



Background Document for
Black-legged kittiwakes *Rissa tridactyla tridactyla*



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.

Acknowledgement

This report has been prepared by Dr Nigel Varty and Ms Kate Tanner for BirdLife International as lead party for the Black-legged kittiwake.

Photo cover page:

Kittiwake and chick, Wikipedia

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Background Document for Black-legged kittiwake *Rissa tridactyla tridactyla*

Executive Summary

This background document on the Black-legged kittiwake – *Rissa tridactyla tridactyla* - 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 *Rissa tridactyla tridactyla* 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 *Rissa tridactyla tridactyla*, where necessary in cooperation with other organisations. This document may be updated to reflect further developments.

Récapitulatif

Le présent document de fond sur la Mouette tridactyle 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 de la Mouette tridactyle 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 de la Mouette tridactyle, 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

Rissa tridactyla tridactyla, Black-legged Kittiwake

Ecology and breeding biology

Rissa tridactyla is a pelagic surface-feeding species and excellent flyer. It roams over large areas in the search for sparsely distributed patches of food. *R. tridactyla* eats mainly marine invertebrates and small fish, however it will also feed on discarded offal and/or fish behind fishing boats and in harbours. The species breeds on coasts as far north as open water occurs, preferring high steep cliffs with narrow ledges (species will nest on glacier or snow bank face when it covers traditional cliff sites)¹ very close to the sea on islands or the mainland. The species winters south to the Sargasso Sea and West Africa, being highly pelagic in the nonbreeding season.

¹ In a few instances man-made structures such as buildings, bridges, sea walls and even offshore oil installations have been utilised.

2. Original Evaluation against the Texel-Faial selection criteria

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

OSPAR Regions: All

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

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

OSPAR Regions I and II.

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

Rissa tridactyla tridactyla was originally nominated for inclusion on the OSPAR List with particular reference to global importance, decline and sensitivity criteria, with information also provided on threat.

Global/regional importance. Although the subspecies *tridactyla* is found throughout the north Atlantic, 85% of the breeding population occurred within the OSPAR area at the time of listing (2008), thus the OSPAR area was considered of global importance for this subspecies (Heubeck, 2004).

Decline. This species was evaluated as significantly declined at the time of listing, in particular in Greenland, Norway and the UK.

Sensitivity. The species was considered sensitive at the time of listing due to its low *resilience* to adverse effects from human activity, with recovery likely to be slow due to its life history characteristics (long-lived and relatively slow to reproduce).

Threats. The species was considered threatened due to changes in the availability of key prey species, linked to possible climate change factors and over-fishing in parts of its range, e.g. sandeel fisheries in the UK. Predation in some areas, e.g. by Great Skuas *Stercorarius skua* in Shetland, and White-tailed Eagles *Haliaeetus albicilla* in Norway, were also cited as threats.

The ICES evaluation of this nomination (ICES, 2007) agreed that the species is highly sensitive, and facing certain threats. Additional references were provided in support of the description of sensitivity and threat.

3. Current status of the species

Distribution in OSPAR maritime area

R.tridactyla has a circumpolar distribution, breeding in the arctic and boreal zones of the northern hemisphere. There are two recognised subspecies. Most of the global population is of the nominate subspecies, *R.t. tridactyla*, which can be found in the North Atlantic from Canada and North-east USA, east through Greenland to West and North Europe and on to Russia. Another subspecies, *R.t. pollicaris* has been described in the North Pacific (Cramp and Simmons, 1983). Within the OSPAR Region *R.t.tridactyla* breeds from Greenland east to Iceland, Jan Mayen, the Faroe Islands, the UK and Republic of Ireland, France, and Spain and north-east to Helgoland, Skagerrak, Kattegat, Norway and the Barents Sea.

During the breeding season, *R. tridactyla* feed mainly on small (up to 15 - 20 cm) pelagic shoaling fish, for example capelin *Mallotus villosus*, sandeels *Ammodytes*, *Gymnammodytes* and *Hyperoplus* spp., herring *Clupea harengus*, cod *Gadus morhua*, and sprat *Sprattus sprattus*; and invertebrates such as euphausiids (Barrett and Tertitski, 2000; Cramp and Simmons, 1983; Barrett and Krasnov, 1996). However, there are large regional, seasonal and annual fluctuations in prey composition due to the availability of prey species. Planktonic invertebrates probably form much of the diet for the rest of the year, though there is little information available on this (Cramp and Simmons, 1983). They will also scavenge offal or discarded fish behind fishing boats or in harbours, which can be an important food source in years when their preferred prey species are less abundant.

They are highly pelagic outside the breeding season and as immatures. They are not true migrants but disperse widely over the North Atlantic outside of the breeding season, and it is probable that populations from many different breeding localities mix together in the North Atlantic and North Sea during winter. For instance, some birds from British and Irish colonies (especially first-winter and immatures) spend time off the eastern seaboard of North America, and some immatures ringed in Norway (and the adjacent Murman coast of Russia) move westwards to Iceland, Greenland, Newfoundland and eastern USA, while others disperse southwards to the western seaboard of Europe (the Faeroes, UK, North Sea and Bay of Biscay) and south to the waters off North-west Africa (Barrett and Tertitski, 2000).

Colony size varies from less than ten pairs to tens of thousands, and may be single- or mixed-species, but the locations of colonies tend to be traditional over many decades. First breeding does not usually occur until 4 - 5 years, usually 2 eggs are laid (can be 1 - 3) (del Hoyo *et al.*, 1996; Cramp and Simmons, 1983).

Large scale future changes in distribution could occur if prey species stocks change distribution or collapse due to climate-related phenomena or overfishing (see below).

Population (current/trends/future prospects)

BirdLife International (2004) gives the European breeding population of *Rissa tridactyla* at >2 100 000 pairs (Table 1). Wetlands International (2006) puts the European breeding population (minus Greenland) at 1 950 000 – 2 700 000 pairs (5 850 000 - 8 100 000 individuals). However, there is often considerable variation between years for the same colony/region due to changes in the availability of prey species.

Recent counts put the breeding population of *R. tridactyla* along the coastline of Norway at approximately 336 000 pairs², comprising 250 000 in the Barents Sea area, 80 000 in the Norwegian Sea, 6000 in the North Sea (Barrett *et al.*, 2006)³. The size and distribution of the main colonies is shown in Figure 1. Around the Varanger Fjord, one of the major breeding areas, about 3500 pairs of *R. tridactyla* were counted in Sør-Varanger, 15 500 pairs on Store Ekkerøy, 11 500 – 12 000 pairs on Hornøya, and an estimated 1000 pairs on Reinøya in 2006. A further 900 pairs were counted on two colonies in the inner part of Varanger Fjord in 1999 (Fugleberget, 700 pairs; Skjaaholmen, 200 pairs). This gives a total of about 31 000 – 32 000 pairs breeding between the Norwegian–Russian border and Hornøya. (Krasnov *et al.*, 2007). Around 270 000 pairs breed in about 200 colonies in Svalbard, about a third of them on Bjornoya (Barrett and Tertitski, 2000).

² This represents 13-15% of the north Atlantic population of 2.3 - 2.6 million pairs (Heubeck, 2004).

³ Counts along the neighbouring Murman coast of Russia made in 1999 – 2005 show that the present populations of *R. tridactyla* are approximately 110,000 pairs (Krasnov *et al.* (2007),. About 50 000 pairs of *R. tridactyla* were counted at Cape Gorodetskiy in 2000 and 48,000 in 2002, making it the largest colony in Murman. Dvorovaya Bay is the second largest colony with 32 330 pairs in 2003 and 37 000 pairs in 2005.

