CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

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# DEEP-SEA SHARK SPECIES FOR CONSIDERATION OF A CITES LISTING

The attached information document has been submitted by the CITES Secretariat at the request of the Pew Environment Group*.

* *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat or the United Nations Environment Programme concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

**Deep-sea Shark Species for Consideration of a CITES Listing**

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**Summary:**

Deep-sea shark species are extremely vulnerable to overexploitation, deep-sea fisheries are largely unregulated, and several deep-sea shark species are found in international trade. Therefore they are in urgent need for protection under the Convention on International Trade in Endangered Species of Fauna and Flora (CITES).

While much is unknown about the life history of deep-sea sharks, what scientists do know accentuate the need for a precautionary approach to management. According to the International Union for Conservation of Nature (IUCN) Shark Specialist Group, "Deep-sea species have particularly low reproductive potential, making them intrinsically vulnerable to overexploitation and population depletion" (Kyne and Simpfendorfer 2007). As fishing pressure has increased and expanded to deep-sea areas, shark species have become increasingly targeted for their meat and liver oil (Hareide *et al*. 2004).

Both of the deep-sea shark species Leafscale gulper shark (*Centrophorus squamosus*) and Portuguese shark (*Centroscymnus coelolepis*) have been consistently highlighted as extremely vulnerable to overexploitation. These shark species have a low productivity, low fecundity, slow growth, and long lives with late maturity.

The Leafscale gulper shark and the Portuguese shark have already seen drastic declines in abundance, especially in the Northeast Atlantic. Fisheries in the Northeast Atlantic region are regulated by a mixture of several regional and international policies, management, and advisory bodies. These include the North East Atlantic Fisheries Commission (NEAFC), the International Council for the Exploration of the Sea (ICES), and the Common Fisheries Policy (CFP) for marine fisheries of the European Union. However, even with supervision, deep-sea fisheries are overexploited, mostly unregulated, and afford very little protection for extremely vulnerable deep-sea species.

European vessels targeting deep-sea shark species are only loosely regulated in the North Atlantic. Despite consistent ICES recommendations, which have recommended setting deepwater shark catch limits at zero since 2005, the European Council of Fisheries Ministers announced that the 2009 total allowable catch (TAC) for deep-sea sharks would be 859 tons. Furthermore, EC Fisheries Ministers decided that in 2010, 10% of the 2009 TAC should account for sharks taken incidentally as bycatch (Shark Alliance 2008).

CITES has a long and involved history with sharks. Currently, three species are listed on Appendix-II (*Rhincodon typus, Cetorhinus maximus, Carcharodon carcharias*) and all but one

sawfish are listed on Appendix-I (Family Pristidae; *Pristis microdon* is listed on Appendix-II for strictly limited trade for conservation purposes).

In 2002, Parties adopted Resolution Conf. 12.6 on the conservation and management of sharks, and subsequently a further 17 Decisions (14.101 to 14.117) have been adopted concerning sharks. The Animals Committee (AC) has considered a number of potential species of concern during the period since the 14th Conference of the Parties in 2007. In addition, the entire genus Centrophorus has been listed by the CITES intercessional Shark Working Group of the Animals Committee on their "shark species of concern" list (CoP 15 Doc 53 Annex; CoP 14 Doc 59.1 Annex 3; AC24 WG5 Doc 1 "conservation and management of sharks and stingrays").

The United Nations Food and Agriculture Organization (FAO) adopted the International Plan of Action for the Conservation and Management of Sharks (IPOA Sharks) in 1999. Technical Guidelines were developed the following year to support the IPOA Sharks (FAO 2000). However, as the implementation of the IPOA-Sharks is voluntary, progress to date has been extremely slow regarding all shark species – and even more so for deep-sea sharks.

Therefore, due to their life history and the current impact on populations from fisheries and trade, we recommend that Parties consider submitting proposals for inclusion on CITES Appendix-II for both the Portuguese shark (*Centroscymnus coelolepis*) and Leafscale gulper shark (*Centrophorus squamosus*). We also recommend listing the remaining *Centrophorus* spp. under the look a-like provision on Appendix-II.

**Primary Threats:**

Deep sea sharks are caught widely both domestically and internationally in targeted fisheries and as bycatch. Fisheries are located in the North Atlantic, Pacific and Indian Ocean. Illegal, unreported, and unregulated (IUU) fishing is also a threat, and has been reported in the international waters of the Atlantic Ocean for both the Leafscale gulper shark and Portuguese shark species (ICES 2007, Lack and Sant 2008).

The Leafscale gulper shark and Portuguese shark are extremely vulnerable to overfishing due to their life history characteristics, which include low productivity, low fecundity, slow growth, late maturity, and a long lifespan. Their vulnerable status is compounded by a significant lack of information on global deep sea shark fisheries, biological status, or comprehensive trade data.

**Leafscale gulper shark *Centrophorus squamosus***

Species of *Centrophoridae* are believed to have the lowest reproductive potential of all elasmobranch species (Irvine 2005, Kyne and Simpfendorfer 2007). Leafscale gulper shark meat and liver are marketed in many areas throughout its range, utilized as fishmeal, dried and salted for human consumption, meat and fins (low value) and liver oil (very high value), and occasionally for its mature eggs. Catch per unit effort (CPUE) for autoline catches in ICES Area VI saw an 80-90% decline in three years; Area VII saw a 67-77% decline in four years; and Area XII saw a 20-69% decline in one year (Compagno 1984, SGRST 2002, White 2003, White *et al.* 2006, Froese and Pauly 2011). OSPAR estimates that even if deepwater fisheries closed and there was zero bycatch, recovery of depleted populations would be so slow as to take longer than 25 years (OSPAR Commission 2010).

**Portuguese shark *Centroscymnus coelolepis***

The Portuguese shark is taken by trawl, hook and gillnet both as a target and bycatch species for its liver oil and flesh. As this shark is increasingly commercially exploited, it is consistently accompanied by a steeply declining trend in overall abundance (OSPAR Commission 2010).

Pregnant females are particularly vulnerable since they tend to be located in shallower water where fisheries may be located. The OSPAR Commission notes that as catches fall fishing effort is simply redirected, causing rapid local depletions and an overall unsustainable fishery.

**Trade Summary:**

There is a general lack of available trade and landings data for deepwater sharks. Many deepwater species are taken as bycatch, often discarded, or landed under generic species-codes such as 'shark,' 'siki,' or 'other.' The lack of accurate catch data, including the underreporting of catches, the lack of recording bycatch, poor taxonomic resolution and species identification, and illegal fishing, makes an assessment of the global catch of deepwater chondrichthyans extremely difficult (Kyne and Simpfendorfer2007, IUCN 2008, MRAG 2011).

One popular use of deep sea sharks is their liver oil for a multitude of products, including as an emollient in beauty products and cosmetics, machinery lubrication, alternative medicines, and health products. Squalene is a product extracted from the livers of only deep sea sharks, frequently marketed in pill form as shark liver oil or naturally occurring squalene.

