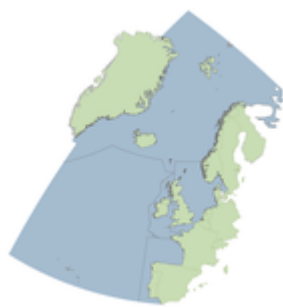


# Status Assessment 2021 - Thornback ray

Based on ICES assessments, the biomass indices and stock size indicators for thornback ray are increasing within OSPAR Regions II and III, either stable (ICES Subarea 8) or increasing (ICES Division 9.a) in OSPAR Region IV, while catch rates around the Azores archipelago (in OSPAR Region V) are stable at a low level. Based on this evidence the overall conclusion on the species' status is positive and improving, although there is uncertainty (i.e. relatively wide confidence intervals) around some stock-related estimates and indicative trends are relatively recent (i.e. over the last 5-10 years). Like all elasmobranchs this species is vulnerable to fishing mortality.



(/en/ospar-assessments/quality-status-reports/qsr-2023/)

Assessment of status		Distribution	Population size	Demographics, e.g. productivity	Previous OSPAR status assessment	Status	
Region	I				○		
	II	?	?	?	●	Good	↑ <sup>1</sup>
	III	?	?	?	○	Good	↑ <sup>1</sup>
	IV	?	?	?	○	Good	↑ <sup>1</sup>
	V	?	?	?	○	↔ <sup>1</sup>	

Assessment of key pressures		Fishing pressure	Habitat damage	Threat or impact
Region	I			
	II	?	?	↓ <sup>2</sup>
	III	?	?	↓ <sup>1</sup>
	IV	?	?	↓ <sup>1</sup>
	V	?	?	?

⊕ Table Legend

⊕ Method of Assessment

Confidence

Medium

Background Information

The thornback ray was nominated for inclusion on the OSPAR List of Threatened and/or Declining Species and Habitats in 2006 and it has been included since 2008 (OSPAR Agreement 2008-6). The original evaluation against the Texel-Faial criteria listed sensitivity and decline in OSPAR Region II as the reasons for listing of this species. Although there were no population estimates for the species, the abundance and range had declined. Owing to its life-history traits, the species has a moderate biological productivity. Therefore, while the level of fishing pressure is moderate, the recovery from depletion is slow and the threats are still present.

The status of this species is based on ICES advice to fisheries managers for fishing opportunities. This advice has been integrated into an assessment for conservation purposes.

Geographical Range and Distribution

The thornback ray is distributed in continental shelf seas from Iceland to South Africa, including the Azores archipelago, the Mediterranean Sea and the Black Sea. Its distribution may also extend into western parts of the Baltic Sea. Thornback rays occur in/over a variety of benthic substrate types including mud, sand, shingle, gravel and rocky areas. The species occurs in OSPAR Regions II, III, IV and V, and in the southern limits of Region I.

Thornback rays are most abundant in coastal areas at c. 10–200m depth, being shallower in occurrence in cold temperate waters, and deeper in warmer waters. The species is nevertheless commonly recorded in waters up to 100m deep, and occasionally recorded to depths of at least 750m (ICES 2018). Outer estuaries and large shallow bays, particularly the Wash and the Thames Estuary in the UK, are important spring/summer spawning grounds, nurseries and feeding areas (e.g. Wheeler 1969, Ellis et al. 2005, Hunter et al. 2006, Wirtz et al. 2008).



Figure 1: Geographic distribution of thornback ray in the Northeast Atlantic and adjacent seas. Note: The distribution also extends to the Azores archipelago, and the distribution around Iceland is more restricted than shown here. Source: IUCN (<https://www.iucnredlist.org/species/39399/103110667>).

## Population/Abundance

ICES assesses and provides advice on fishing opportunities for seven stocks of thornback rays in the ICES Area, namely: (i) Subarea 4 and Divisions 3.a & 7.d (OSPAR Region II); (ii) Subarea 6, (iii) Divisions 7.afg, and (iv) Division 7.e (OSPAR Region III); (v) Subarea 8 and (vi) Division 9.a (OSPAR Region IV), and (vii) around the Azores archipelago (in OSPAR Region V).