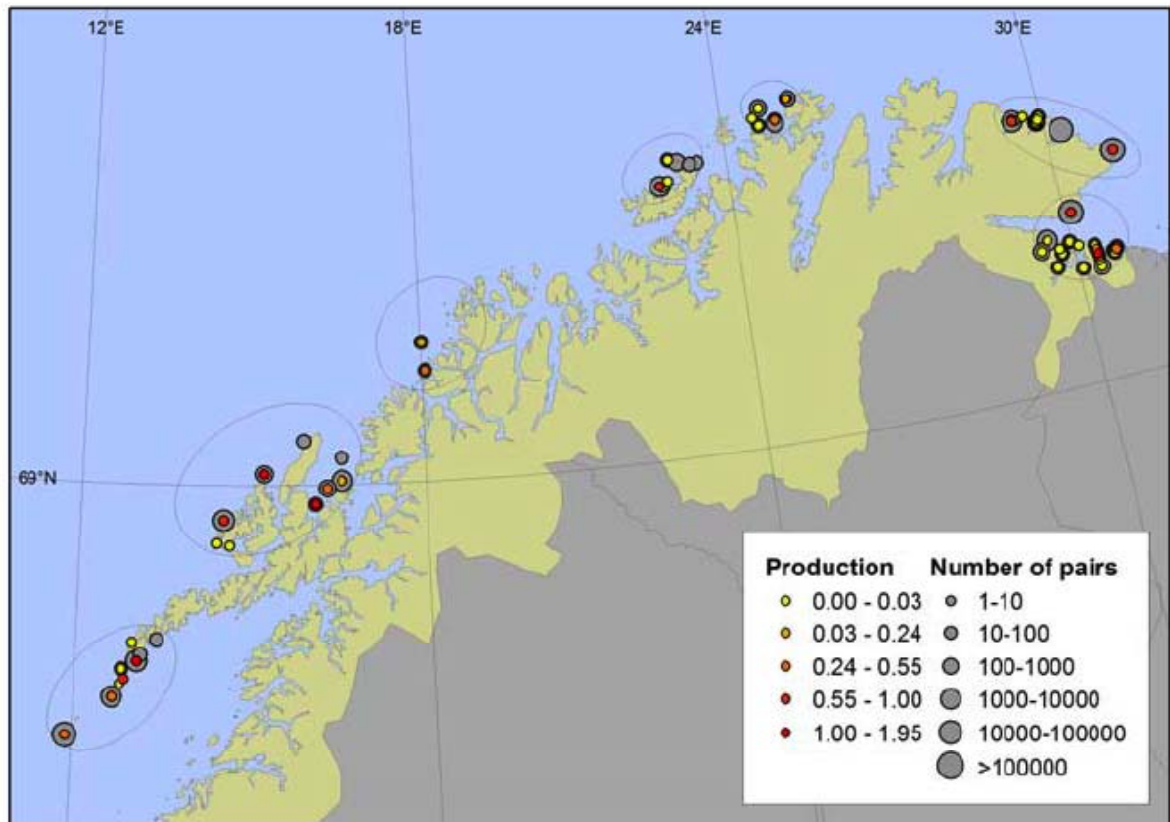
Table 1. Estimates of breeding population of *R.tridactyla* in OSPAR countries (from BirdLife International, 2004)

Country	Breeding population size (pairs)	Year(s) of counts or estimates
Denmark	430 – 500	99 - 00
Faroe Islands	230 000	95
Greenland	150 000 – 300 000	90 - 00
France	5000 – 5600	96 - 00
Germany	7300 – 7300	95 - 99
Iceland	631 000	83 - 85
Republic of Ireland	33 000	99 - 02
Netherlands	0 – 3	98 - 00
Norway	300 000 – 600 000	90 - 01
Svalbard	265 000 – 275 000	80 - 01
Spain	50	98 - 02
Sweden	25 – 30	99 - 00
UK	380 000	98 - 02

In Britain and Ireland, the largest and most numerous colonies are found along the North Sea coasts of Britain, around Orkney and Shetland, and off north-west Scotland, and the most recent estimate of the total population size is 415 995 birds (comprising 282 213 for Scotland, 76 281 for England, 7293 for Wales, 1045 for the Isle of Man, 3 in the Channel Islands, 13 060 for Northern Ireland and 36 100 for the Republic of Ireland, Table 1.1.1 in Mavor *et al.*, 2008). Many *R.tridactyla* winter in Sweden (100 000 – 120 000), Iceland (10 000 - 1 000 000), the Faroe Islands (10 000 – 100,000), France (10 000 – 40 000), Germany (18 800), and the Netherlands (9000) (figures from BirdLife International, 2004).

There was a moderate increase in the breeding population of this species in the OSPAR area over the period 1970 – 1990. From 199 - 0-2000, the species declined in Greenland, Norway and the UK, and suffered a moderate decline [$>10\%$] overall in Europe. Overall, population decreases of 20 – 29% were seen in Norway and the UK (with very high rates of proportional decline in Shetland [69%] and North-east England [40%]), and declines [up to 19%] were seen in the Greenland population (Heubeck, 2004; BirdLife International, 2004).

Figure 1. Distribution and size (number of pairs) of colonies of *R.tridactyla* in the Lofoten-Barents Sea⁴ and the mean number of chicks surviving to near fledging (production) in 2006. From Anker-Nilssen *et al.* (2007).



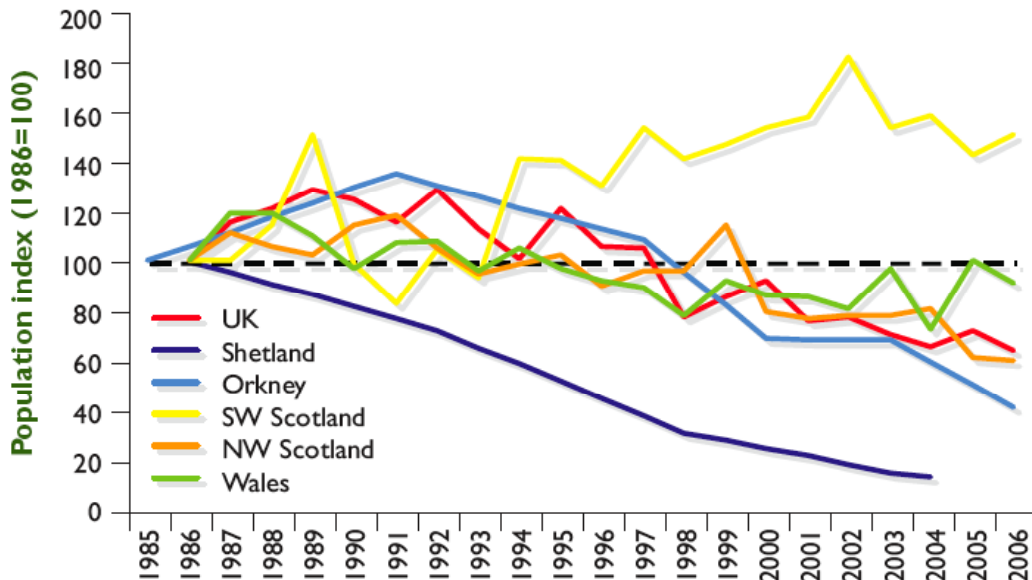
Studies show that numbers of *R.tridactyla* increased in North Norway at a rate of c. 1% p.a. in the 1960s and 1970s, and this increase continued into the early 1980s, at least in Eastern Finnmark where the increase was as high as 4 – 8% p.a. in 1970-1983 (Brun, 1979; Krasnov and Barrett, 1995; Barrett, 1985). However, since 1980 numbers in all monitored colonies in Norway have declined significantly at rates varying between 1 – 5% p.a. Furthermore, there is evidence that the rate of decline has accelerated since the mid-1990s, up to 10 – 15% p.a. in some colonies (Barrett, 2003; Lorentsen, 2005) resulting in average decreases of 6.4% in the Barents Sea colonies and 7.8% p.a. in the Norwegian Sea colonies (Barrett *et al.*, 2006). Numbers of apparently occupied nests in monitoring plots on the key sites Runde, Vedøya (Røst), Hjelmsøya and Hornøya decreased by 75%, 50%, 75% and 50% respectively between the early 1980s and 2005 (Lorentsen, 2005). Little is known about the direct causes of these declines, but deteriorating feeding conditions through a decrease in the availability of capelin *Mallotus villosus* and herring *Clupea harengus* is a possible cause for the declines on Hornøya (Barents Sea) and on Røst (Norwegian Sea) respectively (Anker-Nilssen *et al.*, 1997; Barrett, 2007). However, little is known about possible causes elsewhere in Norway, although another possible factor is the increasing harassment and predation of chicks caused by the increasing population of white-tailed eagles.

