

## Nomination

*Centrophorus granulosus*, Gulper shark

Gulper shark *Centrophorus granulosus* (Bloch & Schneider, 1801)



## Geographical extent

- OSPAR Regions: IV, V
- Biogeographic zones: 14,15,16,17
- Region & Biogeographic zones specified for decline and/or threat: as above

Figure 1: Global distribution of *Centrophorus granulosus* (from Compagno *et al.* 2005)



*Centrophorus granulosus*

Collins 2005 Field Guide

*Centrophorus granulosus* is widely distributed on the upper continental slopes and outer continental shelf of temperate and tropical seas. In the Northeast Atlantic it occurs off France, Spain and Portugal, and in the Mediterranean. It is recorded along the Atlantic coast of Africa, in the Gulf of Mexico and Caribbean, in the Western Indian Ocean, and in the West Pacific. Distribution outside the OSPAR area, where the species is often misidentified as *C. uyato*, is uncertain. (Compagno 1984; Compagno *et al.* 2005; Froese *et al.* 2006; Guallart *et al.* 2006).

## Application of the Texel-Faial criteria

### Global importance

This species is widely distributed in tropical and temperate seas. The OSPAR population is not of global importance.

### Regional importance

There is no information about genetic differentiation of regional populations; the OSPAR Area is not thought to be of regional importance.

### Rarity

*C. granulosus* occurs only in the southern part of the OSPAR Regions V and VI. It is considered by ICES WGEF (in prep.) to be rare in waters from ICES Sub-area VIIIc northwards (north of Portugal).

### Sensitivity

Deepwater elasmobranchs are adapted for life in a very stable, cold, low-productivity environment, and have an even lower productivity than coastal and pelagic sharks. Indeed, this large deepwater dogfish is believed to have the lowest reproductive potential of all elasmobranch species. The reproductive biology of deepwater sharks is characterized by a particularly late onset of maturity and great longevity. This species gives birth to only one pup per litter (Tortonese 1956, Capapé 1985, Fischer *et al.* 1987, Guallart 1998) after a two-year gestation period and occasional resting periods between litters (Guallart 1998). It is extremely vulnerable to overexploitation and stock depletion. Where data are available on catch per unit effort (CPUE), these are initially high, then decline quickly.

Despite a lack of data for certain regions within its geographic range, this species has been assessed as Vulnerable globally on the IUCN Red List of Threatened Species on the basis of its limiting life history traits, recorded declines in fisheries, and the global increase in unmanaged fishing effort in deeper waters. It is assessed as Critically

Endangered in the Northeast Atlantic (Guallart *et al.*, 2006).

*C. granulosus* is highly sensitive to deepwater fishing, mainly longline fishing and gillnet fisheries. Its extremely low intrinsic rate of population increase mean that recovery of depleted populations will be very slow, taking longer than 25 years even if deepwater fisheries close and all bycatch ceases.

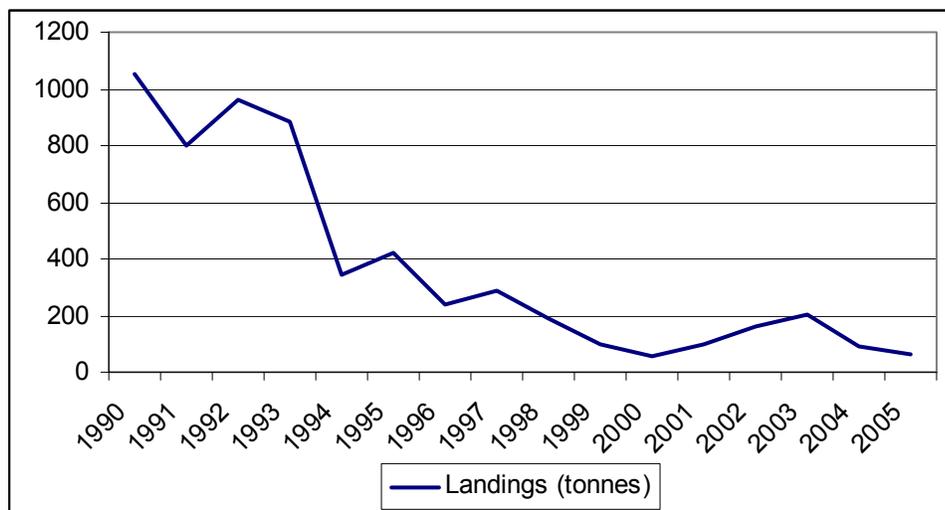
### Keystone species

No information.

