SHARKS
IN THE BALTIC

Distribution, use and conservation of cartilaginous fishes in the Baltic Sea
A matter of survival

Whereas the brackish waters of the Baltic Sea are known to be limiting in terms of the distribution and diversity of all marine life, the region is home to sharks, rays (including skates) and chimaeras, collectively known as cartilaginous fishes. More than 30 such species have been recorded in the Baltic, although many are considered rare or vagrants.

This report reviews and analyses the available information on the presence, use and conservation of Baltic cartilaginous fishes. The aim is to fill existing knowledge gaps and inform management so as to ensure the survival of these especially vulnerable species.
The region

The Baltic Sea is the largest semi-enclosed brackish body of water in the world. Surrounded almost entirely by land, it is connected to the North Sea (and hence the North Atlantic) by narrow straits: the Kattegat and Skagerrak, which are located between Denmark and the southern part of the Scandinavian peninsula. It is bordered by Denmark, Sweden, Finland, Russia, Estonia, Latvia, Lithuania, Poland and Germany, while Norway is situated on the transitional waters of the Skagerrak, at the mouth of the North Sea.

The area under review can be sub-divided into the following geographic areas: Skagerrak, Kattegat, the Sound, the Belts, Western Baltic, Baltic Proper, Gulf of Riga, Gulf of Finland, Archipelago Sea, Bothnian Sea, and Bothnian Bay (see Table 1).

There is some controversy with regard to the borders of the Baltic Sea. Some authors include the Kattegat as part of the Baltic Sea, while others exclude it and set the border at the Belts and Sound areas (Danish Straits). The International Council for the Exploration of the Sea (ICES) refers to the Kattegat and Skagerrak together as a “transitional area”, the Helsinki Commission (HELCOM) includes the Kattegat as part of the Baltic Sea, but excludes the Skagerrak. For the purposes of this report, so as to better reflect the bio-geographic background of species distribution, the Kattegat is considered part of the Baltic Sea and the Skagerrak with its deep-water trench (the Norwegian Deep) is a transitional area to the region under review.

The Baltic Sea has a volume of 21,600 km³ and covers an area of 413,000 km², with an average depth of 52 m (950 km³ per year) than seawater entry (470 km³ per year). As a result, the Baltic Sea is brackish with a horizontal gradient of salinity, declining from western to eastern areas and southern to northern parts. The vertical circulation, however, is restricted by layering caused by the density differences in sea and freshwater that create a distinct mixing zone. The high-density seawater of the North Sea flows towards the bottom layers of the Baltic Sea, while lower density, low-salinity water leaves the Baltic Sea near the surface.

Hydrography and topography of the Baltic Sea

It takes 25 to 35 years to fully exchange the waters of the Baltic Sea, which are replaced by inflow from the North Sea through the Skagerrak, Kattegat and Danish Straits (the Sound). The Skagerrak is roughly triangular in shape, measuring 240 km long and between 80 and 140 km wide. It deepens towards the Norwegian coast to more than 700 m at the Norwegian Deep.

Inflow from rivers and precipitation creates a freshwater surplus in the Baltic, leading to greater freshwater exit (950 km³ per year) than seawater entry (470 km³ per year). As a result, the Baltic Sea is brackish, with a horizontal gradient of salinity, declining from western to eastern parts and southern to northern parts. The vertical circulation, however, is restricted by layering caused by the density differences in sea and freshwater that create a distinct border between waters of different salinity and density. Deep water can only be exchanged by horizontal water influx, which is impeded by topographic barriers. For example, the Darsa Sill (with a water depth of only 18 m) inhibits rapid eastward transport of highly saline and oxygenated water. During periods of stagnation, decomposition of organic material trapped in deep water can cause local oxygen depletion, resulting in mass mortality of aquatic life. As a result, most Baltic fishes live near the surface or in shallower, coastal waters. Human-induced eutrophication (nutrient enrichment resulting in the proliferation of oxygen-depleting plant life) can further stress the fishes in this challenging environment.

The mixing of Baltic water layers is mainly forced by meteorological influences such as wind and heat exchange. Baltic currents are highly variable and primarily driven by wind, horizontal density gradients, and differences in sea level. Tidal forces in the Baltic Sea are minimal.

In addition to regular water exchanges, strong influx events occasionally occur in the Baltic. These irregular phenomena usually take place in the late autumn and winter and depend on atmospheric circulation and a particular sequence of wind and resulting sea level changes. Until the 1980s, these events occurred on average every four to five years, but have since happened only once every 10 years (1983, 1993, 2003). These special hydrographical conditions limit the distribution of Baltic flora and fauna, particularly around the Danian Straits. Only euryhaline organisms (those capable of tolerating a wide range of salinity) and other well-adapted species survive under such highly variable environmental conditions.

The range of species favouring high-salinity water, including most cartilaginous fishes, depends both on the intensity of eastward currents and the strength of the last inflow event.
## Species descriptions

### Common species of the Skagerrak, Kattegat and Western Baltic

For further information on species' Red List and/or HELCOM status, see Appendix 1.

#### Starry or thorny skate Amblyraja radiata

**DESCRIPTION:** Short snout; upper surface very rough; solid thornlets scattered all over disc and tail, thorns typically ribbed and with stellate margin 31. Length up to 90cm, although not more than 60cm in the Baltic area.

#### Baltic distribution: Skagerrak; Kattegat; Danish Straits.

**HABITAT:** Benthic, mainly on sandy and muddy bottoms; down to 1,000m, but mainly at 50-100m 10.

**PREY:** Crabs, prawns, sand eels and other small fishes 36, also cephalopods, worms and amphipods; diet changes with size 90.

**REPRODUCTION:** Maturity at about 40cm in the North Sea and between 60-75cm in higher latitudes 83. Eggs laying with egg cases found throughout the year 19, juveniles caught all year round 42. Young hatch at about 10cm long after four months’ development 19, although this period may be much longer in colder regions 40.

**FISHES AND USES:** Forms a considerable proportion of rays and skates landed by trawlers for human consumption, including European markets 36.

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**Data sources:** George 2003 66 and Merle & Hultin 2020 66, except where indicated.

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### Baltic STATUS: HELCOM high priority, significant decline, critically endangered 35.

### IUCN RED LIST STATUS: Vulnerable Globally (in prep. 2008).

### EU CONSERVATION MEASURES: The EU loosely limits catches of skates and rays (particularly Family Rajidae) from the North and Norwegian Seas (Areas IV and Vla), west of the Skagerrak. There are no limits for the Baltic. The EU has largest share of an international thorny skate catch limit adopted in 2004 by the Northwest Atlantic Fisheries Organization (NAFO). The NAFO limit is currently the only international catch restriction for a cartilaginous fish.

### Small-spotted catshark, lesser spotted dogfish Scyliorhinus canicula (Linnaeus, 1758)

**DESCRIPTION:** Slender body covered with numerous small dark spots on light background; up to nine dusky saddles 35. Greatly expanded nasal flaps reach mouth 72. Can grow up to 100cm in length in the North Sea, but only 60cm in the Mediterranean 35.

**HABITAT:** Prefers soft bottoms and a water temperature of 6–15°C 72; depth range usually 10–200m, although exceptionally to 500m 35.

**PREY:** Schooling fishes, herring, sprat, pilchard, sand eels, whiting, garfish; also bottom-dwelling species, cod, dragonet and flatfishes, squids and crabs 35.

**REPRODUCTION:** In Northeast Atlantic, males mature at 60–70 cm (10 years old); females at 75–90 cm (12 years old) 35. Live bearers; pups nourished by yolk; recording gestation period of 18–24 months; 1–32 pups 35, usually 3 to 11 per litter 72. Born at 20–33 cm 72; maximum age may exceed 60 years, depending on population 35.