It is estimated that the global market for squalene is between 1,000-2,000 tons per year (Oceana 2008, MRAG 2011). In order to supply this quantity of squalene, a significantly higher quantity of deep sea sharks must be caught, as a shark's liver accounts for only about 20-30% of its body weight and squalene is only one component. It is estimated that it takes 3,000 sharks to make just 1 ton of squalene. Squalene pills in the health industry can retail at up to $20 for 60 grams of shark liver oil (MRAG 2011).

Primary markets are found in Korea and Japan, with a growing market in Spain and Australia. Importers include the EU and Australia, with much of the production based in Indonesia, Philippines, India, and Pacific Islands (MRAG 2011).

Intensive fishing has led to the rapid collapse of deepwater deep sea shark stocks, particularly *Centrophorus* species. In south-east Australia, the upper slope shark fishery collapsed after depleting upper slope species, with 98-99% declines for *Centrophorus* species over a twenty-year period (Kyne and Simpfendorfer 2007). A gulper shark liver oil fisher in the Maldives started in the 1980s and collapsed roughly 20 years later due to population depletion. In the north-east Atlantic, deep sea shark fishing to the west of the British Isles led to the depletion of Leafscale gulper sharks and Portuguese sharks – also within a two decade timeframe (Kyne and Simpfendorfer 2007).

**Vulnerability Assessments: The Convention for the Protection of the Marine Environment of the Northeast Atlantic (OSPAR)**

**OSPAR List of Threatened and/or Declining Species and Habitats**

OSPAR produces a List of threatened and/or declining species and habitats, under the OSPAR Strategy on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area. Several shark species have been listed by OSPAR to receive greater protection, including the Portuguese shark *Centroscymnus coelolepis*, Gulper shark *Centrophorus granulosus*, and Leafscale gulper shark *Centrophorus squamosus* in all areas where they occur.

**Vulnerability Assessments: The International Council for the Exploration of the Sea (ICES)**

In 2006, ICES noted substantial (90%) declines in CPUE series for both *C. coelolepis* and *C. squamosus* in Sub-areas VI, VII and XII (ICES WGEF 2007). Substantial declines in CPUE series for the two species in Sub-areas V, VI, and VII suggest that both species are severely depleted and that they have been exploited at unsustainable levels. Current ICES Advice (October

2010) recommends a zero catch of Portuguese shark and Leafscale gulper shark for 2011-2012, with post-2009 TAC of zero for deepwater sharks. According to ICES, there is insufficient information to separate the landings of Portuguese shark *Centroscymnus coelolepis* and Leafscale gulper shark *Centrophorus squamosus.* Total international landings of the combined species measured roughly 11,000 t in 2003 but have rapidly declined to the lowest levels since the start of the fishery (ICES Advice 2010 Book 9, ICES WKDEEP Report 2010).

**Vulnerability Assessments: International Union for Conservation of Nature (IUCN) Red List Assessment**

**Leafscale Gulper Shark *Centrophorus squamosus***

*Global:* Vulnerable

*Regional: Northeast Atlantic* Endangered

The low productivity life-history characteristics of this species, including very late maturity (35 years), long lifespan (70 years) and a long estimated generation period (>50 years), make it highly vulnerable to depletion and slow to recover from overfishing. Given this species' very high intrinsic vulnerability to depletion, evidence for steep declines in several areas of its range in this region and continued fishing pressure, it is assessed as Endangered in the Northeast Atlantic region (Gibson *et al.* 2008).

**Portuguese Shark *Centroscymnus coelolepis***

*Global* Near Threatened

*Regional: Northeast Atlantic* Endangered

The species is of particular concern in the Northeast Atlantic region because the mature part of the population is vulnerable to fisheries and it has a low reproductive output. Evidence for steep declines in several areas of its range in the Northeast Atlantic and continued fishing pressure lead to an assessment of Endangered on the basis of estimated declines of 50–80% (Gibson *et al.* 2008).

**Gulper Shark *Centrophorus granulosus***

*Global* Vulnerable

*Regional: Mediterranean* Vulnerable

*Regional: Northeast Atlantic* Critically Endangered

The Gulper shark is a rare deepwater shark with a widespread global distribution, which inhabits the upper continental slopes and outer continental shelf area. Believed to have the lowest reproductive potential of all elasmobranch species, its reproductive biology is characterized by a late onset of maturity (12 to 16 years in females), only one pup per litter and a two-year gestation period with occasional resting periods. In fact, a single female will produce a maximum of 12 pups in her lifetime. A decline of 80 to 95% from baseline has been estimated for the Northeast Atlantic population and is assessed as Critically Endangered within the Northeast Atlantic. (Gibson *et al.* 2008).

## Annex I
**Species Biology and Background:**

**1.) Leafscale gulper *Centrophorus squamosus*** (Bonnaterre, 1788)
*Classification*: Elasmobranchii | Squaliformes | Centrophoridae | Centrophorus squamosus
Deep-water; bathydemersal. Depth range 145 - 2400 m. Found on or near the bottom of continental slopes and pelagically.
Feeding: Presumably feeds on fish and cephalopods.
Reproduction: Ovoviviparous with 5 to 8 young born at a length between 35 and 43 cm. There is no apparent seasonal reproductive cycle in males.
Size/Age Estimates: This species attains a maximum length of 1.6 m. Maturity is attained at approximately 100 cm total length (TL) in males and at approximately 125 cm in females.
A study of the age and growth of this species off the Atlantic Slope (off Ireland) provided age estimates of 21 to 70 years. This species presumably attains maturity at a relatively late age.
Population trends: Decreasing

Eastern Atlantic: Iceland and Atlantic slope to Senegal, Faeroe Islands, Madeira, Azores, Gabon to Democratic Republic of the Congo, Namibia, western Cape of Good Hope (South Africa).
Western Indian Ocean: off Natal, South Africa, Aldabra Islands and Arabian Sea.
Western Pacific: Japan, Philippines, southeastern Australia and New Zealand.

Range Countries: Angola, Australia, Azores Islands, Canary Islands, Chile, China, Democratic Republic of the Congo, Republic of Congo, Faeroe Islands, France, Gabon, Gambia, Iceland, India, Ireland, Japan, Madeira Islands, Mauritania, Morocco, Mozambique, Namibia, New Zealand, Philippines, Portugal, Senegal, Seychelles, South Africa, Spain, UK

**2.) Portuguese shark *Centroscymnus coelolepis*** (Bocage & Capello, 1864)
*Classification*: Elasmobranchii | Squaliformes | Somniosidae | Centroscymnus coelolepis
Deep-water; bathydemersal. Depth range 150-3700 m, usually 400-2000 m. Found on or near the bottom of the continental slope and abyssal plain. There appears to be sex and size segregation by depth, with females tending to inhabit deeper waters than males.
Feeding: The diet consists mainly of fish, cephalopods, benthic invertebrates, and cetacean species.
Reproduction: Ovoviviparous. Males reach sexual maturity at 27-30 inches (70-75 cm) total length (TL); mature females have been reported at 35-39 inches (90-100 cm) TL. Females give birth to 13-17 young, which are born at 11-12 inches (27-30 cm) in length.
Size/Age Estimates: The average adult length is 27-39 inches (70-100 cm) with a maximum reported size of about 47 inches (120 cm). Males are smaller than females, reaching a maximum length of just over 35 inches (90 cm).
Population trends: Unknown, presumed declining

Eastern Atlantic: Wide but patchy distribution – Iceland south along Atlantic slope to the southwestern Cape coast of South Africa; western Mediterranean; Grand Banks to Delaware Bay.
Western Atlantic: Grand Banks to Delaware, USA; Cuba.
Western Indian Ocean: Seychelles.
Western Pacific: off Japan, New Zealand, and Australia including Tasmania.