The *R.tridactyla* population has declined by 50% in the North Sea since 1990 (Frederiksen *et al.*, 2004b), which has been associated with poor breeding success and lower adult survival over several years (Frederiksen *et al.*, 2004b). In 2004 numbers declined in all regions of the UK to reach or

⁴ Note that this map does not show the location of *all* colonies in the Lofoten-Barents Sea, but just those included in the SEAPOP monitoring project.

approach their lowest levels since the Seabird Monitoring Programme started in 1986, with the Northern Isles (Shetland and Orkney) being particularly hard hit (Mavor *et al.*, 2005). Results from 2006 surveys show that this downward trend is continuing, with the UK population index of *R.tridactyla* reaching its lowest in 21 years of monitoring, 50% lower than its peak in 1992, although the rate of declines in recent years has been slower than during the late 1990s (Figure 2).

Figure 2. Breeding numbers of *R.tridactyla* in the UK shown relative to 1986 baseline (JNCC, 2007)



In terms of the most recent counts, in Britain and Ireland in 2006, there was no general geographical pattern to changes in breeding numbers between 2005 and 2006 (Mavor *et al.*, 2008). Total numbers in six regions declined by approximately 10 - 20% but remained virtually unchanged in four others. The only increases of any size were in north-east and south-east England, with numbers in the latter region 70% higher than in 2005; the first year of increase detected there since 1995⁵. The decline in Britain has been attributed to changes in oceanographic conditions resulting in changes in the distribution and stocks of key prey fish species, and decreases in breeding success, body condition and survival of adult birds (Frederiksen *et al.*, 2004a).

Recent declines have also been documented for populations in Iceland: a stronghold for this species, and 2005 was a particularly bad breeding season for this species across Iceland. However, it is difficult to draw firm conclusions on overall population declines of *R.tridactyla* in Iceland as there are very limited time series data to support this. Monitoring of cliff-breeding seabirds at various colonies in Iceland revealed a significant overall decrease in numbers from the mid-eighties to 2005, although there were some localised increases (Garðarsson, 2006a). The breeding success of *R.tridactyla* in 2005 (most recent published data) was particularly bad. It was highest on the outer Snæfellsnes and Reykjanes peninsula on the south-west coast, where about one young per nest was raised, and numbers of nests in colonies were generally at or above average levels (Garðarsson, 2006a). Elsewhere in the western half of Iceland, success was lower, averaging about 0.2 – 0.7 young per nest. By contrast, breeding failed widely in 2005 in Eastern Iceland. At Skoruvík, for instance, out of a colony of 70,000 – 80,000 nests in 1986 – 1999, only 21 000 nests were estimated and very few

⁵ It should be noted that Black-legged Kittiwakes may move between colonies and hence, year to year changes in numbers at sample colonies may not necessarily reflect larger scale regional population changes.

young (average 0.013, n = 1624) were raised. There is concern that large-scale future changes in population size may continue to occur, especially if recent changes are related to climate change through food availability and quality (see below).

Condition (current/trends/future prospects)

The overall breeding success of *R.tridactyla* in 2006 from 49 UK colonies averaged 0.54 (s.e.+0.04) chicks fledged per breeding pair, below the mean for 1986-2005 of 0.68 (s.e.+0.03) recorded at between 30 and 61 colonies annually (Mavor *et al.*, 2008). A comparison of 39 colonies monitored in both 2005 and 2006 found no significant difference between the two years. However, there were marked variations between regions. Colonies in south-west and north Scotland were very unsuccessful, with breeding success in most other regions generally poor - only in north-east England was fledging close to one young per nest. For instance, the colony on Papa Westray, Orkney, raised only three chicks from 58 nests (0.05 chicks per nest) in 2006, whereas the most successful colony in the UK in 2006 was Coquet Island in north-east England, where *R.tridactyla* fledged 1.37 chicks per nest. In Ireland, the most successful colony (and only other to record above one chick per nest in 2006) was Rockabill (1.14 chicks per nest). Feeding conditions again appeared to be poor generally, especially during the latter half of the chick-rearing period in 2006, and pipefish were noted to be a major component of food items brought back to the nest. Predation at several colonies further lowered success.

Mean clutch size (excluding empty nests) on Hornoya in Norway in 2003, 2004, and 2005, was 1.75, 1.64 and 1.86 respectively.

Limitations in knowledge

There is sufficient data detailing the population trends of this subspecies within the OSPAR area, and the relevant threats. There is a substantial amount of information available on the link between sandeel populations and *R.tridactyla* breeding success. Up-to-date data on breeding populations and productivity in the key countries of Greenland (Denmark) and to some extent Iceland, was not available for this review.

4. Evaluation of threats and impacts

R.tridactyla is threatened by reductions in the availability of small pelagic shoaling prey fish, and human activity can directly or indirectly alter the availability of these prey species, therefore affect *R. tridactyla* survival, for example through interactions with industrial fisheries. For instance, there is substantial published indirect evidence for a link between the observed decline in *R. tridactyla* in the UK and lack of sandeels. Frederiksen *et al.*, (2004b) showed that both breeding success and adult survival of *R. tridactyla* was negatively affected by high sea surface temperatures and by the presence of an industrial sandeel fishery, both factors were presumed to affect sandeel abundance⁶. Frederiksen *et al.* (2005) showed that *R. tridactyla* colonies in the UK could be grouped into regional clusters with similar patterns of temporal variability in breeding success, and that these clusters were

⁶ The increasing trend in the NAO index to the mid-1990s and the associated warming of the North-East Atlantic and the North Sea has caused major changes in plankton communities, in particular, a decline in the copepod *Calanus finmarchicus* (Fromentin and Planque, 1996; Planque and Fromentin, 1996). This copepod is often eaten by sandeels, which are in turn a major source of food for kittiwakes in the North East Atlantic and North Sea (Frederiksen *et al.*, 2006). It is now thought that the bottom-up effect of changing ocean climate conditions causing reductions in forage fish food is a controlling factor in sandeel abundance and quality (Frederiksen *et al.*, 2004b; Wanless *et al.*, 2004; see also Wanless *et al.*, 2005; Frederiksen *et al.*, 2006). According to ICES, this is perhaps the best example in the OSPAR region of a link between seabirds and climate through their prey (ICES, 2007).

consistent with sandeel population structure. Frederiksen *et al.*, (2006) showed that the abundance of sandeel larvae was strongly related to plankton abundance, and that seabird (including *R.tridactyla*) breeding productivity was positively related to the abundance of sandeel larvae in the previous year. The close correlation in some areas between sandeel abundance and breeding success of this species is expected to continue to cause problems into the future, due to climate change effects, and likely resulting regime changes, for example in the North Sea. Furthermore, Frederiksen *et al.*, (2004b) showed that if mean sea surface temperatures in the North Sea were to increase further, this would lead to population declines of *R. tridactyla*, whether the sandeel fishery was reopened or not⁷. Oro and Furness (2002) showed that survival rates of adult *R.tridactyla* in Shetland were also affected by sandeel abundance.

