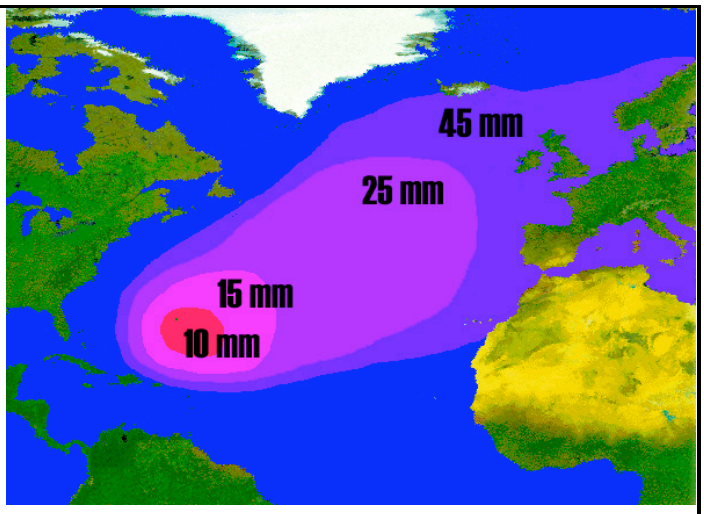
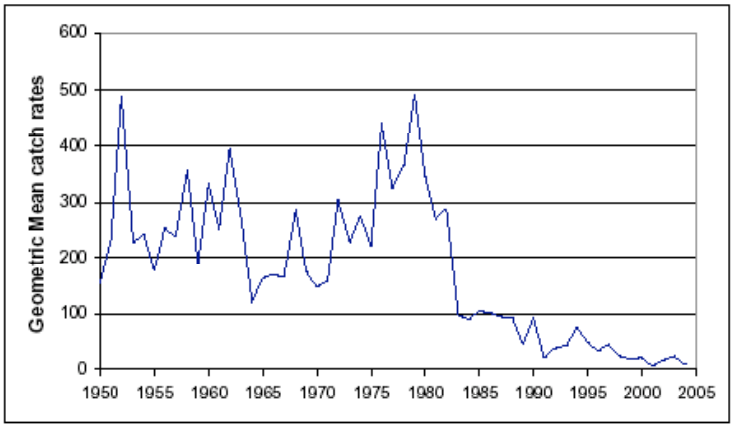
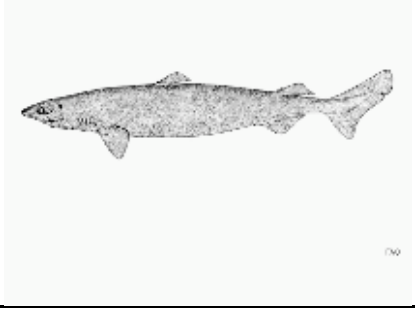
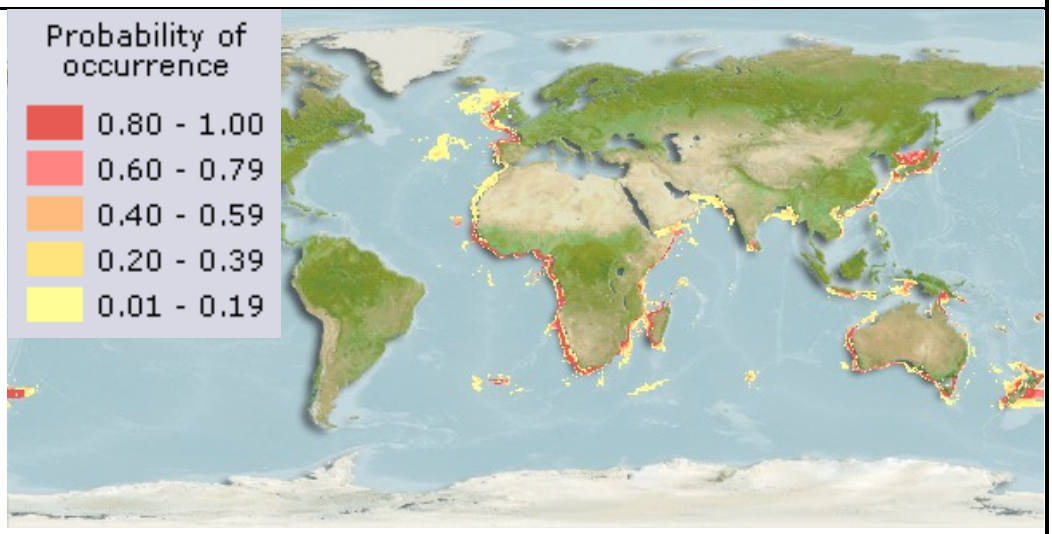
This species proposal to the OSPAR list of species and habitats under threat and/or decline is based primarily on		
Subject of nomination		
Species	***Anguilla anguilla,* European eel** 	
Subspecies or population		
Geographical extent		
OSPAR Regions	I – Arctic Waters II – Greater North Sea III – Celtic IV – Bay of Biscay and Iberian Coast V- Wider Atlantic	I, II, III, IV, V
Biogeographic Zones	from Dinter, 2001	1, 2, freshwater
Region and biogeographic zones specified for decline and/or threat	As above  **Figure 1** Prospective River Basin Districts RBD in Europe. Eels occur in all indicated RBDs (in Danube RBD mostly re-stocked). Source: Nilson et al. (2004).	

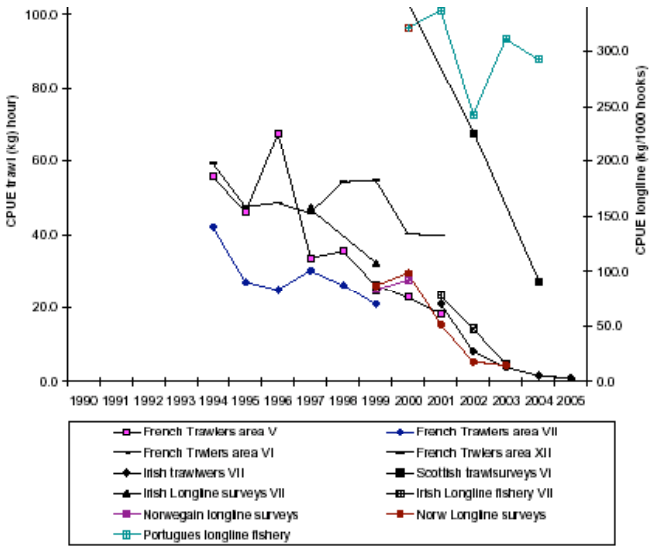
		
Known distribution/range of nominated species (brief description)	Atlantic Ocean: Atlantic coast from Scandinavia to Morocco and rivers of North Atlantic, Baltic and Mediterranean seas. Spawning area in western Atlantic (Sargasso Sea). Recent genomic DNA studies show that the European eel exhibits isolation by distance, implying that non-random mating and restricted gene flow among eels from different location exists (source: www.fishbase .org)	
Application of Texel-Faial Criteria		
Global importance If Yes specify evidence (brief description)	Yes The OSPAR maritime area and the riverbasins of OSPAR Contracting Parties represent almost the whole natural distribution range of the European eel.	
Regional importance If Yes specify evidence (brief description)	No	
Rarity If Yes specify evidence (brief description)	No	
Sensitivity	• Sensitive • Very Sensitive • Neither of the above/ Not sensitive with respect to definitions	(very) Sensitive
Where relevant specify evidence (brief description)	Eels are longlived and spawn only once in their lifetime. Neither mechanisms nor timing or location of the spawning in the Sargasso Sea are yet fully understood. Eels may stay decades in the river systems before migrating back into the sea to spawn. An analysis of the stock dynamics under different management regimes indicates that the recovery time for eel could be at least 20 years, depending on the implemented fisheries restrictions and the model assumptions.	
Keystone species	?	
Decline	• Extirpated (extinct within OSPAR area • Severely declined • Significantly declined • Probability of significant decline • None of the above/ Not declining	Severely declined
Where relevant specify evidence (brief description)	The population of the European eel (*Anguilla anguilla* (L).) is in decline and current fisheries are considered outside sustainable limits (ICES 1999, 2002, 2005, 2006). All available information indicates that the stock is at a historical minimum in most of the distribution area and continues to decline. The recruitment of glass eels to Europe has showed a sharp decline in the last 25 years (1 5% of the pre-1980 level). The historically low recruitment levels in recent years are an indication that the reproduction is seriously impaired and that	

	the stock is likely to be severely depleted. And most recent observations do not indicate recovery (Figures 9.4.9.1 and 9.4.9.2). Factors involved include exploitation as well as other anthropogenic impacts (habitat loss, migration barriers, pollution), but also natural impacts (cormorants, ocean climate). Further assessment of the biological status of eel requires additional and consistent data.  1 Time-series of glass eel monitoring in Europe. The line indicates the geometric mean of the series from Loire (F), Ems (D), and DenOever (NL), which are the longest and most consistent time-series. Each series has been scaled to the 1979–1994 average.
Threat	• Currently threatened • Potentially threatened • Not threatened Currently threatened
Where relevant, specify evidence (brief description)	The population of the European eel (*Anguilla anguilla* (L).) is in decline and current fisheries are considered outside sustainable limits (ICES 1999, 2002, 2005). Fishing mortality is thought to be high both on juvenile (glass eel) and older eel (yellow and silver eel). Apart from fisheries exploitation factors involved include other anthropogenic impacts (habitat loss, migration barriers, pollution), but also natural impacts (cormorants, ocean climate). There are strong concerns that the European eel population might be devastated by a new threat: *Anguillicola crassus*, a foreign parasitic nematode. This parasite from East Asia (the original host is Anguilla japonica) appeared in European eel populations in the early 1980s. Since 1995 it also appeared in the United States (Texas and South Carolina), most likely due to uncontrolled aquaculture eel shipments. In Europe, eel populations are already from 30% to 100% infected with the nematode. Recently it was shown that this parasite inhibits the function of the swimbladder as a hydrostatic organ (Wuertz et al. 1996)
Relevant additional considerations	
Sufficiency of data	There is no agreed assessment method for European eel. This is due to both methodological issues and lack of data. An assessment method for eel was proposed by Dekker (2000). Research in this area is currently ongoing (SLIME) with the aim to provide analytical tools to set reference levels and to evaluate the stock status and the impact of management measures for eel. For some years there have been major inconsistencies between the official statistics on eel landings and ICES estimates. ICES finds that a major revision of the databases is required and has started this work.
Changes in relation to natural variability	While the relative contribution of the various possible influences causing stock decline remain unknown, specific focus is necessarily placed on those processes and influences which are potentially manageable. Some authors (e.g. Knights 2003) propose that the over-riding cause of decline is oceanic or climatological, as there is no evident change in known factors – such as habitat, fishing pressure or health status of the stock – that can explain the totality of a drop of recruitment by a factor 5–10 in the last decade (see Dekker 2004 for a

	comprehensive discussion). This, however, is not a reason for inaction, but rather a driver focusing the need for corrective action on those potential causes of decline which are potentially controllable or correctable by human management action (WGEEL 2005).
Expert judgement	See ICES documents
Threat and link to human activities	
Cross reference to checklist of human activities in OSPAR MPAs guidelines	*Relevant human activity: fishing, pollution, construction,* *Category of effect of human activity*. • Stock depletion •
Management considerations	
Current management	There is no centrally formulated long term management objective for the European eel population, and no proactive fisheries management system operating on a stock wide basis. Season closures have been applied locally in several areas. The effects of such closures to restrict fishing have not been evaluated. Season closure has been advised as a management measure to restrict the impact of fishing. In some countries there are license systems that control the glass eel fisheries. Restocking has been practised by some countries for decades, but this has generally been to maintain fisheries rather than improve the stock or recruitment. Since artificial reproduction is currently not possible for eel, all aquaculture and restocking has to be based on capture of glass eels. there is no actual evidence that restocking is functional in improving the SSB or recruitment.
Required further management	Scientific advice has been that the population is outside safe biological limits, that fishery and anthropogenic impact should be reduced to the lowest possible level and that a recovery plan be developed. (ICES, 2001; 2002). Only a combination of several measures can be expected to bring the stock out of its current critical state. Such measures include 1. Measures to limit exploitation by fisheries 1.1. Prohibition of fishing 1.2. Total allowable catches or quotas 1.3. Gear controls 1.4. Landing size limits 1.5. Closed seasons and/or areas 1.6. Licensing of fishermen and dealers 2. Measures regarding eel Habitat re-creation 2.1. Ensuring habitat accessibility 2.2. Reduction of habitat loss 2.3. Ensure habitat and water quality 2.4. Ensure downstream migration 3. Controls on non-fishery mortality 3.1. Turbine mortality 3.2. Predation 3.3. Disease and contamination 4. Restocking measures 4.1. Using glass eels from sources where there is still a demonstrable surplus 4.2. Using eels from aquaculture production (aquaculture being totally dependent on wild seed) Source: ICES WGEEL 2005 The European Commission has presented a **proposal for the recovery of the European eel stock** (COM(2005) 472 final). The objective of this Eel Recovery plan is to achieve a recovery of the stock of European eel to previous historic levels of adult abundance and the recruitment

