

Ireland

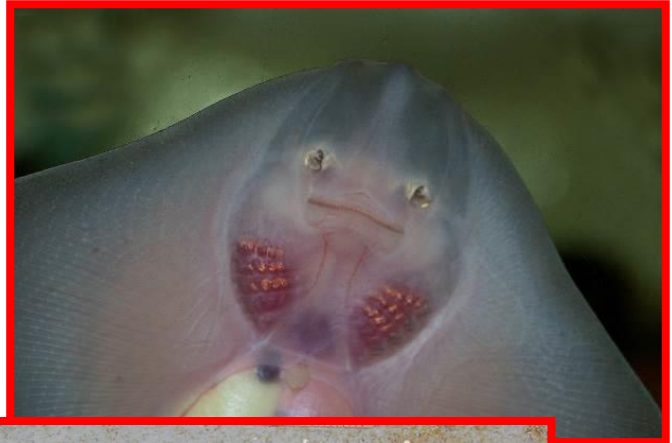
Red List No. 11



THE IUCN RED LIST
OF THREATENED SPECIES™

Cartilaginous fish

[Sharks, skates, rays
and chimaeras]



**National
Biodiversity
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Irish Elasmobranch Group



An Roinn Ealaíon, Oidhreacht,
Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage,
Regional, Rural and Gaeltacht Affairs



Ireland Red List No. 11:

Cartilaginous fish [sharks, skates, rays and chimaeras]

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EXECUTIVE SUMMARY

- A first Red List of cartilaginous fish (sharks, skates, rays and chimaeras), showing risk of extinction, is presented for Irish waters.
- Of the cartilaginous fish occurring in Irish waters, 58 were assessed using the latest IUCN categories.
- Of these, 6 were assessed as Critically Endangered: Portuguese dogfish *Centroscymnus coelolepis*; common (blue) skate *Dipturus batis* (= *flossada*); flapper skate *Dipturus intermedia*; porbeagle shark *Lamna nasus*; white skate *Rostroraja alba* and angel shark *Squatina squatina*.
- A further 5 species were assessed as Endangered: leafscale gulper shark *Centrophorus squamosus*; basking shark *Cetorhinus maximus*; common stingray *Dasyatis pastinaca*; undulate skate *Raja undulata* and spurdog *Squalus acanthias*.
- An additional 6 species were assessed to be Vulnerable: longnose velvet dogfish *Centroselachus crepidater*; kitefin shark *Dalatias licha*; tope *Galeorhinus galeus*; shagreen ray *Leucoraja fullonica*; longnose skate *Dipturus oxyrinchus* and cuckoo ray *Leucoraja naevus*.
- Of the remaining species, 19 were assessed as Near Threatened and 22 species as Least Concern.
- The main anthropogenic impacts on threatened species are over-exploitation by commercial fisheries and habitat destruction and disturbance.
- There are no longer any directed fisheries for any threatened cartilaginous fish in Irish waters. However threatened species are taken as by-catch in several fisheries, involving both Irish and non-Irish vessels. Similarly, endangered and threatened species that straddle Irish and non-Irish waters are caught by fleets further afield.

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INTRODUCTION

Sharks and their relatives are collectively termed chondrichthyan, or cartilaginous, fishes. They represent one of the oldest and most ecologically diverse vertebrate lineages with c.1,115 described species worldwide. The group arose at least 420 million years ago and rapidly diversified to occupy the upper tiers of aquatic food webs (Kriwet *et al.*, 2008). Despite being one of the most speciose groups of predators on earth, they include some of the latest maturing and slowest reproducing of all vertebrates, resulting in very low population growth rates with little capacity to recover from overfishing and other threats such as pollution or habitat destruction (Compagno *et al.*, 2005).

Irish waters contain 71 cartilaginous fish species, over half of the European list, and about 7% of the worldwide total, encompassing a broad range of sharks, rays, dogfishes and rabbitfishes. The Irish region has species occurring in every habitat, from coastal waters to deep-sea and it supports both sedentary and highly migratory taxa. Irish waters are of key importance to many of these species, hosting critical spawning and/or nursery aggregations. Moreover, these waters are the focus of some of the most intense fishing effort in Europe.