Range Countries: Algeria, Australia, Azores Islands, Brazil, Canada, Canary Islands, Cuba, Faeroe Islands, France, Gambia, Greenland, Guinea, Guinea Bissau, Iceland, Ireland, Italy, Japan, Kerguelen Islands, Libya, Madeira Island, Malta, Mauritania, Monaco, Morocco, Namibia, New Zealand, Portugal, Senegal, Seychelles, Sierra Leone, South Africa, Spain, Tunisia, UK, USA

## Annex II

**Shark species of concern***
Created by the intercessional Shark Working Group of the Animals Committee, Convention on International Trade in Endangered Species of Fauna and Flora (CITES)

| |
|---|
| *Squalus acanthias* (Spiny shark shark) |
| *Lamna nasus* (Porbeagle shark) |
| Family Potamotrygonidae (Freshwater stingrays) |
| Family Pristidae (Sawfishes) |
| **Genus *Centrophorus* (Gulper sharks)** |
| *Galeorhinus galeus* (School, tope, or soupfin shark) |
| Order Rhinobatiformes (Guitarfishes, shovelnose rays) |
| Requiem and pelagic sharks |
| Family Mobulidae (Devil rays) |
| *Triakis semifasciata* (Leopard sharks) |
| *Sphyrna* spp. (Hammerhead sharks) |
| *Carcharhinus obscurus* (Dusky shark) |
| *Alopias* spp. (Thresher sharks) |
| *Isurus oxyrinchus* (Shortfin mako) |
| *Carcharhinus falciformis* (Silky shark) |
| *Carcharhinus longimanus* (Oceanic whitetip shark) |
| *Prionace glauca* (Blue shark) |
| *Carcharhinus plumbeus* (Sandbar shark) |
| *Carcharhinus leucas* (Bull shark) |
| *Galeocerdo cuvier* (Tiger shark) |

* From CITES CoP15 Doc. 53

## Annex III

**OSPAR List of Threatened and/or Declining Species and Habitats**

Truncated table taken from the OSPAR List of Threatened and/or Declining Species and Habitats, Part I: Species, Fish section. As noted in the document, fish species affected by fishing in this list are marked with an asterisk (*). (Reference Number: 2008-6)

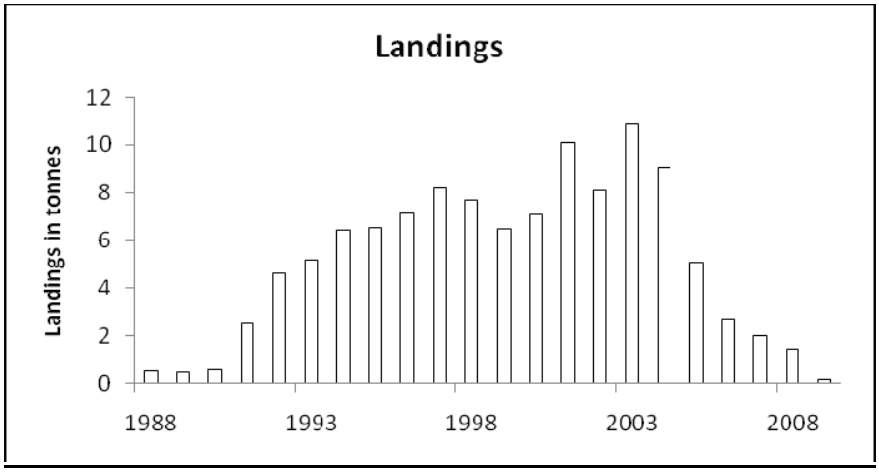
| SCIENTIFIC NAME | Common name | OSPAR Regions where the species occurs | OSPAR Regions where the species is under threat and/or in decline |
|---|---|---|---|
| **Centroscymnus coelolepis* | Portuguese shark | All | All where it occurs |
| **Centrophorus granulosus* | Gulper shark | IV, V | All where it occurs |
| **Centrophorus squamosus* | Leafscale gulper shark | All | All where it occurs |

Abundance for *Centrophorus squamosus* has been declining steeply during the past 10–15 years, and is likely less than 10 % of baseline. OSPAR notes that these declines frequently took place in only a few years. Declines in deepwater fisheries for *Centrophorus* species are also reported from elsewhere in their global range (OSPAR Commission 2010).

The population of *C. coelolepis* in the OSPAR Area is severely depleted. Exploitation effort has been reduced, but is continuing and rapidly moves to new areas in response to depletion or the introduction of management measures. Declines within the OSPAR Area are estimated conservatively as greater than 50% and are possibly greater than 80% across the whole population. Declines in deepwater fisheries for *C. coelolepis* are also reported from elsewhere in its global range. The biology of this species means that, even if/when all deepwater fisheries mortality ceases, recovery will be extremely slow (OSPAR Commission 2010).

**The International Council for the Exploration of the Sea (ICES)**

ICES considers the stocks of both Portuguese shark and Leafscale gulper shark to be depleted.




The figure above shows Portuguese shark (*Centroscymnus coelolepis*) and Leafscale gulper shark (*Centrophorus squamosus*) in the Northeast Atlantic. No landings per species are provided because split ratio remains highly uncertain (ICES Figure 9.4.20.1, ICES Advice 2010 Book 9).

## Annex IV

**International Union for the Conservation of Nature (IUCN) Red List Assessments**
Global and Regional Status (full text)

**Leafscale Gulper Shark *Centrophorus squamosus*** (Bonnaterre, 1788)
Global: Vulnerable A2bd+3bd+4bd (White, W., Blasdale, T., Hareide, N.R., Crozier, P., and Ebert, D. 2003)

> *Centrophorus squamosus* is an important component of deepwater fisheries (longline and trawl) off Ireland, Spain, Portugal and France. Quantitative CPUE data available for autoline catches in three ICES areas (Northeast Atlantic) show an 80 to 90% decline in three years, a 67 to 77% decline in four years, and a 20 to 69% decline in one year. Although this data is for *C. squamosus* and *Centroscymnus coelolepis* combined, these declines together with the acute vulnerability to exploitation of *Centrophorus* species as shown from the New South Wales fishery independent surveys, and the knowledge that *C. squamosus* is the more vulnerable of these two species in terms of life history, leads to this species being assessed as Vulnerable. The flesh and liver are marketed from this species in many areas throughout its range, e.g., eastern Atlantic and eastern Indonesia. In the latter region, *C. squamosus* is landed frequently but in relatively low numbers and in a very limited artisanal fishery. The catches of this species in Australia and Oceania are relatively low and do not represent a significant component of the squaloid catches in either southeastern Australia and New Zealand, but at present there is not enough information to assess it beyond Data Deficient in this region.