### FISHES AND USES:** One of the most heavily fished and traded sharks in the world. Meat sought for human consumption, primarily in Europe; used in fish and chips in UK; smoked belly flaps popular in Germany. Fins not prized but used for shark fin soup. Targeted and taken as bycatch in travel, gillnet and longline fisheries 35. In the Kattegat, recreational angling for spurdog is popular during summer 35; but limited since 2008 to one fish per person per 24-hour period 35.

### Baltic STATUS: HELCOM high priority, significant decline, critically endangered 35.


### EU CONSERVATION MEASURES: The first EU total allowable catch (TAC) limit for the North and Norwegian Sea (ICES Areas IV and Vla) was imposed in 1999 and has been lowered substantially since, yet not enough to restrict fishing and promote recovery. In 2007, a TAC for surrounding EU and international waters including the Skagerrak and Kattegat (Area Ila) was added, but Area Ila was removed from the applicable areas in 2008. ICES has recommended one TAC of zero for all these areas. In Swedish waters, catches with nets and longline are prohibited, while retention of bycatch from trawls is allowed only through special permits. The EU proposed spurdog for CITES listing in 2007 but was defeated.

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**Species**
Species of the Skagerrak and Kattegat and vagrants into the Western Baltic

**Common stingray Dasyatis pastinaca** *(Linnaeus, 1758)*

**DESCRIPTION:** Diamond shaped; large pectoral fins; no dorsal fin, but one (sometimes two) serrated spine in the tail, which is very long and whip-like. Reach up to 200 cm, with tail more than 50% of length.

**BALTIC DISTRIBUTION:** Rare summer guest in Skagerrak and Kattegat; found occasionally in the Danish Straits.

**HABITAT:** Benthic, shallow waters to 200 m deep on soft bottoms.

**PREY:** Bottom-dwelling organisms, molluscs and crabs; also small fish species such as lantern fishes.

**REPRODUCTION:** Live bearer; pups nourished by yolk; four to nine pups per litter; four-month gestation period. Females reach age 53; egg-laying.

**EU CONSERVATION MEASURES:** Outside the Baltic, covered by gear restrictions and bycatch quotas for deep-water dogfish, tope and squids.

**IUCN RED LIST STATUS:** Least Concern Globally (in prep. 2008).

**FISHERIES AND USES:** Low commercial value; taken by anglers.

**BALTIC STATUS:** HELCOM medium priority, probable decline, threatened migrant.

**Porbeagle Lamna nasus** *(Bonnaterre, 1778)*

**DESCRIPTION:** Heavy bodied; conical snout; long gill slits. Strong keels on caudal peduncle (near tail fin); short secondary keels on caudal base; distinctive white spot on rear tip of first dorsal fin. Length up to 300–370 cm.

**BALTIC DISTRIBUTION:** Skagerrak, Kattegat; Danish Straits; vagrant into Western Baltic; historical records from southern and central Baltic to Åland Islands.

**HABITAT:** Pelagic; inshore and offshore; from surface down to 700 m.

**PREY:** Small schooling fishes, mainly herring and mackerel; dogfish, tope and squids.

**REPRODUCTION:** Maturity for males at 150–200 cm, females at 200–250 cm (five years old). Live bearer; pups nourished by yolk; usually four pups per litter; feed on unfertilized eggs in utero. Size at birth is 60–75 cm; gestation period is eight to nine months. Maximum age is 30 years; although may reach 46 years of age in unexploited areas.

**FISHERIES AND USES:** Targeted and taken as bycatch for valuable meat and fins.

**BALTIC STATUS:** HELCOM high priority, significant decline, critically endangered.


**EU CONSERVATION MEASURES:** In 2004, Sweden prohibited porbeagle fishing in Swedish waters.

**PREY:** A variety of bottom-dwelling organisms, preference for crustaceans; also fish species.

**REPRODUCTION:** Egg-laying; about 150 egg cases laid per year (in shallow water); embryo development takes about five months.

**FISHERIES AND USES:** One of the most frequently landed skates/rays. Taken as bycatch in otter and beam-trawl fisheries; targeted in gillnet and longline fisheries for sharks.

**BALTIC STATUS:** HELCOM high priority, significant decline, endangered.

**IUCN RED LIST STATUS:** Near Threatened Globally (2000).

**EU CONSERVATION MEASURES:** No specific safeguards. May benefit from EU and international finning bans.

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**Bluntnose sixgill shark Hexanchus griseus** *(Bonnaterre, 1778)*

**DESCRIPTION:** Large; long snout. Front edge of disc is strongly concave; upper surface smooth in young, partly prickly in larger specimens or adult females. Females reach up to 285 cm; males reach up to 200 cm.

**BALTIC DISTRIBUTION:** Skagerrak, Kattegat; found occasionally in Western Baltic.

**HABITAT:** Benthic; has depth range of 30–600 m.

**PREY:** Feeds primarily on fish, but also crustaceans and other cartilaginous fishes.

**REPRODUCTION:** Maturity at about 150 cm or 11 years of age; egg-laying.

**FISHERIES AND USES:** Once the most commercially important species of skate/ray in north-western Europe; used for meat (smoked), fishmeal and oil. Now extremely rare due to overexploitation.

**BALTIC STATUS:** HELCOM high priority, significant decline, critically endangered.

**IUCN RED LIST STATUS:** Critically Endangered Globally (2006).

**EU CONSERVATION MEASURES:** The EU loosely limits catches of skates and rays (particularly Family Rajidae) from the North and Norwegian Seas (Areas IV and IIa), west of the Skagerrak. Sweden has prohibited fishing and landing from Swedish waters.

**Blackmouth dogfish, blackmouth catshark Galeus melastomus Rangé, 1810**

**DESCRIPTION:** Pattern of dark saddles, blotches and circular spots on back and tail; distinct crest of enlarged dermal denticles along upper margin of elongated tail; mouth cavity black. Maximum length 90 cm.

**BALTIC DISTRIBUTION:** Skagerrak (Norwegian Deep); vagrant into Kattegat.

**HABITAT:** Deep-water; bottom-living on upper edge of continental slopes; mostly in depths of 200–500 m; rarely in shallower water up to 55 m.

**PREY:** Shrimps and prawns; also small fish species such as lantern fishes.

**REPRODUCTION:** Egg-laying; up to 13 eggs per female. Males mature at 34–42 cm; females at 39–45 cm.

**FISHERIES AND USES:** Taken as bycatch in bottom trawls; low commercial value.

**BALTIC STATUS:** HELCOM high priority, significant decline, endangered.

**IUCN RED LIST STATUS:** Least Concern Globally (in prep. 2008).

**EU CONSERVATION MEASURES:** Outside the Baltic, covered by gear restrictions and bycatch quotas for deep-water dogfish, tope and squids.

**PREY:** Taken as bycatch in bottom trawls; low commercial value.

**PARABEAGLE**

**DESCRIPTION:** Heavily bodied; conical snout; long gill slits. Strong keels on caudal peduncle (near tail fin); short secondary keels on caudal base; distinctive white spot on rear tip of first dorsal fin. Length up to 300–370 cm.

**BALTIC DISTRIBUTION:** Skagerrak, Kattegat; Danish Straits; vagrant into Western Baltic; historical records from southern and central Baltic to Åland Islands.

**HABITAT:** Pelagic; inshore and offshore; from surface down to 700 m.

**PREY:** Small schooling fishes, mainly herring and mackerel; dogfish, tope and squids.

**REPRODUCTION:** Maturity for males at 150–200 cm, females at 200–250 cm (five years old). Live bearer; pups nourished by yolk; usually four pups per litter; feed on unfertilized eggs in utero. Size at birth is 60–75 cm; gestation period is eight to nine months. Maximum age is 30 years; although may reach 46 years of age in unexploited areas.