Cartilaginous fish have received attention in Irish waters since the 19th century. Indeed some of the initial descriptions of deepwater species were completed by Ernest Holt in his pioneering research surveys on the R.V. *Helga* (e.g. Holt and Byrne, 1909), while Kennedy (1954) documented various aspects of the ecology of more popular angling species. However it was not until the late 1980s that the impacts of fishing were first considered, through the work on rays and spurdogs (e.g. Fahy, 1988; 1989). Around this time, the International Council for the Exploration of the Sea (ICES) convened its first elasmobranch working group, in Dublin, and by 2005 ICES provided the first population assessments of most of the important commercially exploited species (ICES, 2005; 2014). Another very important research programme, which was initiated by the predecessors of Inland Fisheries Ireland in 1970 and is still ongoing, was the tagging study of sharks and rays (Fitzmaurice *et al.* 2003a-f). In addition to the more common species this programme still provides the only information on some of our very rare species. The Irish Specimen Fish Committee (ISFC) has been recording the distribution and weights of rod-caught 'specimen' and record fish, including the more common chondrichthyan species, since 1955 (ISFC, 2014).

Red list assessment methodology

The International Union for the Conservation of Nature (IUCN) coordinates the Red Listing process at the global level and also at the European level (e.g. Temple & Cox, 2009; Cox & Temple, 2009). However, individual countries and regions are encouraged to produce their own Red Lists, and the IUCN have published guidelines on the application of the Red Listing criteria and categories at the regional level to facilitate this (IUCN, 2003).

The first Irish Red Data Book was published in 1988 and covered vascular plants (Curtis & McGough, 1988). In 1993, the second Irish Red Data Book brought together information on Ireland's threatened vertebrates: mammals, birds, amphibians and fish (Whilde, 1993). These publications took several years to prepare and were costly to print. In recent years the emphasis in Ireland and elsewhere has changed to the production of Red Data Lists. Although subject to the same rigorous assessment procedures (IUCN, 2001, 2003, 2012a, 2012b) the focus has been on making the ensuing publications available online, rather than in hard copy. This has allowed a

faster turn around as evidenced by the recent sequence of new Red Lists for Ireland (Marnell *et al.*, 2009; Regan *et al.*, 2010; King *et al.*, 2011; Nelson *et al.*, 2011; Lockhart *et al.*, 2012; Wyse Jackson *et al.*, 2016). Progress has also been made on revising and updating the original Red Data Books; a new Red List of terrestrial mammals was published in 2009 (Marnell *et al.*, 2009) and the current volume updates elements of Whilde's (1993) assessments of fish.

Red list categories & criteria

The IUCN Red List Categories and Criteria are intended to be an easily and widely understood system for classifying species at high risk of global extinction. The general aim of the system is to provide an explicit, objective framework for the classification of the broadest range of species according to their extinction risk (IUCN, 2001). Adoption of the IUCN system also ensures consistency across taxonomic groups and regions.

Although initially developed to assess risk of global extinction, more recently the IUCN have provided guidance on how to apply the red list categories and criteria on a regional level (IUCN, 2003). Assessments for a geographically defined sub-global area assist in conservation prioritisation at a regional level.

Various versions of the IUCN system have been in use for over 40 years, but since the late 1990s the categories and criteria have undergone an extensive review to produce a clearer, widely applicable, open, and easy-to-use system. Consequently, the categories used by Whilde (1993) are no longer applicable although some comparison is possible. For the purposes of the current assessment the additional category of Regionally Extinct was included, as recommended by the IUCN regional guidelines (IUCN, 2003). This category was not used in the 1993 assessment. The full list of categories used in this assessment is given in Figure 1.