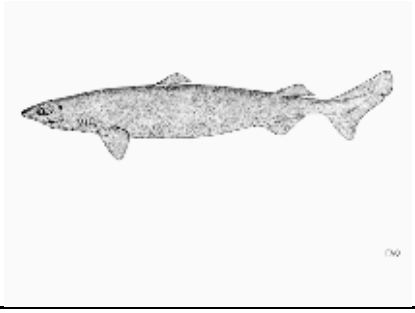
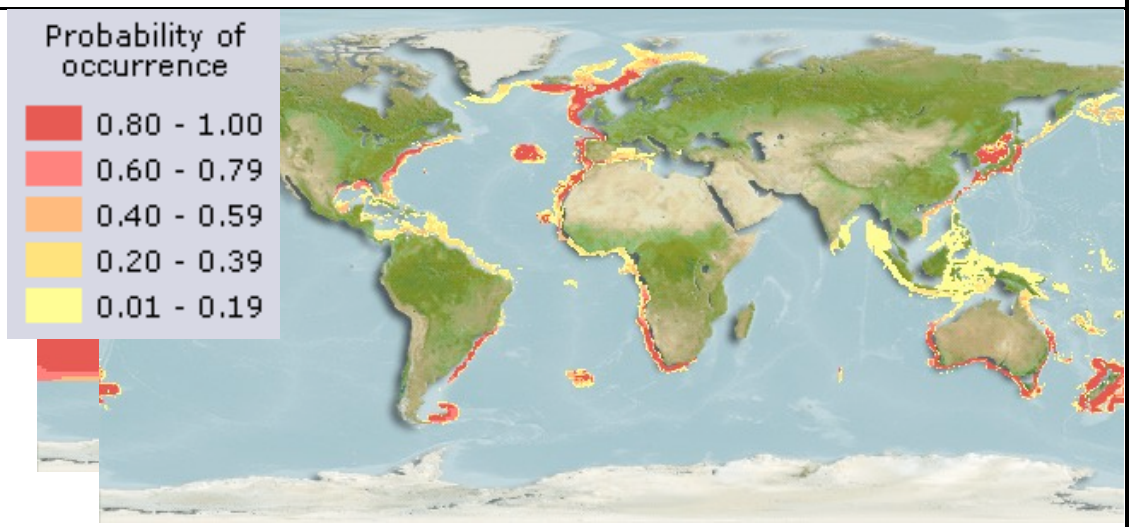
	of glass eel. More specifically: the principal element of the Regulation is the establishment of national eel management plans, by means of which each Member State will achieve the objective of a 40% escapement of adult silver eel from each river basin (measured with respect to undisturbed conditions). **The proposal by the European Commission has not yet been accepted by the Council of Ministers.** Precautionary reference points have not been agreed for eel. Due to the large uncertainties in eel management and biology (one single stock, spawning only once in their lifetime), ICES has proposed an **escapement target of 50%** (ICES, 2003). **An intermediate rebuilding target could be the pre-1980s average SSB level** which has generated normal recruitments in the past. ICES repeats its recommendation that a **recovery plan for the whole stock** should be implemented urgently. An important element of such a recovery plan should be a ban on all exploitation (including eel harvesting for aquaculture) until clear signs of recovery can be established. Other anthropogenic impacts should be reduced to a level as close to zero as possible. **Monitoring** of the fisheries, the stock and the habitat is required. As regards the stock, the following should be considered: Recruitment • Natural *vs.* restocking Yellow eel • As recruits • Abundance, age, size, growth, mortality Silver eel escapement • Contaminants, pathogens Monitoring the habitat of the eel should preferably be done by making use as much as possible of the habitat monitoring in the WFD (2003). However, further datacollection programmes may be required.
Useful references	Report from the ICES/EIFAC Working Group on Eels, Rome 23 27 January 2006. ICES CM 2006/ACFM:16. Dekker, W. (2000). "A Procrustean assessment of the European eel stock." ICES Journal of Marine Science 57(4): 938. Willem Dekker (2003). On the distribution of the European eel (*Anguilla anguilla*) and its fisheries Can. J. Fish. Aquat. Sci./J. can. sci. halieut. aquat. 60(7): 787-799 EC (2000) Water Framework Directive, 2000/60/EC. EC (2005) Proposal for the recovery of the European eel stock, COM(2005) 472. ICES (2003). Report of the ICES Advisory Committee on Fishery Management 2002. ICES Cooperative Research Report no. 255. ICES (2006). Report of the ICES Advisory Committee on Fishery Management 2006. 9.4.9. European Eel. **http://www.ices.dk/committe/acfm/comwork/report/2006/may/eel-eur.pdf**
Remarks	This species was previously proposed for inclusion on the Initial OSPAR list of threatened and/or declining species and habitats by Belgium and Portugal (2001) for OSPAR region II and IV, respectively.
Contact details	
Name	Sabine Christiansen
Organisation	WWF
Address	Magdeburger Str. 17 20457 Hamburg
Telephone	Tel. +49 40 530200-128 (+4940 41268695)
Email	christiansen@wwfneap.org

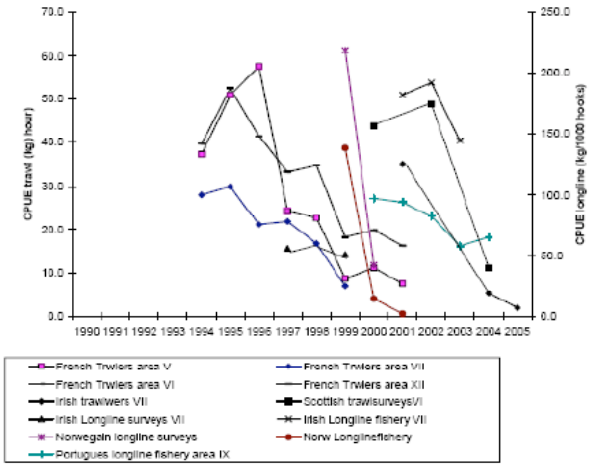
Subject of nomination (this nomination is based on ICES ACFM Advice 2005 and the justification given by IUCN 2006 for listing the species as vulnerable (IUCN 2006)		
Species	***Centrophorus squamosus*** **(Bonnaterre, 1788))– Leafscale gulper shark** 	
Subspecies or population		
Geographical extent		
OSPAR Regions	I – Arctic Waters II – Greater North Sea III – Celtic IV – Bay of Biscay and Iberian Coast V- Wider Atlantic	I, II, III, IV, V
Biogeographic Zones	from Dinter, 2001	1, 2,
Region and biogeographic zones specified for decline and/or threat	As above	
Known distribution/range of nominated species (brief description)	 Fig. 2: Probability map of occurrence of Leafscale gulper shark (*Centrophorus sqamosus*). http://www.fishbase.org/tools/aquamaps/imagethumb/file_destination/pic_653.jpg *Centrophorus squamosus* has a wide distribution: in the eastern Atlantic from Iceland and the Atlantic slope to the Canary Islands, Senegal, Faeroes, Madeira, Azores, Gabon to Dem. Rep. Congo, Namibia, and western Cape of Good Hope (South Africa). *Centrophorus squamosus* is found demersally on the continental slopes at depths between 230 and 2,400 m, also pelagically in the upper 1,250 m of oceanic water in depths to 4,000 m (Compagno and Niem 1998). It is is most abundant from 700 to 900 m.	
Application of Texel-Faial Criteria		
Global importance If Yes specify evidence	Possibly. Leafscale gulper sharks have a wide distribution along the continental shelves/slopes. However, nothing is known on population structure and genetic separation, so	

(brief description)	subpopulations are likely, but not known.	
Regional importance If Yes specify evidence (brief description)	?	
Rarity If Yes specify evidence (brief description)	Yes – on IUCN Red List 2006 (assessed 2003 as near vulnerable)	
Sensitivity	• Sensitive • Very Sensitive • Neither of the above/ Not sensitive with respect to definitions	Very sensitive
Where relevant specify evidence (brief description)	A study of the age and growth of this species off the Atlantic Slope (off Ireland) provided age estimates of 21-70 years (Clarke *et al.* 2002), however, the validation of whether the rings were formed annually was not undertaken. This species presumably attains maturity at a relatively late age.	
Keystone species	No	
Decline	• Extirpated (extinct within OSPAR area • Severely declined • Significantly declined • Probability of significant decline • None of the above/ Not declining	Severely declined
Where relevant specify evidence (brief description)	In ICES subareas VI, VII and XII (corresp. to OSPAR Region III and V), CPUE has declined over the history of the fishery while catch levels have increased to high levels. Landings in subarea IXa have been more stable and the decline in CPUE appears to be less pronounced. The directed fishery on deepwater sharks appears to have increased as is reflected in the increased landings. The CPUE information from the mixed deepwater fishery, where deepwater sharks are mainly taken as a bycatch, can be used as an indicator of stock development. Despite the increased landings, the CPUE information suggests that the stock abundance of these two species is depleted.  Fig. 2: Leafscale gulper sark (s. squamosus). CPUE from trawls fisheries, longline fisheries and surveys (Fig. 1.4.1.3. in ICES ACFM 2005).	
Threat	• Currently threatened • Potentially threatened • Not threatened	Currently threatened
Where relevant, specify evidence (brief description)	*Centrophorus squamosus* is an important component of deep-water fisheries in certain areas within its range. This shark has been exploited commercially for many years. In Japan exploitation peaked during World War II, because of the high percentage of squalene in its	

	liver, but quickly declined due to decreasing numbers caught. Deep-water fisheries (longlining and trawling) which catch large quantities of this species are found in the eastern Atlantic, e.g., off Ireland, Spain, Portugal and France (Iglesias and Paz 1995, Clarke *et al.* 2001, Girard and De Buit 1999). For example, this species is targeted heavily by the Portuguese deep-water longline fishery for which exploitation peaked in 1986 (600 tonnes) and has been steadily declining since then (Correia and Smith, in prep). The catches of the mixed trawl fishery off Rockall Trough and Porcupine Bank in the eastern Atlantic, which consist predominantly of this species and *Centroscymnus coelolepis*, increased from 302 tonnes in 1991 to 3,284 tonnes in 1996, and then declined to 1,939 tonnes in 1999 (ICES 2000). Although this suggests that the population is declining, this data cannot be directly related to fishing effort and it is therefore possible that fishing effort declined between 1996 and 1999. The French bottom trawl fishery has shown rapidly increasing landings of these species, i.e.,322 tonnes in 1990 and 2,939 tonnes in 1996 (Girard and De Buit 1999). Quantitative catch per unit effort are available for autoline catches in ICES Area VI: 218 (1997) to 24 (2000); 219 (1998) to 42 (2000) = 80-90% decline in three years. Area VII: 221(96), 56 (97), 51 (99), 73 (00) = 67-77% decline in four years. Area XII: 100 (1999), 78 and 31 (2000) = 20-69% decline in one year (SGRST 2002). Although this data is for *C. squamosus* and *Centroscymnus coelolepis* combined, the acute vulnerability to exploitation of *Centrophorus* spp has been shown from the New South Wales (NSW) fishery independent surveys (Graham *et al.* 2001), and *C. squamosus* is the more vulnerable of these two species in terms of life history. The major threats as listed by IUCN (2006) are: 3.1.1 Harvesting (hunting/gathering) - Food - Subsistence use/local trade (ongoing) 3.1.2 Harvesting (hunting/gathering) - Food - Sub-national/national trade (ongoing) 3.1.3 Harvesting (hunting/gathering) - Food - Regional/international trade (ongoing) 3.4. Harvesting (hunting/gathering) 9.2 Intrinsic factors - Poor recruitment/reproduction/regeneration (ongoing) 9.7 Intrinsic factors - Slow growth rates (ongoing) Not listed in IUCN (2006) but considered relevant: 4.1.1.1 Accidental mortality - Bycatch - Fisheries-related - Hooking (ongoing) 4.1.1.2 Accidental mortality - Bycatch - Fisheries-related - Netting (ongoing)
Relevant additional considerations	
Sufficiency of data	CPUE series exist, however, exact population status and fishing mortality unknown. Usually no species-specific data available. The rapid development of fisheries for deepwater sharks has also made it difficult for scientists to collect data and perform stock assessments.
Changes in relation to natural variability	Not known
Expert judgement	
Threat and link to human activities	
Cross reference to checklist of human activities in OSPAR MPAs guidelines	*Relevant human activity:* fishing/harvesting, trade *Category of effect of human activity:*. Target fishery and bycatch - Stock depletion
Management considerations	
Current management	Deepwater sharks are caught in large numbers by fleets that diversified into deepwater fishing in the 1990s as an alternative to traditional fisheries. The main fleets catching deepwater sharks are French and UK trawlers, UK and German gill netters, and Portuguese artisanal longliners. Deepwater sharks are caught in a mixed fishery for deepwater species and as a targeted fishery using longlines and gillnets. A series of TACs is set for EU waters and EU vessels in international waters of V-XII. The TAC applies to all deepwater sharks (though 95% of the