**FISHERIES AND USES:** Targeted and taken as bycatch for valuable meat and fins.

**BALTIC STATUS:** HELCOM high priority, significant decline, critically endangered.


**EU CONSERVATION MEASURES:** In 2004, Sweden prohibited porbeagle fishing in Swedish waters.

**PREY:** A variety of bottom-dwelling organisms, preference for crustaceans; also fish species.

**REPRODUCTION:** Egg-laying; about 150 egg cases laid per year (in shallow water); embryo development takes about five months.

**FISHERIES AND USES:** One of the most frequently landed skates/rays. Taken as bycatch in otter and beam-trawl fisheries; targeted in gillnet and longline fisheries.

**BALTIC STATUS:** HELCOM high priority, significant decline, endangered.

**IUCN RED LIST STATUS:** Near Threatened Globally (2000).

**EU CONSERVATION MEASURES:** No specific safeguards. May benefit from EU and international finning bans.

**Blowfish Diodon hystrix** *(Linnaeus, 1758)*

**DESCRIPTION:** Slim, torpedo shape; long, conical snout. Dark blue on back; bright blue fins. Reaches up to 300 cm.

**BALTIC DISTRIBUTION:** Skagerrak; rarely up to Kattegat; vagrant into Western Baltic.

**HABITAT:** Primarily offshore, pelagic; also occurring in coastal waters, often swimming near the surface, down to 150 m. Considered the most wide-ranging of all sharks.

**BALTIC STATUS:** HELCOM high priority; significant decline, critically endangered.

**EU CONSERVATION MEASURES:** The EU loosely limits catches of skates and rays (particularly Family Rajidae) from the North and Norwegian Seas (Areas IV and IIa), west of the Skagerrak. Sweden has prohibited fishing and landing from Swedish waters.

**PREY:** Relatively small species such as squid and pelagic fish; also invertebrates, turtles, bottomfish and other sharks.

**REPRODUCTION:** Males mature at 180–200 cm (six years old); females at about 220 cm (five to seven years old). Live bearer; pups nourished by placenta; 4–135 pups per litter (usually 15–30); 9–12 month gestation period. Females breed annually or in alternate years.

**FISHERIES AND USES:** One of the most heavily fished and traded sharks; several millions taken annually. Most of traditionally low value, but new markets developing; fins used for shark fin soup.

**BALTIC STATUS:** HELCOM medium priority, probable decline, threatened migrant.

**IUCN RED LIST STATUS:** Near Threatened Globally (2000).

**EU CONSERVATION MEASURES:** No specific safeguards. May benefit from EU and international finning bans.
Common angel shark Squatina squatina (Linnaeus, 1758)

**DESCRIPTION:** Broad, flattened body similar to rays, but with gill openings at the sides of the head, not beneath. Eyes on top of head; large spiracles and large mouth at front. Grey to reddish or greenish-brown back with scattered small white spots and blackish dots. Reaches up to 250cm.

**BALTIC DISTRIBUTION:** Skagerrak; Kattegat; found occasionally in Western Baltic.

**HABITAT:** Bottom dweller on sand or mud; moderate depth (5–100m); also inshore on coast and estuaries.

**PRED:** Mainly flatfishes, skates, crustaceans and molluscs.

**REPRODUCTION:** Maturity at 126–167cm. Live bearer; pups nourished by yolk; 7–25 pups per litter, number increases with female size. Gestation of 8–10 months; length at birth is 24–34cm.

**FISHERIES AND USES:** Formerly targeted for human consumption, now taken primarily as bycatch in trawl, gillnet and longline fisheries.

**BALTIC STATUS:** HELCOM high priority, significant decline, endangered.


Species distributed into the Skagerrak, up to/in the Kattegat

Basking shark Cetorhinus maximus (Linnaeus, 1758)

**DESCRIPTION:** Very large: up to 1,000cm in length; average size in northern European waters around 760cm. Slow-moving. Large gill slits extend almost completely from top to bottom of head.

**BALTIC DISTRIBUTION:** Skagerrak; Kattegat. There are no limits for the Baltic.

**HABITAT:** Pelagic, mainly near surface; highly migratory species.

**PRED:** Plankton, ingested by filtering through large mouth.

**REPRODUCTION:** Maturity at around 760cm, males at 90–950m, mainly on soft bottom. Male: One to two young; 150–170cm at birth.

**BALTIC STATUS:** HELCOM medium priority, decline not known, vulnerable.

**IUCN RED LIST STATUS:** Near Threatened Globally (2007). EU CONSERVATION MEASURES: The EU loosely limits catches of skate and rays (particularly Family Rajidae) from the North and Norwegian Seas (Areas IV and IIA), west of the Skagerrak. There are no such limits for the Baltic.

**EU CONSERVATION MEASURES:** No specific protections; may benefit from restrictions on deep-sea fishing.

**Velvet belly shark Etmopterus spinax** (Linnaeus, 1758)

**DESCRIPTION:** Small and dark. Abruptly black belly with very fine dermal denticles, giving the skin a velvety feel. Sharp spines at front of dorsal fins, second one much larger; pectoral fins small and rounded; no anal fin; small gill openings. Reaches up to 60cm in length.

**BALTIC DISTRIBUTION:** Skagerrak (Norwegian Deep). HABITAT: Deep water, near bottom; depth range from 70–2,000m, although mostly 200–500m.

**PREY:** Small fishes, squids and crustaceans.

**REPRODUCTION:** Live bearer; pups nourished by yolk; 6–20 pups per litter; size at birth about 12–14cm.

**FISHERIES AND USES:** Caught offshore in bottom and pelagic trawls; used for fishmeal and meat.

**BALTIC STATUS:** Unknown.

**EU CONSERVATION MEASURES:** Covered by gear and bycatch restrictions for deep-water sharks in Areas V-X.

**Top.e, school shark Galeorhinus galeus** (Linnaeus, 1758)

**DESCRIPTION:** Slender bodied and long nosed. Moderate first dorsal fin; small second dorsal fin, similar to opposite anal fin which can reach 200cm.

**BALTIC DISTRIBUTION:** Skagerrak; Kattegat.

**HABITAT:** Pelagic, but often near bottom; 2–470m depth range.

**PREY:** Feeds opportunistically on small schooling fishes, bottom fishes, squids, crustaceans and echinoderms.

**REPRODUCTION:** Female maturity at over 10 years of age. Live bearer; pups nourished by yolk; 10-month gestation;
20–40 pups per litter, depending on size of female. Length at birth 35–40cm; maximum age about 60 years 66.

FISHERIES AND USES: Fished around the world for meat, liver oil (for pharmaceuticals, lubricants and cosmetics) and fins; also popular with anglers.

BALTIC STATUS: HELCOM high priority, significant decline, endangered.

**ICUN RED LIST STATUS:** Vulnerable Globally (2006).

EU CONSERVATION MEASURES: None yet; protection proposed in UK 13 and Germany 40.

**Sandy ray Leucoraja circularis** (Cuvier, 1838)

DESCRIPTION: Short snout; strong spiny tail; disc has rounded tips; four to six cream-colored spots with dark margins on wings and pelvic fins. Length up to 120cm, but usually about 70cm 46.

**BALTIC DISTRIBUTION:** Skagerrak.

HABITAT: Benthic, on sandy bottoms; usually at depths of 50–100 m 72.

**HABITAT:** Benthic, in relatively cold coastal waters; upper part of continental slopes from 30–550m 72.

**PREDATION:** Areas IV and IIa, west of the Skagerrak. There are no limits for the Baltic.

**ICUN RED LIST STATUS:** Near Threatened Globally (in prep. 2008).

**EU CONSERVATION MEASURES:** The EU loosely limits catches of skate and rays (particularly Family Rajidae) from the North and Norwegian Seas (Areas IV and IIa), west of the Skagerrak. There are no limits for the Baltic.

**HABITAT:** Inshore species, close to bottom, from shore down to 70m depth; mostly on sandy and gravel grounds 72.

**PREY:** Primarily a crustacean feeder 72.

**REPRODUCTION:** Maturity at 70–80 cm 36; live bearer; pups nourished by yolk; 12-month gestation; 10–20 pups per litter; 30cm at birth 52.

