



Background Document for the Northern right whale
Eubalaena glacialis



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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Photo acknowledgement

Cover page: Northern right whale ©NOAA

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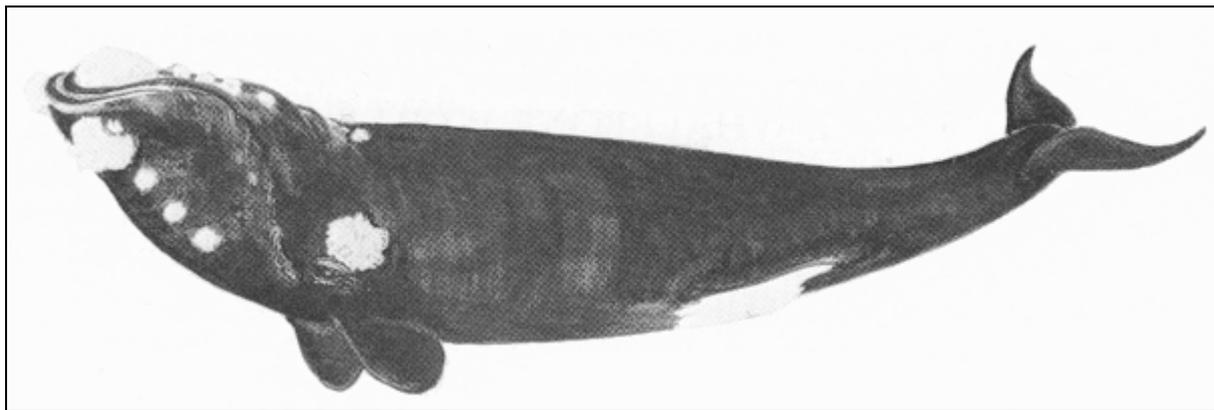
Background Document for Northern right whale *Eubalaena glacialis*

Executive Summary

This Background Document on the Northern right whale *Eubalaena glacialis* 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 2003. The original evaluation used to justify the inclusion of *E.glaialis* 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 2009-2010. Chapter 7 provides proposals for the actions and measures that could be taken to improve the conservation status of the species. In agreeing to the publication of this document, Contracting Parties have indicated the need to further review these proposals. Publication of this background document does not, therefore, imply any formal endorsement of these proposals by the OSPAR Commission. On the basis of the further review of these proposals, OSPAR will continue its work to ensure the protection of *E.glaialis*, where necessary in cooperation with other competent organisations. This background document may be updated to reflect further developments or further information on the status of the species which becomes available.

Récapitulatif

Le présent document de fond sur la Baleine franche noire 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 2003. L'évaluation d'origine permettant de justifier l'inclusion de la Baleine franche noire 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 2009-2010. Le chapitre 7 fournit des propositions d'actions et de mesures qui pourraient être prises afin d'améliorer l'état de conservation de l'espèce. En se mettant d'accord sur la publication de ce document, les Parties contractantes ont indiqué la nécessité de réviser de nouveau ces propositions. La publication de ce document ne signifie pas, par conséquent que la Commission OSPAR entérine ces propositions de manière formelle. A partir de la nouvelle révision de ces propositions, OSPAR poursuivra ses travaux afin de s'assurer de la protection de la Baleine franche noire, le cas échéant avec la coopération d'autres organisations compétentes. Ce document de fond pourra être actualisé pour tenir compte de nouvelles avancées ou de nouvelles informations qui deviendront disponibles sur l'état de l'espèce.



1. Background information

Name of species

Eubalaena glacialis (Müller 1776), Northern Right whale.

Northern right whales are members of the family Balaenidae (suborder Mysticeti, order Cetacea).

The taxonomy follows the view of the IWC Scientific Committee which now recognizes right whales in the North Atlantic, North Pacific and southern hemisphere as three distinct species in the genus *Eubalaena*, namely *E. glacialis* (North Atlantic Right whale), *E. japonica* (North Pacific Right whale) and *E. australis* (Southern Right whale) (IWC 2004), based mainly on the mtDNA phylogenetic findings (Rosenbaum *et al.*, 2000). This taxonomy is also accepted by the Convention on Migratory Species (CMS).

Conventional wisdom holds that the common name “Right whale” comes from English whalers, who designated this as the “right” (*i.e.*, correct) whale to hunt because it occurred near shore, swam slowly enough to be caught from a small boat, floated when dead, and yielded large amounts of valuable oil and baleen. Alternatively, it may have derived from the sense of right whale meaning “true whale”, as later formally recognised in the Latin generic name *Eubalaena* (Perrin *et al.*, 2002).

Description

Right whales have an extremely robust and rotund body form. The body is mostly black, sometimes with irregular white ventral patches. Calves may sometimes be lighter colored. There is no dorsal fin. The head is relatively large, comprising about one-quarter to one-third of the total body length. The upper jaw is somewhat arched, and the margin of the lower lip forms a very pronounced curve. There are about 300 baleen plates on each side of the upper jaw. The baleen plates are relatively narrow and 2-2.8m long (Perrin *et al.*, 2002).