The IUCN guidelines provide five criteria against which species data is assessed (IUCN, 2012b; see Appendix 1). In order to complete the red list, each species was evaluated systematically against each criterion A-D. Criterion E was not used, as sufficient data for a fully quantitative assessment was not available for any of the species under study. Where a species met any one of the criteria it was noted, and the highest level of threat achieved by a species became its qualifying category. All of the criteria met at the highest level of threat were listed for each species.

The IUCN guidelines recommend assessors adopt a precautionary, but realistic approach, and that all reasoning should be explicitly documented (IUCN, 2012b). For example, where a population decline is known to have taken place (e.g. as a result of fisheries), but no management has been applied to change the pressures on the population, it can be assumed the decline is likely to continue in the future. If fisheries are known to be underway within the bathymetric range of a species, but no information is available on changes in catch per unit effort (CPUE), data from similar fisheries elsewhere may be used by informed specialists to extrapolate likely population trends. In a few cases, modelled population data are available and inferred trends are sometimes used where direct information is unavailable. Additionally, where no life history data are available, the demographics of a very closely related species may be applied (Fowler and Cavanagh, 2005). Finally, species designated as Not Evaluated were those whose extreme rarity in Irish waters was not driven by their conservation status, but could be confidently attributed to the species being classed as a rare vagrant, being on the edge of their distribution, or lacking sufficient information on their distribution in Irish waters.

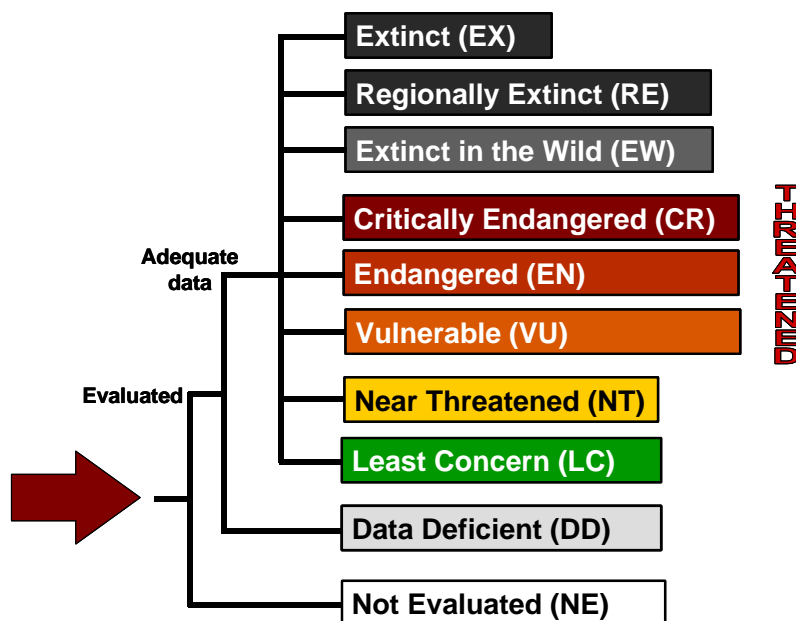


Figure 1: Red List categories used for this assessment. Further details and definitions for these categories and the criteria for achieving them are available in IUCN (2001, 2003) and are summarised in Appendix 1.

Geographic and Taxonomic scope

The geographic scope of this assessment covers the coastal, shelf and deep sea areas around Ireland. The outer extent is the 200 mile Exclusive Economic Zone (EEZ) of the Republic of Ireland, and the waters identified within The Adjacent Waters Boundaries (Northern Ireland) Order (S.I. 2002 No. 791)(Fig. 2). However, any species whose population straddles these boundaries and is not considered a vagrant (Table 2) in Irish waters is included. The approach ignores geographic structure within species, i.e. if several discrete populations occur in Irish waters, they are treated as one.

The assessments cover Irish species of the class Chondrichthyes, the cartilaginous fish. The class is divided into two subclasses: Elasmobranchii (sharks, rays and skates) and Holocephali (chimaeras, sometimes called ghost sharks). The nomenclature and authorities used for fish in this review follows Whitehead *et al.* (1984) and the World Register of Marine Species (WoRMS, 2016).