**FISHERIES AND USES:** Taken as bycatch in bottom trawls, line gear, and probably gillnet fisheries 9; low market value; eggs or give birth.

**ICUN RED LIST STATUS:** Least Concern Globally (2000).

**EU CONSERVATION MEASURES:** None.

**Round ray Rajella fyllea** (Lütken, 1887)

DESCRIPTION: Rhomboid disc with greatly rounded outer corners; tail conspicuously longer than body 72. Upper surface entirely rough; concentrations of thorns on hind parts of disc and head; several irregular, parallel rows of prominent thorns from shoulder to dorsal fin 72. Upper surface is ash grey to dark brown, clouded darker or paler; underside predominantly white 72. Up to 35cm in length 72.

**BALTIC DISTRIBUTION:** Skagerrak (Norwegian Deep).

**HABITAT:** Benthic, 170–2,000m. Restricted to waters of the Kattegat and Western Baltic.

**ICUN RED LIST STATUS:** Least Concern Globally (in prep. 2008).

**EU CONSERVATION MEASURES:** None.

**ICUN RED LIST STATUS:** Listed: Low Concern Globally (2000).

**EU CONSERVATION MEASURES:** None.

**ICUN RED LIST STATUS:** Least Concern Globally (in prep. 2008).

**EU CONSERVATION MEASURES:** The EU loosely limits catches of skate and rays (particularly Family Rajidae) from the North and Norwegian Seas (Areas IV and IIa), west of the Skagerrak. There are no limits for the Baltic.

**PREY:** Marine fish including herring, mackerel and garfish 72. Herds and small numbers of fish with its tail, sometimes cooperatively 72.

**REPRODUCTION:** Live bearer; pups nourished by yolk; gestation period of about 14 months 72; two to four pups per litter, 114–160cm long at birth. Males mature at about 300cm; females at 370–400cm 36; maximum age estimated to be 45–50 years 7.

**FISHERIES AND USES:** Targeted and taken incidentally in longline and drift net fisheries and by offshore anglers. Meat and fins are valuable.

**BALTIC STATUS:** HELCOM high priority, significant decline, critically endangered 72.

**ICUN RED LIST STATUS:** Vulnerable Globally (in prep. 2008).

**EU CONSERVATION MEASURES:** None.

**Species found occasionally in the Skagerrak, Kattegat and Western Baltic**

**Common thresher shark Alopias vulpinus** (Bonaparte, 1788)

**DESCRIPTION:** Caudal fin very long; upper lobe equals the length of the body. Length possibly up to 600cm in females 72.

**BALTIC DISTRIBUTION:** Found occasionally in the Skagerrak and Kattegat.

**HABITAT:** Pelagic, from surface to at least 366m deep 72.

**PREY:** Marine fish including herring, mackerel and garfish 72. Herds and small numbers of fish with its tail, sometimes cooperatively 72.

**Osmoregulation:** How sharks and rays survive in both salt and freshwater

Marine cartilaginous fishes maintain concentrations of urea and other substances which affect osmosis in their tissues and body fluids at slightly higher levels than those in the surrounding seawater, resulting in a net influx of water 32. As such, they do not need to drink seawater continuously, as bony fishes do. Juvenile sharks, especially, benefit from the increased prey abundance and reduced rates of predation associated with low-salinity waters 20, e.g. shallow bays and rivers in the sub-tropics and tropics. Some shark and ray species are euryhaline, which means that they are able to tolerate and even thrive in both fresh and salt water 22.

Large parts of the Baltic Sea have ever-changing salinity levels, which require inhabitants to osmoregulate. The gills, kidneys, liver, rectal gland and drinking processes all play a significant role in helping sharks and rays adjust to different environmental salinities 22. Hyperosmotic sharks and rays experience a massive influx of water when they enter brackish areas and the processing of this water by the kidneys and subsequent excretion requires a great deal of energy. It appears impossible for such species to live for extended periods in the nearly freshwater of the far northern and eastern parts of the Baltic Sea. Shark and ray species that do adapt well to salinity differences in this region, such as spurdog (Squalus acanthias) and thornback ray (Raja clavata), are considered marginally freshwater species. In the strong, seasonally influenced environment of the Baltic Sea, however, no true euryhaline species exist.

Although research on the physiology of Baltic sharks and rays is limited, scientists speculate that the cold temperatures and scarcity of available prey during the winter months limit the metabolic capability needed to maintain the energetic activity of osmoregulation. Another process that is likely to be limited by low salinity is reproduction. Indeed, it appears sharks and rays do not reproduce in the Baltic Sea. Egg-bearing species may suffer disruption or slowing of embryonic development in egg cases, while live-bearing species may not be able to gain the surplus energy required for their lengthy embryonic development. As such, they are thought to migrate back into high-salinity areas to lay eggs or give birth.
**Angular roughshark** *Oxycephalus carinatus* (Linnaeus, 1758)

**DESCRIPTION:** High, triangular body; sail-like dorsal fins with spines. First dorsal spine inclined forward; no anal fin. Large, rough denticles over eyes; grey or grey-brown above and below with a colour pattern of darker marks on a light background. Size up to 150 cm, usually from 50–70 cm.

**BALTIC DISTRIBUTION:** Found occasionally in the Skagerrak (Norwegian Deep) [10]; single record in Danish shallow coastal water (1972) [11].

**HABITAT:** Benthic, on continental shelf and upper slope; depths of 60–600 m, although usually below 100 m.

**PREY:** Worms, crustaceans and molluscs [12].

**REPRODUCTION:** Maturity at about 50 cm. Live bearer; pups nourished by yolk; probably seven or eight young [13]; born 25 cm in length [14].

**FISHERIES AND USES:** Taken as bycatch in bottom-trawl fisheries [15].

**BALTIC STATUS:** HELCOM high priority, significant decline, endangered [16].

**EU RED LIST STATUS:** Least Concern Globally (2007).

**EU CONSERVATION MEASURES:** The EU loosely limits catches of and rays (particularly *Family Rajidae*) from the North and Norwegian Seas (Areas IV and IIa), west of the Skagerrak. There are no limits for the Baltic.

**Nursehound, greater spotted dogfish** *Scyliorhinus stellaris* (Linnaeus, 1758)

**DESCRIPTION:** Very similar to small-spotted catshark (*S. canicula*). Grey or brown; heavy-bodied, very large. First dorsal fin set vertically above base of pelvic fins; nostrils separated by broad interspace. Maximum length of 150 cm; average about 120 cm [17].

**BALTIC DISTRIBUTION:** Found occasionally in the Skagerrak (two records at Swedish Bohuslän coast in 1875 and 1944 [18]); single record in the Kattegat [19].

**HABITAT:** Sea floor, usually on rocky or seaweed-covered grounds; depth range of 1–125 m [19].

**PREY:** Wide variety of invertebrates, such as crustaceans and molluscs; also bottom fish [19].

**REPRODUCTION:** Egg-laying; egg development at about nine months; young about 16 cm long at hatching [20].

**FISHERIES AND USES:** Taken as bycatch in bottom-trawl and artisanal fisheries [21]; occasionally caught by anglers [22].

**BALTIC STATUS:** Unknown.

**EU RED LIST STATUS:** Near Threatened Globally (2006).

**EU CONSERVATION MEASURES:** None.

**Spotted ray** *Raja montagui* Fowkes, 1910

**DESCRIPTION:** Rhomboid shape with short rostrum; bright background with many small black spots on whole upper side. Two equal-sized dorsal fins at end of tail; long regular row of 20–50 thorns from mid-disc to first dorsal. Reaches up to 80 cm in length [23].