Northeast Atlantic: Endangered A2bd+3bd+4bd (Blasdale, T., Hareide, N.R., Crozier, P. in Gibson *et al*. 2008)

> A deepwater shark of the continental slopes, found on or near the seabed at depths of 230–2,400m and also in the upper 1,250m of oceanic water, well above the seabed. The very unproductive life-history characteristics of this species, including very late maturity (35 years), long lifespan (70 years) and a long estimated generation period (>50 years), make it highly vulnerable to depletion and slow to recover from overfishing. This shark has been exploited commercially for many years and is (or has been) an important component of fisheries in certain areas of its range. The species has been heavily exploited in the Northeast Atlantic, where available catch per unit effort data show consistently declining trends. French commercial trawl data which provides an estimate of Centrophorus squamosus stock abundance in the areas exploited by these fleets to the west of the UK, show an overall decline in CPUE in all areas fished of ~90% or >90% since 1995. From 2001–2005 the decline in CPUE was consistent across all areas fished and also supported by CPUE data from Irish trawlers. Catch rates of C. squamosus in Scottish surveys have also declined. In contrast, short time series of CPUE available for the western coast of Portugal, at the southern extent of this species' range in the Northeast Atlantic area seem stable. Given this species' very high intrinsic vulnerability to depletion, evidence for steep declines in several areas of its range in this region and continued fishing pressure, it is assessed as Endangered in the Northeast Atlantic region. It was recently (2008) listed on the OSPAR List of threatened and/or declining species and habitats. The catches of this species in Australia and Oceania are relatively low and do not represent a significant component of the squaloid catches in either southeastern Australia and New Zealand, but at present there is not enough information to assess it beyond Data Deficient in this region. In Japan exploitation of C. squamosus peaked during World War II, but quickly declined due to decreasing numbers caught. Globally the species is assessed as Vulnerable on the basis of steep declines in several areas of its

range, its very low productivity and continued fishing pressure from expanding deepwater fisheries.

**Portuguese Shark *Centroscymnus coelolepis*** (Bocage and Capello, 1864)

Global: Near Threatened (Stevens, J. and Correia, J.P.S. 2003)

Mainly a bycatch species taken by trawl and hook, although with some limited targeting for its flesh and oil. However, appropriate data on biomass or trends in abundance are lacking. The productivity of this species is likely to be low (although age estimates and annual fecundity are currently unknown) and further increases in catches should be viewed with concern. Its lower abundance, demersal habits (not appearing to range into midwater) and suspected low productivity warrant a Near Threatened assessment.

Northeast Atlantic: Endangered A2bd+4bd (Blasdale, T. in Gibson *et al*. 2008)

In the Northeast Atlantic, this species forms an important catch of mixed trawl fisheries, and mixed and directed longline and gillnet shark fisheries operating west of Ireland, Spain, Portugal and France. Centroscymnus coelolepis likely has limiting life-history characteristics similar to related species, with very slow growth and low fecundity, resulting in very low intrinsic rate of increase. Where catch per unit effort are available, these are initially high and then tend to decline rapidly. There has been a consistent overall decline in CPUE in all ICES subareas exploited by French commercial trawlers since 1995, to 10% or less of the 1995 level by 2005. This is supported by CPUE data from Irish trawlers, and by fishery-independent data from Scottish surveys. The species is of particular concern in this region because the mature part of the population is vulnerable to fisheries and it has a low reproductive output. Evidence for steep declines in several areas of its range in the Northeast Atlantic and continued fishing pressure lead to an assessment of Endangered on the basis of estimated declines of 50–>80%. This species was listed on the OSPAR List of threatened and/or declining species and habitats in 2008.

**Gulper Shark *Centrophorus granulosus*** (Bloch and Schneider, 1801)

Global: Vulnerable A2abd+3d+4d (Guallart, J., Serena, F., Mancusi, C., Casper, B.M., Burgess, G.H., Ebert, D.A., Clarke, M. and Stenberg, C. 2006)

A rare deepwater shark with a widespread global distribution, inhabiting the upper continental slopes and outer continental shelf area. Believed to have the lowest reproductive potential of all elasmobranch species; its reproductive biology is characterized by a late onset of maturity (12 to 16 years in females), only one pup per litter and a two-year gestation period with occasional resting periods. This makes it extremely vulnerable to overexploitation and population depletion. Despite a lack of data for certain regions within its geographic range, this species is globally assessed as Vulnerable on the basis of its limiting life history traits and the global increase in unmanaged fishing effort to exploit deeper waters.

Northeast Atlantic: Critically Endangered A2abd+3d+4d (Clarke, M. and Stenberg, C. 2006)

This species is extremely rare in the Mediterranean, which, in combination with the documented localized depletion subsequent to brief targeted fishing efforts and the species' inherent vulnerability to exploitation even in moderate numbers through bycatch, leads to an assessment of Vulnerable in this region. A decline of 80 to 95% from baseline has been estimated for the Northeast Atlantic population. Due to the low level of recruitment (resulting from a low fecundity and low reproductive output), this species is assessed as Critically Endangered within the Northeast Atlantic. It was recently (2008) listed on the OSPAR List of threatened and/or declining species and habitats where it occurs in the Northeast Atlantic.

**Annex V**

## CITES Conf. 12.6 (Rev. CoP15)*
## Conservation and management of sharks (Class Chondrichthyes)

RECOGNIZING that sharks are particularly vulnerable to overexploitation owing to their late maturity, longevity and low fecundity;

RECOGNIZING that there is a significant international trade in sharks and their products;

RECOGNIZING that unregulated and unreported trade is contributing to unsustainable fishing of a number of shark species;

RECOGNIZING the duty of all States to cooperate, either directly or through appropriate sub-regional or regional organizations in the conservation and management of fisheries resources;

NOTING that IUCN's *Red List of Threatened Species* (2009.2) lists 181 shark taxa;

RECOGNIZING that the International Plan of Action on the Conservation and Management of Sharks (IPOA-sharks) was prepared by the Food and Agriculture Organization of the United Nations (FAO) in 1999 and that all States whose vessels conduct directed fisheries or regularly take sharks in non-directed fisheries are encouraged by FAO's Committee on Fisheries (COFI) to adopt a National Plan of Action for the Conservation and Management of Shark Stocks (NPOA-Sharks);