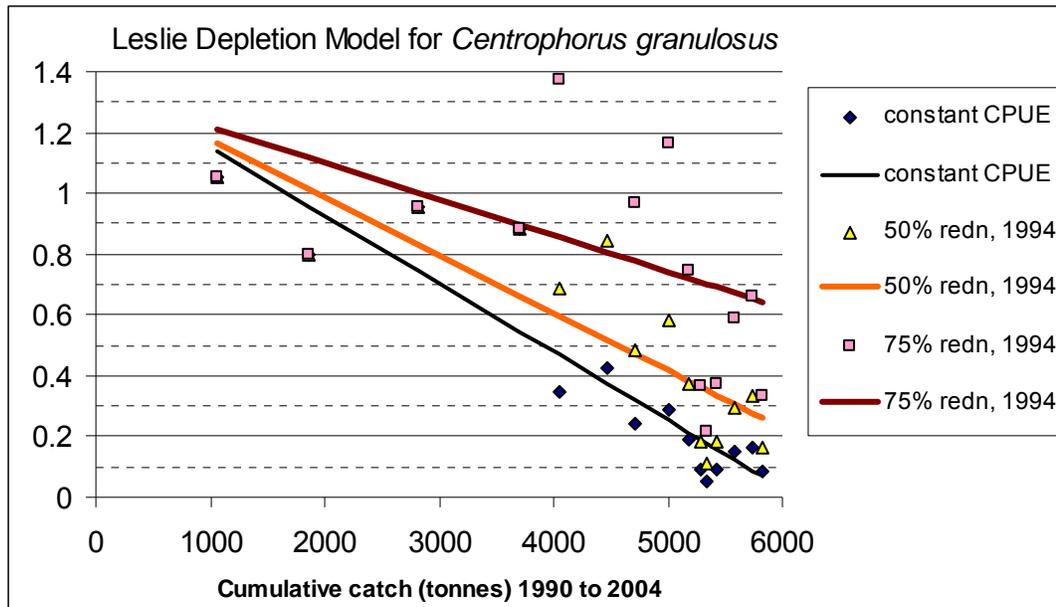
### Decline

A decline of 80-95% from baseline has been estimated for the Northeast Atlantic population (Guallart *et al.* 2006), based on data from the Portuguese target longline fishery within the main distribution range of this species. This fishery started in 1983, exhibited a strong decline in annual catch from about 1,000 t in 1990 to less than 100 t in 2004, and has since closed. Most of the landings compiled by the ICES WGEF (2006) and represented in Figure 2 were from this fishery. These fisheries data have been analysed with a Delury depletion model, using different assumptions of effort to provide a rough index of abundance. The depletion model (Figure 3), suggests that the stock has declined since fishing began by between 80% (if effort fell by 50%) and 95% (if effort remained constant).

Figure 2: Estimated Portuguese *Centrophorus granulosus* landings 1990–2005 (ICES WGEF 2006)



**Figure 3: Estimates of depletion of *Centrophorus granulosus* off the Portuguese coast, 1990–2004.** (Model developed at IUCN SSC Shark Specialist Group Northeast Atlantic Red List Workshop, 2006)



Steep declines in stocks of this and other species of *Centrophorus* are also reported from other locations where deepwater shark fisheries have taken place.