The most conspicuous external characteristics of right whales are the callosities on the head. These are irregular patches of thickened, keratinized tissue, which are inhabited by dense populations of specialized amphipod crustaceans, known as cyamids or “whale lice”. The callosities occur at the tip of the snout, on the lower lips and chin, above the eyes, and in front of and behind the blowholes. The callosity patterns are unique to individuals and are therefore extremely useful as a natural “tag”, which allows repeated identification of individuals by photographs. Adults are 13–16m long. The tail fluke is wide up to 40% of the body length.

Species ecology and breeding biology

Right whales occur in temperate to subpolar latitudes. The population of North Atlantic right whales is separated from North Pacific right whales (*Eubalaena japonica*) by Arctic ice, so there is no interchange between populations, and apparently has not been for millions of years (Perrin *et al.*, 2002). Future changes of this situation might occur due to global warming. The melting of the Arctic sea ice might create passages for migrating whales and the actual genetic isolation thus might come to an end.

They migrate annually between high-latitude feeding grounds and low-latitude calving and breeding grounds.

The typical reproductive cycle in females is three years between births. The gestation period is approximately one year. Calving occurs during winter. The only known current calving ground in the North Atlantic is in shallow coastal waters near Georgia and northeastern Florida. Calves are 4.5–6m long at birth. Growth is relatively rapid from birth to weaning at about age 1, by which time the calf approximately doubles in body length to 9–11m. Growth after age 1 is likely to be dependent on feeding success (Evans 2008).

Breeding or mating also occurs during the winter. Because of the 3-year female reproductive cycle, breeding can take place geographically distant from calving. In the western North Atlantic, the location of the majority of the population during the winter is not known, and adult males are nearly absent from the calving ground. Breeding must occur wherever the adult population spends the winter, but it is not known whether there are specific, distinct winter habitats or whether the whales are broadly dispersed across wide regions of the North Atlantic. Information on the age at maturity has been derived from photo-identification studies which track known individuals from birth. The youngest mature female in the western North Atlantic was four at maturity and five at first calving, but average age at first calving is closer to nine or ten years (Evans 2008). Right whales are believed to reach sexual maturity at body lengths of 13–16m (Perrin *et al.*, 2002).

Right whales feed entirely on zooplankton, especially on large calanoid copepods. They also feed on smaller copepods, krill, pteropods, or the planktonic larval stages of crustaceans. The most common prey species is the copepod *Calanus finmarchicus* (Perry *et al.* 1999).

Right whales are “skimmers”. They feed by swimming forward with the mouth agape. Water flows into the opening at the front, and out through the baleen, straining their prey from the water. Feeding can occur at or just below the surface, or at depth. At times, they apparently feed very close to the bottom, because they are observed to surface at the end of an extended dive with mud on the head. Typical feeding dives last for 10–20 minutes. Feeding takes place in spring, summer, and autumn in higher latitude feeding grounds, where ocean temperatures are cooler and overall biological productivity is much higher. The best known right whale feeding grounds are in the western North Atlantic. These habitats are in near shore and shelf waters, where some combination of bottom topography, water column structure and stratification, and currents acts to physically aggregate zooplankton into extremely dense concentrations. There are probably also offshore feeding grounds, in locations not yet known, based on historical whaling records and on the fact that some known whales are often missing from the known habitats for months or years at a time (Perrin *et al.*, 2002).

There are very few data on the longevity of right whales. The oldest known right whale was a female photo-identified several times from 1935 (with calf) to 1995 (fatally injured). In consequence, she must have lived for at least 70 years.

Potential predators of right whales include killer whales and large sharks. Predators may be more likely to attack calves or juveniles than adults. Predation may have been one of the selective

pressures leading to the evolution of right whales' use of shallow coastal habitats for calving (Perrin *et al.*, 2002).

2. Original Evaluation against the Texel-Faial selection criteria

List of OSPAR regions and Dinter biogeographic zones where the species occurs:

OSPAR Regions: All

Biogeographic zones : (Holo)Pelagic - Warm-temperate waters; (Holo)Pelagic - Cold-temperate waters; (Holo)Pelagic Cold-Arctic waters

List of OSPAR regions where the species is under threat:

All where it occurs.

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

E. glacialis was nominated for inclusion by one Contracting Party (UK) citing regional importance, rarity, decline and sensitivity, with information also provided on threat.