Based on ICES advice, current indications are that the stocks of thornback ray are increasing within OSPAR Regions II and III, either stable (Subarea 8) or increasing (Division 9.a) within OSPAR Region IV (Subarea 8), while catch rates around the Azores archipelago (in OSPAR Region V) are stable at a low level.

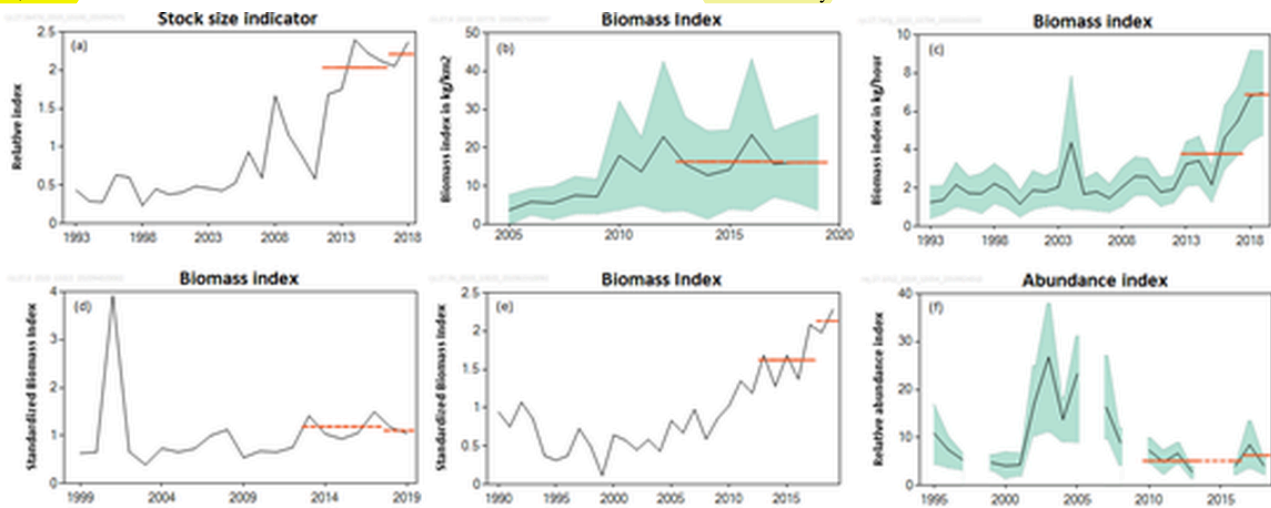


Figure 2: Temporal trends in ICES stock-size indicators for Thornback ray presented for OSPAR Regions as follows: (a) Region II (ICES Subarea 4 and Divisions 3.a and 7.d); (b) Region III (Subarea 6); (c) Region III (Divisions 7a-fg); (d) Region IV (Subarea 8); (e) Region IV (Division 9a) and (f) Region V (Subarea 10). Source: ICES 2020 a-d, 2019 a, c). Red lines indicate the mean of the stock size indicators for the periods 2012-2016 and 2017-2018 (for a), for the periods 2010-2013, 2016 and 2017-2018 (for f), for the periods 2013-2017 and 2018-2019 for (b, c, d, e).

There is considerable uncertainty around these stock size estimates and biomass indices in some areas, however, as can be seen in **Figure 2** they do not provide precise population figures. Furthermore, the indications of increases in stock size are relatively recent (i.e. within the last 5-10 years). Therefore knowledge of thornback ray populations (i.e. species abundance) as a whole within individual OSPAR Regions remains somewhat inconclusive at present.

## Condition

The thornback ray is a relatively fast-growing species, with higher fecundity than many elasmobranchs. A length range of 10–97 cm in total length (TL) for males and 10–105 cm TL for females, has been observed (McCully et al. 2012, Serra-Pereira et al 2011). Based on mark-recapture data, the maximum age is at least 17 years (Bird et al. 2020). In Region III, individuals reach maturity at age 6 and length 65–71 cm (Gallagher et al. 2005), whereas in Region IV females reach maturity at age 7.5 and 78.4 cm and males at 5.8 years and 67.6cm (Serra-Pereira et al 2011). Fecundity is estimated from 60–140 eggs per year (Holden 1975).

