

Summary of Information on Elasmobranch Skates and Rays and Pelagic Sharks of the Mid Atlantic Ridge and Azores area (Based on WG Elasmobranch report, June 2009)

The European Commission has requested information on Demersal Skates and Rays and select pelagic sharks in the area of the Mid Atlantic Ridge and Azores. The limited information that is available is contained in the 2009 report of the Elasmobranch Working Group. This information is summarized below as a service to the European Commission. No advice is given.

Long line fisheries which take pelagic sharks (mainly as bycatch) are primarily subject to management by the International Commission for Conservation of Atlantic Tunas (ICCAT). Its Scientific and Statistical Committee (SCRS) is the appropriate source of scientific advice on these fisheries. ICES and ICCAT cooperate in the compilation of scientific information on pelagic sharks in the Northeast Atlantic area.

Demersal Skates and Rays for the Mid Atlantic Ridge and the Azores

The Mid-Atlantic Ridge (MAR) (ICES Subareas X, XII, XIV) is an extensive and diverse area, which includes several types of ecosystem, including abyssal plains, seamounts, active underwater volcanoes, chemosynthetic ecosystems and islands.

The elasmobranch fauna of Mid-Atlantic Ridge in ICES Subareas X and XII is poorly understood. No assessments have been conducted, as a consequence of insufficient data.

Information on elasmobranchs recorded in MAR is available from the literature (Hareide and Garnes, 2001) and was summarized in ICES (2005).

The most abundant skate in Subarea X is the thornback ray *Raja clavata*. Other skates observed include *Dipturus batis*, *D. oxyrinchus*, *Leucoraja fullonica*, *Rajella bathyphila*, *Raja brachyura*, *Raja maderensis* and *Rostroraja alba* (Pinho, 2005; 2006). There occur batoid species, such as Bigelow's ray *Rajella bigelowi*, stingray *Dasyatis pastinaca*, marbled electric ray *Torpedo marmorata* and electric ray *T. nobiliana*. These species are generally discarded if caught in commercial fisheries. Some of the scarcer demersal elasmobranchs observed on MAR include *Bathyraja pallida* and *Bathyraja richardsoni* (ICES, 2005).

Stock boundaries are not known for the species in this area, neither are the potential movements of species that also occur on the continental shelf of mainland Europe.

Species-specific landings data are not available. The catches reported from each country and Subarea is given in Table 1. Figure 1 presents historical total landings of skates reported for Area X and XII.

Landings data are also collated by NEAFC, and further studies are required to ensure that these data are consistent with ICES estimates.

Since 1995, Portugal has carried out an annual spring demersal bottom longline survey around the Azores. An annual abundance index for thornback ray is presented in Figure 2.

Sources of Information

Hareide, N. R. and Garnes, G. 2001. The distribution and catch rates of deep water fish along the Mid-Atlantic Ridge from 43 to 61 N. Fisheries Research, 519: 297–310.

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Pinho, M. R. 2005. Elasmobranchs of the Azores. Working Document (WGEF 2005).

Pinho, M. R. 2006. Elasmobranch statistics from the Azores (ICES Area X). Working Document (WGEF, 2006).

Table 1 Landings of demersal rays and skates (t) from ICES Subarea X, XII and XIV.

ICES SUBAREA X													
	Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1996
Azores	Rajidae	48	29	35	52	43	32	55	62	71	99	117	71
France	Rajidae						1						
Spain	Rajidae												
ICES SUBAREA X													
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Azores	Rajidae	99	117	103	83	68	70	89	72	50	62	70	72
France	Rajidae					2		0	0
Spain	Rajidae				24	29				.		0	
ICES SUBAREA XII													
UK	Rays and skates					1	+	6	+	.			.
ICES SUBAREA XIV													
UK	Rays and skates					+	+	-	-	-		.	.
Norway	Rajidae										6	.	1