Table 1: Summary assessment of *E. glacialis* against the Texel-Faial criteria

Criterion	Comments	Evaluation
Regional importance	The historic distribution of the eastern stock of <i>E. glacialis</i> included areas both inside and outside the OSPAR Maritime Area. Given the current endangered status of this species the remaining whales occurring within the OSPAR Area are of regional importance (OSPAR, 2008).	Qualifies
Decline	Tens of thousands of Northern Right whales were caught in earlier centuries (mostly before 1800) but historic records are not complete enough for pre-whaling population numbers to be estimated accurately. The current size of the North Eastern Atlantic population is unknown but it is estimated to be no more than the low tens of individuals, if it exists (Brownell, <i>et al.</i> 1986; Kraus <i>et al.</i> , in Evans, 2000; Evans 2008). The species was believed to be near extinction in the late 1980's, with possibly only a few individuals remaining, and there is no evidence of recovery (Klinowska, 1991) (OSPAR, 2008). However, there has been evidence of a recovery in the western North Atlantic (Clapham, 2005)	Qualifies
Sensitivity	Many populations of <i>E. glacialis</i> occurred in coastal waters of temperate regions and appeared to depend on inshore areas for reproductive activities. This species may therefore be more vulnerable to the detrimental effects of human activity than many other cetaceans (Klinowska, 1991). Baleen whales, such as the right whale use sound to provide information about the physical environment and to communicate between individuals. They emit low frequency sound that can travel hundreds of kilometers (Evans, 2000). This makes them sensitive to	Qualifies-very sensitive

	acoustic disturbance from military activities such as naval sonars (particularly low frequency acoustics), as well as other sources such as seismic exploration. The whales will be particularly vulnerable if the zone of influence coincides with migration and breeding areas (Evans, 2000; OSPAR, 2008).	
Threat	The northern right whale has been hunted in the North Atlantic since the 10-11th centuries. The population has been severely depleted as a result and it is now probably the most endangered of the large whale species (Klinowska, 1991). The main current threats are from entanglement in fishing gear, ship strikes and pollution (bioaccumulation of heavy metals and organochlorines, oil pollution, and radioactivity) and acoustic disturbance (OSPAR, 2008).	

Relevant additional considerations

Sufficiency of data: Most of the historic data on Northern Right whales comes from whaling records. Sightings schemes are a more recent source of information but it is difficult to determine population size from these data as the animals are so rare (OSPAR, 2008).

Changes in relation to natural variability: The large numbers of Northern Right whales that were captured during earlier centuries will have masked any changes in the population caused by natural variability. With such a small number remaining, natural variability may however become a major contributory factor in its local extinction (OSPAR, 2008).

Expert judgement: Historic records show that tens of thousands of whales were caught when it was the target of whaling during earlier centuries leading to the historic decline in this species. It is also clear that it remains vulnerable today, that sightings in the OSPAR Maritime Area are comparatively rare, and that there is a threat of it becoming extinct in this area (OSPAR, 2008).

ICES evaluation: The species occurred in all regions of the OSPAR area, but in Region II is peripheral to the historical range of the species. The ICES Advisory Committee on Ecosystems (ICES, 2003) concluded that there is good evidence of decline but little evidence of direct threats currently¹, owing to the extremely low (if still extant) population size (OSPAR, 2008).

3. Current status of the species

Distribution

Geographic range (IUCN):

Range description:

E. glacialis was formerly common on both sides of the North Atlantic. It appears to be effectively extinct in the eastern North Atlantic but in the past probably ranged from a calving ground in the Golfo de Cintra (23°N) off Western Sahara, through the Azores, Bay of Biscay, western British Isles, and the Norwegian Sea to the North Cape (hence the Dutch name Noordkaper). In the western North Atlantic

¹ Other references list collision and entanglement as serious threats in western Atlantic, predominantly to calves - Knowlton and Kraus, 2001; Kraus and Rolland, 2007, Evans, 2008

the species migrates from a calving ground off Florida and Georgia along the eastern seaboard of North America, to summering grounds in the Gulf of Maine, Bay of Fundy, and Scotian Shelf, with some individuals reaching the Gulf of St Lawrence, the Davis and Denmark Straits and occasionally Iceland and Norway. It is unclear whether in the past the animals in the northern part of the range (off Iceland and Norway) belonged mainly to the western or eastern breeding stocks (IUCN, 2008).

Distribution in OSPAR maritime area: In the OSPAR Maritime Area there have been sightings of the Northern Right whale on or near continental shelf edges off the Iberian Peninsula, the Irish Sea, west of Scotland and Ireland, in Norway and south of Iceland (Evans, 2000; Reid *et al.*, 2003; Evans, 2008). The whales used northern feeding grounds in the spring then moved to temperate waters in autumn and winter. Historically the main calving grounds included the Bay of Biscay and there were feeding areas in Scandinavian waters (Collett, 1909; Thompson, 1928; Fairley, 1981) (OSPAR, 2008). The last known sighting in the OSPAR Maritime Area was made in the Azores, on January 2009 (MS pers. comm.).