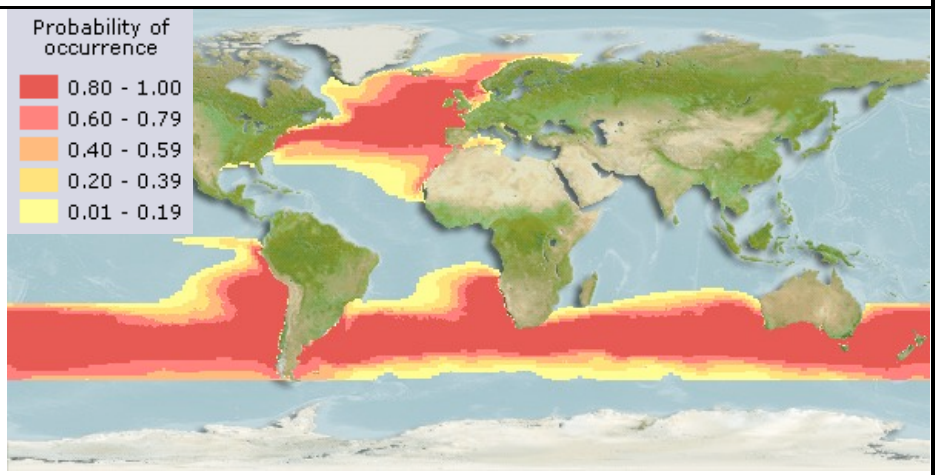
	catch consists of Portuguese dogfish and Leafscale Gulpershark, the other species being discarded). The sum of these TACs is 7,000 t for 2005 and 2006. The TACs do not appear to restrict the catches of deepwater sharks. These sharks are often taken in mixed fisheries. An effort restriction regime is in place since 2003 (EC 2347/2002, 27/2005) for fisheries taking these sharks in EU waters and for EU vessels in international waters. Norwegian vessels in EU waters are subject to a multi-species quota for these species and spurdog. This quota is about equal to recent Norwegian catches of deepwater sharks in EU waters. Since 1 February 2006, no gillnets, trammel nets and entangling nets may be deployed deeper than 200 m in ICES areas VI a, b and VII b,c,j,k and subarea XII. (COUNCIL REGULATION (EC) No 51/2006).
Required further management	The rates of exploitation and stock sizes of deepwater sharks cannot be quantified. However, based on the CPUE information, the stocks of Portuguese dogfish and Leafscale Gulper shark are considered to be depleted and likely to be below any candidate limit reference point. Given their very poor state, **ICES recommends a zero catch of deepwater sharks**. If a fishery is taking place on these species, the catch data should be recorded by species. Zero catch of deep water shark in the mixed fisheries will require that means are identified and implemented to avoid any by-catches of deep water sharks in these fisheries. If this is not possible, in order to reduce catches in the mixed fishery, effort needs to be reduced to the lowest possible level in mixed fisheries taking deep water sharks as a by-catch. Research action considered necessary (IUCN 2006) 3.2 Research actions - Population numbers and range (needed) 3.6 Research actions - Uses and harvest levels (needed) 3.9 Research actions - Trends/Monitoring (needed)
Useful references	White, W.T. 2003. *Centrophorus squamosus*. In: IUCN 2006. *2006 IUCN Red List of Threatened Species*. <www.iucnredlist.org>. Downloaded on **01 September 2006**. ICES ACFM (2005). 1.4.1 Deepwater sharks in the northeast Atlantic (ICES Sub-areas V-XIV, mainly Portuguese dogfish and leafscale gulper shark. Vol. 10, pp 21-27
Remarks	This species is listed in the IUCN Red List 2006 as vulnerable (criteria VU A2bd+3bd+4bd ver 3.1 (2001). Assessment date: 2003. Evaluators: White, W.T. (SSG Australia & Oceania Regional Workshop, March 2003) ICES ACFM (2005) recommends a zero catch of deepwater sharks
Contact details	
Name	Sabine Christiansen
Organisation	WWF
Address	Magdeburger Str. 17 20457 Hamburg
Telephone	Tel. +49 40 530200-128(+4940 41268695
Email	christiansen@wwfneap.org

Subject of nomination (this nomination is based on ICES ACFM Advice 2005 and the justification given by IUCN 2006 for listing the species as near threatened (IUCN 2006)		
Species	***Centroscymnus coelolepis)*** **(Bocage & Capello, 1864)– Portuguese dogfish** 	
Subspecies or population		
Geographical extent		
OSPAR Regions	I – Arctic Waters II – Greater North Sea III – Celtic IV – Bay of Biscay and Iberian Coast V- Wider Atlantic	I, II, III, IV, V
Biogeographic Zones	from Dinter, 2001	2, 7, 5, 6, 9, 11, 12, 13, 14, 15, 16, 20
Region and biogeographic zones specified for decline and/or threat	As above	
Known distribution/range of nominated species (brief description)	 Fig. 2: Probability map of occurrence of Portuguese dogfish (*Centroscymnus coelolepis*). http://www.fishbase.org/tools/aquamaps/imagethumb/file_destination/pic_88.jpg Wide and patchy global distribution. Eastern Atlantic: Iceland south along Atlantic slope to the southwestern Cape coast of South Africa; Lives On or near the bottom of the continental slope and abyssal plain in depths from 270-3,700 m, with highest abundances in waters of 1100 to 1300 m depth. Surveys conducted in Portugal never found this species in depths shallower than 800 m. There appears to be sex and size segregation by depth.	
Application of Texel-Faial Criteria		
Global importance If Yes specify evidence (brief description)	Possibly. Portuguese dogfish occur globally on the continental shelves/slopes. However, nothing is known on population structure and genetic separation, so subpopulations are likely but not known.	
Regional importance If Yes specify evidence	?	

(brief description)		
Rarity If Yes specify evidence (brief description)	Yes – on IUCN Red List 2006 (assessed 2003 as near threatened)	
Sensitivity	• Sensitive • Very Sensitive • Neither of the above/ Not sensitive with respect to definitions	Very sensitive
Where relevant specify evidence (brief description)	Portuguese dogfish stock is highly vulnerable to exploitation as all reproductive stages, including mature and pregnant female Portuguese dogfish are found in ICES subareas V-VII where exploitation is most intense (in fact females dominate the catches). It is well established that targeting mature females is detrimental to shark stock status, due to longevity and slow recruitment. Portuguese dogfish is a sedentary species which increases its vulnerability to exploitation - local depletions are evident in the declines in CPUE.	
Keystone species	No	
Decline	• Extirpated (extinct within OSPAR area • Severely declined • Significantly declined • Probability of significant decline • None of the above/ Not declining	Severely declined to extirpated
Where relevant specify evidence (brief description)	In ICES subareas VI, VII and XII (corresp. to OSPAR Region III and V), CPUE has declined over the history of the fishery while catch levels have increased to high levels. Landings in subarea IXa have been more stable and the decline in CPUE appears to be less pronounced. The directed fishery on deepwater sharks appears to have increased as is reflected in the increased landings. The CPUE information from the mixed deepwater fishery, where deepwater sharks are mainly taken as a bycatch, can be used as an indicator of stock development. Despite the increased landings, the CPUE information suggests that the stock abundance of these two species is depleted.  **Figure 1.4.1.2** Portuguese dogfish (*C. coelolepis*). CPUE series from trawls fisheries, longline fisheries and surveys	
Threat	• Currently threatened • Potentially threatened • Not threatened	Currently threatened
Where relevant, specify evidence (brief description)	This shark has been exploited commercially for a long time – tthe high sqalene contents of the liver (22-49% by weight), is making it commercially attractive. Taken by trawl, hook and gillnet both as a target and bycatch species for its liver oil and flesh. Important fisheries for this species exist in Portugal where it is targeted by a deepwater longline fishery. Between 1986 and 1999 catches in Portugal varied between about 300-900 tonnes with an increasing trend. The price of landed wet weight in Portugal has also been increasing since 1986	

	(US$1.5/kg in 1986 to US$3.5/kg in 1999), which suggests that demand is driving the fishing industry to continue exploitation. However, CPUE data were lacking and it is not currently possible to assess changes in abundance and biomass from any areas. The major threats as listed by IUCN (2006) are: 3.1.1 Harvesting (hunting/gathering) - Food - Subsistence use/local trade (ongoing) 3.1.2 Harvesting (hunting/gathering) - Food - Sub-national/national trade (ongoing) 3.1.3 Harvesting (hunting/gathering) - Food - Regional/international trade (ongoing) 3.4.1 Harvesting (hunting/gathering) - Materials - Subsistence use/local trade (ongoing) 3.4.2 Harvesting (hunting/gathering) - Materials - Sub-national/national trade (ongoing) 3.4.3 Harvesting (hunting/gathering) - Materials - Regional/international trade (ongoing) 4.1.1.1 Accidental mortality - Bycatch - Fisheries-related - Hooking (ongoing) 4.1.1.2 Accidental mortality - Bycatch - Fisheries-related - Netting (ongoing)
Relevant additional considerations	
Sufficiency of data	CPUE series exist, however, exact population status and fishing mortality unknown. Usually no species-specific data available. The rapid development of fisheries for deepwater sharks has also made it difficult for scientists to collect data and perform stock assessments.
Changes in relation to natural variability	Not known
Expert judgement	
Threat and link to human activities	
Cross reference to checklist of human activities in OSPAR MPAs guidelines	*Relevant human activity:* fishing/harvesting, trade *Category of effect of human activity:*. Target fishery and bycatch - Stock depletion
Management considerations	
Current management	Deepwater sharks are caught in large numbers by fleets that diversified into deepwater fishing in the 1990s as an alternative to traditional fisheries. The main fleets catching deepwater sharks are French and UK trawlers, UK and German gill netters, and Portuguese artisanal longliners. Deepwater sharks are caught in a mixed fishery for deepwater species and as a targeted fishery using longlines and gillnets. A series of TACs is set for EU waters and EU vessels in international waters of V-XII. The TAC applies to all deepwater sharks (though 95% of the catch consists of Portuguese dogfish and Leafscale Gulpershark, the other species being discarded). The sum of these TACs is 7,000 t for 2005 and 2006. The TACs do not appear to restrict the catches of deepwater sharks. These sharks are often taken in mixed fisheries. An effort restriction regime is in place since 2003 (EC 2347/2002, 27/2005) for fisheries taking these sharks in EU waters and for EU vessels in international waters. Norwegian vessels in EU waters are subject to a multi-species quota for these species and spurdog. This quota is about equal to recent Norwegian catches of deepwater sharks in EU waters. Since 1 February 2006, no gillnets, trammel nets and entangling nets may be deployed deeper than 200 m in ICES areas VI a, b and VII b,c,j,k and subarea XII. (COUNCIL REGULATION (EC) No 51/2006).
Required further management	The rates of exploitation and stock sizes of deepwater sharks cannot be quantified. However, based on the CPUE information, the stocks of Portuguese dogfish and Leafscale Gulper shark are considered to be depleted and likely to be below any candidate limit reference point. Given their very poor state, **ICES recommends a zero catch of deepwater sharks**. If a fishery is taking place on these species, the catch data should be recorded by species. Zero catch of deep water shark in the mixed fisheries will require that means are identified and implemented to avoid any by-catches of deep water sharks in these fisheries. If this is not possible, in order to reduce catches in the mixed fishery, effort needs to be reduced to the

	lowest possible level in mixed fisheries taking deep water sharks as a by-catch.
Useful references	Stevens, J. & Correia, J.P.S. 2003. *Centroscymnus coelolepis*. In: IUCN 2006. *2006 IUCN Red List of Threatened Species.* <www.iucnredlist.org>. Downloaded on **01 September 2006**. ICES ACFM (2005). 1.4.1 Deepwater sharks in the northeast Atlantic (ICES Sub-areas V-XIV, mainly Portuguese dogfish and leafscale gulper shark. Vol. 10, pp 21-27
Remarks	This species is listed in the IUCN Red List 2006 as near threatened (criteria nt ver 3.1 (2001). Assessment date: 2003. Evaluators: Stevens, J. & Correia, J.P.S. (SSG Australia & Oceania Regional Workshop, March 2003) ICES ACFM (2005) advises zero catch for the species in all ICES areas.
Contact details	
Name	Sabine Christiansen
Organisation	WWF
Address	Magdeburger Str. 17 20457 Hamburg
Telephone	Tel. +49 40 530200-128(+4940 41268695
Email	christiansen@wwfneap.org