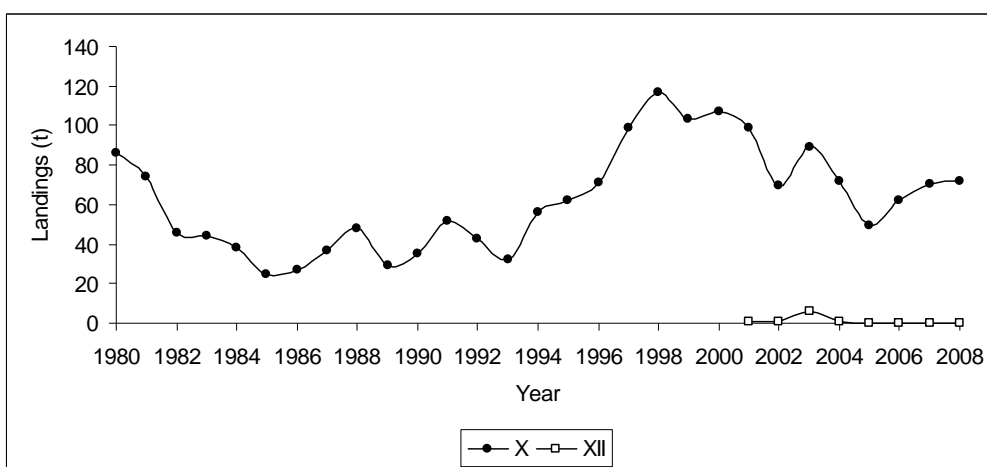


Figure 1 Historical landings of rays and skates from Azores (ICES Subarea X) and Mid Atlantic Ridge (ICES Subarea XII).

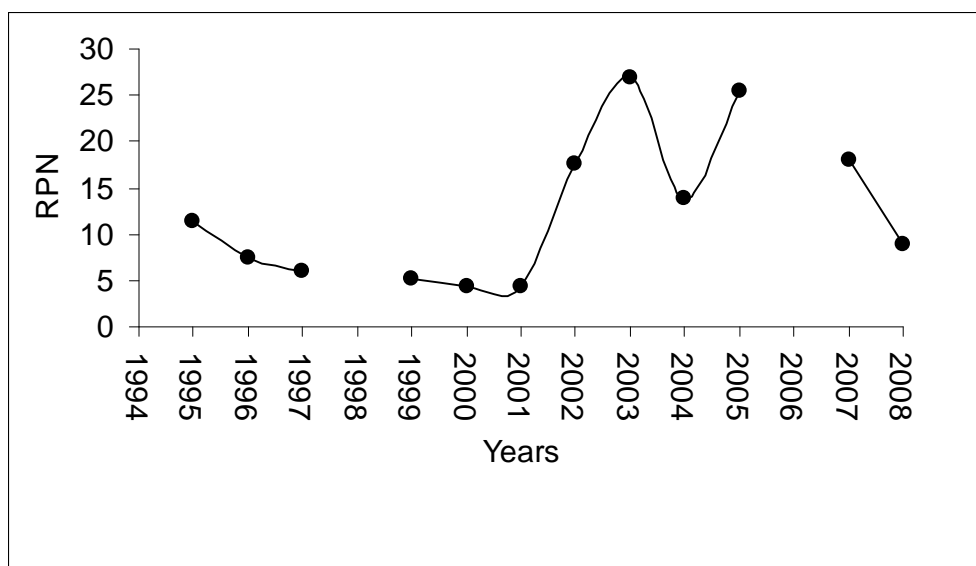


Figure 2 Long line Survey Results. Relative Population Numbers (RPN) of *Raja clavata* from the Azores (ICES X).

Porbeagle – Shortfin mako – Blue shark

The latin names of these species are: Porbeagle (*Lamna nasus*), Shortfin mako shark (*Isurus oxyrinchus*) and Blue shark (*Prionace glauca*). Porbeagle are the least productive and blue shark the most productive of the three species discussed in this section.

Assessment units

Porbeagle comprises separate Northwest and Northeast Atlantic stocks. The stock in the Northeast Atlantic (ICES Sub-areas I–XIV) occurs primarily in continental shelf waters but will also include waters beyond the EU 200 nm EEZ.

There is a single stock of **shortfin mako** in the North Atlantic including areas in the Northwest Atlantic and waters beyond the EU 200 nm EEZ. ICCAT (2008) considered that the 5°N parallel was the most appropriate division between North and South Atlantic stocks.