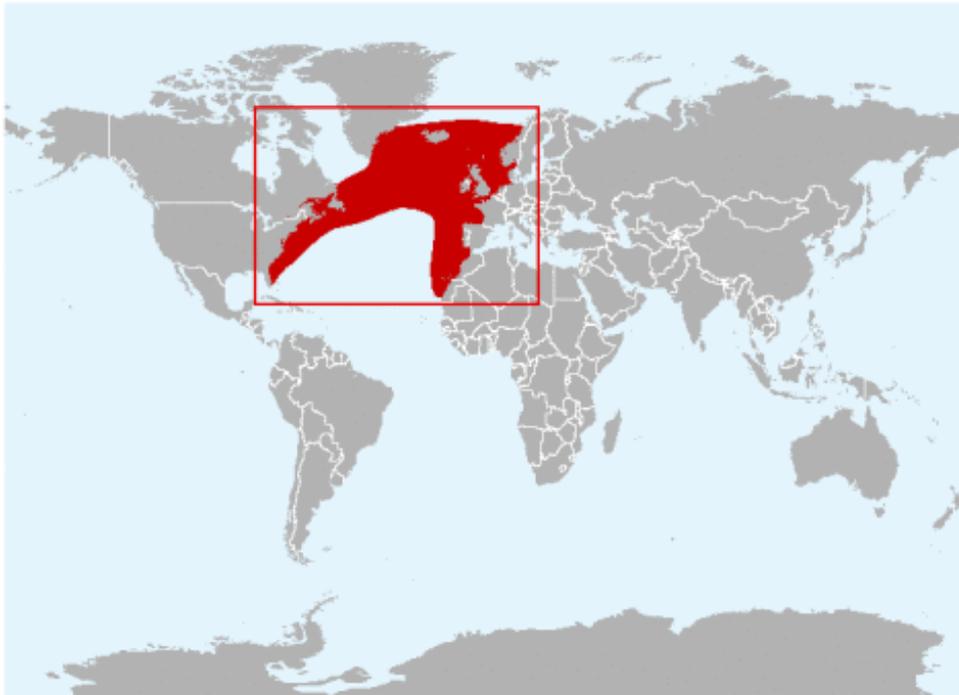
General distribution in the North Atlantic: There are believed to be two, or possibly three right whale populations in the North Atlantic but this historical hypothesis has not been proven by genetic analysis. Nevertheless, individuals' site fidelity to their place of birth may maintain a relative separation between two (or more) subdivisions of reproductive populations (IWC, 2008).

Western North Atlantic: The range of *E. glacialis* extends from the coastal waters of the south-eastern US (winter breeding grounds) to New England and the Bay of Fundy (summer feeding grounds). Some observations have been reported from Newfoundland, Labrador Basin, south-eastern Greenland and the Norwegian Sea, as well as further south down to the Gulf of Mexico (IWC, 2008).

Central North Atlantic: Whaling registers seem to indicate the presence of a central population which may migrate from eastern Greenland to the Azores or the Bermudas. As data concerning these animals are scarce, the existence of this stock remains a hypothesis (IWC, 2008).

Eastern North Atlantic: Historical observation data and whaling registers indicate that animals originating from the oriental population migrate following European coasts from the north to north-western Africa (Reid *et al.*, 2003). The present existence of this historical stock is under discussion (IWC, 2008).

Range map (IUCN):



Right whales sighted on the eastern side of the Atlantic might well have their origins on the western side of the Atlantic. This species has important migration capabilities as illustrated by individuals matched with the US east-coast right whale catalogue (comment: Norway) and data obtained by satellite telemetry (Baumgartner and Mate, 2005).

Population (current/trends/future prospects)

Abundances (N) and actual conservation status (N/K):

Because of historical whaling, populations are extremely depleted. The western North Atlantic stock, with only 300 individuals (2% of the carrying capacity) is the most important one known to remain. There is no sign of recovery in spite of the species being protected since the 1930's (IWC, 2008). The hypothesized reasons for this lack of recovery have been numerous and include inbreeding, habitat degradation, competition for food, pollution, and human-caused mortality (Baumgartner and Mate, 2005). Indeed, it has been suggested that the limited number of offspring did not offset additional mortality due to ship collisions and accidental fishing gear entanglement (IWC, 2008). Hypotheses that have been advanced to explain the low reproductive rates observed for several years include: genetic factors, poor nutrition, chemical contaminants, biotoxins and disease (IWC, 2001c; Reeves *et al.*, 2001). However, reproduction has increased in recent years. Rare recent observations in the eastern North Atlantic may indicate the existence of remnants of the initial stock or the occasional appearance of erratic individuals originating from the western stock (Reid *et al.*, 2003; Evans, 2008; IWC, 2008).

Table 2: Stocks, carrying capacity (K), actual abundance (N) for *E. glacialis*. §: estimation validated by the IWC.

Stocks or areas	K	N	Census year
Western North Atlantic	12.000-15.000 in 1530	314 §	2001
Central North Atlantic	-	-	
Eastern North Atlantic	-	Extinct ?	

General IUCN assessment information:

Red List category & criteria: Endangered D

Year assessed: 2008

Assessors: Reilly, S.B., Bannister, J.L., Best, P.B., Brown, M., Brownell Jr., R.L., Butterworth, D.S., Clapham, P.J., Cooke, J., Donovan, G.P., Urbán, J. & Zerbini, A.N.