NOTING the contents of: *Report of the technical workshop on the status, limitations and opportunities for improving the monitoring of shark fisheries and trade*. Rome, 3-6 November 2008. *FAO Fisheries and Aquaculture Report No. 897* (an advanced copy of which was circulated as document AC24 Inf. 6) and FAO (2009) *Responsible fish trade*. *FAO Technical Guidelines for Responsible Fisheries.* No. 11. Rome, FAO;

NOTING that, through the adoption of Resolution Conf. 9.17 and Decisions 10.48, 10.73, 10.74, 10.93, 10.126, 11.94 11.151, 12.47-12.49, 13.42, 13.43 and 14.101-14.117, Parties to CITES have previously recognized the conservation threat that international trade poses to sharks;

WELCOMING the report adopted at the 18th meeting of the Animals Committee that noted that CITES should continue to contribute to international efforts to address shark conservation and trade concerns;

NOTING that States were encouraged by FAO to have prepared NPOAs for sharks by the COFI 24th session held in 2001;

NOTING that there is a significant lack of progress with the development and implementation of NPOAs;

CONCERNED that insufficient progress has been made in achieving shark management through the implementation of IPOA-Sharks except in States where comprehensive shark assessment reports and NPOA-Sharks have been developed;

CONCERNED that the continued significant trade in sharks and their products is not sustainable;

**THE CONFERENCE OF THE PARTIES TO THE CONVENTION**

INSTRUCTS the CITES Secretariat to inform FAO of the concerns of the CITES Parties regarding the significant lack of progress in implementing the IPOA-Sharks, and to urge FAO to take steps to encourage actively relevant States to develop NPOA-Sharks;

DIRECTS the Animals Committee to examine information provided by range States on trade and other available relevant data and information, and report their analyses at the 16th meeting of the Conference of the Parties;

ENCOURAGES Parties to obtain information on implementation of NPOA-Sharks or regional plans, and to report directly on progress to the CITES Secretariat and at future meetings of the Animals Committee;

URGES FAO's COFI and Regional Fisheries Management Organizations (RFMOs) to strengthen their efforts to undertake the research, training, data collection, data analysis and shark management plan development outlined by FAO as necessary to implement the IPOA-Sharks;

ENCOURAGES Parties to assist in building financial and technical capacity in developing countries for shark and ray activities under CITES, and for the implementation of the IPOA-Sharks;

URGES Parties that are shark fishing States but that have not yet implemented an NPOA-Sharks, to develop their own NPOAs at the earliest opportunity and take steps to improve research and data collection on both fisheries and trade as a first step towards their Shark Plans, particularly the necessity to improve the collection of catch and trade data at the lowest taxonomic level possible (ideally by species);

FURTHER URGES Parties to discuss CITES activities within the appropriate RFMOs of which they are members;

ENCOURAGES Parties to improve data collection, management and conservation measures for shark species, implementing, enhancing and enforcing these actions through domestic, bilateral, RFMOs or other international measures;

DIRECTS the Animals Committee to make species-specific recommendations at meetings of the Conference of the Parties if necessary on improving the conservation status of sharks;

REQUESTS Management Authorities to collaborate with their national Customs authorities to expand their current classification system to allow for the collection of detailed data on shark trade including, where possible, separate categories for processed and unprocessed products, for meat, cartilage, skin and fins, and to distinguish imports, exports and re-exports and between shark fin products that are dried, wet, processed and unprocessed fins. Wherever possible, these data should be species-specific;

INSTRUCTS the Secretariat to monitor discussions within the World Customs Organization regarding the development of a Customs data model, and the inclusion therein of a data field to report trade in sharks at species level, and to issue Notifications to the Parties concerning any significant developments;

ENCOURAGES Parties, in close cooperation with FAO and RFMOs, to undertake or facilitate continued research to improve understanding of the nature of illegal, unreported and unregulated (IUU) fishing concerning sharks, identify the linkages between international trade in shark fins and meat, and *IUU fishing;*

ENCOURAGES Parties, intergovernmental and non-governmental bodies to undertake studies of trade in shark meat, including prices in major fish markets in order to better identify the shark products that are driving IUU fishing; and

DIRECTS the Animals Committee to report progress on shark and ray activities at the meetings of the Conference of the Parties.

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* *Amended at the 15th meeting of the Conference of the Parties.*

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**Deep-sea Species for Consideration of a CITES Listing: Orange Roughy**

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**Summary:**

Deep-sea fish species are extremely vulnerable to overexploitation, deep-sea fisheries are predominately unregulated, and several deep-sea fish are found in international trade. The orange roughy (*Hoplostethus atlanticus*) has been consistently highlighted as extremely vulnerable to overexploitation, and dramatic declines in abundance have already occurred globally. Therefore, they are in urgent need for protection under the Convention on International Trade in Endangered Species of Fauna and Flora (CITES).

Orange roughy are one of the highest valued commercially-caught fish products, making the economic incentives a major driver in its overexploitation (FAO 2007). In the majority of global fisheries for orange roughy, intensive fishing pressure led swiftly to fishery collapse. In each instance, the decline in consumption was directly due to a contraction of supply; despite its poor track record orange roughy continues to be fished where viable stocks remain.

Orange roughy is an extremely deep-living species characterized by slow growth, tremendous longevity (well over 100 years), late age at maturity (25-40 years), and low fecundity. Their sporadic recruitment and aggregating behavior around seamounts result in extreme vulnerability to exploitation and allows rapid overfishing (ICES WGDEEP 2010; OSPAR 2010).

Therefore, due to their vulnerable life history traits and dramatic population declines, we recommend that Parties consider submitting a proposal for inclusion on CITES Appendix-II for orange roughy (*Hoplostethus atlanticus*).

**Primary Threats:**

The only known threat to orange roughy is from deepwater fisheries. This has been repeatedly demonstrated since 1990, when catches peaked and then steadily declined wherever they have been exploited (Sissenwine and Mace 2007). Orange roughy is the primary example for what can happen when a species life history is not fully understood, there are major stock assessment challenges, and the species is economically valuable. As stated in the 2006 FAO Expert Consultation: "This is a dangerous combination of factors, which is acutely illustrated by the failure to sustain most orange roughy fisheries" (Sissenwine and Mace 2007).

In fact, orange roughy fisheries have a poor track record with numerous examples of stock collapse, including the St. Helens Hills of Tasmania, Namibia and the South West Indian Ocean (Japp and Wilkinson 2007). During an FAO Expert Consultation on Deep-sea Fisheries in the High Seas, it was pointed out that "deepwater fisheries beyond 500 meters generally have a history of less than three decades" – and orange roughy is generally most abundant at 900-1700 meters (Sissenwine and Mace 2007; Bailey et al. 2009). Recent communication from the European Commission states that "some stocks, like orange roughy, should not be fished at all" (Consultation on fishing opportunities for 2011 COM(2010)241 final).