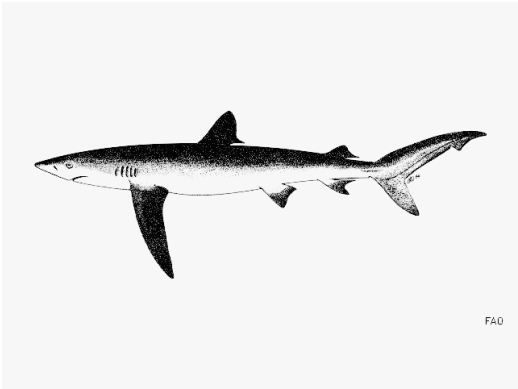
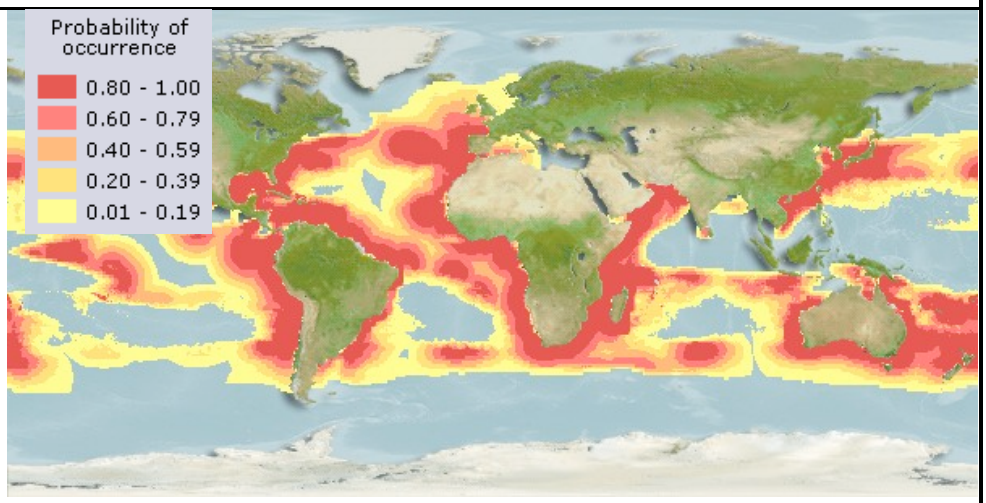
Subject of nomination (this nomination is based on the justification given by IUCN 2006 for listing the species as vulnerable (IUCN 2006)		
Species	***Lamna nasus* (Bonnaterre 1788) – Porbeagle shark** 	
Subspecies or population	North East Atlantic Subpopulation. North Atlantic tagging studies (DFO 1999, Kohler *et al*. 2002, Stevens 1990) indicate only one trans-Atlantic movement (Kohler and Turner 2001), implying that the two north Atlantic populations are distinct. There is no evidence of genetic exchange between the North Atlantic and the Southern Hemisphere population(s), which are separated by warm water.	
Geographical extent		
OSPAR Regions	I – Arctic Waters II – Greater North Sea III – Celtic IV – Bay of Biscay and Iberian Coast V- Wider Atlantic	I, II, III, IV, V
Biogeographic Zones	from Dinter, 2001	1, 2
Region and biogeographic zones specified for decline and/or threat	As above	
Known distribution/range of nominated species (brief description)	 Fig. 2: Probability map of occurrence of Porbeagle shark (Lamna nasus). http://www.fishbase.org/tools/aquamaps/imagethumb/file_destination/pic_88.jpg The porbeagle shark is a wide-ranging coastal and oceanic species found in temperate and cold-temperate waters worldwide (1-18°C, 0-370 m). Most abundant on continental offshore fishing banks but also found far from land in ocean basins and occasionally close inshore. Coastal and oceanic, amphitemperate, with centres of distribution in the North Atlantic and in a circumglobal band of temperate water of the southern Atlantic, southern Indian Ocean, southern Pacific and Antarctic Ocean (Compagno 2001).	

Application of Texel-Faial Criteria		
Global importance If Yes specify evidence (brief description)	Yes The distribution range of the genetically distinct Northeast Atlantic subpopulation falls entirely into the OSPAR maritime area.	
Regional importance If Yes specify evidence (brief description)	?	
Rarity If Yes specify evidence (brief description)	Yes – on IUCN Red List 2006	
Sensitivity	• Sensitive • Very Sensitive • Neither of the above/ Not sensitive with respect to definitions	Very sensitive
Where relevant specify evidence (brief description)	The porbeagle is a wide-ranging, coastal and oceanic shark, but with apparently little exchange between adjacent populations. Low reproductive capacity (av. reproductive age 18 y, ann. population increase 0.05) , very low natural mortality and high commercial value (in target and incidental fisheries) of mature and immature age classes makes this species highly vulnerable to over-exploitation and population depletion.	
Keystone species	?	
Decline	• Extirpated (extinct within OSPAR area • Severely declined • Significantly declined • Probability of significant decline • None of the above/ Not declining	Severely declined to extirpated
Where relevant specify evidence (brief description)	The eastern and western North Atlantic populations have both been seriously over-exploited by directed longline fisheries. Collapse of the Northeast Atlantic population led to intensive target fishing in the well-documented Northwest Atlantic fishery in the 1960s, with most of the virgin biomass removed in just six years. Renewed target fishing in the 1990s led to a further population decline to ~11-17% of virgin biomass within the three generation period for this species. The decline in this fishery is historically well-documented: The Northeast Atlantic fishery began when Norway started targeting porbeagle in the 1930s using longlines. Norwegian landings first reached a peak of 3,884 t in 1933. About 6,000 t were taken by the Norwegian fleet in 1947, when the fishery reopened after the Second World War, followed by a progressive drop in landings to between 1,200-1,900 t from 1953-1960. The collapse of this fishery led to the redirection of fishing effort by Norwegian and Danish longline shark fishing vessels into the Northwest Atlantic. Norwegian landings from the Northeast Atlantic subsequently decreased from 160-300 t/annum in the early 1970s to only 10-40 t/year in the late 1980s/early 1990s, while average Danish landings fell from over 1,500 t in the early 1950s to less than 100 t throughout the 1990s (DFO 2001a, Gauld 1989). French and Spanish longliners have operated directed fisheries for porbeagle since the 1970s. Reported landings from the main French fishing grounds in the Celtic Sea and Bay of Biscay decreased from over 1,092 t in 1979 to 3-400 t in the late 1990s. Spanish vessels appear to have taken porbeagle opportunistically both in the early and late 1970s and since 1998. Landings off Spain tend to be greater during the spring and autumn, with a drop in the summer (Mejuto 1985, Lallemand-Lemoine 1991). It is unclear, however, whether the very variable early landings data from the Spanish fleet (from nil to nearly 4,000 t/year) represents huge variations in catches, possibly the result of 'boom and bust' fisheries removing different segments of the stock, or differences in catch reporting. Bonfil (1994) estimated that 50t of porbeagle were taken as a supplementary catch in the Spanish longline swordfish fishery in the Mediterranean and Atlantic during 1989. The long line fishery in the Bay	

	of Biscay (ICES Area VIII), directed at the more abundant blue shark, also landed about 30 t of mainly porbeagle and some shortfin mako Isurus oxyrinchus during 1998-2000. ICES data (Heessen 2003) indicate that annual landings from Area IXa into mainland Portugal peaked at almost 3,000 t in 1987-88 and have since declined (these records do not appear in the FAO statistics). Reported landings from the historically most important fisheries, around the UK and in the North Sea and adjacent inshore waters have decreased to very low levels during the past 30-40 years, while catches from the offshore ICES sub-regions west of Portugal, west of the Bay of Biscay and around he Azores have increased since 1989. This is attributed to a decline in heavily fished and depleted inshore populations and redirection of effort to previously lightly exploited offshore stocks.	
Threat	• Currently threatened • Potentially threatened • Not threatened	Currently threatened
Where relevant, specify evidence (brief description)	Ongoing overfishing continues to deplete the populations in the Northeast Atlantic: the Northeast Atlantic population has been subject to unrestricted fishing pressure ever since its earlier crash. Data are lacking, but stock depletion is considered to be much greater than in the Northwest Atlantic. Longline tuna and swordfish fleets in the southern hemisphere take a significant partially-utilised bycatch. The major threats as listed by IUCN (2006) are: 3.1.1 Harvesting (hunting/gathering) - Food - Subsistence use/local trade (ongoing) 3.1.2 Harvesting (hunting/gathering) - Food - Sub-national/national trade (ongoing) 3.1.3 Harvesting (hunting/gathering) - Food - Regional/international trade (ongoing) 3.5.1 Harvesting (hunting/gathering) - Cultural/scientific/leisure activities - Subsistence use/local trade (ongoing) 4.1.1.1 Accidental mortality - Bycatch - Fisheries-related - Hooking (ongoing) 4.1.1.2 Accidental mortality - Bycatch - Fisheries-related - Netting (ongoing) 9.2 Intrinsic factors - Poor recruitment/reproduction/regeneration (ongoing) 9.7 Intrinsic factors - Slow growth rates (ongoing) Porbeagle has been fished in the Northeast Atlantic by many European countries, principally Denmark, France, Norway and Spain. There has never been any restriction on fishing effort on this stock.	
Relevant additional considerations		
Sufficiency of data	Data are lacking, but stock depletion is considered to be much greater than in the Northwest Atlantic.	
Changes in relation to natural variability	Not known	
Expert judgement		
Threat and link to human activities		
Cross reference to checklist of human activities in OSPAR MPAs guidelines	*Relevant human activity:* fishing/harvesting, trade *Category of effect of human activity:*. Target fishery and bycatch - Stock depletion	
Management considerations		
Current management	Fishing restrictions in EU waters only apply to non-EU member states: Norway is allocated a quota of 200 t of porbeagle in European Community (EC) waters, reduced in 1985 from the 500 t established in 1982 (Gauld 1989). Since 1985, the Faeroe Islands can also take 125 t from EC waters (originally 300 t in 1982, 150 t in 1984a). These quotas currently exceed total landings from shelf areas in the region and yield no management benefit. The status of the largely unmanaged, unmonitored Northeast Atlantic stock is likely worse than the seriously depleted Northwest stock, with stringent	

	conservation and management action (fisheries closure and stock assessment) needed urgently to enable stocks to rebuild to levels where sustainable commercial and recreational fisheries are possible. In 2003, the EU adopted a regulation prohibiting shark finning in EU waters and by EU vessels worldwide. However, this regulation is one of the weakest in the world and does not effectively limit shark finning. It allows up to 5% of a shark's *whole* weight to be landed which exceeds science-based limits and allows the unpunished **finning of two out of three sharks caught.** The Regulation further allows vessels to land and/or to trans-ship fins separately from the corresponding shark carcasses, thereby making effective monitoring all but impossible. This major loophole is not part of any other finning ban in the world. The Regulation was adopted in 2003 and EU Member States were required to report annually on its implementation. This reporting was not accomplished. No shark finning regulations exist outside European waters in international waters of the OSPAR area.
Required further management	The major management actions as listed by IUCN (2006) are: 1.1.1 Policy-based actions - Management plans - Development (in place, needed) 1.1.2 Policy-based actions - Management plans - Implementation (in place, needed) 3.2 Research actions - Population numbers and range (in place, needed) 3.3 Research actions - Biology and Ecology (in place, needed) 3.6 Research actions - Uses and harvest levels (in place, needed) 3.8 Research actions - Conservation measures (in place, needed) 3.9 Research actions - Trends/Monitoring (in place, needed) 4.4 Habitat and site-based actions - Protected areas (needed) 5.3.1 Species-based actions - Sustainable use - Harvest management (in place, needed) 5.3.2 Species-based actions - Sustainable use - Trade management (needed) A critical step towards ending the practise of finning and the serious threat it poses to shark populations is to strengthen the EU regulation before its standards are adopted elsewhere in the world. This requires that the major loopholes in the regulation be closed through amendments which:). Prohibit separate landings of fins and carcasses as well as trans shipment at sea, and require that all fins, carcasses, and logbooks be presented together for inspection at the first point of landing;). Apply a fin to carcass ratio of no more than 5% to *dressed,* not *whole*, weight of sharks, or require that sharks be landed with fins attached; Include regular reviews and reports on the operation of the Regulation to be made at two year intervals commencing January 2008.

Useful references	Stevens, J., Fowler, S.L., Soldo, A., McCord, M., Baum, J., Acuña, E., Domingo, A. & Francis, M. 2005. *Lamna nasus*. In: IUCN 2006. *2006 IUCN Red List of Threatened Species.* <www.iucnredlist.org>. Downloaded on 01 September 2006. And references given there, see http://www.iucnredlist.org/search/details.php/11200/ref Anonymus (2003). Proposal to include the Porbeagle (*Lamna nasus*) in Appendix II CITES proposed by the Federal Republic of Germany (on behalf of the member states of the European Community). http://www.cites.org/common/com/ac/20/E20-inf-06.pdf#search=%22CITES%20porbeagle%22 Fordham, S. V. (2006). Shark Alert. Revealing Europe´s impact on shark populations. http://www.sharkalliance.org/do_download.asp?did=23495
Remarks	This species was previously proposed for inclusion on the Initial OSPAR list of threatened and/or declining species and habitats by Portugal on behalf of the Azores. This species is listed in the IUCN Red List 2006 as vulnerable (criteria VU A2bd+3d+4bd ver 3.1 (2001). Assessment date: 2005. Evaluators: Cavanagh, R.D., Heupel, M. & Simpfendorfer, C. (Shark Red List Authority) In 2006, Germany again issued proposals to list spurdog and porbeagle under CITES Appendix II which will need support from a majority of EU Member States in order to proceed to the next Conference of the CITES Parties in the Netherlands in mid-2007.
Contact details	
Name	Sabine Christiansen
Organisation	WWF
Address	Magdeburger Str. 17 20457 Hamburg
Telephone	Tel. +49 40 530200-128(+4940 41268695
Email	christiansen@wwfneap.org