**BALTIC DISTRIBUTION:** Found occasionally in the Skagerrak and Kattegat [24].

**HABITAT:** Benthic, from shallow waters to 650 m; more common at about 100 m on sandy and muddy bottoms [25].

**PREY:** Wide variety of invertebrates, such as crustaceans and molluscs; also bottom fish [26].

**REPRODUCTION:** Maturity at about 60 cm [27]; egg-laying: 24–60 egg cases per year, laid in summer [28].

**FISHERIES AND USES:** Taken as bycatch in bottom-trawl fisheries [29].

**BALTIC STATUS:** HELCOM medium priority, probable decline, threatened migrant [30].

**EU RED LIST STATUS:** Least Concern Globally (in prep. 2008).

**EU CONSERVATION MEASURES:** None.

**Greenland shark** *Somniosus microcephalus* (Buch & Sonnem, 1801)

**DESCRIPTION:** Grey or brown; heavy-bodied, very large. Thought to grow up to 730 cm, but usually 245–430 cm [31]. Spineless, equal-sized, lower dorsal fins [32].

**BALTIC DISTRIBUTION:** Migrates south from the North Atlantic and Arctic regions to the North Sea and occasionally into the Skagerrak [32]; found sometimes in winter off Swedish Bohuslän coast [33].

**HABITAT:** Continental shelves and upper slopes [34]; depths of 0–1,200 m [35].

**PREY:** Seals, fishes, sea birds, squids (including giant squids), invertebrates and whales as carrion [36].

**REPRODUCTION:** Female maturity at 450 cm; live bearer; pups nourished by yolk; litters of 10; about 40 cm at birth [37].

**FISHERIES AND USES:** Traditionally fished in Greenland, Iceland and northern Norway for liver oil and meat – fresh, dried and fed – for human and sled dog food [38]. Native peoples have used skin for making boots and teeth for making knives. Mostly fished with hook and line, longline gear or gaffs. Often taken as bycatch in seal and whale nets and cod traps. Recreational fisheries are developing (promoted as extreme tourism) [39]. Fished through iceholes [40].

**BALTIC STATUS:** HELCOM medium priority, decline not known, vulnerable [41].

**EU RED LIST STATUS:** Near Threatened Globally (2006).

**EU CONSERVATION MEASURES:** None.

**Marbled electric ray** *Torpedo marmorata* Riso, 1810

**DESCRIPTION:** Round shape; relatively long abdomen; large pelvic fins; two dorsal fins at mid-tail length, first one distinctly larger than second [42]. Colour variable above, marbled on darker brown background; underside is white to cream [43]. Up to 100 cm in length; females mature at about 40 cm; males at 30 cm [44]. Large electric organs to the sides of the head.

**BALTIC DISTRIBUTION:** Found occasionally in the Skagerrak and Kattegat.

**HABITAT:** Benthic on soft as well as rocky bottoms; between 10 and 100 m in depth [45].

**PREY:** Mainly small benthic fishes, but also invertebrates [46].

**REPRODUCTION:** Live bearer; pups nourished by yolk; gestation lasts about ten months; litter from 5–32 pups, depending on size of female [47].

**FISHERIES AND USES:** Taken as bycatch in coastal bottom-trawl fisheries [48].

**BALTIC STATUS:** HELCOM medium priority, probable decline, threatened migrant [49].

**EU RED LIST STATUS:** Least Concern Globally (in prep. 2008).

**EU CONSERVATION MEASURES:** None.

**Smooth hammerhead shark** *Sphyrna zygaena* (Linnaeus, 1758)

**DESCRIPTION:** Large hammerhead without a notch at centre of head. First dorsal fin moderately high, second dorsal and pelvic fins low. Olive-grey to dark grey-brown above, white below. Grows up to 400 cm [50].

**BALTIC DISTRIBUTION:** Single record in the Kattegat in 1937 [51].

**HABITAT:** Coastal shelves; surface to 20 m deep or more [52].

**PREY:** Bony fishes, small sharks, skates and stingrays [53].

**REPRODUCTION:** Live bearer; pups nourished by placenta; 26–37 pups per litter; 12-month gestation; size at birth about 60–64 cm [54].

**FISHERIES AND USES:** Taken primarily as bycatch in longline fisheries; fished for use in shark fin soup [55].

**BALTIC STATUS:** Unknown.

**EU RED LIST STATUS:** Vulnerable Globally (2006).

**EU CONSERVATION MEASURES:** None.

**Oceanic whitetip shark** *Carcharhinus longimanus* (Perron, 1861)

**DESCRIPTION:** Snout is short and rounded; large, rounded first dorsal fin; tips of first dorsal, pectorals and lower caudal fin lope have white tips [56]. Length up to 350 to 395 cm [57].

**BALTIC DISTRIBUTION:** Single record in Swedish Gullmarsfjord (2004) [58].

**HABITAT:** Pelagic; oceanic.

**PREY:** Fishes, stingrays, sea turtles, marine mammal carrion, squids and crabs.

**REPRODUCTION:** Live bearer; pups nourished by placenta; 1–13 pups per litter; 12-month gestation; size at birth about 40–60 cm [59].

**FISHERIES AND USES:** Taken primarily as bycatch in longline fisheries; fished for use in shark fin soup [60].

**BALTIC STATUS:** Unknown.

**EU RED LIST STATUS:** Vulnerable Globally (2006).

**EU CONSERVATION MEASURES:** None.
The use of cartilaginous fishes in Europe

Sharks, skates and rays have been fished in European waters for centuries, providing everything from basic sustenance to luxury items. Indeed, most of these body parts have been used at some time or another for specific purposes 24.

Today, fished cartilaginous fishes are sought or retained for their meat (for human consumption or pet food), fins (for the Asian delicacy, shark fin soup) and oil from their relatively large livers (which are used in cosmetics, lubricants and pharmaceuticals). The hides can be used for leather, while shark cartilage is an unproven yet popular alternative treatment for human disease. Sharks are also used for recreational purposes through sport fisheries (often ‘catch and release’) and ecotourism operations.

European demand for spurdog (Squalus acanthias) is strong and persistent enough to drive targeted fisheries around the world. Catches of spurdog in the Northeast Atlantic have declined by 90% since the 1970s 2 (along with the population), in response, imports from the Northwest Atlantic and the Pacific have increased. In Germany, the smoked belly flaps of spurdog are known as ‘Schillerflecken’ and commonly sold in fish markets. Germany’s annual imports of spurdog (2,000t) put it among the top five importers of shark meat in the EU; it is the largest single importer of frozen spurdog meat since the late-1990s, receiving 25% of American and 20% of Canadian exports 2.

The porbeagle (Lamna nasus) is the highest value shark consumed by Europeans. Porbeagle steaks are traded in fresh and frozen form and sold in markets, restaurants and canteens. Fish retailers often use whole porbeagle or its parts for display purposes.

In an attempt to act as a responsible consumer, Germany has produced and promoted proposals to restrict international trade in spurdog and porbeagle under Appendix II of the Convention on International Trade in Endangered Species (CITES) (see Conservation – section 5).

Baltic fisheries taking cartilaginous fishes

The Baltic Sea has been fished intensively for centuries, but catch statistics on cartilaginous fishes are scant. Today the main species are sprat, herring, cod, salmon and a few flatfishes. The ICES Working Group on Elasmobranch Fishes (WGEl) has analysed current and historical data on cartilaginous fish populations and fisheries in the Northeast Atlantic. Only activities in the Skagerrak, Kattegat and North Sea are included in these analyses, but not specified for each region. Data for the Baltic Sea are either scarce or excluded due to the low extent of fisheries. In this section, we look at Baltic cartilaginous fishes data from ICES and other sources.