**Trade Summary:**
Fisheries for orange roughy have existed in the Atlantic, Indian, and Pacific Oceans – particularly on and around seamounts. Despite the existence of orange roughy fisheries in the southern hemisphere for more than 25 years, significant uncertainties persist in relation to stock status, biology, and population dynamics.

As a fish with a traditionally high market value, orange roughy has always been a highly sought after species. It is mainly sold in the USA, Australia, and New Zealand, with some value-added processing carried out in China (MRAG 2011). Currently, New Zealand remains the primary supplier of orange to the global market, although historically there have been orange roughy fisheries in the NE Atlantic, the European Union, Chile, and Namibia (MRAG 2011).

It has been said that in most cases the management of orange roughy fisheries worldwide has failed. In a summary report of more than 30 individual orange roughy fisheries, including some individual seamounts, Lack *et al*. (2003) reported that nearly half of these have been fished to lower than 30% of their unexploited biomass. Only one remains above this level, and for more than half of the fisheries surveyed the status of the stocks was unknown (Lack et al. 2003, MRAG 2011).

**Vulnerability Assessment: The International Council for the Exploration of the Sea (ICES)**
ICES considers orange roughy to be depleted in all Sub-areas, based on life history characteristics and the catch per unit effort/landings data available. In addition, ICES states that it is not currently possible to manage a sustainable orange roughy fishery. Therefore, the ICES Advice summary for 2011 is:"No directed fisheries for this species and measures to minimize bycatch should be taken" (ICES Advice 2010, Book 9).

**Vulnerability Assessment: The Convention for the Protection of the Marine Environment of the Northeast Atlantic (OSPAR)**
**OSPAR List of Threatened and/or Declining Species and Habitats**
OSPAR produces a list of threatened and/or declining species and habitats, under the OSPAR Strategy on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area. Orange roughy (*Hoplostethus atlanticus*) has been listed by OSPAR since 2006 to receive greater protection in all areas where they occur. In addition, OSPAR asserts in its 2010 background information document on orange roughy that no sustainable fishery is possible due to the extreme vulnerability of this species, and makes orange roughy subject to conservation measures under UNGA 61/105 (OSPAR 2010 Background).

**Vulnerability Assessment: European Commission Consultation document on Fishing Opportunities for Deep See Species 2011 and 2012** (COM(2010)241)
In the Commission Consultation document on Fishing Opportunities for Deep Sea Species 2011 and 2012, fisheries for orange roughy are highlighted as needing stricter protections and a cessation of directed fishing effort: "For orange roughy, scientific bodies advise that there should be no fishing in any of the TAC areas. The protection areas for orange roughy in ICES Divisions VI and VII are no longer adequate … in view of the fact that no orange roughy should be caught from any area. However, there is a need to prevent orange roughy being fished and later discarded as a by-catch of other species that might be targeted in the areas in which aggregations of orange roughy are known to occur" (document available at http://www.seas-at-risk.org/1mages/consultation%20deep%20sea%20TACs%2020111-2012.pdf).

**Protections Afforded:**
Regionally, deep-sea fisheries are regulated by several regional management and advisory bodies and overlapping international policies. However, even with this oversight, orange roughy fisheries are overexploited, mostly unregulated, and afford very little protection for these extremely vulnerable deep-sea species.

Australia: The species has been listed as threatened since 2006 due to severe overfishing.

Chile: Stock on the seamounts of Juan Fernandez Islands was slightly under its MSY level in 2006 and a ban on fishing was put in place due to perceived risk and lack of knowledge.

NEAFC: Resolution 61/105 of the UN General Assembly (2006) calls on states and regional fisheries management organizations such as NEAFC to vulnerable marine ecosystems, including vulnerable species like orange roughy. NEAFC has started to implement the resolution by adopting bottom fisheries area closures. The measure will be in force until 31 December 2015. NEAFC Recommendation VII:2009 fixes the fishing effort of contracting parties to a maximum of 65% of the highest level put into deep-sea fishing in previous years, as calculated from aggregate power, aggregate tonnage, fishing days at sea or number of participating vessels. (OSPAR 2010 Background)

European Union: The EU first introduced measures for EU vessels targeting deep-water species in 2003 (ICES 2010). Since then, fishing for certain deep-water species has mostly been regulated in two ways: by limiting the catch; and by limiting the capacity of vessels that target deep-water species. The measures currently in place have been far from effective in safeguarding our oceans from the adverse impacts of deep-sea fishing. Regulation (EC) No 2270/2004 set up three closed areas for the protection of vulnerable aggregations of orange roughy (OSPAR 2010 Background). In 2010 almost all of the directed fisheries on orange roughy in the North East Atlantic will have ceased. However, all of the relevant measures are taken on a non-permanent basis and will be subject to review every other year. (OSPAR 2010 Background)

Azores: Council Regulation (EC) No 1568/2005 permanently prohibits the use of bottom-contacting trawls in specified areas. The Azores regional government has also decreed a prohibition of bottom trawling. (OSPAR 2010 Background)

Faroe Islands: Management measures limit deep-sea fishing fleet size at the 1995 level (OSPAR 2010 Background).

International: The status of most high seas stocks is uncertain, but likely range from underexploited to over-exploited. Tasman Sea - Depleted. Lord Howe - No stock assessment, but CPUE declining. Northwest Challenger - No stock assessment, but CPUE declining. Louisville - No stock assessment, but CPUE declining (MRAG 2011).

## Annex I

**Species Biology and Background:**

**Orange roughy *Hoplostethus atlanticus*** (Collett, 1889)
*Classification:* Actinopterygii | Beryciformes | Trachichthyidae | | Hoplostethus atlanticus
Bathypelagic; oceanodromous. Depth range 180-2000 m; frequently found at 900-1200 m. Aggregations are associated with seamounts, steep slopes and other topographical features.

Feeding: Opportunistic predators, consuming amphipods, crustaceans, small fish, and squid, among other prey.

Reproduction: Thought to migrate several hundred kilometers to specific sites, and form spawning aggregations. Spawns in NE Atlantic in January and early March; spawning in the southern hemisphere is typically from June-August. Low fecundity, with about 20,000-70,000 eggs depending on body mass.

Size/Age Estimates: Extremely long-lived and very slow growing (oldest specimens have been mentioned at 149 or 187 years, depending on source and aging method). Total length can be up to 75 cm. Age of maturity is around 20-40 years, depending on region. Mean length at maturity varies between regions as well, ranging from 18-32.5 cm, with examples of 24 cm (South Africa) to 42 cm in NE Atlantic.