Similarly, in Norway, capelin *Mallotus villosus* are the preferred food of *R.tridactyla* breeding in East Finnmark and large stock fluctuations (including several collapses) in the Barents Sea may be having negative effects on the population (Krasnov and Barrett, 1995; Barrett, 2007). Large numbers of dead *R.tridactyla* were washed ashore in north Norway in late April 2003. Inspection of 51 corpses indicated that they had died of starvation. Coincidental with the wreck were reports of many of the large colonies in the region being temporarily abandoned at a time when birds would normally be starting to breed. (Barrett *et al.*, 2004). In 2003, the capelin stock was low and spawning took place exceptionally far west, forcing the birds to leave their colonies in their search for food. When small amounts of capelin appeared along the Finnmark coast in mid-May the birds returned to their colonies and breeding proceeded as normal. Unfortunately, *R. tridactyla* are small-bodied surface feeders, with a relatively restricted foraging range from the breeding colony (staying mainly within 50 km of the colony), and so are more likely to be affected by local changes in prey abundance or availability than wider-ranging seabirds (Furness and Tasker, 2000).

R.tridactyla is also threatened by predation. Great skuas (*Stercorarius skua*) are important predators of adults and their chicks in Shetland (Oro and Furness, 2002), white-tailed eagles (*Haliaeetus albicilla*) are both direct and indirect (via corvids) predators of chicks and there is evidence that increasing harassment from *H.albicilla* in many colonies along the whole coastline of Norway has caused repeated local breeding failures and declines in *R.tridactyla* numbers (Barrett and Krasnov, 1996; Barrett, 2003; Anker-Nilssen and Aarvak, 2006). For example, on Bleiksøya, where *H.albicilla* continually patrol the cliff face causing *R.tridactyla* to repeatedly fly out in panic, the *R.tridactyla* population has declined from 5800 pairs in 1993 to c. 600 pairs in 2005 (RT Barrett pers. obs.) A variety of other avian and mammalian predators are known to take *R.tridactyla* eggs, chicks or adults (Barrett and Tertitski, 2000).

An estimated 5000 *R.tridactyla* are also killed as bycatch in fisheries off the north-western United Kingdom (ICES, 2008). *R.tridactyla* is also reported to be threatened by marine oil spills and chronic oil pollution and may be threatened by future outbreaks of the avian influenza virus (BirdLife International, 2008). Human harvesting of eggs was formerly a problem but is no longer a threat (Barrett and Tertitski, 2000). However, it is hunted on Greenland (BirdLife International, 2008) and

⁷ *R.tridactyla* around the Isle of May have declined by > 50% since 1990, a period during which a lesser sandeel *Ammodytes marinus* fishery was active and profound oceanographic changes occurred.. Breeding success and adult survival were low when the sandeel fishery was active (1991 – 98) and were also negatively correlated with winter sea temperature, with a 1-year lag for breeding success. An observed improvement in breeding success from 2000 onwards has been insufficient to arrest the population decline (Frederiksen *et al.*, 2004b). Stochastic modelling indicated that the population is unlikely to increase if the fishery is active or sea temperature increases, and is almost certain to decrease if both occur. The fishery also had a strong effect on demographic performance, although the exact mechanism is unclear as kittiwakes and fishermen target different sandeel age groups.

there has been considerable concern about the scale of hunting of seabirds in Greenland during spring 2008⁸.

5. Existing management measures

R.tridactyla is not listed on any Annexes of the EU Birds Directive, nor is it covered specifically by the Bern Convention or the Convention on Migratory Species, including its African-Eurasian Migratory Water Bird Agreement (AEWA). However, it is protected under national legislation by several OSPAR Contracting Parties. In France, the species is included in the 'Liste des espèces d'oiseaux protégées en France en application de l'article L. 411-1 du code de l'environnement et de la directive 79/409 du 2 avril 1979 concernant la conservation des oiseaux sauvages' which is based on the 'Arrêté du 17 avril 1981 fixant les listes des oiseaux protégés sur l'ensemble du territoire' (Journal Officiel 19-05-1981 p. NC 4758-4760) and modified by the 'Arrêté du 29 juillet 2005' (Bernard Cadiou *in litt.* 2008).⁹ In Portugal, the species is protected under 'D.L. 140/99 de 24 de Abril rectificado pelo D.L. 49/2005 de 24 de Fevereiro' and under the government's commitment to the CMS under 'Resolução da Assembleia da República n.o 69/2003: Aprova o Acordo para a Conservação das Aves Aquáticas Migradoras Afro-Euroasiáticas, concluído na Haia em 15 de Agosto de 1996'. In Spain, *R.tridactyla* is included on the State Catalogue of Threatened Species (Catálogo Nacional de Especies Amenazadas¹⁰) as a species of "Special Interest" (Royal Decree 439/1990). It is also protected under regional legislation and included on the Galician Catalogue of Threatened Species: "Vulnerable" (Decree 82/2007 of 19th of April). The species is categorised as Vulnerable in the Norwegian Red List and the All-Ireland Vertebrate Red Data Book.

The hunting of seabirds, including *R.tridactyla*, in Greenland has been regulated by national executive order since 1988, and hunting between February 15 and the autumn was banned under Greenland's 2001 Bird Protection Act. 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, including spring 2008¹¹. 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. 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. Boertman *in litt.* 2008) and a network of effective hunting-free reserves in coastal areas would be beneficial for the wintering seabirds.

R.tridactyla is a relatively well-studied and monitored species throughout the OSPAR area, due to the relative ease with which this can be achieved. However, there are few other specific conservation measures directed at *R.tridactyla* by the OSPAR Contracting Parties, although protection of seabird colonies from predators and human disturbance probably benefits the breeding birds, e.g. control of carrion crow *Corvus corone corone* and scaring of ravens *C.corax* in some colonies in Brittany (B.Cadiou *in litt.* 2008).

⁸ See <http://www.rspb.org.uk/news/details.asp?id=tcm:9-188494> . About 2,000 of Greenland's 10,000 hunters, out of a population of 56,000, depend on sales of seabird meat at town and city markets. The rest hunt for pleasure alone, using powerful speedboats and semi-automatic guns.

⁹ See <http://www.ecologie.gouv.fr/Liste-des-especes-d-oiseaux.html> or http://www.ecologie.gouv.fr/IMG/pdf/Liste_oiseaux-2.pdf

¹⁰ http://www.mma.es/secciones/biodiversidad/especies_amenazadas/catalogo_especies/vertebrados_aves/pdf/ver200.pdf

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).