#### Threat

The main threat to *Centrophorus granulosus* is deepwater fisheries. These are among the most valuable of deepwater sharks, primarily for their liver oil and flesh (Guallart *et al.* 2006), but target fisheries for *Centrophorus* species rapidly become economically unviable when stocks decline.

STECF (2003) describes a directed longline fishery for deep-water sharks, based at Viana do Castelo in northern Portugal, initiated in 1983. Its landings were predominantly of gulper shark, with relatively small quantities of leafscale gulper shark and Portuguese dogfish. In the early years of the fishery, only the livers of the sharks were of commercial value and the carcasses were discarded at sea. Fishermen then started to process part of the catches on board to increase the value of the fish landed. The fishery declined rapidly (the trend in Figure 2 reflects the activity of this fishery). STECF (2003) reported that in recent years only one Portuguese longliner fished full time. This fishery has now closed (partly influenced by falling oil prices), but the species is still occasionally taken as bycatch in the Portuguese black scabbardfish longline fishery in ICES Subarea IX (ICES WGEF 2006).

Although some other European countries have also reported landings of this species (UK (England, Wales and Scotland), France and Spain), these landings are low and those by UK vessels are considered to be misidentified leafscale gulper sharks (ICES WGEF 2006).

#### Relevant additional considerations

##### Sufficiency of data

Data available on *Centrophorus granulosus* in the OSPAR area are very limited; the species can be confused with other deepwater shark species, and species-specific statistics are generally lacking. The ICES WGEF has, for this reason, not been able to assess the stock. The Delury model cited by Guallart *et al.* 2006 provides only a crude indication of stock status. However, all deepwater shark populations in the area are declining and it is generally agreed that conservation measures for these species are needed.

##### Changes in relation to natural variability

Nothing has been published on the natural variability of *C. granulosus*, but its extremely low intrinsic rate of population increase and data for other members of this genus demonstrate that population size and distribution are unlikely to fluctuate naturally. The *Centrophorus granulosus* group needs revision and the species, as currently recognized, has occasionally been misidentified as *C. uyato*. Nothing is known about its population genetics. Studies of the population genetics of this species are urgently needed to determine whether

populations in different areas are genetically distinct.

#### *Expert judgement*

The lack of data on population size and trends for this species in the OSPAR Maritime Area means that expert judgement has played a part in this nomination. It rests on recognition that the threats to the gulper shark are known, that such threats occur in the OSPAR Maritime Area, and that they have led to significant declines in stocks of *Centrophorus* species and other deepwater sharks in this area and elsewhere.

#### *ICES Evaluation*

ICES WGEF (in prep.) reviewed an earlier draft of this nomination and considered that the data available were insufficient to assess the status of the stock/species and that there was no robust justification presented to list this species as a Threatened and Declining species. The WGEF (in prep.) expressed concern, however, at the declining landings of this species in ICES Sub-area IXa (part of OSPAR Area IV), especially as the biological characteristics of this species make it sensitive to over-exploitation. They noted that the available data show a decline in landings of about 90% since the early 1990s, though this is at least partly due to fluctuations in the price of liver oil or changing fishing patterns. The OSPAR nomination has since been rewritten, with incorrect data deleted, and new information is presented above to strengthen the case for this nomination.

Since 2005, the ICES Advisory Committee on Fisheries Management (ACFM) has advised that the total allowable catch (TAC) for all deep water sharks in mixed fisheries be set at zero for the entire distribution area of the stocks, with no target fisheries permitted unless there are reliable estimates of current exploitation rates and stock productivity. Catches of sharks are generally not recorded to the species level; they should be.

Preventing bycatch mortality will be very difficult to achieve, requiring the identification and implementation of measures to avoid any by-catches of deep water sharks in these fisheries. If this is not possible, reduction of catches in the mixed fisheries that take deep water sharks as a by-catch will require a reduction in overall fishing effort to the lowest possible level. Current deepwater shark catch quotas (which are not species-specific) are higher than total catches and only restrict the catches of deepwater sharks in a few areas.