Population trends: Decreasing

Eastern Atlantic: Iceland to Morocco, and Walvis Bay, Namibia to off Durban, South Africa
Western Atlantic: Gulf of Maine/off northern Nova Scotia
Eastern Pacific: Chile
Indo-Pacific: South-central Indian Ocean and New Zealand

Range Countries: Argentina, Australia, Azores Islands, Chile, Faeroe Islands, France, Greenland, Iceland, Ireland, Morocco, Namibia, New Zealand, Norway, South Africa, St. Paul Island, USA

**Annex II: OSPAR, ICES, and FAO Information**

**OSPAR List of Threatened and/or Declining Species and Habitats**

Truncated table taken from the OSPAR List of Threatened and/or Declining Species and Habitats, Part I: Species, Fish section. As noted in the document, fish species affected by fishing in this list are marked with an asterisk (*). (Reference Number: 2008-6)

| SCIENTIFIC NAME | Common name | OSPAR Regions where the species occurs | OSPAR Regions where the species is under threat and/or in decline |
|---|---|---|---|
| **Hoplostethus atlanticus* | Orange roughy | I, V | All where it occurs |

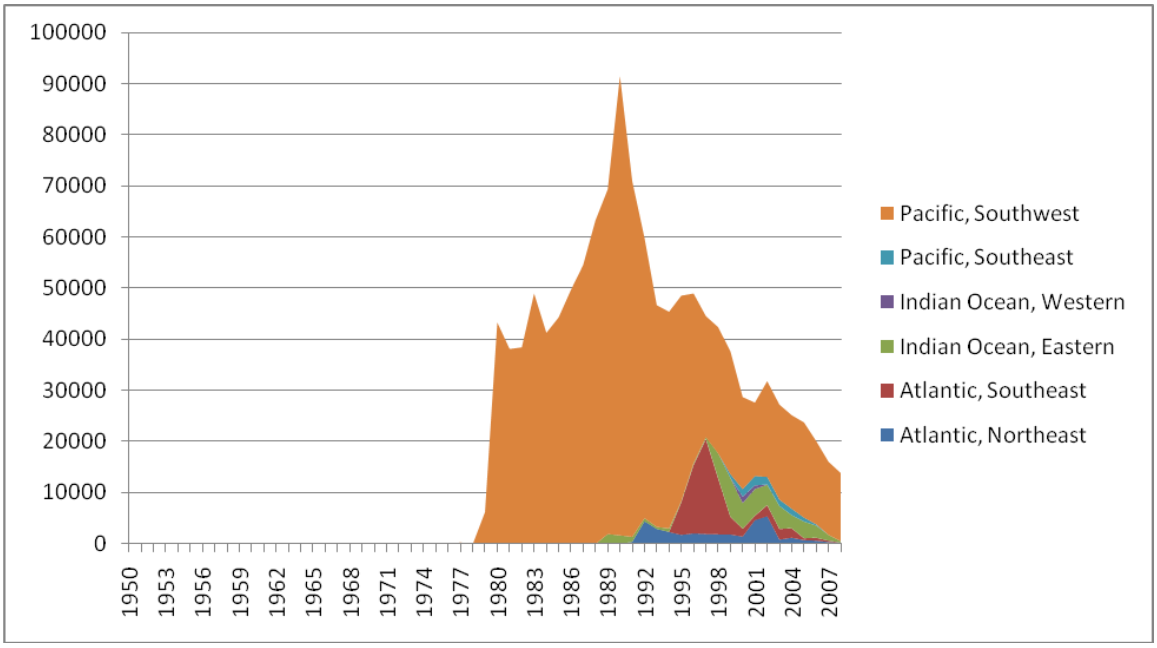
**ICES Advice 2011**

**Orange roughy (*Hoplostethus atlanticus*) in all areas**

Due to its very low productivity, orange roughy can only sustain very low rates of exploitation. Currently, it is not possible to manage a sustainable fishery for this species. ICES recommends no directed fisheries for this species. By-catches in mixed fisheries should be as low as possible. (ICES Advice 2010, Book 9)

**FAO FishSTAT Data (through 2009)**

Declining captures in global orange roughy fisheries.



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**Deep-sea Grenadier Species for Consideration of a CITES Listing**

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**Summary:**

Deep-sea fish species are extremely vulnerable to overexploitation, deep-sea fisheries are predominately unregulated, and several deep-sea fish are found in international trade. The Roundnose grenadier (*Coryphaenoides rupestris*) and the Roughhead grenadier (*Macrourus berglax*) have been consistently highlighted as extremely vulnerable to overexploitation in the North Atlantic, where marked declines in abundance have already occurred. Therefore they are in urgent need for protection under the Convention on International Trade in Endangered Species of Fauna and Flora (CITES).

Roundnose grenadier and Roughhead grenadier are extensively fished in the North Atlantic Ocean, either as a targeted fishery or as bycatch. The history of the fisheries for Roundnose and Roughhead grenadiers is of concern and characterized by serial depletions. At the start of the fishery, the Roundnose grenadier was first targeted in the North, with the fishing effort progressively moving westward across the Atlantic as populations were fished out until hitting New England area of the United States (Devine and Haedrich 2008).

The targeted Roundnose grenadier fishery was halted due to poor landings; at which point the fishery then turned to Roughhead grenadiers as a replacement. The decline of the Roundnose emphasizes the economic importance of the Roughhead fishery, both as targeted and bycatch species (COSEWIC 2007).

Both of these species demonstrate low productivity, longevity of 50-70 years, and slow growth. Estimates on maturity vary, but generally it is believed that females mature at around 50-60 cm (roughly 12-15 years), males at about roughly 40 cm. Fecundity is estimated to be relatively low and estimated generation time is 17-19 years (DFO 2010).

Due to their life history and the impact on populations from fisheries, we recommend that Parties consider submitting a proposal for inclusion on CITES Appendix-II for both the Roundnose grenadier (*Coryphaenoides rupestris*) and the Roughhead grenadier (*Macrourus berglax*).

**Primary Threats:**

The primary threat to the Roundnose and Roughhead grenadier is commercial deep-water fisheries in the North Atlantic, where these species are currently facing overexploitation, according to the Food and Agriculture Organization (FAO species fact sheet). Marked declines in landings have been reported throughout both species' range. Perhaps of foremost concern is that both species are typically caught before they fully mature (Devine and Haedrich 2008). Although it is estimated that females mature around 12-15 years, but commercial grenadier catches are typically comprised of ages 5-10 with a peak at 6 years (COSEWIC 2007).

Fisheries for both grenadier species are unregulated under the North Atlantic Fisheries Organization (NAFO). In the NW Atlantic, Roundnose grenadier is primarily taken as bycatch in

Greenland halibut (*Reinhardtius hippoglossoides*) and redfish (*Sebastes spp.*) fisheries. The Roughhead grenadier (*Macrourus berglax*) is one of only four *Macrourus* species in the world, and the only one in the North Atlantic. Roughhead grenadier is caught commercially by the Portuguese and Spanish for its liver and is a by-catch species of the Greenland halibut fishery (COSEWIC 2007).