Some notable colonies are within established protected areas. In France, the breeding colonies of “Falaise de la pointe Fagnet”, “Falaise du Bessin occidental”, Cap Fréhel and Cap Sizun are in Special Protected Areas (SPAs) designated under the Birds Directive (code FR2310045, FR2510099, FR5310095, FR5310055 respectively). In addition, colonies at Cap Gris Nez, “Littoral Seine Marin”, Cap Fréhel and Cap Sizun, have been proposed as Marine Special Protection Areas under the Birds Directive (B.Cadiou *in litt.* 2008). In the breeding season, the UK’s 33 SPAs where *R.tridactyla* is a qualifying species, support on average, 390 597 pairs (JNCC, undated¹²). This amounts to about 78% of the British breeding population, and about 14% of the all-Ireland population. These SPAs contain about 12% of the international North Atlantic population. The UK is also currently considering the further designation of marine SPAs for this species. The species also occurs at several IBAs within the OSPAR region¹³.

Most species of seabird breeding in Britain and Ireland have been censused three times: during ‘Operation Seafarer’ in 1969- - 70 (Cramp *et al.*, 1974), the ‘Seabird Colony Register’ census (SCR) in 1985 – 88 (Lloyd *et al.*, 1991) and ‘Seabird 2000’ in 1998 – 2002 (Mitchell *et al.*, 2004¹⁴). Coverage of known *R.tridactyla* colonies in Britain and Ireland was complete during both the SCR Census (1985 - 88) and Seabird 2000, with the exceptions of a colony in Galway (Ireland) not counted during the former and one in Sligo (Ireland) not counted during the latter survey. In Norway, the national monitoring programme for seabirds, which was established in 1988 and revised in 1996, now addresses population changes in 17 species of breeding seabirds along the coast, including *R.tridactyla*, and six key sites (Runde, Sklinna, Røst, Anda, Hjelmsøya and Hornøya) (Lorentsen, 2005). In 2005, the SEAPOP programme¹⁵ was launched, which focuses on Spitsbergen, Bjørnøya, Hornøya, Hjelmsøya, Anda and Røst (Anker-Nilssen *et al.*, 2007). Monitoring of *R.tridactyla* also takes place in France (along the entire French Channel and Atlantic coasts, B.Cadiou *in litt.* 2008) and in Iceland (Garðarsson 2006a, b, and *in litt.* 2008). No information on monitoring efforts in Greenland was received.

6. Conclusion on overall status

The OSPAR area appears to be of global importance for the *R. tridactyla tridactyla* subspecies, with about 85% of the subspecies occurring in the OSPAR Region (Heubeck, 2004). *R.tridactyla* has a very large population and breeds throughout the OSPAR Region. However, there is strong evidence that its population has suffered from significant declines in the period 1990 – 2000 within many OSPAR Contracting Party states. Overall, population decreases of 20 – 29% were seen in Norway and the UK with very high rates of proportional decline in Shetland (69%) and north-east England (40%). Declines up to 19% were seen in the Greenland population. Studies in 2005 and 2006 in Norway, Iceland and the UK show that this decline has continued, and therefore the species continues to be evaluated as significantly declined. In addition, the species is sensitive to over-fishing due to its relatively restricted

¹² UK SPA review, see <http://www.jncc.gov.uk/page-1412> and <http://www.jncc.gov.uk/page-1419> for download of data on SPAs relevant to *R.tridactyla*.

¹³ Within the OSPAR region, BirdLife International (2008) list the species as occurring at 8 IBAs in Iceland (Breidafjörður, Grímsey, Hælavíkurbjarg, Krísuvíkurbjarg, Látrabjarg, Ritur, Skoruvík-Skálabjarg, Vestmannaeyjar), 16 in Norway (Hjelmsøy, Hornøya and Reinøy, Kongsøy, Makkaurhalvøya (Syltefjordstauran), Omgangsstauran, Røst, Runde, Sværholtklubben, Værøy, Varangerfjord, and on Svalbard and the Jan Mayen Islands - Bjørnøya (Bear Island), Fuglefjella, Hopen island, Jan Mayen island, North-west Spitsbergen National Park and South Spitsbergen National Park). The relevant sites for the UK, Ireland or other European countries are not listed.

¹⁴ See www.jncc.gov.uk/marine/seabirds/seabird2000/default.htm.

¹⁵ See www.seapop.no.

foraging range from the breeding colony (staying mainly within 50 km of the colony) and has a low resilience due to its life history characteristics (long-lived and relatively slow to reproduce).

There is substantial published indirect evidence for a link between the observed declines in this species and prey availability, for example sandeels in the UK. For instance, both breeding productivity and adult survival of *R. tridactyla* in colonies on the Isle of May, UK were shown to be negatively affected by high sea surface temperatures and by the localised presence of an industrial sandeel fishery, with both factors presumed to affect sandeel abundance. The close correlation in some areas between sandeel abundance and breeding success of this species is expected to continue to cause problems into the future, due to climate change effects, and likely resulting regime changes, for example in the North Sea. A similar situation probably exists for other prey species in other parts of the species range in the OSPAR region. Other threats to the species include predation by great skuas *Stercorarius skua* and white-tailed eagles *Haliaeetus albicilla*.

Apart from monitoring, there are currently few conservation measures directed specifically at *R.tridactyla*, although activities at major mixed seabird colonies provide some protection, and it is included within some national legislation.

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 other relevant authorities, to:

- a. notify them of listing under OSPAR, threats facing the species, and the willingness of OSPAR to co-operate in developing conservation measures;
- b. request information on any measures taken for the protection of *R.t.tridactyla* and their effectiveness;
- c. highlight the need for protection from predation at breeding colonies, where relevant.

Awareness raising: OSPAR should work with relevant Contracting Parties (see Table 2 below) to raise awareness of status and threats to *R.t.tridactyla* among both management authorities and general public¹⁶.

Species Action Plan: OSPAR should work with relevant Contracting Parties to facilitate development of a species action plan at the OSPAR level for *R.t.tridactyla*, involving relevant international authorities.

Monitoring: OSPAR should work with relevant Contracting Parties to facilitate development of a monitoring strategy for *R.t.tridactyla* for the OSPAR Region, involving relevant international authorities, and deliver to national contacts. This should build upon the starting point provided in section 7.2 and should take into account, the need to:

- (i) continue and expand existing monitoring of breeding colonies of *R..t. tridactyla* to include demographic parameters, and feeding of chicks;

¹⁶ 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.

- (ii) promote and coordinate the collection of information on the numbers, distribution and activities of *R..t. tridactyla* and the identification of the key threats (co-ordinate monitoring within the OSPAR Area).

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

Further research: OSPAR should emphasise to relevant scientific funding bodies the need for further research into causes of decline and possible link to food availability, e.g. sandeels.

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. Monitoring and Assessment: implement the above monitoring and assessment strategy for species status in the OSPAR Area;
- b. MPAs: protect sites important to this species as OSPAR MPAs, with management plans for these MPAs that include conservation of *R.t.tridactyla*, taking into account the need to protect breeding colonies from predation.