Evaluators: Taylor, B.L. & Notarbartolo di Sciara, G. (Cetacean Red List Authority)

Justification: The major decline occurred more than three generations ago. The number of reproductively active females was determined to be 70 animals in the western North Atlantic in 1998. Even allowing for the possibility that some mothers have been missed in the identification catalogue, this means that the total number of mature (i.e. reproductively active) individuals is well below the Endangered threshold of 250. The eastern North Atlantic subpopulation, if it still exists, is clearly extremely small (fewer than 50 mature individuals). If listed separately, it would be classified as Critically Endangered, Possibly Extinct (CR PE) (IUCN, 2008).

History:

- 1996 – Endangered (Baillie and Groombridge 1996)
- 1996 – Endangered (Baillie and Groombridge 1996)
- 1994 – Endangered (Groombridge 1994)
- 1994 – Endangered (Groombridge 1994)
- 1990 – Endangered (IUCN 1990)
- 1990 – Vulnerable (IUCN 1990)
- 1988 – Endangered (IUCN Conservation Monitoring Centre 1988)
- 1986 – Endangered (IUCN Conservation Monitoring Centre 1986)

North Atlantic right whales were the first target of commercial whaling and the first whale species to be seriously depleted. They are nowadays the rarest large whales in the world. The North Atlantic population of this species is usually divided into an eastern and a western stock. The present range of western *E. glacialis*, from Florida to Nova Scotia with very occasional records beyond those limits, is

much reduced from its historical extent. The best estimate of present abundance is about 300 animals. In the eastern North Atlantic, there have been only a handful of right whale sightings in the last few decades. It is not known whether some or all of the whales seen are individuals from the known western population (Perrin *et al.*, 2002). Photo-identification and preliminary genetics data from recent work suggest that there may be links between animals found in the western and eastern Atlantic (Knowlton *et al.*, 1992; Evans, 2000) (OSPAR, 2008). The right whale observed in the Azores on January 2009 was matched to a whale regularly seen in the Western North Atlantic (MS, pers. comm.). This whale was sighted in the Bay of Fundy in September 2009. Given the rarity of sightings in the Central and Eastern Atlantic, and considering that in only a few of these sightings have whales been photographed, then the match from the Azores and another recent match (Jacobsen *et al.*, 2004) may suggest a stronger link than previously thought between whales found in the western and eastern Atlantic

Current population sizes

Northwest Atlantic: The current population is of about 300–350 individuals off the east coast of North America. IWC (2001a) obtained a minimum estimate of 263 in 1996 from identified animals known to be alive at that time and indicated that the true population was probably not much higher. Kraus *et al.* (2001) provided a minimum estimate of 299 in 1998 based on animals presumed to be alive at that time (and not missing for more than 5 years). Preliminary analysis of more recent data has yielded estimates similar to those above. The whales are regularly surveyed in the winter calving ground off Florida and Georgia, and in spring/summer feeding grounds in Cape Cod Bay, the Great South Channel off Massachusetts, the Gulf of Maine, the Scotian Shelf, and the Bay of Fundy, but not all the whales using the wintering ground are seen in these major summering areas (IWC, 2001b). There have been a few sightings in recent years in the Gulf of St Lawrence, six sightings off Iceland between 1987-2003, and one in the former whaling ground off Cape Farewell in 2004 (IWC, 2005). A sighting off Norway in 1999 (Jacobsen *et al.*, 2004) and a recent sighting in the Azores in 2009 (MS, pers. comm.) were identified as well-known animals from the western North Atlantic population.

Calf counts have been collected since 1980 but counts in the 1980's were probably underestimates, due to non-coverage of the winter calving grounds. Calf production has fluctuated, possibly linked to environmental conditions (Greene *et al.*, 2003). It was low during 1998-2000 (av. 3 per year, with an associated calving interval of 5.7 years, Kraus *et al.*, 2001) but high during 2001-2005 (av. 23 per year) (Clapham, 2005). Nineteen calves were recorded in 2006 and 29 calves were recorded in 2009, with the average inter-birth interval of the mothers concerned was 3.2 years (Anon, 2006).

An analysis of survival and reproductive rates (Caswell *et al.*, 1999) concluded that survival rates had declined and that, as of 1995, the population was in decline. However, the finding of population decline was based on the assumption that only 38% of mature females were reproductively active, whereas the true figure appears to be over 70% (IWC, 2001b). A subsequent review of survival rates concluded that survival rates probably were lower in the 1990s than in the 1980s (Clapham, 2003). No more recent data on survival rates have been published to date; while reproduction has noticeably increased in this population, mortality has remained high and is a source of serious concern (IWC, 2006).

Increase, if any, in this population is at a much lower rate than in the Southern Right whale. Per capita calf production and calving intervals have been highly variable over the last decade. The occurrence of skin lesions, of a kind not seen in Southern Hemisphere right whales, was recorded during the period 1995 to 2002, and appeared to be correlated with the failure to reproduce of females that would normally be ready to calve (Reeves *et al.*, 2001; Rolland *et al.*, 2007). Over the same period, body condition as measured by blubber thickness was poorer in the North Atlantic than in Southern

Hemisphere right whales (IWC, 2001c). Mortality rates are higher than in Southern Hemisphere right whales, due largely to human-caused deaths (IWC, 2001b).

