR states with significant populations, such as Canada, Russia, USA, to:

a. notify them of the listing under OSPAR, threats facing the species, and the willingness of OSPAR to co-operate in developing conservation measures;

b. request information on the effectiveness of any measures taken for the protection of this species.

c. highlight the need for protection from hunting and disturbance at all main breeding colonies;

Awareness raising: OSPAR should work with relevant Contracting Parties (see Table 2 below) to raise awareness of status and threats to the species among both management authorities and general public[15].

Banding Programme: OSPAR should work with relevant Contracting Parties to promote CAFF's 'Circumpolar Murre Banding Programme'.

CAFF Action Plan: OSPAR should work with relevant Contracting Parties to promote the updating and implementation of the CAFF Action Plan (1996) for this species.

Monitoring and Assessment: OSPAR should work with relevant Contracting Parties to facilitate development of a monitoring and assessment strategy for *U.lomvia* for the OSPAR Area, involving

[15] This could perhaps best be achieved, at least initially, through a brochure and accompanying web site that lists all OSPAR Listed features, the threats they face, and recommended conservation actions.

relevant international authorities, and deliver to national contacts. This should build upon the starting point provided later in this section and take into account:

(i) the need to continue and expand existing monitoring of breeding colonies to include demographic parameters, with increased monitoring in Greenland and Iceland;

(ii) the need to promote monitoring schemes for East Greenland IBAs (none of the East Greenland IBAs are presently monitored);

OSPAR's work on coordination of assessment and monitoring should address this need.

Further research: OSPAR should emphasise to relevant scientific funding bodies the following research needs with respect to *U. lomvia:*

a. further research to determine status and distribution of this species along north-east and east Greenland coast, with identification of additional key areas (which should then be monitored and protected).

b. further research into causes of decline especially in Greenland and Iceland.

Actions/measures for relevant Contracting Parties

OSPAR should recommend that relevant Contracting Parties undertake the following actions and measures, and establish a mechanism by which Contracting Parties report back on the implementation of these actions and measures, and the implementation of the monitoring and assessment strategy, so that the progress can be evaluated in conjunction with the future assessment of the status of the species:

a. Breeding colonies: work to protect this species from hunting and disturbance at all main breeding colonies.

b. MPAs: protect sites important to this species as OSPAR MPAs, with management plans for these MPAs that include conservation of *U.lomvia*;

c. Banding Programme: co-operate with CAFF's 'Circumpolar Murre Banding Programme'.

d. Monitoring and Assessment: develop and implement the above monitoring and assessment strategy in the OSPAR area.

Brief summary of proposed monitoring system

As explained above, there is no overall coordinated monitoring of *U.lomvia* within the OSPAR Region; what exists takes place through implementation of the CAFF Murre Action Plan and individual national efforts. OSPAR could play an important role in helping to promote and coordinate the collection of information on the numbers, distribution and activities of *U.lomvia* and the identification of the key threats. Relevant Contracting Parties (Greenland (Denmark), Iceland, Norway), should be tasked to report to OSPAR on:

- Annual monitoring, including data on breeding numbers and productivity at known breeding colonies;
- Establishment of ringing scheme for chicks at selected colonies (banding to be carried out in at least one, preferably more, key colonies in each country);
- Annual monitoring of hunting of *U.lomvia*, particularly in eastern and north-east Greenland;
- Birds killed from bycatch (compiled from fisheries statistics) and reported killed due to oil pollution;

- Further data collection at the colonies where resources allow, covering diet, feeding ecology, chick provisioning rates, chick survival and growth rates, and additional research into the impact of climate change on the status and distribution of the species within OSPAR.

Table 3: Summary of key threats and existing protection for *Uria lomvia*

Key threats	Hunting pressure, particularly in Greenland Climate change Oil pollution	
Relevant Contracting Parties	Denmark (Greenland), Iceland, Norway	
Other responsible authorities	Arctic Council – especially CAFF Working group, and CBird NEAFC Non-OSPAR countries with significant populations, e.g. Canada, USA and Russia, and into whose territories birds from the OSPAR Region migrate.	
Already protected? **Measures adequate?**	Represented within IBA network. Hunting in Greenland regulated. CAFF *International Murre Conservation Strategy* and proposed *Circumpolar Murre Banding Program*	Some IBAs for this species but coverage is not comprehensive, not all are within national protected area systems, and few have international status. Some hunting control in Greenland, but this is not considered sufficient to fully address the threat, particularly in wintering areas. CAFF Action Plan developed for the species but this is now most likely out of date as it was developed in the mid-1990s.