ICES fisheries data

Catch data for cartilaginous fishes were retrieved from ICES fisheries data (using FAO FishStat Plus) for ICES areas IIIa – IIId. The processed data included all landings from 1973 to 2005 from the Baltic Sea and the adjacent Skagerrak. Landings of cartilaginous fishes have been recorded during this time by vessels from Belgium, Denmark, Germany, Iceland, the Netherlands, Norway, Sweden, and the United Kingdom. The German Democratic Republic and the Federal Republic of Germany submitted separate catch reports until German reunification in 1990. Landings were generally not recorded in the species level. Only a few species were classified separately; others were reported under species groups (see Table 3).

Landings of several species of cartilaginous fishes were recorded from the Skagerrak and Kattegat by all the above mentioned countries. Catches were also reported from the Belts, the Sound and the Western Baltic (sub-divisions 22, 23 and 24) by Denmark, Germany and Sweden, and from southern and central parts of the Baltic Proper (sub-divisions 25 and 27) by Sweden.

“Picked” dogfish (Squalus acanthias), or spurdog, was landed by Belgium, Denmark, Germany, the Netherlands, Norway, Sweden and the United Kingdom. Main catches came from the Skagerrak and Kattegat from Danish, Swedish and Norwegian vessels, and to a lesser extent from other countries. Landings from the Belts, the Sound, and the Western Baltic were very low (approximately 1t). Notably, a small amount (about 10 t) was recorded from the Baltic Proper (sub-divisions 25 and 27) by Swedish fishing vessels. The total landing statistics reveal a clear and serious decline in spurdog abundance over the observed years (see Figure 3 overleaf). Indeed, since 1993 the landings per year have not exceeded 1,000t. Spurdog made up 79% of total landings of cartilaginous fishes from the Baltic. This figure is probably an underestimation given the likelihood that the category ‘Dogfish sharks not elsewhere included’ also included spurdog.

Other shark species included in Baltic landings reports are tope (Galeorhinus galeus), porbeagle (Lamna nasus) and blue shark (Prionace glauca). About 10t of blue shark was caught during the years 1989–2004 in the Skagerrak/Kattegat, while

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** Table 3: Classification of cartilaginous fishes and species groups in ICES data.**

<table>
<thead>
<tr>
<th>ICES category</th>
<th>Cartilaginous fish species or group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dogfish sharks not elsewhere included</td>
<td>Any cartilaginous fish species, not determined</td>
</tr>
<tr>
<td>Dogfish sharks not elsewhere included</td>
<td>Squalus acanthias</td>
</tr>
<tr>
<td>Dogfish sharks not elsewhere included</td>
<td>Lamna nasus</td>
</tr>
<tr>
<td>Dogfish sharks not elsewhere included</td>
<td>Galeorhinus galeus</td>
</tr>
<tr>
<td>Dogfish sharks not elsewhere included</td>
<td>Prionace glauca</td>
</tr>
<tr>
<td>Dogfish sharks not elsewhere included</td>
<td>Aptychus turritus</td>
</tr>
<tr>
<td>Dogfish sharks not elsewhere included</td>
<td>Aptychus obscurus</td>
</tr>
<tr>
<td>Dogfish sharks not elsewhere included</td>
<td>Chimaera monstrosa</td>
</tr>
</tbody>
</table>

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* It is not clear whether this category also includes dogfishes of the family Etmopteridae (e.g. Etmopterus spinax) and catsharks of the family Scyliorhinidae.

** “Picked” dogfish is a misspelling of piked dogfish (spurdog), Squalus acanthias.

*** This group can also include species that were formerly known as Raja but have since been reclassified to another batoid genus (e.g. starry skate Raja radiata Amblyraja radiata).
a very small amount of this species was reported in catches in the Belts by Danish fishermen. Less than 10t of tope was landed during 1999–2005 from the Skagerrak/Kattegat, while very small quantities of the species were taken from the Danish Straits, also by Danish vessels. Porbeagles, which were landed by Norway, Sweden and Denmark, were usually caught in the Skagerrak/Kattegat (approximately 1,355t), and to a lesser extent (approximately 6t) in the Danish Straits and the Western Baltic (sub-divisions 22, 23 and 24), according to Danish and Swedish fisheries data provided to ICES. In 2005, no porbeagle catches were recorded. Interestingly, these catches enhance our knowledge of these species’ range; distribution data on tope are confined to the Skagerrak and Kattegat, but catch records reveal a more southerly distribution into the Danish Straits; the same is true for the blue shark.

In comparison to the shark catches, landings of rays and skates, although fishing and landing is reportedly incidentally. Most of the cartilaginous fish catch and rays (including skates) and pelagic sharks as targeted take rays (including skates) and pelagic sharks as targeted catches of the aforementioned categories of dogfishes are reported and fisheries data from logbook registries only cover vessels exceeding 10m in length. It is possible that small-spotted catsharks (Squalus acanthias) are included in Swedish catches of the aforementioned categories of dogfishes and rays, although fishing and landing is reportedly prohibited in Swedish waters for these species. Overall, the data from the Baltic is likely taken as bycatch because quantities are too low to support targeted fisheries.

Rather than being classified by species-specific categories, the species are summarized in these data sets by super-ordinated categories such as ‘all rajidae’ or ‘dogfishes not elsewhere included’. Data on minimum length are not available and fisheries data from logbook registries only cover vessels exceeding 10m in length. It is possible that small-spotted catsharks (Squalus acanthias) are included in Swedish catches of the aforementioned categories of dogfishes and rays, although fishing and landing is reportedly prohibited in Swedish waters for these species. Overall, the no information on catches per statistical rectangle).

Data from the Danish Directorate of Fisheries show cartilaginous fish landings from 1995–2002 (see Table 4). Catches from sub-division 24 were reported primarily by Danish vessels (and one Swedish boat) and landed at ports in Denmark or outside Denmark. These data reveal modest catches of “picked” dogfish (spurdog) and lesser spotted dogfish (S. canicula), as well as larger catches of skates and rays from the Baltic. The distribution of the lesser spotted dogfish further eastward into low salinity (about 8 PSU) areas, as demonstrated by this data, is notable.
Conservation

Conservation tools

There are many relevant global, regional and national regulatory tools available for conserving Baltic sharks, rays and rabbit fishes and their habitats.

International instruments

IPOA-Sharks

In 1999, the United Nations Food and Agriculture Organization (FAO) adopted the International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks). The IPOA-Sharks calls on all fishing nations to assess their cartilaginous fish populations and prepare national and regional plans of action for sharks in accordance with FAO technical guidelines 35. The IPOA is, however, wholly voluntary and progress toward its implementation has been slow 35. The EU only recently started to develop a Community Plan of Action (CPAOA) for sharks; a final plan is anticipated by 2009. As yet, there are no regional plans of action for sharks.

HELCOM

The Helsinki Commission, or HELCOM, aims to protect the Baltic Sea by fostering intergovernmental cooperation among the bordering countries. HELCOM is the governing body of the Convention on the Protection of the Marine Environment of the Baltic Sea Area (also known as the Helsinki Convention). The Convention area covers the whole of the Baltic Sea area including inland waters. First signed in 1974 and revised in 1992, the Convention now claims all countries bordering the Baltic as well as the European Community as signatories. Governments of the Contracting Parties are obliged to implement HELCOM recommendations through their respective national programmes and legislation.

Although HELCOM offers no specific measures for the management or conservation of cartilaginous fish species of the Baltic, the Commission adopted a Red List of threatened and declining species of Baltic lampreys and fishes earlier this year (see Appendix 1). HELCOM maintains a joint working programme on Marine Protected Areas with the OSPAR Commission (see below) 36.

IBSFC

The International Baltic Sea Fishery Commission (IBSFC), defunct since January 2006, was established in 1973 by the Convention on Fishing and Conservation of the Living Resources in the Baltic Sea and Belts (the Gdansk Convention) 34. The IBSFC obtained scientific advice from ICES and set catch limits for the four main commercially exploited fish species (cod, salmon, herring and sprat). This function is now performed by the European Commission and Council of Ministers. Neither regime has addressed the catch of cartilaginous fishes in the Baltic.