There is a single stock of **blue shark** in the North Atlantic including areas in the Northwest Atlantic and waters beyond the EU 200 nm EEZ. ICCAT (2008) considered that the 5°N parallel was the most appropriate division between North and South Atlantic stocks.

It is unclear as to whether Mediterranean populations of these species are separate, but since there is no clear evidence of mixing, the Mediterranean Sea is considered separate for assessment purposes

Management Measures

Most of the catch is bycatch in pelagic longline fisheries targeting tuna and swordfish. Effective management therefore needs to apply to these fisheries managed by ICCAT.

The ICCAT Commission will in 2009 not be meeting until the week of November 9.

None of the three shark species are confined to the area around the Azores and in the Mid Atlantic Ocean and regulations should be consistent with the regulations on fisheries affecting these sharks in other areas.

Data availability for the Northeast Atlantic Ocean

Some of the species for which ICES has collated information to date include basking shark (*Cetorhinus maximus*), porbeagle (*Lamna nasus*), blue shark (*Prionace glauca*) and shortfin mako shark (*Isurus oxyrinchus*). ICCAT has collected landing statistics for a number of years. Landing figures from ICES WGEF do not necessarily match the ICCAT records.

Landings data have not been reported for the full duration of the fishery, with many landings reported under the generic landings category “Sharks *nei*”. Species-specific recording has increased in recent years. The lack of species-specific catch data, especially for blue and shortfin mako, has meant that ICCAT assessments have used estimated catches. Although both the quantity and quality of the data available to conduct stock assessments has increased with respect to those available in 2004, they are still quite uninformative and do not provide a consistent signal to inform the models.

Fisheries

Porbeagle has been subject to targeted fisheries in the Northeast Atlantic since the early 1900s, as this pelagic species occurs closer to land. Porbeagle is still taken in locally important directed fisheries in the Celtic Sea.

Blue and shortfin mako tend to be most abundant further offshore, and these pelagic sharks are caught by a variety of gears in the Atlantic Ocean (i.e. longlines, gillnets, hand lines, rod and reel and trawls), mostly as bycatch in pelagic longline fisheries targeting tuna and swordfish. However, several fisheries are increasingly targeting them as well, especially shortfin mako which is a more valuable species. There are also recreational fisheries in some countries like the United States, Canada, and EC-UK, and EC-Ireland.

Tuna and billfish fisheries, which expanded in recent decades, harvest shortfin mako, blue shark, and a variety of other pelagic sharks, with some of these fisheries targeting sharks at certain times/areas.

Porbeagle

There is a single-stock of porbeagle in the NE Atlantic that occupies the entire ICES area (Subareas I–XIV). This stock extends from Norway, Iceland and the Barents Sea to Northwest Africa. For management purposes the southern boundary of the stock is 36°N and the western boundary at 42°W.

ICES advised in 2008 ‘Given the state of the stock, no targeted fishing for porbeagle should be permitted and bycatch should be limited and landings of porbeagle should not be allowed’.

Exploratory assessments were undertaken in the joint ICES/ICCAT meeting using a Bayesian Surplus Production (BSP) model and an age structured production model (Campana *et al.*, 1999,2001).

The BSP model was used to estimate status and project population trends for NE Atlantic porbeagle. This model was used in previous ICCAT assessments for blue shark and shortfin mako in 2004 and 2008. An informative prior was developed for the rate of population increase (r) based on demographic data, but the prior for K was weakly informative. Catch and standardized CPUE data (ICES, 2009 (Section 6.5.2) and ICCAT, 2009) were used in this model, and the outputs are described in more detail in ICCAT (2009).

An age-structured production model (using the same input data) was also applied to the NE Atlantic stock of porbeagle to provide contrast with the BSP model. The model dynamics are age-structured, incorporating age-specific parameters for survival, fecundity, maturity, growth, and selectivity. The stock-recruitment function is also parameterized in terms of maximum reproductive rate at low density. Also see ICCAT (2009) for more details.

The BSP model projections indicated that sustained reductions in fishing mortality would be required to initiate stock recovery. Recovery of the stock to BMSY under zero fishing mortality would take 15–34 years. Model outputs suggested that the current TAC (436 t) may allow the stock to remain stable, at its current depleted level under most credible model scenarios. Catches of 200 t or less resulted in higher probabilities of recovery to BMSY within 25–50 years under nearly all model scenarios.