Table 2: Summary of key threats and existing protection for *Rissa tridactyla tridactyla*

Key threats	Decline in prey fish species (e.g. sandeel, capelin) due to overfishing and climate change Predation and/or harassment by <i>Stercorarius skua</i> , <i>Haliaeetus albicilla</i> and other avian and mammalian predators Some bycatch mortality especially off NW UK.	
Relevant Contracting Parties	Denmark (including Greenland), Iceland, Norway, UK, Republic of Ireland, France	
Other responsible authorities	Arctic Council – especially CAFF Working group NEAFC	
Already protected? Measures adequate?	No international protection status Protected/recognised under national legislation in: France, Portugal, Spain, Norway and Ireland Regulation of hunting in Greenland	Not aware of specific measures taken to protect this subspecies, except predator control at some colonies Some notable colony sites fall within SPAs in France and the UK

Brief summary of the proposed monitoring system (see annex 2)

As explained above, there is no overall coordinated monitoring of *R.tridactyla* within the OSPAR region; what exists takes place through 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 *R.tridactyla* and the identification of the key threats. Relevant Contracting Parties (Greenland (Denmark), Iceland, Norway, UK, Republic of Ireland, France), should be tasked to report to OSPAR on:

- Annual colony monitoring including at least data collection on breeding numbers and productivity for all occupied colonies in Greenland (Denmark), Iceland, Norway, UK, Republic of Ireland, and France.
- Further data collection to augment the baseline data collection at the colonies where resources allow (for example covering management effectiveness, threats and impacts, and parameters such as diet, feeding ecology, chick provisioning rates, chick survival and growth rates).
- Establishment and/or continuation of ringing schemes for chicks at selected colonies (banding to be carried out in at least one, preferably more, key colonies in each country).
- Additional data collection into impact of fisheries, including birds killed from bycatch (compiled from fisheries statistics).
- Additional research into the impact of climate change on the status and distribution of the species within OSPAR.

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)
<i>Belgium</i>	Yes		
<i>Denmark</i>	Yes		
<i>European Commission</i>			
<i>France</i>	Yes	Bernard Cadiou, Bretagne Vivante conservation.bretagne-vivante@wanadoo.fr	Information on location and size of colonies, legal protection and conservation measures provided.
<i>Germany</i>	Yes		
<i>Iceland</i>	Yes	Arnpór Garðarsson, University of Iceland arnthor@hi.is	Copies of published papers on recent population changes and overall current status provided Garðarsson, A. (2006a). Viðkoma ritu sumarið 2005. <i>Bliki</i> 27: 23-26. Garðarsson, A. (2006b) Nýlegar breytingar á fjölda íslenskra bjargfugla. <i>Bliki</i> 27: 13-22.
<i>Ireland</i>	Yes		
<i>Netherlands</i>	Yes	Kees Camphuysen (NIOZ) camphuys@nioz.nl	National reports and references as well as information on distribution and population sizes provided. National report in Dutch, with distribution maps ¹⁷ National report in Dutch with distribution maps and trends ¹⁸ Camphuysen C.J. and F. de Vreeze 2005. De Drieteenmeeuw als broedvogel in Nederland. <i>Limosa</i> 78: 65-74. Camphuysen, C.J. and Leopold, M.F. 2007 Drieteenmeeuw vestigt zich op meerdere platforms in Nederlandse wateren, <i>Limosa</i> 80(4): 153 – 156.

¹⁷ http://www.watermarkt.nl/wm_user_files/File/watermarkt/publicaties/rikz2003.033.pdf

¹⁸

http://files.kennisplein.intranet.minvenw.nl/3/2/329389/Monitoring_van_zeevogels_en_zeezoogdieren_op_het_Nederlands_Continentaal.pdf

Norway	Yes	Tomas Aarvak, Norwegian Ornithological Society tomas@birdlife.no	<p>Copies of key documents on distribution, population and monitoring of species provided.</p> <p>Frederiksen, M., Wanless, S., Harris, M.P., Rothery, P. and Wilson, L.J. (2004b) The role of industrial fisheries and oceanographic change in the decline of North Sea black legged kittiwakes. <i>Journal of Applied Ecology</i> 41: 1129-1139.</p> <p>Barrett R.T., Lorentsen S-H. and Anker-Nilssen T. 2006. The status of breeding seabirds in mainland Norway. <i>Atlantic Seabirds</i> 8(3): 97-126.</p> <p>Barrett, R.T. and Tertitski, G.M. (2000) Black-legged kittiwake <i>Rissa tridactyla</i> pp 100-103 in Anker-Nilssen, T., Bakken, V., Strøm, H., Golovkin, A.N., Bianki, V.V., and Tatarinkova, I.P. (eds.) <i>The Status of Marine Birds Breeding in the Barents Sea Region</i> Norsk Polarinstitutt Rapport no. 113.</p> <p>Krasnov, Y.V., Barrett, R.T, and Nikolaeva, N.G. (2007). Status of black-legged kittiwakes (<i>Rissa tridactyla</i>), common guillemots (<i>Uria aalge</i>) and Brünnich's guillemots (<i>U. lomvia</i>) in Murman, north-west Russia, and Varanger, north-east Norway. <i>Polar Research</i>, 26:113–117.</p>
Portugal	Yes	Pedro Geraldes (SPEA) pedro.geraldes@spea.pt	Brief information on distribution (of non-breeding birds), as well as details of relevant national conservation legislation provided.
Spain	Yes	Javier Pantoja (DG Biodiversity- Min. Environment) Jpantoja@mma.es Pep Arcos (SEO) jmarcos@seo.org	<p>Information on location and size of colonies, legal protection and conservation measures provided.</p> <p>Details of trends in Iberian population, as well as breeding numbers and evidence of decline provided.</p> <p>Mouriño, J. and Alcalde, A. (2004) Gaviota Tridáctila, <i>Rissa tridactyla</i> in Madroño, A., González, C. and Atienza, J.C. (eds.) <i>Libro Rojo de las Aves de España</i> Madrid, Spain: Dirección General para la Biodiversidad – SEO/BirdLife.</p>
Sweden	Yes	Martin Green martin.green@zoekol.lu.se	<p>Information on the only Swedish breeding colony for this species (location and size) provided.</p> <p>Tjernberg, M. and Svensson, M. (eds) (2007). <i>Artfakta – Rödlistade vertebrater i Sverige</i>. [Swedish Red data Book of Vertebrates]. Ardatbanken, SLU, Uppsala.</p>

UK	Yes	Norman Ratcliffe (RSPB) – contact mark.bolton@rspb.org.uk	<p>Relevant references for UK populations and details of most recent population counts published by JNCC provided.</p> <p>Heubeck, M. (2004) Black-legged Kittiwake <i>Rissa tridactyla</i> pp 277-290 in Mitchell, P.I., Newton, S.F., Ratcliffe, N. and Dunn, T.E. (eds.) <i>Seabird populations of Britain and Ireland</i>. T. & A.D. Poyser, London.</p> <p>JNCC (2006). UK Seabirds in 2006. Results from the UK Seabird Monitoring Programme. From www.jncc.gov.uk/seabirds</p> <p>Mavor, R.A., Heubeck, M., Schmitt, S. and Parsons, M. 2008. Seabird numbers and breeding success in Britain and Ireland, 2006. Peterborough, Joint Nature Conservation Committee. (UK Nature Conservation, No. 31.). Also available as download via website http://www.jncc.gov.uk/Default.aspx?page=4363</p>
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* - Information from BirdLife International (2008); '?' signifies occurrence information not available from BirdLife International's database.