Annex 1: Overview of data and information provided by Contracting Parties

Contracting Party	**Feature occurs in CP's Maritime Area***	**OSPAR nominated Contact Point (in bold), or other contributor providing information**	**Contribution made to the assessment (e.g. data/information provided, national reports, references or weblinks)**
Belgium	Vagrant		
Denmark	Vagrant (Yes in Greenland)	David Boertmann, National Environmental Research Institute, Denmark dmb@dmu.dk	Information on breeding colonies and distribution on north and east coasts of Greenland, relevant national legsiatlion and declines in numbers provided. Boertmann, D. (1994). An annotated checklist to the birds of Greenland. - Meddr. Grønland Biosc. 38: 64 pp. CAFF Circumpolar Seabird Working Group (1996). *International Murre conservation strategy and action plan*. CAFF International Secretariat, Akureyri, Iceland. 16 pp.
European Commission			
Finland	Vagrant		
France	Vagrant		
Germany	Vagrant		
Iceland	Yes	Arnþór Garðarsson, University of Iceland arnthor@hi.is	One paper (in Icelandic) on recent changes in numbers of cliff-breeding seabirds provided: Garðarsson, A. (2006) Nýlegar breytingar á fjölda íslenskra bjargfugla. *Bliki* **27**: 13-22.
Ireland	Vagrant		
Netherlands	Vagrant		
Norway	Yes	Tomas Aarvak, Norwegian Ornithological Society tomas@birdlife.no	Key references, with information on population size and distribution, research and monitoring programmes provided. Bakken, V. and Pokrovskaya, I.V. (2000). Brünnich's Guillemot *Uria lomvia*. Pp. 119-124 *in:* Anker-Nilssen, T., Bakken, T., Strøm, H., Golovkin, A.N., Bianki, V.V. and Tatarinkova, I.P. (eds). *The Status of Marine Birds Breeding in the Barents Sea Region.* Norsk Polarinst. Rapportser. No. 113, Norwegian Polar Institute, Tromsø. 213 pp. Krasnov, Y.V., Barrett, R.T, and Nikolaeva, N.G. (2007). Status of black-legged kittiwakes (*Rissa tridactyla*), common guillemots (*Uria aalge*) and Brünnich's guillemots (*U. lomvia*) in Murman, north-west Russia, and Varanger, north-east Norway. Polar Research, 26:113–117.
Portugal	Vagrant		
Spain	Vagrant		
Sweden	Vagrant		
UK	Vagrant		

Summaries of country-specific information provided

Greenland. There are only two known breeding areas for *U.lomvia* in east Greenland (see Figure 1). Large colonies of *Uria lomvia* can be found in east Greenland, near Scoresby Sound, and surveys conducted in 2004 by the Greenland Institute of Natural Resources (GINR) showed declines in these colonies, verifying the decline identified by an earlier 1995 survey (Falk *et al.,* 1997). A 2004 French photographic survey of east Greenland colonies (O.Gilg, unpubl.) also found evidence of declines (results of this survey included in the Greenland Seabird Colony database, http://www.dmu.dk/International/Arctic/Oil/Seabird+colonies/).

Iceland. There is very little published information on *U.lomvia* populations, trends and conservation measures in Iceland.Numbers of five common species of cliff-breeding seabirds were monitored at 5-10 year intervals between the mid-eighties and 2005, on two cliffs, Krísuvíkurberg and Hafnaberg, in south-west Iceland, and one cliff, Skoruvíkurbjarg, in north-east Iceland (Garðarsson, 2006). These counts were supplemented by repeated counts at Snæfellsnes, west Iceland, and Drangey, north Iceland. The population of *U.lomvia* decreased in both regions throughout the period at nearly 7%. The long-term decreases of this species was presumed to be due to large scale changes in their food supply associated with global climatic change (Garðarsson, 2006). Recent unpublished data mainly support the evidence that the Icelandic population of *U.lomvia* is declining rapidly (A. Garðarsson *in litt.* 2008). A general survey of seabirds in Iceland repeating work from the 1980s is due to be concluded by the end of 2008 and will present up-to-date information on the status and distribution of the species in Iceland (A. Garðarsson *in litt.* 2008).

Norway. In Norway, *U.lomvia* is mainly found in the high Arctic and northern parts of the Barents Sea where they possibly track the feeding migration of capelin *Mallotus villosus*. Those that do not migrate out of northern Norwegian waters largely stay in the ice free part of the Barents Sea during winter, where they forage on capelin and possibly also herring (Anker-Nilssen *et al.,* 2007). *U.lomvia* was first recorded breeding in Norway in 1964 (Brun, 1965), but were almost certainly present in colonies before then. Today they breed in small numbers on at least Hjelmsøya, Gjesvær, Syltefjord and Hornøya/Reinøya[16], and the total Norwegian coastal population is in the order of 1500 pairs, with few or none south of the Barents Sea area (Barrett *et al.* (2006) estimated < 10 pairs in the Norwegian Sea). However, an estimated 185,000 individuals were counted Bjørnøya (Bear Island), Svalbard in 2006 (Anker-Nilssen *et al.,* 2007). Surveys of birds during spring, summer and autumn cruises in the Barents and Norwegian seas, found the following densities (birds/km^2) for *U.lomvia*: 0.330 (Spring/Summer 2005), 0.068 (Spring/Summer 2006), 1.527 (Autumn 2005) and 1.351 (Autumn 2006) (Anker-Nilssen *et al.,* 2007). Little is known about population trends, but there was a steep decline in 1986/87 and numbers have further decreased west of the North Cape (on Hjelmsøya), but are recovering east of the Cape. This is certainly true for Hornøya, where the population doubled to c. 600 individuals between 1987 and 1996, since when it seems to have stabilized (R Barrett unpublished data quoted in Barrett *et al.,* 2006). However, Barrett *et al.* (2006) showed that there was a significant decline in the numbers of *U.lomvia* breeding at two colonies on the coast of the Barents Sea between 1984-2005 (change of -14.3% up to 1995, and -25.9% for period 1996-2005).

[16] About 600 individuals were counted in 2001 on Hornøya and ca. 100 individuals on Reinøya (Furness and Barrett, 2005). Krasnov et al. (2007) argue that assuming that there were and that there has been little change since (RTB, unpubl. data), the 2006 population on Hornøya and Reinøya was estimated to be on the order of 700–800 individuals, or 400–500 pairs.

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OSPAR's vision is of a clean, healthy and biologically diverse North-East Atlantic used sustainably

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