Northeast Atlantic: It is not clear whether there is a remnant Northeast Atlantic population or whether the animals seen there in modern times are vagrants from the western Atlantic breeding stock (Reid *et al.*, 2003; Evans, 2008). There have been only nine confirmed sightings from 1960 to 2009, including the animals sighted in Norway in 1999 and in the Azores in 2009, which were matched with the western North Atlantic population (IWC, 2001b; MS, pers. comm.). A possible right whale was sighted in the Bay of Biscay in 1977 (Aguilar, 1981) and a cow-calf pair was sighted off Cape Vincent, Portugal in 1995 (Martin and Walker, 1997). A recent survey of the former Cintra Bay calving ground off Western Sahara failed to locate any right whales (Notarbartolo di Sciara *et al.*, 1998), although survey conditions were often poor. A single right whale was sighted in 2000 in international waters overlying the offshore Hatton Bank to the northwest of Scotland, during a British Geological Survey mission (Ó Cadhla *et al.*, 2004). Five further sighting records from UK waters and the deeper Atlantic west of the European continental shelf were given in Reid *et al.* (2003).

Population trend: Unknown (IUCN, 2008).

Condition (current/trends/future prospects)

The Northern Right whale remains critically depleted even after more than six decades of international legal protection and may still be facing the threat of extinction (Perrin *et al.*, 2002).

Limitation in knowledge

Knowledge about the North Atlantic right whale in the OSPAR range is extremely sparse, due to the rarity of sightings records and the breeding status of the species in the area (Possibly Extinct). The few recent observations may refer to individuals of the western North Atlantic stock.

4. Evaluation of threats and impacts

Table 3. Summary of key threats and impacts to *E. glacialis*

Type of impact	Cause of threat	Comment
Death or injury by ship strikes	Shipping and navigation	Increasing ship traffic increases this kind of threat for right whales, especially as this species is spending much time in near shore habitats and appears to be particularly vulnerable to this threat .
Disturbance	Research	If too invasive.
Entanglement in fishing gears	Fishing	Can cause mortality or serious injury.
Noise disturbance	Military activities (sonars)	Hearing damage, inter-individual communication affected, habitat loss, disturbance
Noise disturbance	Shipping and navigation	Hearing damage, inter-individual communication affected, habitat loss, disturbance
Noise disturbance	Oil and gas exploration and extraction activities	Hearing damage, inter-individual communication affected, habitat loss, disturbance

Health, fertility problems	Chemical pollution	Persistent organic pollutants bio-accumulate in lipid rich tissues (blubber).
Prey decline	Global warming	Consequences are still largely unknown, further studies are needed.
Habitat disturbance and loss	Noise pollution, reduction of sea surface ice (global warming), disturbance, removal of target species	In areas where habitat loss is a risk, studies are needed to evaluate how the species is at risk from this threat and how its effects might be mitigated.

Cross-reference to checklist of human activities in OSPAR MPA Guidelines

Relevant human activity: Shipping & navigation, military activity, research; fishing, hunting, harvesting.

Category of effect of human activity: Physical – noise disturbance. Biological – removal of target species, removal of non-target species, physical damage to species.

Major threats:

Whaling, and therefore human activity, is known to have caused the significant decline of the Northern Right whale (OSPAR, 2008). North Atlantic right whales were the first whales to be harvested commercially by the Basques along the Atlantic coast of Western Europe as early as the 11th century. As populations nearest shore were depleted, Basque whaling expanded to more distant waters, reaching eastern Canada by 1530 (Perrin *et al.*, 2002).

All right whale populations worldwide were protected from commercial whaling in the 1930s by the first International Convention for the Regulation of Whaling. However, illegal whaling has been reported throughout the 20th century.

As right whales in the North Atlantic are no longer hunted, the most serious current threat is death or injury from collisions with ships off the eastern coast of North America and entanglements in fishing gear (Knowlton and Kraus, 2001; Kraus and Rolland, 2007).

Indeed, the most significant human-related source of mortality at present in western North Atlantic right whales is collision with large ships. Between 1970 and 1999, 16 right whales were known to have been killed by ships, and two others were last seen with serious and probably fatal injuries. There are probably additional mortalities that are never discovered because the carcasses are lost at sea. Ship collisions in the North Atlantic are influenced by right whales spending much time in near shore habitats and a high level of industrial development (Perrin *et al.*, 2002).

The second most important human-related mortality factor in western North Atlantic right whales is incidental capture in commercial fishing gear. The gear involved is fixed gear (set in one location rather than towed behind a vessel), including sink gill nets, drift nets, and a variety of pot and trap fisheries. Since 1970, three right whales are known to have been killed by entanglements and eight others were seriously injured but disappeared and probably died. It is not always known whether entanglements occur in actively fishing gear or in gear that has been lost or damaged. Many entanglements involve the tail, where the leading edges of the flukes begin, and leave characteristic scars afterwards. As over 60% of whales in the western North Atlantic carry such scars, one can suggest that entanglements are often not lethal (Perrin *et al.*, 2002).