**Vulnerability Assessment: Critically Endangered**

Although this species has not yet been formally evaluated by the International Union for Conservation of Nature (IUCN), a 2006 study by Devine *et al*. found both Roundnose and Roughhead grenadiers qualified as **Critically Endangered under IUCN Red List Criteria** in the Northwest Atlantic (Devine *et al.* 2006). The study observed declines in both relative abundance and mean size over a 17 year period (1978-1994). During that period, mean size declined for Roundnose grenadier (54.9%) and Roughhead grenadier (26.5%). Additional survey information available from 1995-2003 for Roundnose grenadier and Roughhead grenadier showed declines in relative abundance over the entire 26 year period were 99.6% and 93.3%, respectively. Using the IUCN benchmark, the estimated declines for three generations were 99-100% (Devine *et al.* 2006).

**Vulnerability Assessment: The International Council for the Exploration of the Sea (ICES)**

A total allowable catch (TAC) management system is in place for Roundnose grenadier in various ICES Sub Areas, Divisions, and Subdivisions for European Community vessels (ICES Advice 2010, Book 9). Caught frequently as bycatch in ICES areas, there has been a noticeable decline in landings as the population abundance decreases. ICES Advice for 2011 stresses the recommendation that "the fishery should not be allowed to expand, and a reduction in catches should be considered" (ICES Advice 2010 Book 9).

**Trade Summary:**

According to NAFO statistics, the bulk of the NW Atlantic catch of both Roundnose and Roughhead grenadier species is taken on the high seas. They are traded internationally, although most are reported as caught by Spanish bottom trawl vessels which largely deliver their catches to Spanish ports (MRAG 2011).

The majority of the grenadier catch in the NE Atlantic is taken within primarily EU waters, although some is also taken on the high seas. The main fleet for the NE Atlantic is French, targeting Roundnose grenadier in a mixed fishery along with Black Scabbardfish and Blue Ling. Some Faroese, Spanish, Russian, Polish and Danish vessels also participate in this fishery (MRAG 2011).

Grenadier fillets are very popular and have been widely consumed in France since the 1990s, where it is usually sold as fresh 'skin off' fillets. The principal two grenadier species sold are Roundnose and Roughhead (Alliance de Produits de la Mer 2010 in MRAG 2011). Wholesale prices at Paris' main market for grenadier ranged in mean value from €9.05 to €12.19 (mean price €/kg) from February to November 2009 (MRAG 2011). Online, one French wholesaler priced 150-250 gram fresh fillets of grenadier at €15.5 to €28.4 per kilo, while frozen fillets hovered around €8/kg (MRAG 2011).

**Protections Afforded:**

Fisheries in the North Atlantic region are regulated by several regional management and advisory bodies, and overlapping international policies. These include the North East Atlantic Fisheries Commission (NEAFC), North Atlantic Fisheries Organization (NAFO), International Council for

the Exploration of the Sea (ICES), and the Common Fisheries Policy (CFP) for marine fisheries of the European Union. However, even with this oversight, deep-sea fisheries are overexploited, mostly unregulated, and afford very little protection for these extremely vulnerable deep-sea species such as Roundnose and Roughhead grenadier.

International: NEAFC regulates deep-sea fisheries in the NE Atlantic regional international waters, mainly through regulation on effort restrictions. As for NAFO, currently there is a moratorium on this fishery in Subarea 0; however, most of Roundnose grenadier catches are unregulated with the exception of mesh size in other fisheries (DFO 2010). The fishery for Roughhead grenadier is unregulated and is mainly taken as by-catch in the Greenland halibut fishery.

Canada: In 2008, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed Roundnose grenadier as Endangered in the NW Atlantic. There is a moratorium on targeted Roundnose grenadier catches in NAFO Sub-areas 2 and 3 (Canadian waters). However, Roundnose grenadier is still captured as by-catch in other commercial fisheries – particularly the Greenland Halibut fishery – both inside and outside Canadian waters (DFO 2010). Roughhead grenadier was assessed by COSEWIC to be of special concern in 2007, and is under consideration for status under the Species at Risk Act (SARA).

European Union: A total allowable catch (TAC) management system is in place for Roundnose grenadier for European Union vessels, although the quotas have consistently been set higher than the ICES recommendations. Other than general EU deep-sea fishing effort restrictions, the fishery for Roughhead grenadier is unregulated and is mainly taken as by-catch.

**Annex I: Species Biology and Background**

**1.) Roundnose Grenadier *Coryphaenoides rupestris*** (Gunnerus, 1765)
*Classification*: Actinopterygii | Gadiformes | Coryphaenoides | Coryphaenoides rupestris
Deep-water; bathypelagic. Depth range predominantly 400-1200 meters depth, but can range from 180-2600 m (Cohen 1990). Have also been known to form large schools at 600-900 m (Frimodt 1995).

North Atlantic: Found from about 37°N to Baffin Island and Greenland in the western Atlantic, and off Iceland and Norway (66°N) south to North Africa (20°N) in the eastern Atlantic.

Feeding: A variety of fish and invertebrates, pelagic crustaceans, cephalopods, and occasionally lantern fishes.

Reproduction: Batch spawner. The species apparently undergoes spawning migrations as well as diurnal vertical feeding migrations that may carry them more than 1000 m off bottom. Spawning is believed to take place in summer and autumn. Estimates on maturity vary, but generally it is believed that females mature at around 50-60 cm (roughly 12-15 years), males at about roughly 40 cm. Fecundity is estimated to be relatively low and estimated generation time is 17 years (DFO 2010).

Size/Age Estimates: This species shows low productivity, which can only sustain low rates of exploitation. Age estimates show longevity of 50-70 years with a slow growth. This species attains a maximum length of 110 cm, with females being larger and heavier than males.
Population trends: Declining

Range Countries: Bahamas, Canada, Denmark, Faeroe Islands, France, Greenland, Iceland, Ireland, Mauritania, Norway, Sweden, UK, USA

**2.) Roughhead Grenadier *Macrourus berglax*** (Lacepède, 1801)
*Classification*: Actinopterygii | Gadiformes | Macrouridae | Macrourinae
Benthopelagic; non-migratory. Depth range 100-1000 meters, usually 300-500 m (Cohen 1990).

North Atlantic: Found from Norfolk Canyon and George Bank north to Labrador, Davis Strait, eastern and western Greenland, Iceland, and from the Irish Atlantic slope north to Faeroe Islands, Norwegian coast, to Spitzbergen, and to the Barents Sea.

Feeding: Opportunistic feeder, with amphipods dominating the diet.

Reproduction: Batch spawner, with spawning peaks occurring in early spring or winter. Estimates on maturity vary, but generally it is believed that females mature at around 50-60 cm (12-15 years), males at about roughly 40 cm. Fecundity is estimated to be relatively low and estimated generation time is 19 years (DFO 2010).

Size/Age Estimates: This species shows low productivity, which can only sustain low rates of exploitation. Age estimates are around 50-70 years, with slow growth, and females living longer than males. This species attains a maximum length of 110 cm, with females being larger and heavier than males.
Population trends: Declining

Range Countries: Canada, Faeroe Islands, Greenland, Iceland, Ireland, Norway, UK, USA

**Annex II: Key References**

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