Subject of nomination (this nomination is based on the justification given by IUCN 2006 for listing the species as Lower Risk: near threatened (LR/nt) (IUCN 2006)		
Species	*Prianace glauca* (Linnaeus, 1758) – Blue shark 	
Subspecies or population		
Geographical extent		
OSPAR Regions	I – Arctic Waters II – Greater North Sea III – Celtic IV – Bay of Biscay and Iberian Coast V- Wider Atlantic	II, III, IV, V
Biogeographic Zones	from Dinter, 2001	1, 2
Region and biogeographic zones specified for decline and/or threat	As above	
Known distribution/range of nominated species (brief description)	 Fig. 2: Probability map of occurrence of Blue shark (*Prionace glauca*). http://www.fishbase.org/tools/aquamaps/imagethumb/file_destination/pic_898.jpg **Blue sharks are** probably the widest ranging chondrichthyan species. *P. glauca* is oceanic and circumglobal, occurring in temperate and tropical waters (Compagno 1984). They are a pelagic species (usually found to at least 150 m) that rarely comes near shore but have been known to frequent inshore areas around oceanic islands and locations where the continental shelf is narrow. In the Atlantic they can be found from New Foundland, Canada to Argentina and from Norway to South Africa, including the Mediterranean. Highly migratory species, Annex I of the 1982 Convention on the Law of the Sea. In the North Atlantic tagging and recapturing of individuals has shown a regular	

	clockwise trans-Atlantic migration route with the current system there. Apparently these sharks ride the Gulf Stream to Europe, take various currents down the European and African coasts, and ride the Atlantic North Equatorial Current to the Caribbean region. Blue shark movements are strongly influenced by water temperature and this species undergoes seasonal latitudinal migrations on both sides of the North Atlantic . It appears to have a wide thermal tolerance and seem to prefer layers of waters from 12°-21°C. Blue sharks demonstrate tropical submergence to remain in the deep, cooler waters in the tropical and equatorial parts of their range. In the eastern North Atlantic, results show a seasonal migration of blue sharks from about 30°N to 50°N in the northeast Atlantic and different patterns of movement for different segments of the population (Stevens 1976, 1990). Blue sharks dominate shark aggregations over seamounts, where abundance is up to 20 higher than in surrounding oceanic waters.
Application of Texel-Faial Criteria	
Global importance If Yes specify evidence (brief description)	Yes – OSPAR is /the northeast Atllantic coastal states are responsible for the female part of the one Atlantic blue shark population and probably provide a nursery and juvenile area around the Azores. Kohler et al. (2002): Based on evidence from tagging data, blue sharks of the North Atlantic constitute a single stock of fish. They make frequent trans-Atlantic movements between the western and eastern regions as well as some exchange taking place from east to west. Blue sharks utilize the major North Atlantic current systems to accomplish these extensive movements. In addition, this species is segregated by sex and size in vast regions of the Atlantic with larger, mature fish of both sexes caught in the southern part of their range. Immature males and females and sub-adult females dominate the northern regions with the smallest fish found in the Mediterranean Sea. Sex ratios of nearly 1:1 are found in the western North Atlantic with primarily females in the northeastern Atlantic and Mediterranean and primarily males in the southeastern region. Similar localized results in the Atlantic have been found by other investigators that support this one stock hypothesis involving a complex reproductive cycle with mating areas in the northwestern North Atlantic and **pupping areas in the eastern North Atlantic**. Documented seasonal migrations to the higher latitudes take place on both sides of the North Atlantic.
Regional importance If Yes specify evidence (brief description)	
Rarity If Yes specify evidence (brief description)	Not yet
Sensitivity	• Sensitive • Very Sensitive • Neither of the above/ Not sensitive with respect to definitions sensitive
Where relevant specify evidence (brief description)	Blue sharks as a species is more resilient than most other shark species: they grow quickly compared to many other shark species, reaching sexual maturity at a fork length of about two metres and an age of about six years. They also produce more pups (25-50) than many other shark species. This helps explain their persistence in the face of high overall catches in the North Atlantic. However, the population structure of blue sharks in the northeastern Atlantic makes them highly sensitive to overfishing.. The population consists of primarily immature males and immature and sub-adult females with some mature females

	and a sex ratio heavily favoring the females. These results are substantiated by numerous published fishing and tagging records from commercial and sport fisheries showing higher incidences of juveniles and females in the NE Atlantic including the waters off Norway, England, Ireland,Azores, and Africa. The Azores probably represent an important spring nursery ground for juvenile blue sharks in the North Atlantic.	
Keystone species	yes	
Decline	• Extirpated (extinct within OSPAR area • Severely declined • Significantly declined • Probability of significant decline • None of the above/ Not declining	Probability of significant decline
Where relevant specify evidence (brief description)	While blue sharks are among the most abundant, widespread, fecund and faster growing of the elasmobranchs, and a pelagic species that is widely distributed throughout the world's oceans, they are also the most heavily fished sharks in the world. The impact of annual fisheries mortality (mainly of bycatch), estimated at 10 to 20 million individuals, is likely to be having an effect on the world population, but monitoring data are inadequate to assess the scale of any population decline. There is concern over the removal of such large numbers of this likely keystone predator from the oceanic ecosystem.	
Threat	• Currently threatened • Potentially threatened • Not threatened	Currently threatened
Where relevant, specify evidence (brief description)	The most significant bycatch of blue shark occurs in the pelagic longline fisheries, particularly in the Atlantic swordfish longline fishery where the catch of blue shark often exceeds the catch of swordfish. E.g. Buencuerpo et al (1998) noted that of more than 51 000 fishes landed by the Spanish swordfish fleet only 1/5 the was swordfish, 4/5 was sharks of which 63 % was blue shark (thus discarded fish not registered). In a recent study of the Spanish longline swordfish fishery 2000-2004, Mejuto *et al*. 2006 estimate that large pelagic sharks amount to 70.3 % of the total landings in weight of the Atlantic swordfish fishery (this means that 3 sharks are caught for one swordfish of equivalent size!). 86 % of these by-caught large pelagic sharks are blue sharks. Total blue shark catch is estimated at 107 mt, 28% of which is by purse seines), results in an estimated catch mortality of 37 mt (at 40 % catch mortality) (Campana et al. 2004) Acc. IUCN (2006), this shark is usually caught with pelagic longlines but also hook-and-lines, pelagic trawls, and even bottom trawls near coasts. It is utilized fresh, smoked, and dried salted for human consumption; its hides are used for leather; fins for shark-fin soup base; and also for fishmeal and liver oil. This shark is also considered a game fish and taken by sports anglers with rod and reel (Compagno 1984). IUCN (2006) lists rhe most important threats as follows: 3.1 Harvesting (hunting/gathering) - Food (ongoing) 3.4 Harvesting (hunting/gathering) - Materials (ongoing) 3.5 Harvesting (hunting/gathering) - Cultural/scientific/leisure activities (ongoing) 4.1.1 Accidental mortality - Bycatch - Fisheries-related (ongoing) Blue sharks are one of the species marketed by European fisheries on the shark fin market, European countries being among the globally most important shark fin	

retailers: Spain ranked 4th, the US 5th, France 12th, UK 14th, and Portugal 16th in 2003 (Lack and Sant 2006).

Table 1: FAO data for total catches of sharks in metric tonnes by EU Countries in 2004

Country	Total in 2004	Atlantic Ocean
Spain	51,071	42,364
France	21,613	21,306
UK	16,066	16,033
Portugal	12,765	11,523
Ireland	5,043	5,043
Belgium	2,505	2,505
Italy	1,061	1,061
Greece	925	925
Estonia	922	922
Germany	859	859
Faeroe Islands	687	687
Netherlands	631	631
Denmark	402	402
Sweden	285	285
Lithuania	101	101
Malta	26	26
Cyprus	13	13
Slovenia	5	5
Poland	1	1
Total	114,981	104,692

.

Relevant additional considerations

Sufficiency of data	There is strong concern that the insufficiency/lack of data camouflages the real decline of the North Atlantic population. As most of the bycaught individuals are discarded, fishing mortality can only be estimated: The multifleet logbooks available with fishery data are not considered to be complete given the large number of incidental captures, variation in release status (alive vs. dead) and unreported captures over time. Thus these data are not suitable for stock assessment and population modeling. Furthermore, stock assessment analysis of a highly migratory species such as the blue shark is difficult at best. The complex sexual and life-stage segregation patterns of the population in the North Atlantic make the modeling process even more difficult. Alternative methods are needed to deal with the problem. ICCATT...
Changes in relation to natural variability	Not known
Expert judgement	

Threat and link to human activities

Cross reference to checklist of human activities in OSPAR MPAs guidelines	*Relevant human activity:* fishing/harvesting, trade *Category of effect of human activity:*. Target fishery and bycatch - Stock depletion

Management considerations

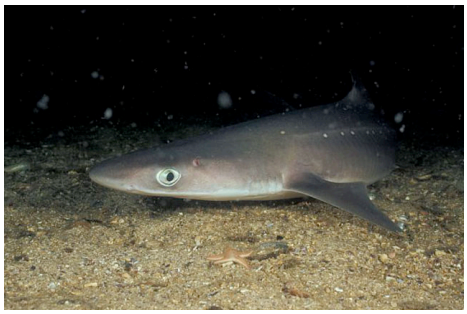
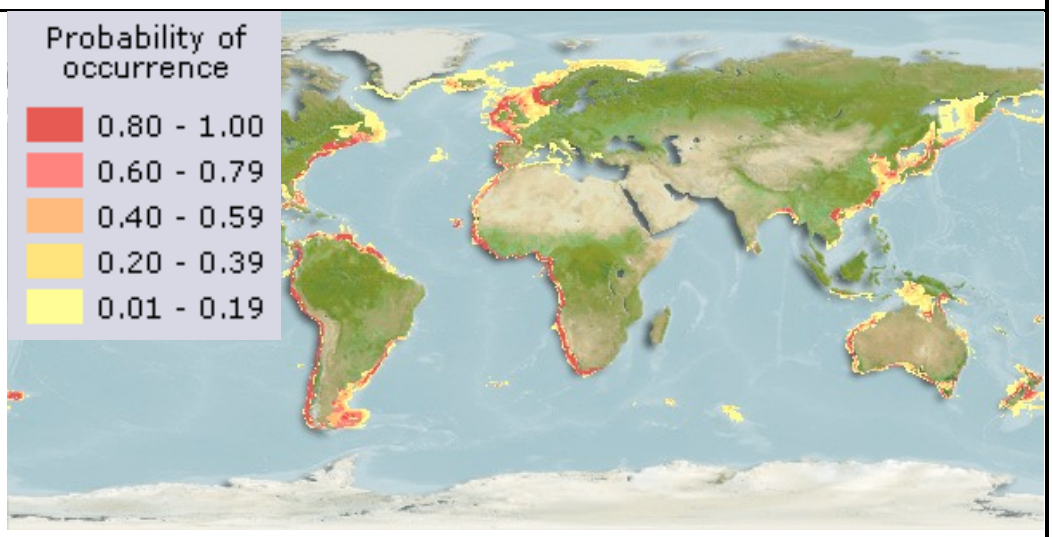
Current management	The United Nations Food and Agriculture Organization (FAO) International Plan of Action for Sharks calls on States, within the framework of their respective competencies and consistent with international law, to cooperate through regional fisheries organizations with a view to ensuring the sustainability of shark stocks as well as to adopt a National Plan of Action for the conservation and management of sharks.

	In 2003, the EU adopted a regulation prohibiting shark finning in EU waters and by EU vessels worldwide. However, this regulation is one of the weakest in the world and does not effectively limit shark finning. It allows up to 5% of a shark's *whole* weight to be landed which exceeds science-based limits and allows the unpunished **finning of two out of three sharks caught.** The Regulation further allows vessels to land and/or to trans-ship fins separately from the corresponding shark carcasses, thereby making effective monitoring all but impossible. This major loophole is not part of any other finning ban in the world. The EU Regulation was adopted in 2003 and EU Member States were required to report annually on its implementation. This reporting was not accomplished. In 2004, ICCAT made a similar recommendation with respect to its whole regulatory area. " CPCs shall require their vessels to not have onboard fins that total more than 5% of the weight of sharks onboard, up to the first point of landing. CPCs that currently do not require fins and carcasses to be offloaded together at the point of first landing shall take the necessary measures to ensure compliance with the 5% ratio through certification, monitoring by an observer, or other appropriate measures". The success on bycatch of blue sharks shall be reviewed no later than 2007. Cortés & Neer (2006) concluded that the fin to carcass ratio is highly variable, depending on species, fin set, and finning procedure, the average (measured scientifically) being around 3.7-3.8 % of whole body mass. Owing to the high variability among species, species-specific management would help ensure that finning (defined here as retaining only the fins and discarding the remainder of the body) does not occur on species with lower FW:DW ratios as a result of fishermen trying to meet the 5% FW:DW allowance. If species-specific management is not feasible, the available data suggest that the aggregated 5% ratio is not inappropriate when using the primary fin set in the calculations. In all, the authors conclude that the only guaranteed method to avoid shark finning is to land sharks with all fins attached .
Required further management	The regulation of landing shark fins and trade have to be strengthended: • require that shark fins and carcass be landed at the same time and at the same port; • decrease the EU fin to carcass ratio to (or below) the international standard of 5 per cent dressed weight, or require that sharks be landed whole, and, • develop and implement a more holistic European plan of action for sharks that includes precautionary limits on catch based on ICES advice, as well as protection for endangered species, reduction of bycatch, recovery plans for depleted species and management plans for others. In working toward such a European plan of action, European countries should: • immediately adopt and implement the TAC recommendations and other ICES scientifi c advice for shark and skate species that have been evaluated by ICES; • elevate the priority of improving species-specific fisheries and trade data collection and facilitating scientific assessment of the status of sharks, skates and rays in European waters and adjacent seas; • secure national legislation and regional agreements to protect and conserve the shark species listed under CMS, the Barcelona and Bern Conventions, and additional shark species considered Endangered or