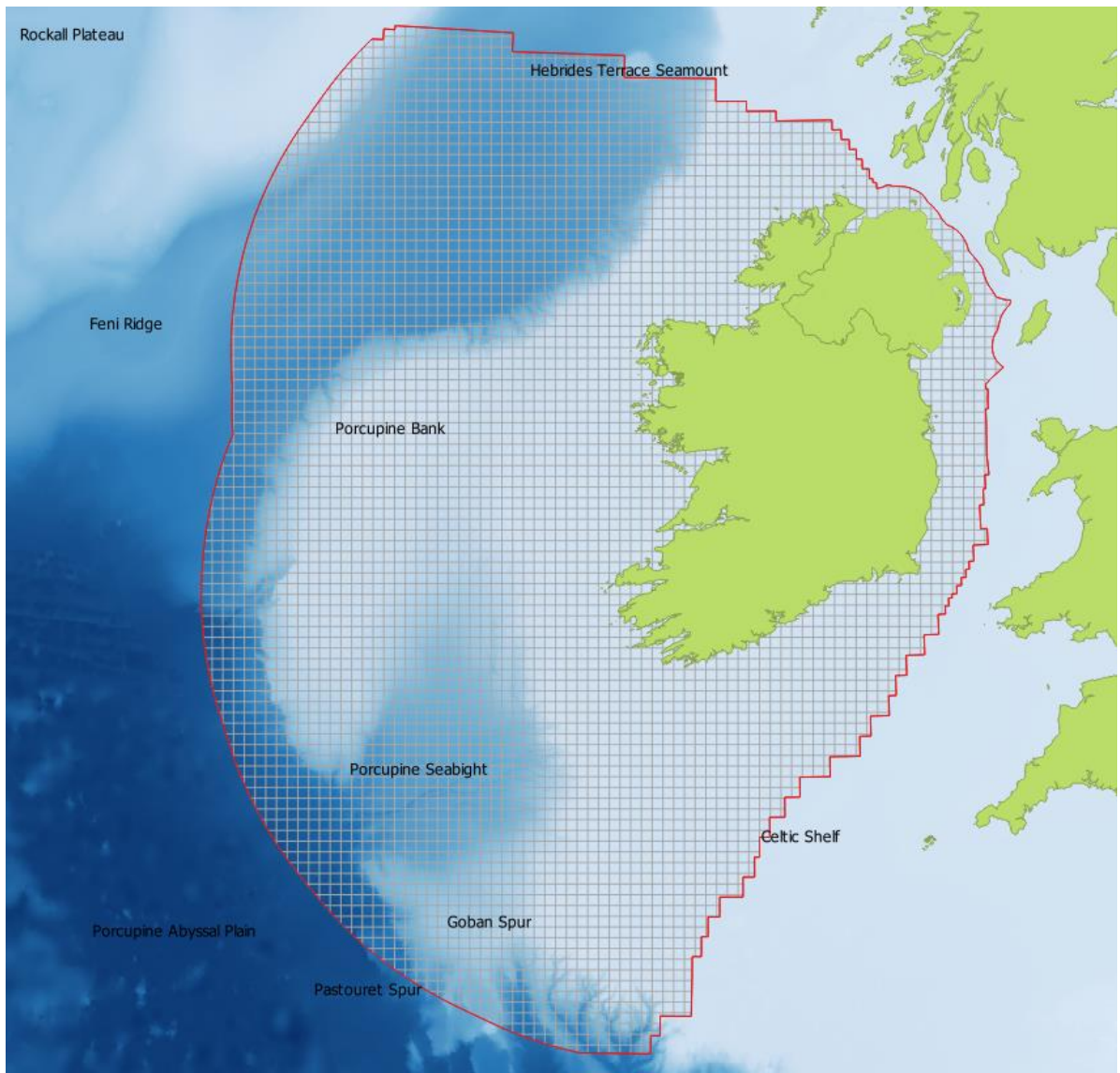


Figure 2: The geographic scope of the Red List assessment includes the Exclusive Economic Zone of the Republic of Ireland and the waters defined by the Northern Ireland Adjacent Waters Limit.