Shortfin Mako

There is a single stock of shortfin mako in the North Atlantic. The stock distribution is beyond the ICES convention area and ICCAT assesses this stock and provides advice. ICCAT Standing Committee on Research and Statistics (ICCAT-SCRS) will meet 6–9 October and will discuss this stock.

The summary of the current state of knowledge expressed by SCRS in 2008 starts on page 171 of http://www.iccat.int/Documents/BienRep/REP_EN_08-09_I_2.pdf ICCAT-SCRS did not express concern with the status of these 2 stocks: a) North Atlantic , b) South Atlantic with regards to the B_{msy} benchmark, although the 2008 shark stock assessment meeting noted by the there was a “non-negligible probability that the stock could be below the biomass that supports MSY and above the fishing mortality rate associated with MSY” and that “recent biological data show that the productivity for this species is lower than previously believed” (ICCAT, 2008).

Shortfin mako is caught frequently as a bycatch, mostly in surface longline fisheries that traditionally target tuna and billfish, and in other high seas tuna fisheries. Like porbeagle shark, it is a relatively high-value species (cf blue shark, which is of lower commercial value), and thus is normally retained. Recreational fisheries on both sides of the North Atlantic also catch this species, although in relatively small quantities and some of these fish are released. They are also taken in Mediterranean fisheries.

The 2006 Report of ICCAT-SCRS suggested that, if the status of this stock was to be improved, then reductions in effective fishing effort would be most beneficial to shortfin mako, given that the basis for recommending catch limits was hampered by the uncertainty of catches (ICCAT, 2006). Technical measures (e.g. modifications to fishing gear, restrictions on fishing areas and times, minimum or maximum sizes for allowable retained catch) were also suggested as having potential benefits to the stock (ICCAT, 2006).

Blue shark

There is one stock of blue shark in the North Atlantic. ICCAT, 2008 considered that the 5°N parallel was the most appropriate division between North and South Atlantic stocks of blue shark. Assessment of this stock is considered to be the responsibility of ICCAT.

The summary of the current state of knowledge expressed by SCRS in 2008 starts on page 171 of http://www.iccat.int/Documents/BienRep/REP_EN_08-09_I_2.pdf ICCAT-SCRS did not express concern with the status of these 2 stocks: a) North Atlantic , b) South Atlantic with regards to the B_{msy} benchmark.

No large-scale directed fisheries, but commonly taken bycatch species. Although a lower value species than porbeagle and shortfin mako, the fins of this species are marketable.

Blue shark is a major bycatch in many fisheries for tunas and billfish, where it can comprise up to 70% of the total catches. Since 1998 there has been a Basque artisanal longline fishery targeting blue shark and other pelagic sharks in the Bay of Biscay. This fishery takes place from June to November and historically has involved between 3 and 5 vessels. As a consequence of changes in local fishing regulations the number of vessels has been reduced to two since 2008.

Observer data indicated that substantially more sharks are caught as bycatch than reported in catch statistics. Blue sharks are also caught in considerable numbers in recreational fisheries, including in the ICES area.

Blue shark is considered to be one of the most productive pelagic elasmobranchs. In 2008, ICCAT tentatively concluded that stock status appeared to be close to unfished biomass levels and fishing mortality rates well below those corresponding to the level at which MSY is reached. However, ICCAT did not use these assessments to make conclusions about stock status and has not provided management advice based on these analyses because of inherent uncertainty in the assessments.

Other pelagic shark species

The status of other pelagic shark stocks is unclear, and data are limited. Some of these species, such as longfin mako (*Isurus paucus*) and thresher sharks (*Alopias* spp.) have a low productivity, and are so susceptible to over-exploitation.

Source of Information

Campana, S.E., Marks, L., Joyce, W., Hurley, P., Showell, M., and Kulka, D. 1999. An analytical assessment of the porbeagle shark (*Lamna nasus*) population in the Northwest Atlantic. Canadian Stock Assessment, Research Document 1999/158, Ottawa.

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ICES. 2008. Report of the ICES Advisory Committee, 2008. ICES Advice, 2008. Book 9. 345 pp. For porbeagle see Section 9.4.7

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