During 1999-2003, the recorded human-caused mortality and serious injury averaged 2.6 animals per year, of which 1.6 per year were due to fishery entanglements and 1.0 per year were due to vessel collisions. A further 11 deaths (8 ship strikes, 1 entanglement and two of unknown cause) were reported between 2004 and the end of 2006. Based on scarring from fishing gear it is estimated that at least 72% of the right whale population had been involved in an entanglement event at some point in their lives, and that 10-30% of the population is entangled each year (Clapham, 2005). Because some anthropogenic deaths probably pass undetected, reported rates are considered as minimum estimates (IUCN, 2008).

Right whales are feeding specialists, with a relatively narrow range of acceptable prey species and requiring prey to be concentrated in exceptionally high densities. The development of their feeding grounds is closely linked to physical phenomena such as water structure, currents, and temperature. This makes them very sensitive to impacts from climate change. Any possible impacts may be increased because of matrilineal fidelity to their feeding grounds, and possibly a relatively low ability to locate new feeding grounds when conditions change (Perrin *et al.*, 2002).

Other human impacts:

There are a number of other potential human impacts on right whales:

- Habitat loss due to high levels of human activity.
- Pollution (especially oil spills). A recent concern is that some contaminants (through bioaccumulation) may act as hormone mimics, affecting reproduction, or as immune suppressants.
- Acoustic disturbance. Anthropogenic noise may have the potential to interfere with acoustic communication, particularly since the major noise source, shipping, is also concentrated in the lower frequencies.
- Effects of intensive commercial fisheries may alter ecosystem structure, increasing the abundance of other species that feed on zooplankton, particularly small fishes.
- The long-term effects of extreme population depletion by whaling might include reduced genetic diversity and associated health and reproductive problems.

5. Existing Management measures

The population was severely depleted before it was given protection by the first International Convention for the Regulation of Whaling. The ban needs to remain in place and management measures need to be geared towards enabling the recovery of the population. OSPAR does not deal with whaling issues directly but can communicate an opinion on it to the IWC and to the North Atlantic Marine Mammal Commission (NAMMCO) (OSPAR, 2008).

Conservation actions: The Right whale has been protected from hunting by the IWC and its predecessor since 1935, and is also protected in Canada, a non-member of the IWC. Efforts are underway in both the US and Canada aimed at limiting deaths and injuries due to ship strikes and entanglements. In both countries, recovery plans have been developed involving collaboration among the various stakeholders. Regulations are in place in the US requiring modifications to fishing gear and restrictions on certain types of gear in areas and times where Right whales are common (Clapham, 2005). A Mandatory Ship Reporting Scheme has been in place since 1999 in two areas in the right whale calving and summering grounds to enable vessels to be warned of right whales in the area. Regulations specify minimum approach distances for whale-watching and other vessels. Shipping lanes in the Bay of Fundy have been moved, with the approval of the International Maritime

Organization (IMO), to take them away from the major summer concentrations of right whales. A regulatory proposal to enforce maximum transit speeds on vessels passing through Right whale habitats off the US east coast was still under review in 2007 (IUCN, 2008).

There is as yet no indication of a decrease in the rate of anthropogenic mortality; hence it is unclear whether the measures taken to date are sufficient.

The species is listed in Appendix I of both CITES and CMS.

The IUCN have classified the northern right whale as an endangered species (IUCN, 2002).

Right whales are also protected by the Bern Convention (annex II).

As a cetacean species known to occur in the waters of European fishery zones, Northern right whales are afforded strict protection as Annex IV species under the EU Habitats Directive (i.e. Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora).

In Ireland, all whales are listed as a protected species under the Wildlife (Amendment) Act 1976-2005 making it an offence to hunt, kill or injure a whale and/or disturb their breeding or resting places. In addition, a “Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish Waters” has been in place since 2007. This is applied by all Authorities when licensing acoustic surveys, e.g., petroleum exploration and development, marine scientific research, etc. The guidelines provide mitigation measures designed to minimise the potential impact on cetaceans from certain anthropogenic sound sources including *inter alia*, seismic surveys.

Similarly, in the UK, northern right whales are protected under the various country-specific Habitats Regulations and the Offshore Regulations, which make it an offence to hunt, kill or injure and/or disturb them. In 2010, guidance will be provided on regulations related to the protection of all cetaceans in UK waters from injury and disturbance potentially caused by human activities. In addition, as part of the consents process for undertaking seismic surveys, and activities involving explosives and piling, there is a requirement to undertake operations in accordance with JNCC guidelines which include conducting marine mammal observations prior to and during the activity and utilising procedures to reduce and avoid direct harm to animals (see <http://www.jncc.gov.uk/default.aspx?page=4273>).

6. Conclusion on overall status

The breeding stock of North Atlantic right whale within the OSPAR range is possibly extinct (comment: Norway states this extinction as a fact and not only a possibility), and the few recent sightings reported from the area are likely to be of individuals from the western Atlantic breeding stock. However, rare records of this highly endangered species do occur in the OSPAR Maritime Area and, although the species' status in the area is poorly known, these indicate that the OSPAR area continues to form part of the natural range of the species in the North Atlantic.