Table 1: Checklist of cartilaginous fish species of Ireland after Whitehead *et al.* (1984) and WoRMS (2016), with current European (Nieto *et al.*, 2015), Northeast Atlantic (Gibson *et al.*, 2008) and Global Red List (Camhi *et al.*, 2009) designations.

Family (common)	Family (scientific)	Common name	Scientific name	NE Atlantic	Global	Europe
Cow sharks	Hexanchidae	Sharpnose sevengill shark	<i>Hepranchias perlo</i>	NT	NT	DD
		Bluntnose sixgill shark	<i>Hexanchus griseus</i>	NT	NT	LC
Friiled sharks	Chlamydoselachidae	Friiled shark	<i>Chlamydoselachus anguineus</i>	NT	NT	LC
Mackerel sharks	Lamnidae	Porbeagle	<i>Lamna nasus</i>	CR	VU	CR
		Shortfin mako shark	<i>Isurus oxyrinchus</i>	VU	VU	DD
Basking sharks	Cetorhinidae	Basking shark	<i>Cetorhinus maximus</i>	EN	VU	EN
		Common thresher shark	<i>Alopias vulpinus</i>	NT	VU	EN
Cat sharks	Scyliorhinidae	White ghost shark	<i>Apristurus aphyodes</i>	DD	DD	LC
		Iceland catshark	<i>Apristurus laurussonii</i>	LC	DD	LC
		Ghost shark	<i>Apristurus manis</i>	LC	LC	LC
		Smalleye catshark	<i>Apristurus microps</i>	LC	LC	LC
		Black roughscale catshark	<i>Apristurus melanoasper</i>	DD	DD	LC
		Lesser-spotted dogfish	<i>Scyliorhinus canicula</i>	LC	LC	LC
		Bull huss	<i>Scyliorhinus stellaris</i>	NT	NT	NT
False cat sharks	Pseudotriakidae	Blackmouth dogfish	<i>Galeus melastomus</i>	LC	LC	LC
		Mouse catshark	<i>Galeus murinus</i>	LC	LC	LC
Requiem sharks	Carcharhinidae	False catshark	<i>Pseudotriakis microdon</i>	DD	DD	DD
Hound sharks	Triakidae	Blue shark	<i>Prionace glauca</i>	NT	NT	NT
		Tope	<i>Galeorhinus galeus</i>	DD	VU	VU
Rough sharks	Oxynotidae	Starry smooth hound	<i>Mustelus asterias</i>	LC	LC	NT
Gulper sharks	Centrophoridae	Leafscale gulper shark	<i>Centrophorus squamosus</i>	EN	VU	EN
		Birdbeak dogfish	<i>Deania calcea</i>	VU	LC	EN
Kitefin sharks	Dalatias	Kitefin shark	<i>Dalatias licha</i>	VU	DD	EN
Bramble sharks	Echinorhinidae	Bramble shark	<i>Echinorhinus brucus</i>	DD	DD	EN
Lantern sharks	Etmopteridae	Greater lantern shark	<i>Etmopterus princeps</i>	LC	DD	LC
		Velvet belly lantern shark	<i>Etmopterus spinax</i>	NT	LC	NT