R. tridactyla was nominated for inclusion in the OSPAR List in 2007 by BirdLife International.

Contact person: Ms Kate Tanner, BirdLife International, c/o Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, SG19 2DL. UK

Summaries of country-specific information provided

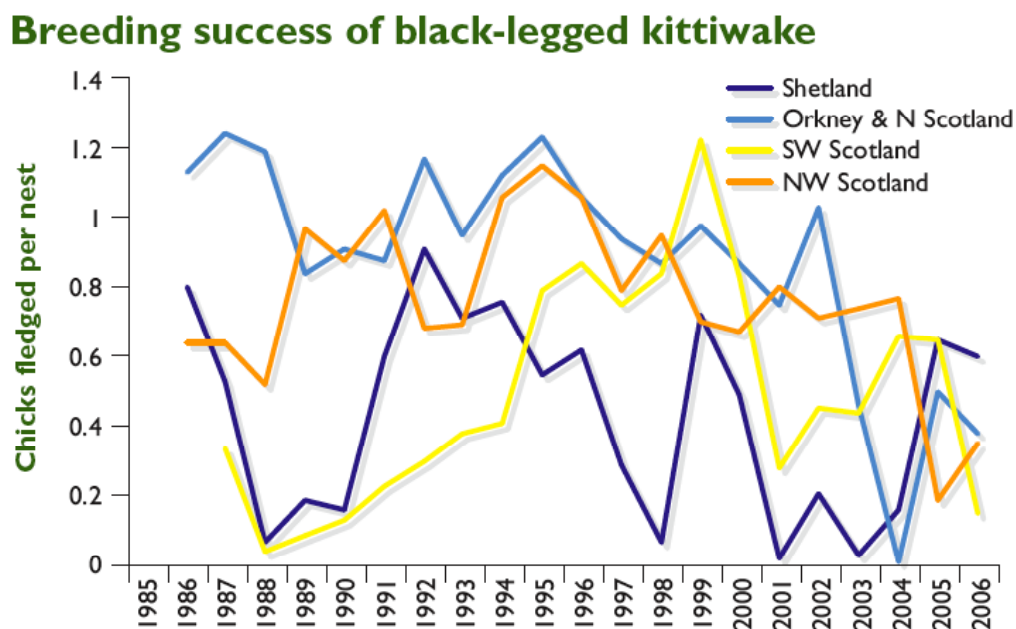
Britain (from Mavor *et al.*, 2008): In Shetland, overall numbers of apparently occupied nests (AON) of *R.tridactyla* in annual monitoring plots showed a small increase between 2005 and 2006. On Foula, numbers increased by 18.9%, which represents a halt to the 50% decrease recorded between 1997 and 2003 (Gear, 2006; Heubeck, 2006). However, numbers at this site are currently only one-quarter of those recorded between 1987 – 1992. In Orkney, whole-colony counts at five mainland sites recorded a total of 4396 AON, which represented a decline of 39.0% since they were last monitored, in 2003. Like many regions around the UK, populations in both Shetland and Orkney are in long-term decline but the decline seems to have begun 5 – 10 years earlier in Shetland, where the rate of decline since 1985 has also been greater.

Few colonies are monitored annually in north and north-east Scotland, where further declines were noted at North Sutor and Sands of Forvie between 2005 and 2006. Both now hold only one-quarter of the respective peak counts recorded during the 1990s. Counts in 2006 at Fowlsheugh showed a decline of 43.8% since 1999 and 69.7% since 1992, when peak numbers were recorded. Compared with even earlier baseline numbers at this colony are currently around half of those recorded in 1986. Overall numbers in south-east Scotland and north-east England also declined by 12.3% and 13.5%, respectively, and counts on the Isle of May, were the lowest recorded since the SMP began (1986). Trends in both regions have been downward since the late 1980s/early 1990s although in south-east Scotland, where the index has fallen by 50% since 1986, the rate of decline is almost double that found to the south. In north-west and south-west Scotland the long-term trends in each region have diverged since the early 1990s, with a highly significant increase detected in the south-west (although with a decline most recently), but a significant decrease in the north-west.

Increases occurred in the small colonies monitored in east England (e.g. Lowestoft) and south-east England where, after 10 successive years of decline, an increase of 70.6% occurred at South Foreland. This region has the highest rate of decline in Britain, measuring -11% *per annum* since the 1986 baseline and -21% *per annum* since 1995 prior to which the population had been at least relatively stable or perhaps increasing. In north-west England, where the population index had been remarkably stable since 2002, there was a large increase, attributable to the colony at St. Bees Head, where 1300 AON were counted in 2006, the highest number there since 2000.

In Wales, there has been a steady decline in the population index since 1987/88 but in recent years there has been some fluctuation in the trend, e.g. in 2006, a particularly large decline of 65.5% was recorded at Little Ormes Head, and on St. Margaret's Island, where only four AON were found in 2001, a substantial increase of 84.9% occurred, with 331 AON recorded in 2006¹⁹, by far the highest count there since 1988.

Figure 3. Breeding success (chicks fledged/nest) of *R.tridactyla* for 1985 – 2006 in Scotland (JNCC, 2007)



Breeding success of *R.tridactyla* in 2006 was very low in most regions of the UK, especially in South-west Scotland, where it was at its lowest since 1990 (Figure 3). Success of *R.tridactyla* in Shetland, which have suffered periodic failures or near-failure, was above average in 2005 and 2006. Breeding success of *R.tridactyla* in Orkney is positively correlated with that in Shetland (they rely on the same stock of sandeels for food), but historically they were always more successful in Orkney than in Shetland. However, in 2004 – 2006 this pattern broke down, with *R.tridactyla* less successful in Orkney. There is evidence from the Isle of May (South-east Scotland) that post-fledging survival of chicks hatched there in 2006 may have been very low, because there appeared to be a rapid deterioration in feeding conditions around the time of fledging. Hence, many juveniles may have died soon after fledging; if this was repeated at other colonies the 2006 cohort would have been smaller than that indicated by the breeding success figures alone.

¹⁹ However, this may have been due to birds moving from the nearby Gower peninsula as a result of disturbance caused by sand dredging in the vicinity of colonies.

Ireland: In Ireland, the few colonies monitored in 2005 and 2006 all decreased in size; on the Isle of Muck (North-east Ireland) 6.6% fewer nests were recorded, Dunmore and Rockabill (both South-east Ireland) held 10.9% and 22.5% fewer nests, respectively, and at Downpatrick Head (North-west Ireland) numbers were 16.0% lower. Following three successive years of decline the count at Dunmore was the lowest on record (Mavor *et al.*, 2008).

Netherlands: *R.tridactyla* can be found in the Dutch offshore area the whole year round, with lowest numbers in summer (June-July). In the winter months (October – January) *R.tridactyla* is present in large numbers; up to 80 000 birds can be counted in this period. Numbers have been going up in recent years. Since 2000 *R.tridactyla* has also been recorded breeding in the Netherlands. Nests can be found on offshore platforms, in particular on offshore platforms near the food-rich “Friese Front” area, around 50 km north of the Dutch Wadden islands. In 2006, 40 of these offshore nests were found - 32 of which were located on one platform.

Norway (from Anker-Nilssen *et al.*, 2007): On Spitsbergen there was little change in numbers of *R.tridactyla* in 2006 compared with 2005 (-2.8%). At Hornøya, a large decline in *R.tridactyla* (-24.4%) occurred between 2005 and 2006 and their breeding success was low (0.58 large chicks per nest). At Hjelmsøya there was very poor breeding success with most chicks dying soon after hatching, and numbers of *R.tridactyla* breeding in the colony continued to drop (-9.6% between 2005 and 2006). At Anda, counts suggest that the population had been relatively stable (1.7% increase), and breeding success was high. Indeed, about 1000 pairs of *R.tridactyla* bred on Anda in 2005 and 2006, and compared to the census made in the early 1980s, it seems that the population has remained relatively stable over the last two decades, unlike many of the other sites monitored in the SEAPOP programme. Sandeels, herring and gadoids made up most of the chick diet. At Røst, where the most extensive monitoring work was carried out, the *R.tridactyla* population increased slightly (+0.7%), but their breeding success in the main cliff was greatly impaired (about halved) by the disturbance and predation of young by white-tailed eagles. The 2006 survey on Bjørnøya (Bear Island) showed that the population of *R.tridactyla* had increased since 1986/8, reaching 130,000 apparently occupied nests, although there was little change between the figures for 2005 and 2006 (-2.6%). On the mainland coast, detailed mapping carried out in east Finnmark between Laksefjord and the Russian border recorded > 100,000 pairs of *R.tridactyla* (Anker-Nilssen *et al.*, 2007).