## Threats and Impacts

The original rationale for including this species on the OSPAR List was because it had been depleted by fisheries in most of Region II, where the area of its distribution had contracted significantly. There were lesser declines in other parts of the OSPAR area. A general decrease in fishing effort is

shown in the Northeast Atlantic from the beginning of the 21st century (e.g. Gascuel et al. 2016, Couce et al. 2020, ICES 2020c). However, bycatch is still a problem and measures for more effective bycatch mitigation still have to be developed.

## Measures that address key pressures from human activities or conserve the species/habitat

For EU waters, fishing pressure on thornback ray is currently regulated through a Group-TAC which includes all skate and ray species except *Raja undulata* and those listed as prohibited. The Group-TAC was introduced in 1999 in the North Sea (Division 3.a and Subarea 4) and in 2009 in the eastern English Channel (Division 7.d) and other areas.

Studies on individual survivability in different fishing métiers show that thornback ray has a survivability of >50% in the pulse-trawl fishery (Schram and Molenaar 2018) and >90% in gill nets (Enever et al. 2009, Catchpole et al. 2017). Recent studies suggest variable at-vessel mortality and discard survival, depending on several factors (e.g. gear type, soaking time, fish size) (Ellis et al., 2018; Schram and Molenaar, 2018; Serra-Pereira and Figueiredo, 2019). It is possible that this bycaught small-bodied species may be less susceptible to fishing pressure than the large-bodied skates (e.g. Silva et al., 2012), though further studies on discard survival are required. Further studies on discard survival in particular in bottom trawls are nevertheless required.

## Conclusion (including management considerations)

Based on ICES assessment, the biomass indices of thornback ray are increasing within parts of OSPAR Region II and Region III, either stable (ICES Subarea 8) or increasing (ICES Division 9.a) in OSPAR Region IV, while catch rates around the Azores archipelago (in OSPAR Region V) are stable at a low level. Based on this evidence the overall conclusion on the species' status is positive and improving, although there is uncertainty (i.e. relatively wide confidence intervals) around some stock-related estimates. Furthermore, indications of increases in stock size are relatively recent (i.e. within the last 5-10 years), therefore the status of Thornback ray populations as a whole within individual OSPAR Regions is inconclusive at present.

The species' sensitivity has not changed however, while further understanding of the life-cycle and population structure of this species is still required. Bycatch mortality is still a problem for this species and measures for more effective bycatch mitigation have to be developed. Understanding how to increase avoidance, gear selectivity, and thornback ray survival should be further investigated and measures to address these issues should be developed. In the coming years attention should be given to the species-specific differences in susceptibility to fishing pressure, and a species-specific approach to management could usefully be considered.

## Knowledge Gaps

A substantial lack of knowledge remains on both the spawning and nursery areas for thornback rays (outside the Thames estuary and other UK coastal areas) and also on the population structure of this species. This limits the development of spatio-temporal management measures for the species. Tagging (electronic and conventional) programmes and DNA analyses focusing on thornback rays throughout their range should be considered. In addition, existing survey data could provide information on the locations of nursery grounds and other juvenile habitats, which should be further investigated to identify sites where there are large numbers of 0-groups (i.e. fish in their first year of life) and where these life-history stages are found on a regular basis (ICES 2019b).

Understanding how to increase avoidance, gear selectivity and thornback ray survival should be further researched and appropriate management measures should be developed accordingly. The population size is not known and the information on life history and population structure is incomplete. The Working Group on Elasmobranch Fishes (WGEF) states that: "WGEF is still concerned about the possibility of misidentification of skates in some recent IBTS surveys, especially differentiation between *R. clavata* and starry ray *Amblyraja radiata*" (ICES 2019b). The effect of such misidentifications would be to underestimate Thornback ray abundance.

## Method used

The assessment is based on ICES stock assessments (survey trends).

## References

## Sheet reference:

BDC2021/Thornback ray



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