7. Actions to be taken by OSPAR

As set out in Article 4 of Annex V of the Convention, OSPAR has agreed that no programme or measure concerning a question relating to the management of fisheries shall be adopted under this Annex. However where the Commission considers that action is desirable in relation to such a question, it shall draw that question to the attention of the authority or international body competent for that question. Where action within the competence of the Commission is desirable to complement or support action by those authorities or bodies, the Commission shall endeavour to cooperate with them.

For the avoidance of doubt, in the context of the OSPAR Convention, the management of fisheries includes the management of marine mammals

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

- Develop guidelines or Codes of Practice to mitigate the potential impact on Northern right whales of anthropogenic sound sources.
- Develop a reporting system for ship strikes of large whales that will better inform on the scale of this occurrence and possibly identify critical areas or seasons for such events.
- Encourage Contracting Parties to facilitate in information exchange and cooperate in research efforts where new records of this endangered species occur within the OSPAR Maritime Area.
- Communicate with US/Canadian authorities requesting information on possible support measures that OSPAR could provide to enhance the prospects for the remaining population of right whales in the North Atlantic.

Actions/measures for relevant Contracting Parties

- Keep informed of trends in western North Atlantic stock and of any new sightings from the OSPAR region.
- Communicate any new sighting or acoustic records of the species to OSPAR, other Contracting Parties and to the relevant authorities and institutions in the US/Canada.
- Incorporate effective mitigation of threats to the remaining Northern right whale stocks into ongoing measures for the protection of cetacean species
- Include the consideration of potential occurrence of Northern right whale in designing national and international cooperative research programmes for cetaceans, as appropriate.

Table 4: Summary of key priority actions and measures which could be taken for *E.glacialis*. Where relevant, the OSPAR Commission should draw the need for action in relation to questions of fisheries management to the attention of the competent authorities. Where action within the competence of the Commission is desirable to complement or support action by those authorities or bodies, the Commission shall endeavour to cooperate with them.

Key threats	Death or injury by ship strikes, entanglements in fishing gears, noise pollution, chemical pollution, habitat loss	
Relevant Contracting Parties	Denmark, France, Iceland, Ireland, Norway, Portugal, Spain, UK	
Other responsible authorities	NAMMCO; IWC; CITES	
Already protected? Measures adequate?	IWC (fully protected) Bern Convention Annex II Bonn Convention (CMS) Annex I CITES Appendix I IUCN Red List (Endangered) EU Habitats Directive Annex IV	Current measures mostly ban hunting and international trade of Right whale. No measure is designed to protect habitat against identified threats such as global warming, ecosystem shifts and associated effect on prey stocks, pollution, man-made noise, ship strikes... Guidance to mitigate the impact on cetaceans of anthropogenic sound from acoustic surveys is in place in Ireland and the UK.

Suggestions for further research

- Examine the relationship between Iceland feeding groups and the western North Atlantic stock.
- Develop the necessary research to investigate and/or monitor the regularity of occurrence of the species within the OSPAR Maritime Area.
- Conduct an assessment of the potential threat to this species of entanglement in fishing gears and ship strikes within the OSPAR Maritime Area.

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

Contracting Party	Feature occurs in CP's Maritime Area	Contribution made to the assessment (e.g. data/information provided)	National reports References or web links
<i>Belgium</i>			
<i>Denmark</i>	yes		
<i>European Commission</i>			
<i>France</i>	yes		
<i>Germany</i>			
<i>Iceland</i>	yes	yes	
<i>Ireland</i>	yes	yes	<p>Ó Cadhla, O., Mackey, M., Aguilar de Soto, N., Rogan, E. and Connolly, N. 2004. <i>Cetaceans and Seabirds of Ireland's Atlantic Margin. Volume II- Cetacean distribution and abundance</i>. Report on research carried out under the Irish Petroleum Infrastructure Programme (PIP): Rockall Studies Group (RSG) projects 98/6 and 00/13, Porcupine Studies Group project P00/15 and Offshore Support Group (OSG) project 99/38, 89pp.</p> <p>Reid, J.B., Evans, P.G.H. and Northridge, S.P. 2003. <i>Atlas of Cetacean distribution in north-west European waters</i>. Joint Nature Conservation Committee, Peterborough. 75pp.</p>
<i>Netherlands</i>			
<i>Norway</i>	yes	yes	
<i>Portugal</i>	yes	Report of sighting of Northern Atlantic right whale in the Azores in January 2009	Contact: Mónica Silva (monica@uac.pt)

Background document for Northern right whale *Eubalaena glacialis*

<i>Spain</i>	yes		
<i>Sweden</i>			
<i>UK</i>	yes	yes	Reid, J.B., Evans, P.G.H. and Northridge, S.P. 2003. <i>Atlas of Cetacean distribution in north-west European waters</i> . Joint Nature Conservation Committee, Peterborough. 75pp.

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North-East Atlantic used sustainably**

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