	Critically Endangered by the IUCN Shark Specialist Group; • promote immediate, precautionary limits on international fisheries taking sharks through RFMOs, particularly for pelagic sharks at ICCAT, and, • support and advance proposals by Germany to include the spurdog and porbeagle shark in CITES Appendix II and ensure adherence to existing CITES shark listings, resolutions and decisions.
Useful references	Buencuerpo, V., S. Rios and J. Moron. 1998. Pelagic sharks associated with the swordfish, *Xiphias gladius*, fishery in the eastern North Atlantic Ocean and the Strait of Gibraltar. Fish. Bull. 96; pp. 667-685. Campana, S. E., Marks, L., Joyce, W., Kohler, N. (2004). Influence of recreational and commercial fishing on the blue shark (Prionace glauca) population in Atlantic Canadian waters. DFO Canada, Research document 2004/069. http://www.marinebiodiversity.ca/shark/english/document/Derby%20Res%20Doc.pdf Compagno, L.J.V. 1984. FAO species catalogue. Vol. 4. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. FAO Fish. Synop. No. 125, vol. 4. Cortés, E. & J. A. Neer (2006). Preliminary Reassessment of the validity of the 5 % fin to carcass weight ratio for sharks. Col. Vol. Sci. Pap. ICCAT, 59(3): 1025-1036. http://www.iccat.int/Documents/CVSP/CV059_2006/no_3/CV059031025.pdf Kohler, Nancy E., Patricia A. Turner, John J. Hoey, Lisa J. Natanson, Ruth Briggs (2002). Tag and recapture data for three pelagic shark species: Blue shark (*Prionace glauca*), shortfin mako (*Isurus xyrinchus*), and probeagle shark (*Lamna nasus*) in the north Atlantic ocean. Col.Vol.Sci.Pap. ICCAT, 54 (4): 1231-1260. Mejuto, J. B. García-Cortés, J. M. de la Serna2, A. Ramos-Cartelle (2006). Scientific estimations of by-catch landed by the spanish surface longline fleet targeting swordfish (*Xiphias gladius*) in the Atlatnic Ocean: 2000-2004 period. Col. Vol. Sci. Pap. ICCAT, 59(3): 1014-1024. Shark Specialist Group. 2000. IUCN Shark Specialist Group Red List Assessments, 2000 (unpublished report). Silva, A.A., H.M. Silva, and K. Erzini. 1996. Some results on the biology of the blue shark, *Prionace glauca*, in the North Atlantic based on data from a research cruise of the R/V *Arquipelago* in Azorean waters: A summary paper. Stevens, J. 2000. *Prionace glauca*. In: IUCN 2006. 2006 IUCN Red List of Threatened Species. <www.iucnredlist.org>. Downloaded on 03 September 2006.
Remarks	This species was previously proposed for inclusion on the Initial OSPAR list of threatened and/or declining species and habitats by WWF and Iceland/Portugal/UK (2001) for OSPAR region V This species is listed in the IUCN Red List 2006 as lower risk/near threatened (criteria VU A2bd+3d+4bd ver 3.1 (2001). Assessment date: 2000. Evaluators: Musick, J.A. & Fowler, S. (Shark Red List Authority)

Contact details

Name	Sabine Christiansen
Organisation	WWF
Address	Magdeburger Str. 17 20457 Hamburg
Telephone	Tel. +49 40 530200-128(+4940 41268695
Email	christiansen@wwfneap.org

Subject of nomination (this nomination is based the justification given by IUCN 2006 for listing the species as critically endangered (IUCN 2006)		
Species	***Squalus acanthias*** **(Linnaeus 1758)– Spurdog**  Copyright: *Salesjö, A.*	
Subspecies or population	Northeast Atlantic subpopulation	
Geographical extent		
OSPAR Regions	I – Arctic Waters II – Greater North Sea III – Celtic IV – Bay of Biscay and Iberian Coast V- Wider Atlantic	I, II, III, IV, V
Biogeographic Zones	from Dinter, 2001	2, 7, 5, 6, 9, 11, 12, 13, 14, 15, 16, 20
Region and biogeographic zones specified for decline and/or threat	As above	
Known distribution/range of nominated species (brief description)	 Fig. 2: Probability map of occurrence of spurdog (*Squalus acanthias*). http://www.fishbase.org/tools/aquamaps/imagethumb/file_destination/pic_139.jpg The spiny dogfish or spurdog *Squalus acanthias* is a small demersal shark of temperate continental shelf seas worldwide. Most stocks are highly migratory, but there is no regional fisheries management for the species. Management is in place in only a few range states and in only a limited part of the range of highly migratory stocks.	
Application of Texel-Faial Criteria		
Global importance If Yes specify evidence	Yes, for Northeast Atlantic subpopulation	

(brief description)		
Regional importance If Yes specify evidence (brief description)	?	
Rarity If Yes specify evidence (brief description)	Yes – on IUCN Red List 2006 (assessed 2006 as critically endangered)	
Sensitivity	• Sensitive • Very Sensitive • Neither of the above/ Not sensitive with respect to definitions	Very sensitive
Where relevant specify evidence (brief description)	Although naturally abundant, this is one of the more vulnerable species of shark to over-exploitation by fisheries because of its late maturity (> 11 years), low reproductive capacity (1-20 young per litter, gestation period of min. 18 monhs), longevity (maximum age is at least 25 to 30 years, with some estimates going much higher and approaching 100 years), long generation time (25-40 years) and hence a very low intrinsic rate of population increase (2-7% per annum). Population segregation and an aggregating habit make mature (usually pregnant) females highly vulnerable to fisheries even when stocks are seriously depleted.	
Keystone species	No	
Decline	• Extirpated (extinct within OSPAR area • Severely declined • Significantly declined • Probability of significant decline • None of the above/ Not declining	Severely declined
Where relevant specify evidence (brief description)	Some targeted *Squalus acanthias* fisheries have been documented for over 100 years. Fisheries stock assessments report a decline in total biomass of >95% from baseline in the Northeast Atlantic, where catch effort is effectively unlimited. In European waters (mainly the North and Irish Seas), picked dogfish has been fished since the beginning of this century mainly by British and Norwegian fishermen, but later also by the French and the Irish (Bonfil 1994). Total catches were on average of 3,000 t/y before the 1930s, rose to over 12,000 t/y by 1937 mainly due to increases in the Norwegian fishery and then varied between 20,000-42,000 t/y in the period 1951-70 (Holden 1977). Holden (1968) considered that the female part of the Scottish-Norwegian stock of picked dogfish was being overfished in the late 1960s, but no stock assessments are known for any of the European fisheries for picked dogfish. Holden (1977) and Myklevoll (1989d) illustrate many of the factors that have caused the variations in the catches of picked dogfish in the British and Norwegian fisheries. These include among others, differences in size and presentation of the product due to different capture methods, competitiveness of prices, limits on market demand, and the existence of alternative and more profitable fisheries. (FAO FIGIS species fact sheet, see http://www.fao.org/figis/servlet/species?fid=2834 , accessed 3 September 2006)	

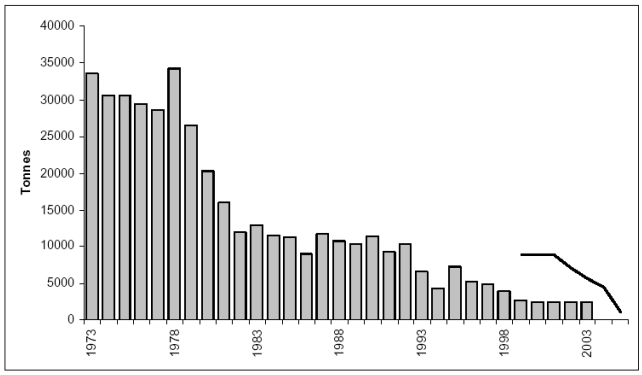


Figure 3. Landings (t) of spurdog in the North Sea and Skagerrak (Source: ICES), with TAC allocated to EU vessels indicated (black line).

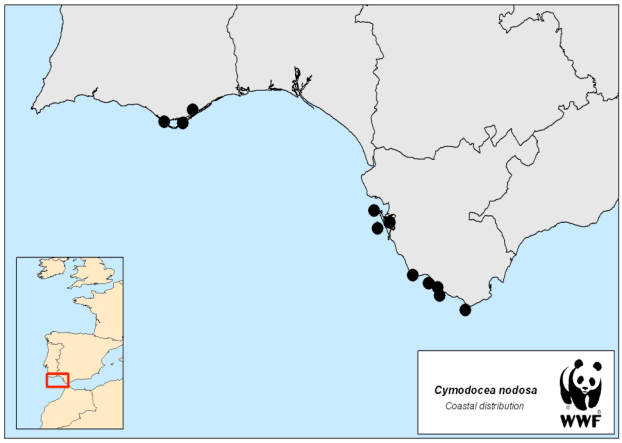
Threat	• Currently threatened • Potentially threatened • Not threatened	Currently threatened
Where relevant, specify evidence (brief description)	The major threats as listed by IUCN (2006) are: 3.1.1 Harvesting (hunting/gathering) - Food - Subsistence use/local trade (ongoing) 3.1.2 Harvesting (hunting/gathering) - Food - Sub-national/national trade (ongoing) 3.1.3 Harvesting (hunting/gathering) - Food - Regional/international trade (ongoing) 3.2.2 Harvesting (hunting/gathering) - Medicine - Sub-national/national trade (ongoing) 3.2.3 Harvesting (hunting/gathering) - Medicine - Regional/international trade (ongoing) 3.5.2 Harvesting (hunting/gathering) - Cultural/scientific/leisure activities - Sub-national/national trade (ongoing) 4.1.1.1 Accidental mortality - Bycatch - Fisheries-related - Hooking (ongoing) 4.1.1.2 Accidental mortality - Bycatch - Fisheries-related - Netting (ongoing) 4.1.1.3 Accidental mortality - Bycatch - Fisheries-related - Entanglement (ongoing) 4.1.3 Accidental mortality - Bycatch - Other (past, present) 5.1 Persecution - Pest control (ongoing) 9.2 Intrinsic factors - Poor recruitment/reproduction/regeneration (ongoing) 9.7 Intrinsic factors - Slow growth rates (ongoing) 9.10 Intrinsic factors - Other (ongoing)	
Relevant additional considerations		
Sufficiency of data		
Changes in relation to natural variability	Not known	
Expert judgement		
Threat and link to human activities		
Cross reference to checklist of human activities in OSPAR MPAs guidelines	*Relevant human activity:* fishing/harvesting, trade *Category of effect of human activity:*. Target fishery and bycatch - Stock depletion	
Management considerations		
Current management	Spurdog are currently managed by quota in the North Sea with the Total Allowable Catch (TAC) reduced by 87% between 1999 and 2005 (Table 1).	

Table 1. TAC (t) for spurdog in the EU waters of the North Sea (IV) and IIa for EC nations and Norway (the Norwegian quota includes long line catches of other shark species in these and adjacent ICES sub-areas).

Year	EC	Norway	Total	EC Regulation No
1999	8870	-	-	1570/1999
2000	8870	(600)	9470	2742/1999
2001	8870	(200)	9070	2848/2000
2002	7100	(200)	7300	2555/2001
2003	5640	(200)	5840	2341/2002
2004	4472	(200)	4672	2287/2003
2005	1136	(100)	1236	27/2005

	In 2003, the EU adopted a regulation prohibiting shark finning in EU waters and by EU vessels worldwide. However, this regulation is one of the weakest in the world and does not effectively limit shark finning. It allows up to 5% of a shark's *whole* weight to be landed which exceeds science-based limits and allows the unpunished **finning of two out of three sharks caught.** The Regulation further allows vessels to land and/or to trans-ship fins separately from the corresponding shark carcasses, thereby making effective monitoring all but impossible. This major loophole is not part of any other finning ban in the world. No shark finning regulations exist outside European waters in international waters of the OSPAR area.
Required further management	European demand continues to fuel markets around the world. The major management actions as listed by IUCN (2006) are: 1.1.1 Policy-based actions - Management plans - Development (in place, needed) 1.1.2 Policy-based actions - Management plans - Implementation (in place, needed) 1.2.1.1 Policy-based actions - Legislation - Development - International level (needed) 1.2.1.2 Policy-based actions - Legislation - Development - National level (needed) 1.2.1.3 Policy-based actions - Legislation - Development - Sub-national level (needed) 1.2.2.1 Policy-based actions - Legislation - Implementation - International level (needed) 1.2.2.2 Policy-based actions - Legislation - Implementation - National level (needed) 1.2.2.3 Policy-based actions - Legislation - Implementation - Sub-national level (needed) 2.2 Communication and Education - Awareness (in place, needed) 3 Research actions (in place) 3.8 Research actions - Conservation measures (needed) 3.9 Research actions - Trends/Monitoring (needed) 4.4.1 Habitat and site-based actions - Protected areas - Identification of new protected areas (needed) 5.3.1 Species-based actions - Sustainable use - Harvest management (needed) 5.3.2 Species-based actions - Sustainable use - Trade management (needed) The regulation of landing shark fins and trade have to be strengthended: • require that shark fins and carcass be landed at the same time and at the same port; • decrease the EU fin to carcass ratio to (or below) the international standard of 5 per cent dressed weight, or require that sharks be landed whole, and, • develop and implement a more holistic European plan of action for sharks that includes precautionary limits on catch based on ICES advice, as well as protection for endangered species, reduction of bycatch, recovery plans for depleted species and management plans for others. In working toward such a European plan of action, European countries should: • immediately adopt and implement the TAC recommendations and other ICES scientifi c advice for shark and skate species that have been evaluated by ICES; • elevate the priority of improving species-specific fisheries and trade data collection and facilitating scientific assessment of the status of sharks, skates and rays in European waters and adjacent seas; • secure national legislation and regional agreements to protect and conserve the shark species listed under CMS, the Barcelona and Bern Conventions, and additional shark species considered Endangered or Critically Endangered by the IUCN Shark Specialist Group; • promote immediate, precautionary limits on international fisheries taking sharks through RFMOs, particularly for pelagic sharks at ICCAT, and, • support and advance proposals by Germany to include the spurdog and porbeagle shark in CITES Appendix II and ensure adherence to existing CITES shark listings,