## **Threat and link to human activities**

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

*Relevant human activity:* Fishing, hunting, harvesting; *Category of effect of human activity:* Biological – removal as target and non-target species by fisheries.

The decline in catches of many of the deepwater shark fisheries, including the NE Atlantic fishery for *Centrophorus granulosus*, is believed to be an indication of a decline in the population and therefore a threat that is linked to human activity.

Although no catch per unit effort data are available for this species in the OSPAR Area, the declining catches for the Portuguese fishery are believed to represent falling yields from a declining stock. This pattern of steeply declining catches is recorded in other fisheries for species of *Centrophorus* for which stock and catch per unit effort data are also available. It is recognised that, for this species, falling liver oil prices and changing patterns of fisheries may also have influenced the closure of the fishery, although market demand for deepwater shark flesh remains high in Europe.

## **Management considerations**

There is no agreed management plan for this species. Deepwater sharks are managed by a combination of TACs, effort regulations and technical measures (fishing gear restrictions) in different OSPAR/ICES areas.

In 2007, the TAC for deepwater sharks in international waters of ICES Sub-areas V, VI, VII, VIII and IX (parts of OSPAR regions IV and V) is 2,472 t. In 2008, the TAC for these species in these areas will be reduced to 1,646 t. In 2007 and 2008, the TAC for deepwater sharks is set at 20 t annually in ICES Sub-area X, and 99 t in Sub-area XII (part of OSPAR region V). These TACs apply to a list of 13 deepwater shark species, including gulper shark. They are not restrictive in all sub-areas, but quota restrictions have contributed towards the decline in landings for all these species combined from around 10,000 t in 2004, to about 2000 t in 2006. Gillnet bans have also resulted in a decline in the proportion of international landings from gillnet fishing countries (UK and Germany – their fisheries do not take gulper shark). Overall, recent deepwater shark landings are the lowest since the fishery reached full development in the early 1990s, and much lower than the total 7,100 t of TACs available. (ICES WGEF in prep.) ICES ACFM has, since

2005, recommended a zero quota for deepwater sharks.

European Council Regulations have regulated effort in deepwater fisheries. Regulation (EC) No 2347/2002 set maximum capacity and power (kW) ceilings on individual Member States' fleets fishing for deepwater species, and Regulation (EC) No 27/2005 set a limit of effort (kilowatt days) at 90% of the 2003 level for 2005, and 80% for 2006.

Regulation (EC) 1568/2005 banned the use of trawls and gillnets in waters deeper than 200 m in the Azores, Madeira and Canary Island areas. In 2006, a ban on gillnetting was applied to waters deeper than 200 m in ICES Divisions VIa, b, VII b, c, j, k and Sub-area XII following concern over excessive deepwater shark mortality. Following a review by STECF in 2006, Regulation (EC) No 41/2007 revised this measure, banning the use of gill nets by Community vessels at depths greater than 600 m (thus permitting hake and monk netting, but protecting many deepwater shark stocks previously targeted). A maximum by-catch of deepwater shark of 5% is allowed in hake and monkfish gillnet catches above 600 m. This ban does not cover Sub-areas VIII or IX (gulper shark occurs in the latter) and redirection of deepwater shark fishing effort to these areas has been noted.

A gillnet ban in waters deeper than 200 m is also in operation in the NEAFC regulatory Area (international waters of the ICES/OSPAR Areas).

Bycatch mortality, whether discarded or utilised, poses a particular challenge for the management of deepwater sharks; these species cannot be returned alive following capture in commercial fisheries. Deepwater trawls, in particular, are not species-selective and take a bycatch of non-commercial species, including deepwater sharks (Allain *et al.* 2003). There are no obvious measures that could mitigate the by-catch of this shark in these commercial fisheries

This species is classified as Vulnerable worldwide, but as Critically Endangered in the Northeast Atlantic in the IUCN Red List (Guallart *et al.*, 2006). The species is listed as Vulnerable in Turkey (Fricke *et al.*, in press).

## Further information

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