Sea surveys in the Barents Sea and Norwegian Sea undertaken as part of the SEAPOP programme in 2005 and 2006 revealed densities of *R.tridactyla* of 2.802 birds/km² in spring and summer 2005, 8.709 birds/km² in autumn 2005, 9.101 birds/ km² in spring and summer 2006, and 14.408 birds/ km² in autumn 2006 (Anker-Nilssen *et al.*, 2007).

Iceland: In the last few years, *R.tridactyla* has produced very few young along most of the north-east, east, south and west coasts where sandeels (currently very low numbers) are probably the main prey species. However, the large colonies on the SW coast are little affected. A general survey repeating work in the 1980s is nearing completion and the results should be available later this year (A. Garðarsson *in litt.* 2008).

Spain: Two colonies are located in Galicia (NW Spain) - one at Cabo Vilán (up to 70 pairs in the 1980s) and the other on the Islas Sisargas (over 200 pairs in the 1980s). However, since the 1980s populations have declined, with the Sisargas colony comprising only a few pairs since 1993 (with 11 pairs in 2007) and Cabo Vilán having 54 pairs in 1999 (only 9 in 2007) (Pep Arcos *in litt.* 2008).

Annex 2: Detailed description of the proposed monitoring and assessment strategy

Rationale for the proposed monitoring

The species has suffered a significant decline in parts of its range within the OSPAR Region in the last 15 – 20 years, notably in Norway, the UK, and Greenland and appears sensitive to overfishing and due to its relatively restricted foraging range from the breeding colony (staying mainly within 50 km of the colony) and has a low resilience due to its life history characteristics (long-lived and relatively slow to reproduce). In addition, as the population development and reproductive rates of *R.tridactyla* can be monitored more cost-efficiently than most other seabirds and has a wide distribution within the OSPAR region, this species is ideal for studying how environmental variability at different spatial scales in the marine ecosystem within the OSPAR region affects vital demographic parameters of a top predator.

Good monitoring programmes are already in place for most breeding colonies (including all the major colonies in the UK and Ireland and Norway), under several different projects and initiatives. Therefore for OSPAR monitoring and assessment purposes it will be necessary to bring together an overview of these separate efforts at the level of the OSPAR Region.

Use of existing monitoring programmes

Most of the individual colonies are well known in some countries, notably Britain and Ireland, Norway and Iceland, and many are already monitored. Most *R.tridactyla* colony monitoring schemes collect data on numbers of breeding pairs and productivity. Several schemes, collect additional data on diet, feeding ecology and chick provisioning rates where possible. Some colony monitoring schemes have also collected information on parameters such as clutch size, egg dimensions, hatching success, chick survival and chick growth. Any OSPAR monitoring strategy for this species will therefore essentially be to bring together the outputs of the various ongoing monitoring, assessment and research efforts across the OSPAR area, ensuring at the same time that any significant gaps are filled.

Almost all currently occupied colonies in Britain and Ireland are monitored annually (by a variety of different organisations). Monitoring of *Rissa tridactyla* in the Britain and Ireland is coordinated through the UK's Joint Nature Conservation Committee (JNCC) Seabird Monitoring Programme (SMP)²⁰ in partnership with other bodies including the Royal Society for the Protection of Birds (RSPB), the Republic of Ireland's National Parks and Wildlife Service and BirdWatch Ireland. The JNCC collate the results of this monitoring for all British and Irish colonies, which are then published as part of the annual SMP report for Britain and Ireland.

There is also a long history of monitoring *R.tridactyla* in Norway. The Norwegian Seabird Project took place 1979 – 1984 and was followed by various mapping and monitoring projects, and much more detailed data concerning overall numbers, distribution and population trends have since been collected using international standards (for example Lorentsen, 2005). Most of these data are now stored in The National Seabird Registry at the Norwegian Institute for Nature Research (NINA), Trondheim, from where all seabird monitoring is coordinated. The national monitoring programme for seabirds, which was established in 1988 and revised in 1996, now addresses population changes in 17 species of breeding seabirds along the coast, including *R.tridactyla*, and six key sites (Runde,

²⁰ The aim of the SMP is to contribute information to enable the appropriate agencies to maintain favourable status of seabird populations in the UK and the Republic of Ireland. It ensures that sufficient data on breeding numbers and appropriate demographic and behavioural parameters of seabirds are collected - both regionally and nationally - to enable their population and conservation status to be assessed, and to monitor the impacts of ecosystem pressures.

Sklinna, Røst, Anda, Hjelmsøya and Hornøya) (Lorentsen, 2005). In 2005, the SEAPOP programme was launched (www.seapop.no)²¹, which focuses on Spitsbergen, Bjørnøya, Hornøya, Hjelmsøya, Anda and Røst (Anker-Nilssen et al., 2007). The earlier established monitoring activities, which include the national programme and long-term studies of seabird ecology on Røst and Hornøya, are being integrated into the SEAPOP programme (Anker-Nilssen *et al.*, 2007).

Annual censuses of *R.tridactyla* in France are conducted along the entire French Channel and Atlantic coastlines by a variety of groups including GON (Groupe Ornithologique Nord, in Nord-Pas-de-Calais), GONM (Groupe Ornithologique Normand, in Normandy), Bretagne Vivante-SEPNB (in Brittany), the University of Toulouse (in Brittany), and the Direction Départementale de l'équipement, Cellule Qualité des Eaux Littorales (CQEL, in Vendée) (Bernard Cadiou *in litt.* 2008).

Monitoring of *R.tridactyla* breeding colonies is also conducted in Iceland (Garðarsson, 2006a, b) where a repeat of the national surveys undertaken in the 1980s is due to be completed and results published in late 2008 (Garðarsson *in litt.* 2008).

Results from *R.tridactyla* colony monitoring and other research programmes are not formally coordinated or reported on across the OSPAR area at present. Since there is already considerable monitoring effort for this species, for monitoring and assessment purposes under OSPAR, the focus should be on ensuring that the resulting available information is captured for this species at the OSPAR level. Therefore, the relevant Contracting Parties (Greenland (Denmark), Iceland, Norway, UK, Republic of Ireland, France) should report monitoring data to OSPAR. It may be necessary for OSPAR to consider how best to ensure consistency of monitoring effort.

Synergies with monitoring of other species or habitats

There is an opportunity for synergy with monitoring of another OSPAR-listed seabird species – the Thick-billed Murre *Uria lomvia* – which breeds with *R.tridactyla* in some colonies in Greenland, Iceland, and parts of Norway (principally Svalbard and Jan Mayen).

Assessment criteria

Work needs to be done to set assessment criteria for the monitoring of this species at an OSPAR level. These criteria should be used to interpret the collected data, with some indication of at what point action, for example additional monitoring, actions and measures, should be taken beyond the minimal requirements.

Techniques/approaches:

- Annual colony monitoring including at least data collection on breeding numbers and productivity for all occupied colonies in Greenland (Denmark), Iceland, Norway, UK, Republic of Ireland, and France.

²¹ The SEAPOP programme aims to co-ordinate a long-term, comprehensive, standardised and cost-effective study of the most important aspects of seabird numbers, distribution, demography and ecology in Norwegian waters to satisfy the needs of the offshore industry, fisheries management, nature management, the scientific community and society at large in their various roles as exploiters, protectors and researchers of the 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.