	resolutions and decisions.
Useful references	Fordham, S., Fowler, S.L., Coelho, R., Goldman, K.J. & Francis, M. 2006. *Squalus acanthias* (Northeast Atlantic subpopulation). In: IUCN 2006. *2006 IUCN Red List of Threatened Species.* <www.iucnredlist.org>. Downloaded on **01 September 2006**. And literature therein. FAO species catalogue Vol.4. Sharks of the world. An Annotated and Illustrated Catalogue of Shark Species Known to Date Part 1 - Hexanchiformes to Lamniformes. Compagno, L.J.V. 1984. FAO Fish. Synop., (125) Vol.4, Part 1 http://www.ices.dk/marineworld/fishmap/ices/pdf/spurdog.pdf Fordham, S. V. (2006). Shark Alert. Revealing Europe´s impact on shark populations. http://www.sharkalliance.org/do_download.asp?did=23495
Remarks	This species was previously proposed for inclusion on the Initial OSPAR list of threatened and/or declining species and habitats by Belgium (2001) for OSPAR region II (as extirpated) This species is listed in the IUCN Red List 2006 as critically endangered (criteria CR A2bd+3bd+4bd ver 3.1 (2001)). Assessment date: 2006. Evaluators: Fordham, S., Fowler, S.L., Coelho, R., Goldman, K.J. & Francis, M. In 2006, Germany again issued proposals to list spurdog and porbeagle under CITES Appendix II which will need support from a majority of EU Member States in order to proceed to the next Conference of the CITES Parties in the Netherlands in mid-2007.
Contact details	
Name	Sabine Christiansen
Organisation	WWF
Address	Magdeburger Str. 17 20457 Hamburg
Telephone	Tel. +49 40 530200-128(+4940 41268695
Email	christiansen@wwfneap.org

Subject of nomination		
Habitat	**_Cymodocea_ beds, _Cymodocea_ meadows, Seagrass beds EUNIS Code: A5.531, A5.5312, A5.53131 and A5.53132**  http://www.zelena-istra.hr/more/posidonia/2003/ostalo/cimodocea.jpg **Definition for habitat mapping** *Cymodocea nodosa* Ucria (Ascherson), 1869 *Cymodocea nodosa* forms large and dense patches with green leaves that can reach 60 cm long and 4,5 mm wide in well shorted fine sands or on superficial muddy sands in sheltered waters at depths of 1-30 meters. Frequently is mixed with another phanerogams (*Zostera noltii* and *Zostera marina)* beds at muddy sands rich in organic nutrients.	
Subspecies or population		
Geographical extent		
OSPAR Regions	I – Arctic Waters II – Greater North Sea III – Celtic IV – Bay of Biscay and Iberian Coast V- Wider Atlantic	IV
Biogeographic Zones	from Dinter, 2001	South European Atlantic shelf (IXa ICES Area); Benthic and neritic of the shelf and upper continental shelf (<1000 m depth)
Region and biogeographic zones specified for decline and/or threat	As above	
Known distribution/range of nominated species (brief description)	C. *nodosa* has a tropical origin, nowadays restricted to the Mediterranean and scattered locations in the North Atlantic from South Portugal to Senegal, including Canary Island and Madeira. Southern Portugal constitutes the geographic limit of its distribution. Shallow meadows of *Cymodocea* and *Zostera* are usually found in sheltered bays close to harbours, or in areas subject to human impact.	
Application of Texel-Faial Criteria		
Global	No	

importance If Yes specify evidence (brief description)		
Regional importance If Yes specify evidence (brief description)	Yes The distribution range of the Atlantic population falls entirely on Region IV, limited to Portugal and Spain	
Rarity If Yes specify evidence (brief description)	Yes, limited number of locations based on Red List of Spanish Vascular Flora (evaluation according to IUCN categories)	
Sensitivity	• Sensitive • Very Sensitive • Neither of the above/ Not sensitive with respect to definitions	Sensitive
Where relevant specify evidence (brief description)	*Cymodocean* meadows are much influenced by physical stress caused by hydrodynamic forces. Major disturbances such as dredging or water pollution cause extensive damage. Apparently healthy *Cymodocea nodosa* beds are known to exist in areas subject to low-level contamination using this bed as water-quality bio-indicators (Schneider *et al*. 2002). Since sexual reproduction is not successful, disturbed areas will only recover by horizontal vegetative propagation from residual meadows (Alberto *et al.* 2001). It has a low resistance to turbidity that would reduce light penetration and prevent adequate photosynthesis. It has to be permanently submerged.	
Ecological significance	Seagrass meadows constitute a complex ecosystem, which play a pivotal role in the coastal benthos. They strongly influence the local environment by amplifying the primary substrate, supplying nutrients to the seafloor and by providing a spatially diverse habitat structure and resources for rich algal and animal communities. Also contributes to global marine productivity. Where the habitat is well-developed algae, actinians, ascidians and hydroids as *Aglaophenia harpago* or *Plumularia obliqua*, might colonize the leaves. The main taxonomic groups of macrofauna associated with the seagrass are generally similar to species occurring in shallow areas in a variety of substrata (e.g. amphipods, polychaeta, worms, bivalves and echinoderms). The mollusks gastropods are the most abundant within the community (Cancemi *et al.* 2002). The shelter provided by seagrass beds makes them an important nursery area for cuttlefish (*Sepia officinalis*) or the common octopus (*Octopus vulgaris*) an fishes as the gilthead seabream (*Sparus aurata*) or the stripped red mullet (*Mullus surmuletus*).	
Decline	• Extirpated (extinct within OSPAR area • Severely declined • Significantly declined • Probability of significant decline • None of the above/ Not declining	Significantly declined
Where relevant specify evidence (brief description)	It has been reported the decrease of *Cymodocea* at the Strait of Gibraltar during 30 years (Luque and Templado, 2004) as a result of industrial and coastal destruction that have increased turbidity to the system for a long-term period that estimated the decline by between 15% and 80% of its former natural distribution at the Gulf of Cadiz. There is a severe reduction in effective population size caused by habitat fragmentation and isolation. The absence of reproductive success of Ria Formosa Natural Park (Portugal) and its low genetic variability led to affect to the habitat quality. In other areas the decline is not well documented due to the lack of previous mapping studies. After *Cymodocea* regression, it is replaced by opportunistic *Caulerpa prolifera,* that reduces significantly the associated fauna and produces great densities of the polichaete worm *Capitella capitata*.	
Threat	• Currently threatened • Potentially threatened • Not threatened	Currently threatened

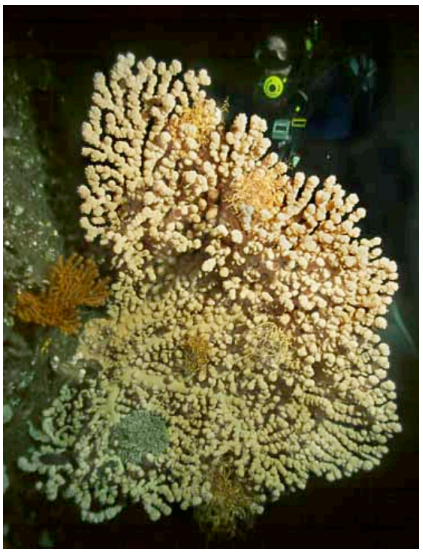
Where relevant, specify evidence (brief description)	A number of the threats to *Cymodocea* beds are directly linked to human activities. There are extraction of sediments, dumping of solid waste and dredged spoils, constructions, land-based activities, placement of submarine cables and pipelines, anchoring and mobile fishing gears or fish cage farms.
Relevant additional considerations	
Sufficiency of data	There are many studies on seagrass beds and mainly general mapping of their extent and of the associated communities has been carried out in particular locations. Despite this, there is still a poor spatial analysis of the habitat.
Changes in relation to natural variability	The extent of seagrass beds may change as a result of natural factors such as severe storms, exposure to air and freshwater pulses. Warm sea temperatures coupled with low level of sunlight may cause significant stress and mortality of seagrass.
Expert judgement	
Threat and link to human activities	
Cross reference to checklist of human activities in OSPAR MPAs guidelines	*Relevant human activity:* extraction of sediments, dumping of solid waste and dredged spoils, constructions, land-based activities, placement of submarine cables and pipelines, anchoring and mobile fishing gears or fish cage farms. *Category of effect of human activity*. • Substratum removal • Substratum change (inc. smothering) • Increased siltation (deposited sediment) • Turbidity changes (suspended sediment) • Physical damage to species (inc. abrasion) • Displacement (moving) of species • Removal of target species • Removal of non-target species • Changes in population or community structure or dynamics •
Management considerations	
Current management	
Required further management	Due to genetic isolation in some areas all plans and management affecting the seagrass habitat should consider *C. nodosa* dynamics in a metapopulation perspective (i.e. the seagrass patch extinction and recolonization) with selected patches preserved to allow vegetative recolonization in disturbed areas. Management could also include the establishment of protected areas, restoration and the control of substratum removal or physical damage to the habitat. Reseach actions might be implemented. Promoting awareness of the importance of seagrass beds could assist in minimizing anchor damage. Protected areas could be designated under the proposed OSPAR MPA network although the EU Habitats Directive and the Bern Convention cover seagrass.

Useful references	Alberto, F., Mata, L. and Santos, R. (2001). Genetic homogeneity in the seagrass *Cymodocea nodosa* and its Northern Atlantic limit revealed through RAPD. *Mar. Ecol. Prog. Ser.* Vol. 221: 299-301. Cancemi, G., Buia, M.C. y Mazzella, L. (2002). Structure and growth dynamics of *Cymodocea nodosa* meadows. *Scientia Marina*, 66(4): 365-373. Luque, Á.A. and Templado, J. (2004). Praderas y bosques marinos de Andalucía. Consejeria de Medio Ambiente, Junta de Andalucía, Sevilla, 336 pp. Neto, A.I., Cravo, D.C. and Haroun, R.T. (2001). Check list of the benthic marine plants of the Madeira Archipelago. *Botanica Marina* 44: 391-414. Ramos Lopez, M.H. and Carvalho, M.L.S. (1990). Lista de espécies botanicas a proteger em Portugal Continental. Ministerio do Ambiente e dos Recursos Naturais. Lisboa, Portugal, 11pp. Red List of Spanish Vascular Flora. (1997). *Conservación Vegetal.* Felipe Dominguez, Eds., 44 pp. http://www.uam.es/otros/consveg/documentos/numero6.pdf#search=%22lista%20roja%20espa%C3%B1a%22 Schneider, P. et al. (2002). A new approach for surveying submerged aquatic vegetation (SAV) in shallow coastal waters: Application of digital echo-sounder technique for ecosystem . 6º Symposium du ICES sur l'Acoustique appliquée aux Pêches et Ecosystémes Aquatiques.
Remarks	

Contact details

Name	Pilar Marcos
Organisation	WWF
Address	Gran Via de San Francisco, 8 esc D 28005 Madrid
Telephone	Tel +34 913540578
Email	pmarcos@wwf.es

Subject of nomination	
Habitat Species	***Octocoral ecosystems (sensu Freiwald et al. 2004)*** ***Paragorgia arborea, Primnoa resaediformes* (sea fans) and other deepwater gorgonian corals (leather corals)**



http://www.marinbi.com/skarnsundet/paragorgia_rudolf.jpg

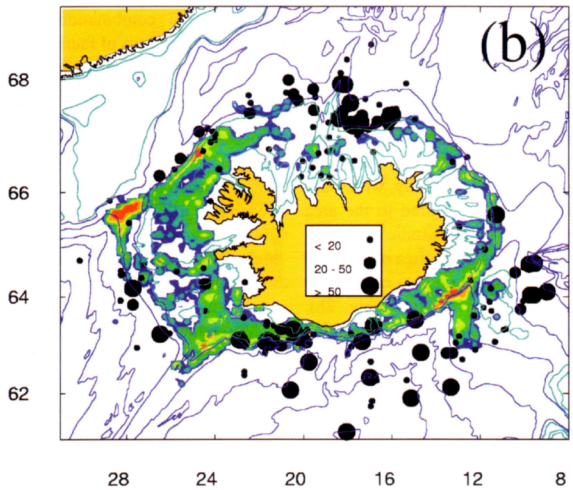
http://www.marinbi.com/cnidaria/primnoa_resedaeformis.jpg

Octocorals comprise the systematic groups of sea pens (Pennatulacea, gorgonian corals), blue corals (Helioporacea) and true soft corals (Alcyonacea). Virtually all of the 2700 described species form usually large, long-lived colonies which host a specialised symbiotic fauna. Leather corals (Gorgoniidae, including precious corals, sea fans and bamboo corals) dominate cold-water soft coral ecosystems in terms of spatial coverage, the true soft corals are prominent (octocoral gardens) on seamounts or deep shelves, especially in the high latitudes where stony corals are not prominent.