OSPAR

The Oslo–Paris Convention, or OSPAR, was founded in 1992 by combining the foregoing conventions, the Oslo Convention (Osocom) and the Paris Convention (Parcom). OSPAR provides a legal framework for international cooperation to protect the marine environment of the Northeast Atlantic. The OSPAR Commission is made up of government representatives of the 15 Contracting Parties and the European Commission. Human activities are managed under OSPAR through six strategies, one of which involves the conservation of marine biodiversity and ecosystems. This strategy has four elements, including the assessment of species that are threatened or in decline and the development of measures for their protection. The list of species assessed as needing protection contains three cartilaginous fish species: the basking shark (Cetorhinus maximus), common skate (Dipturus batis) and spotted ray (Raja montagui). In 2007, Germany proposed eight species of cartilaginous fish for listing under OSPAR. Four of these occur in the Baltic: porbeagle shark (Lamna nasus), thornback ray (Raja clavata), spurdog (Squalus acanthias) and angel shark (Squatina squatina).

Although the Baltic Sea is not one of OSPAR’s principal areas of focus, several Baltic countries (Denmark, Finland, Germany, Norway and Sweden, as well as the EU) are OSPAR Contracting Parties. In addition, a declaration of Ministers and an agreement on cooperation with HELCOM recognizes that the biodiversity and distribution of species in the Baltic Sea is strongly linked to the original OSPAR maritime area 36.

CMS

The Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention) is an intergovernmental treaty that provides a framework for conserving migratory species throughout their range. Appendix I is reserved for species threatened with extinction; CMS Parties strive to protect these animals as well as their habitats and migratory routes. In addition, CMS facilitates concerted conservation action among Range States. CMS Appendix II is designed for migratory species that would significantly benefit from international cooperation, for which global or regional agreements among Range States are encouraged. Agreements range from legally binding treaties to less formal Memoranda of Understanding and can be adapted regionally.

CMS adopted a resolution on migratory sharks in 2005 and is now in the process of developing a landmark, global agreement for these species. Currently, basking, white and whale sharks are listed under the CMS Appendices. The CMS Scientific Council has determined that an additional 15 shark and ray species meet the criteria for listing under the CMS Appendices.

EU regulations

Apart from the Norwegian coast in the Skagerrak, the short coastline of the Russian Kaliningrad enclave and the Russian coastline on the Bay of Finland, the waters of the Baltic Sea are governed by the EU and its Member States.

EU fisheries management

As mentioned above, there is currently no holistic European plan for cartilaginous fishes, although fisheries management and recovery plans are mandated for commercial species under the EU Common Fisheries Policy and encouraged under IPOA-Sharks. To date, only a few measures are in place to safeguard sharks and rays from overfishing by EU vessels.

Since 2006, basking sharks and white sharks have been protected through a prohibition on fishing, retaining, transshipping and landing that applies to Community vessels 37.

The first EU total allowable catch (TAC) limit for spurdog of the North and Norwegian Seas (ICES Areas IV and Ila) was set in 1999 at 8,870t. This limit has since been regularly reduced, but never enough to restrict fishing and promote recovery. Indeed, before 2005, spurdog TACs were roughly two times higher than actual catches. Of the 2008 TAC of 631t for this region, Denmark was allotted 571t and Germany 101t; Sweden took 1t. In 2007, an additional TAC (2,828t) was imposed for spurdog taken from adjacent EU and international waters of Areas I, V, VI, VII, VIII, XII and XIV, as well as Ila, the Skagerrak and Kattegat. In the 2008 EU regulation, Area III was removed from the areas
In recent years, EU spurdog TACs have been limited to bycatch only; spurdog catch thereby cannot exceed 5% of the live weight of fish onboard a vessel. ICES has recommended one TAC of zero for all these areas. 

In 1999, a TAC of 6,060t was introduced for skate and rays of the Family Rajidae of the North and Norwegian Seas (Areas IV and Ila). This limit was reduced annually and met the actual level of catches for the first time in 2006, at 2,777t.

Directed fisheries for deep-sea sharks are prohibited by EU regulations, but landings of these exceptionally slow-growing species are still allowed through a bycatch TAC in areas V-X and XII (7,126t for 2006, 2,491t for 2007, reduced to 1,715t in 2008) that is allocated to EU Member States through national quotas. Restrictions on deep-water fishing gear are meant to reduce bycatch of deep-water sharks, but are more lenient (in terms of allowable depths) than the ICES advice.

After years of debate, the EU imposed its first ‘precautionary’ TAC for porbeagle sharks in 2008; areas of application include the Baltic (Area III). The current limit of 581t is on a par with recent landings from this exceptionally depleted population and is therefore unlikely to lead to rebuilding or even fishery restriction. Denmark received 30t of the 2008 porbeagle TAC; Germany was allotted 6t and Sweden 1t.

EU Finning Ban

In 2003, with Regulation 1185/2003, the EU banned the wasteful practice of shark finning in EU waters and on EU vessels through the best possible means: prohibiting the removal of shark fins at sea. Article 4 of the regulation, however, allows derogation from this key measure by national authorities if vessels can prove it is necessary for processing, national authorities can issue “special fishing permits” to allow fishermen to remove shark fins onboard vessels, as long as the bodies are retained.

Germany and Lithuania are the only EU Member States bordering the Baltic that issue special fishing permits. Germany originally issued five permits, but decreased the number to three in 2007. Lithuania has issued one.

EU conservation measures

The EC Habitats Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora was developed to protect biodiversity by designating ecologically valuable habitats as nature reserves. This programme mandates that EU Member States identify and protect habitats of special ecological importance, but only guards against declines from the status quo. As such, fishing is still allowed in protected areas as long as it does not lead to population decline. Regulations on bycatch or targeted fisheries have not yet been imposed. Germany has acted upon this Directive in the Baltic by implementing four nature reserves.

The Habitat Directive includes a list of animals and plants in need of strict protection. There are currently no cartilaginous fishes on this list, thus excluding them as priorities for protection.

Conservation action by Baltic countries

Sweden is the only Baltic country to offer specific protections for sharks and rays (beyond EU restrictions). In 2004, Sweden prohibited the fishing and landing of numerous fish species from Swedish waters of the Skagerrak, Kattegat and Baltic Sea. Cartilaginous fish species under this protective regulation include the small-spotted catshark, basking shark, common skate, thornback ray, and porbeagle. Sweden has secured 1t of the new 2008 TAC for porbeagle sharks, presumably for animals taken outside Swedish waters.

Since 2008, an addition to this regulation forbids targeted fishing for spurdog with nets and longlines; trawl fishermen must obtain special permits in order to keep spurdog caught as bycatch. Sweden limits anglers to one spurdog during a 24-hour period.

Subject to spurdog limits, leaving the species unregulated in the Baltic after just one year of management. Germany received 31t of the 2008 TAC of 204t.

In actuality, more than 30 such species have been found in its waters (including the Skagerrak), some commonly. Indeed, all the cartilaginous fish species that occur in the eastern and northern North Sea also inhabit the Baltic, albeit in much lower numbers. These individuals form the fringe of the species range, rather than separate populations, and yet deserve consideration in terms of their contribution to the overall health and stability of populations and the surrounding environment. Further research into the physiological limits of distribution as well as abundance, population structure and migration associated with Baltic Sea sharks and rays, is necessary for a more complete picture of their status and conservation needs.

Available data on catch of sharks and rays from the Baltic reveal a surprisingly active fishery in the Skagerrak and Kattegat and even the Western Baltic. Fishery trends for commercially important species in the Baltic mimic the declines documented for North Sea sharks, skates and rays. Notably, the annual catch of spurdog from the Baltic in the late-1980s is about on a par with today’s allowable catch limits for the whole of EU waters (2,500t).