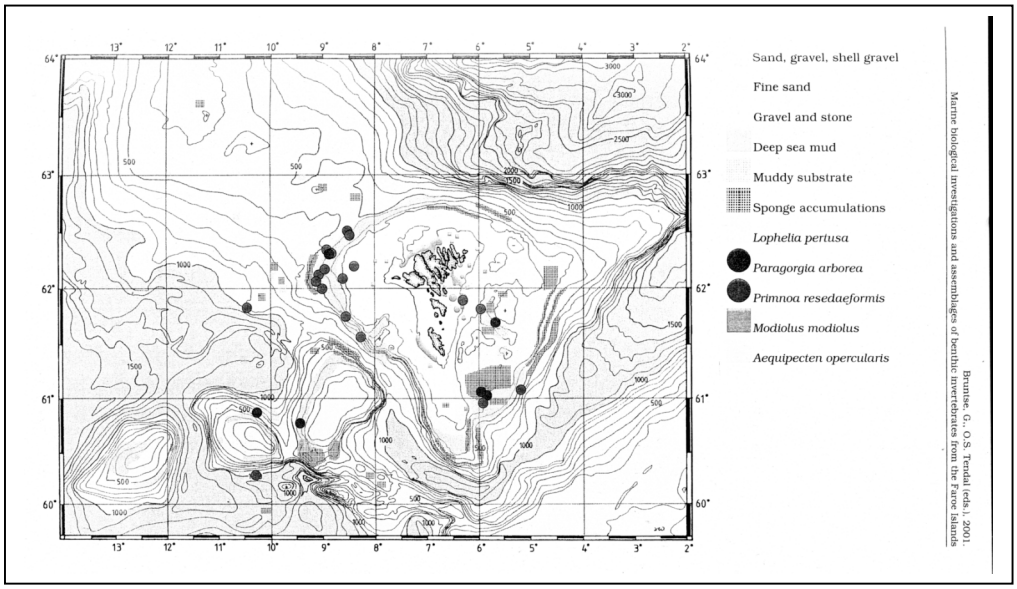
Probably the largest octocoral colonies are found within the sea fans, or gorgonian corals. Sea fans are anchored to the bottom on cobbles and boulders in glacial deposits and often have both mobile and sessile associated species, including fishes.
They grow like a tree with a central flexible trunk that branches up into the water column. Colonies that are several centuries old can be as high as 5 metres thus, and in a descriptive way, being comparable with “trees” in the cold-water environment (Andrews et al. 2002). Gorgonians produce a protein skeleton. This skeleton is made up of a wood-like core that is surrounded by a softer layer called the rind. Coral polyps are embedded in this rind and extend their bodies through openings in order to feed. Their huge fan-like colonies are oriented to prevailing currents. Common genera with a cosmopolitan distribution are *Placomus*, *Paragorgia* and *Primnoa.*

An analysis of the associated fauna of *Paragorgia arborea* yielded 97 species and 47 species were identified associated with *Primnoa resedaeformis* (Buhl-Mortensen and Mortensen 2004). These observations underline the importance of octocoral colonies as a major habitat-formers and providers.

Subspecies or population		
Geographical extent		
OSPAR Regions	I – Arctic Waters II – Greater North Sea III – Celtic IV – Bay of Biscay and Iberian Coast V- Wider Atlantic	I, III (?), IV, V

Biogeographic Zones	from Dinter, 2001	9 (?), 11, 13, 15, 16, 22, 23 – full distribution not known
Region and biogeographic zones specified for decline and/or threat	Anywhere within fishing depth	
Known distribution/range of nominated species (brief description)	Records of *Paragorgia arborea* from the Faroes, Iceland and Greenland show that the species has a coherent distribution from the coast of Norway to Nova Scotia. Whereas in Norwegian fjords, dense populations of the gorgonian corals *Paragorgia arborea* and *Primnoa resedaeformis* were observed alongside *Lophelia pertusa* in shallow waters, offshore, *P. arborea* is always found at depths greater than about 200 m, following water from the North Atlantic Current, generally with a temperature of 4-8 °C. Two co-occurring colour forms have been reported from most areas. Colonies about 2.5 m high have been documented, and it seems likely that considerably larger ones exist (Tendal 1992). Around Iceland, Ragnarsson & Steingrimsson (2003) mapped the present occurrence of octocorals in relation to fishing pressure with otter trawl gear (see Fig. below). Trawling and occurrence of corals mostly does not coincide, which wither indicates that no trawling occurs in boulder areas, or that decades of trawling may have diminished the previously wider distribution of the corals. An indication for the latter hypothesis comes from evidence given by German fishermen who targeted redfish around Iceland in the 1970s. They reported to have caught as a bycatch huge fragments of "bubble gum trees" (Paragorgia) e.g. in an area called "Rosengarten" to the south east of Iceland. Fishing in this area continued for many years with decreasing catches of both fish and coral bycatch (pers. com. to S. Christiansen). Ragnarsson & Steingrimsson (2003) Octocorals ? BioICE  Figure 9. Examples of benthic animals that are potentially vulnerable to physical disturbances caused by trawling and their distribution in Icelandic waters in relation to otter trawling effort. (a) Total biomass (kg h^{-1}) of sponges (Porifera) caught with otter trawl during MRI groundfish survey 2002 (Steingrímsson and Tendal; unpubl. res.). (b) Total number of octocorals collected in the BIOICE project (Steingrímsson and López-González; unpubl. res.).  Also off Iceland, in particular in an area called "Rosengarten" German redfish fishermen "harvested" fragments of coral such as this in the 70s – until there where no more. http://weblog.greenpeace.org/deepsea/images/imgPfUnd4.j	

Around the Faroes, *Paragorgia arborea* was first described in 1944 and later confimed by 6 records taken in the BIOICE project in depths shallower than 500 m. Faroese fishermen also report about colonies of 2.5 m hight (estimated to be at least 1500 years old). *Primnoa resaediformes* is more widespread around the Faroes and was first recorded in 1906. Most records, including the present ones, come from 200-500 m depth, in North Atlantic water. Specimens of 1 m size were recorded, corresponding to an estimated age of about 500 years.



Around the Azores, deep-sea corals seem to be common throughout the region, namely in the steep volcanic biotopes of the insular slopes and offshore seamounts. The most sampled gorgonians include large *Callogorgia verticillata*, Dentomuricea spp., *Acanthogorgia hirsuta* and *A. armata*, *Viminella flagellum*. These species probably form deep sea forests of considerable densities. Other conspicuous gorgonian species such as *Paragorgia johnsoni* are also important elements. Antipatharian fauna is apparently dominated by the *Antipathella wollastoni* in the littoral of the islands and shallow seamounts below ca. 20 m. The black coral *Leiopathes glaberrima* can reach up to 2m high and it forms dense forests between 200 and 600 m.
Several coral associations can be recognised. These associations can include species of the same group (e.g. *Madrepora oculata* with *Lophelia pertusa*) mixed with gorgonians (e.g. *Paramuricea* spp), stony hydroids, etc. The composition of those associations is probably depth related.

Application of Texel-Faial Criteria		
Global importance If Yes specify evidence (brief description)	No	
Regional importance If Yes specify evidence (brief description)	No	
Rarity If Yes specify evidence (brief description)	No	
Sensitivity	• Sensitive	Very sensitive

	• Very Sensitive • Neither of the above/ Not sensitive with respect to definitions	
Where relevant specify evidence (brief description)	Both species are considered to be very vulnerable to physical damage (Bruntse & Tendal 2001). From Freiwald et al. (2004) : Analysis of the life span of octocorals indicates, that some of the large colony-forming species, such as *Primnoa resedaeformis* can live for centuries (Risk et al. 2002, Andrews 2002). However, gorgonian corals are difficult to age. Growth rate estimations indicate that off Nova Soctia a *Primnoa resaediformes* of 80 cm is an estimated 46 years old (Mortensen & Buhl-Mortensen 2005). Leather corals are often fragile as many groups/species build large anastomosing colonies that are attached to any kind of hard substrate lying on the seabed. Different species of leather corals show different styles of internal skeletonisation consisting of masses of tiny, needle-like calcareous skeletal elements, the sclerites. These sclerites are glued together by a leathery substance called gorgonin that stiffens the entire colony. The strongest degree of skeletonisation is developed in the precious corals.	
Keystone species	Yes	
Decline	• Extirpated (extinct within OSPAR area • Severely declined • Significantly declined • Probability of significant decline • None of the above/ Not declining	Probability of significant decline
Where relevant specify evidence (brief description)	There are no records about decline in this group or species. Research is only just beginning. However, fishermens experience indicates a significant decline in areas of bottom trawling at least off Iceland and the Faroes, probably on all the "good" fishing places for redfish which lives within the octocoral habitat. This is also known from Canada, where fishermen reported significant changes to the seafloor over the duration of their fishing careers, including a decrease in the size and number of corals they caught (Gass & Willison 2005).	
Threat	• Currently threatened • Potentially threatened • Not threatened	Currently threatened
Where relevant, specify evidence (brief description)	There are indications from a Canadian (DFO) fisheries observer program that all the most frequently used fishing gears (gill nets, trawls, longlines) may cause damage to the corals. However, in Canada, longlining seems to be the most significant threat to date, as otter trawling may be restricted in boulder areas which provide the substrate for the gorgonian corals. Video transects e.g. off Nova Scotia, Canada, revealed lonlines entangled in damaged corals. This was confirmed by fishermen. Secondary damage may occur from the long free end of a snagged longline. Apart from directly smashing or tilting the gorgonians, fishing also weakens the structure of individual colonies by damaging the tissue resulting in a higher rate of epibiont and parasite colonisation, increasing the mortality and lower ing the fertility. Among other species, redfish lives associated with corals in the boulder fields which they use for rest and shelter. Decreasing availabity of three-dimensional current-reducing structure may have an effect on the competitiveness/success of redfish.	
Relevant additional considerations		
Sufficiency of data	Considering octocorals in general, data are absolutely insufficient, in particular as concerns the more southerly/warmer species. However, the species *Paragorgia arborea and Primnoa resaediformes* are in some areas well described (Faroes, Iceland, partially Norway). The overall distribution is yet not entirely known.	
Changes in relation to natural		

variability	
Expert judgement	
Threat and link to human activities	
Cross reference to checklist of human activities in OSPAR MPAs guidelines	*Relevant human activity:* fishing and other physically impacting activities (locally e.g. oil installations, pipeline construction) *Category of effect of human activity:* physical damage to destruction of individuals and habitat
Management considerations	
Current management	No current management apart from the likely protection from trawling in areas designated for the protection of skleractinian corals. However, longlining in these areas is still allowed.
Required further management	1. Information collection and mapping of presently known records 2. Designation of protected areas 3. Fisheries management to prohibit use of damaging gear (trawls, bottom longlines, bottom-set gill nets) in known areas of coral occurrence 4. New research and habitat mapping
Useful references	Andrews, A., EE. Cordes, M. M. Mahoney, K. Munk, K. H. Coale, G. M. Cailliet, J. Heifetz (2002). Age, growth and radiometric age validation of a deep-sea. Habitat-forming gorgonian (Primnoa resedaeformis) from the Gulf of Alaska. Hydrobiologia 471, 101-110 Buhl-Mortensen, L., P. Mortensen (2005). Distribution and diversity of species associated with deep-sea gorgonian corals off Atlantic Canada. In: Freiwald A, Roberts JM (eds), *Cold-water Corals and Ecosystems*. Springer-Verlag Berlin Heidelberg, pp 849-879 Bruntse, G., O. S. Tendal Eds. (2001). Marine biological investigations and assemblages of benthic invertebrates from the Faroe Islands. Report, 80 pp. Freiwald, A., Fosså, J. H., Grehan, A., Koslow, T., Roberts, J. M. (2004). Cold water coral reefs. UNEP-WCMC, Cambridge, UK Gass, E. S., Willison, J. H. M. (2005). An assessment of the distribution of deep-sea corals in Atlantic Canada by using both scientific and local forms of knowledge. In: Freiwald A, Roberts JM (eds), 2005, *Cold-water Corals and Ecosystems*. Springer-Verlag Berlin Heidelberg, pp 223-245 ICES WG DEC 2006 Mortensen, P. B., L. Buhl-Mortensen, D. C. Gordon Jr. (2004). Effects of Fisheries on Deepwater Gorgonian Corals in the Northeast Channel, Nova Scotia. American Fisheries Society Symposium 41 :369-382 Mortensen, P., L. Buhl-Mortensen (2005). Morphology and growth of the deep-water gorgonians *Primnoa resedaeformis* and *Paragorgia arborea.* Mar. Biol. 147, 775-788 Ragnarsson, S. A., S. A. Steingrimsson (2003). Spatial distribution of otter trawl effort in Icelandic waters: comparison of measures of effort and implications for benthic community effects of trawling activities. ICES J. Mar. Sci. 60: 1200-1215 Tendal , O. S.1992. The North Atlantic distribution of the octocoral Paragorgia arborea (L., 1758) (Cnidaria, Anthozoa). Sarsia 77:213-217
Contact details	
Name	Sabine Christiansen
Organisation	WWF
Address	Magdeburger Str. 17 20457 Hamburg
Telephone	Tel. +49 40 530200-128(+4940 41268695
Email	christiansen@wwfneap.org