Call for action

Sharks, rays and chimaeras of the Baltic Sea are poorly studied and have virtually no protection. Most existing EU management of cartilaginous fishes excludes the Baltic, and collection of fisheries data for these species is lacking throughout the region. HELCOM and IBSF (although the latter no longer exists) have not provided any fisheries recommendations or regulations specific to Baltic cartilaginous fishes. Our understanding and conservation of these species has suffered as a result of this inattention.

Although it is not surprising to find records of highly migratory Atlantic shark species (such as the porbeagle shark) venturing eastward into the central Baltic Sea, it is extremely surprising that fisheries’ catch records indicate relatively high numbers of some species (such as spurdog and small-spotted catsharks) as far east as sub-region 24 and 25 (Western Baltic and Baltic Proper).

This report shows that sharks, rays and chimaeras are present in the Baltic Sea, particularly in the transitional waters of the Skagerrak and Kattegat, and that their populations have been and still are subject to indirect fishing pressure and, in some cases, ongoing targeted fishing. Safeguards for these species could help protect the region’s biodiversity and perhaps provide a conservation buffer for the particularly depleted shark and ray populations based in the North Sea. Any fisheries taking cartilaginous fishes from the Baltic should be subject to stringent, precautionary management, if allowed at all.

There is a general misconception that the Baltic Sea, due to its low salinity, extreme hydrological circumstances and physical barriers, is devoid of sharks, rays and chimaeras.

The serious state of most European shark and ray populations today brings conservation responsibilities for all EU Member States. Even countries with few or no native sharks or rays have much to offer in terms of ensuring sustainable fisheries for these species and recovery of depleted populations. For instance, Baltic nations with even minor populations of spurdog or porbeagle sharks are considered Range States under CITES and can therefore play a leadership role in securing associated beneficial limits on international trade. Similar arguments can be made for other international agreements. Moreover, the contentious annual TAC setting debates within the European Council of Fisheries Ministers urgently need the strong voices of both responsible, affected fishing countries and neutral nations, which are free from vested interests. Indeed, leaving decisions on allowable catches solely to the States with the greatest economic interest is unlikely to lead to the precautionary management approach warranted for such slow-growing species.
In order to enhance the understanding of and outlook for sharks, rays and chimaeras, we urge Baltic country governments to:

- promote ICES advice for EU shark and ray fisheries restrictions, especially minimal catch limits for spurdog, porbeagle, skates/rays and deep-water sharks, with the European Commission and within the European Council of Fisheries Ministers;
- ensure that EU regulations covering cartilaginous fishes found in the Baltic Sea (particularly spurdog) apply to the Baltic Sea;
- collaborate to establish complementary, precautionary fisheries regulations on Baltic sharks and rays for which ICES advice has not yet been developed;
- facilitate species-specific population assessments and long-term monitoring surveys for cartilaginous fishes of the Baltic;
- require size and species-specific reporting of shark and ray catches (i.e. discards and landings) data;
- investigate appropriate size limits on shark and ray landings (i.e. minimum, maximum or a combination thereof) for maximizing survival of the age classes most critical to population health;
- determine the fishing gear and methods used to catch Baltic sharks and rays, as well as the associated discard mortality;
- secure measures to protect key Baltic shark and ray habitats, such as fishing closures, gear restrictions and protected areas;
- encourage research on the influence of salinity and anoxic environments on the distribution, abundance, migration, stock structure, life-cycle and reproductive rates of sharks and rays in the Baltic;
- adopt national legislation to protect shark and ray species listed under wildlife conventions and/ or considered by the IUCN to be Endangered or Critically Endangered;
- promote the adoption of Germany’s proposals to list and conserve additional sharks and rays under OSPAR, particularly those species found in the Baltic: porbeagle, spurdog, angel shark and thornback ray;
- continue to support Germany’s proposals to list spurdog and porbeagle under CITES;
- ensure the adoption of a requirement that all sharks and rays caught in the Baltic be landed (i.e. minimum, maximum or a combination thereof) for maximizing survival of the age classes most critical to population health;
- actively promote and participate in the development and timely adoption of a European Community Plan of Action for Sharks; and
- encourage sound shark and ray management proposals by the EU delegations to international fisheries bodies around the world.

Since 1948, the World Conservation Union (IUCN) has been assessing the conservation status of species on a global scale. The IUCN Red List of Threatened Species™ highlights taxa that are threatened with extinction in order to promote their conservation. The list provides objective and scientifically based information on the current status of biodiversity through the use of the IUCN Red List Categories and Criteria.**

National Red Lists have been provided to HELCOM by all states adjacent to the Baltic Sea. Only the Swedish and German lists contained cartilaginous fishes (see Appendix 1). National Red Lists are usually compiled by nature conservation departments, e.g. the German Federal Agency for Nature Conservation. National Red List assessments reflect, in a condensed way, the knowledge of a large number of specialists.

### Appendix 1: List of Threatened and Declining Species of Cartilaginous Fishes of the Baltic Sea

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>HELCOM priority 2007</th>
<th>HELCOM Red List 2007</th>
<th>Global IUCN Red List with assessment year , regional assessment NE Atlantic</th>
<th>National Red Lists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alopias vulpinus</td>
<td>High priority, significant decline</td>
<td>CR</td>
<td>VU (in prep. 2008)</td>
<td>SN (GE 1996)</td>
</tr>
<tr>
<td>Amblyraja radiata</td>
<td>High priority, significant decline</td>
<td>EN</td>
<td>VU (in prep. 2008)</td>
<td>EN (GE 2003)</td>
</tr>
<tr>
<td>Carcharhinus longimanus</td>
<td>Medium priority, decline not known</td>
<td>VU</td>
<td>NT (2007)</td>
<td>VU (SW 2005)</td>
</tr>
<tr>
<td>Cetorhinus长长的</td>
<td>Medium priority, decline not known</td>
<td>VU</td>
<td>NT (2007)</td>
<td>VU (SW 2005)</td>
</tr>
<tr>
<td>Chimaera monstrosa</td>
<td>Medium priority, decline not known</td>
<td>VU</td>
<td>NT (2007)</td>
<td>VU (SW 2005)</td>
</tr>
</tbody>
</table>

**Key to IUCN Red List category: NE = Not Evaluated, DD = Data Deficient, LC = Least Concern, NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered.

Key to HELCOM classification: NE, DD, LC, NT, VU, EN, and CR the same as IUCN Red list classification. Th. Threatened Migrant.

Key to National Red lists: DE = Germany, SW = Sweden, GE = in George 2003.
<table>
<thead>
<tr>
<th>Scientific name</th>
<th>English</th>
<th>German</th>
<th>Danish</th>
<th>Norwegian</th>
<th>Swedish</th>
<th>Finnish</th>
<th>Polish</th>
<th>Lithuanian</th>
<th>Russian</th>
</tr>
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<tr>
<td>Aloeis vulpinus</td>
<td>German thresher shark</td>
<td>Gewöhnlicher Fischhai</td>
<td>Reitwhale</td>
<td>Reitwhale</td>
<td>Krabba</td>
<td>Kottab</td>
<td>Gąska</td>
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<tr>
<td>Alopias vulpinus</td>
<td>Common thresher shark</td>
<td>Gewöhnlicher Fischhai</td>
<td>Reitwhale</td>
<td>Reitwhale</td>
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<td>^tIceS wgef Report (2006) 37</td>
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THE SHARK ALLIANCE

The Shark Alliance is a not-for-profit coalition of non-governmental organisations dedicated to restoring and conserving shark populations by improving European fishing policy. Because of the influence of Europe in global fisheries and the importance of sharks in ocean ecosystems, these efforts have the potential to enhance the health of the marine environment in Europe and around the world.

The mission of the Shark Alliance is two-fold:

- To close loopholes in European policy regarding the wasteful and unsustainable practice of shark finning;
- To secure responsible, science-based shark fishing limits for long-term sustainability and ecosystem health.

To discover more about the Alliance visit: www.sharkalliance.org