Sleeper sharks	Centroscymnidae	Black dogfish	<i>Centroscyllium fabricii</i>	LC	LC	LC
		Portuguese dogfish	<i>Centroscymnus coelolepis</i>	EN	NT	EN
		Longnose velvet dogfish	<i>Centroselachus crepidater</i>	LC	LC	LC
		Knifetooth dogfish	<i>Scymnodon ringens</i>	LC	DD	LC
		Little sleeper shark	<i>Somniosus rostratus</i>	DD	DD	DD
Rough sharks	Oxynotidae	Sharp-back shark	<i>Oxynotus paradoxus</i>	DD	DD	DD
Dogfish sharks	Squalidae	Spurdog	<i>Squalus acanthias</i>	CR	VU	EN
		Little gulper shark	<i>Squalus uyato</i>	DD	DD	VU
		Angel shark	<i>Squatina squatina</i>	CR	CR	CR
Angel sharks	Squatinidae	Electric ray	<i>Tetronarce nobiliana</i>	LC	DD	LC
Electric rays	Torpedinidae	Arctic skate	<i>Amblyraja hyperborea</i>	LC	LC	LC
Skates	Rajidae	Shorttail skate	<i>Amblyraja jenseni</i>	LC	LC	LC
		Starry skate	<i>Amblyraja radiata</i>	LC	VU	LC
		Pale skate	<i>Bathyraja pallida</i>	LC	LC	LC
		Richardson's skate	<i>Bathyraja richardsoni</i>	LC	LC	LC
		Blue skate	<i>Dipturus flossada (= batis)</i>	CR	CR	CR
		Flapper skate	<i>Dipturus intermedia (= batis)</i>	CR	CR	CR
		Norwegian skate	<i>Dipturus nidarosiensis</i>	NT	NT	NT
		Longnosed skate	<i>Dipturus oxyrinchus</i>	NT	NT	NT
		Sandy skate	<i>Leucoraja circularis</i>	VU	VU	EN
		Shagreen skate	<i>Leucoraja fullonica</i>	NT	NT	VU
		Cuckoo skate	<i>Leucoraja naevus</i>	LC	LC	LC
		Kreffft's skate	<i>Malacoraja krefftii</i>	LC	LC	LC
		Blue skate	<i>Neoraja caerulea</i>	DD	DD	LC
		Blonde skate	<i>Raja brachyura</i>	NT	NT	NT
		Thornback skate	<i>Raja clavata</i>	NT	NT	NT
		Small-eyed skate	<i>Raja microocellata</i>	NT	NT	NT
		Spotted skate	<i>Raja montagui</i>	LC	LC	LC
		Undulate skate	<i>Raja undulata</i>	EN	EN	NT

		Deep-water skate	<i>Rajella bathyphila</i>	LC	LC	LC
		Bigelow's skate	<i>Rajella bigelowi</i>	LC	LC	LC
		Round skate	<i>Rajella fyllae</i>	LC	LC	LC
		Mid-Atlantic skate	<i>Rajella kukujevi</i>	DD	DD	LC
		White skate	<i>Rostroraja alba</i>	CR	EN	CR
		Common stingray	<i>Dasyatis pastinaca</i>	NT	DD	VU
Stingrays	Dasyatidae	Pelagic stingray	<i>Pteroplatytrygon violacea</i>	LC	LC	LC
Eagle rays	Myliobatidae	Eagle ray	<i>Myliobatis aquila</i>	DD	DD	VU
		Devil ray	<i>Mobula mobular</i>	EN	EN	EN
Devil rays	Mobulidae	Rabbitfish	<i>Chimaera monstrosa</i>	NT	NT	NT
Rabbitfish	Chimaeridae	Opal chimaera	<i>Chimaera opalescens</i>	LC	NE	LC
		Small-eyed rabbitfish	<i>Hydrolagus affinis</i>	LC	LC	LC
		Large-eyed rabbitfish	<i>Hydrolagus mirabilis</i>	LC	LC	LC
		Pale ghost shark	<i>Hydrolagus pallidus</i>	LC	LC	LC
Longnose rabbitfish	Rhinochimaeridae	Straightnose rabbitfish	<i>Rhinochimaera atlantica</i>	LC	LC	LC
		Bentnose rabbitfish	<i>Harriotta raleighana</i>	LC	LC	LC

Workshops and data collation

Assessments for the species were all carried out as part of a workshop with experts on the 23rd September 2014, with additional analyses of the data carried out in October 2014 – December 2015. Workshop participants who completed the assessments were Maurice Clarke (Marine Institute), Edward Farrell (Irish Elasmobranch Group), Stephen Foster (Marine Division, DAERA Northern Ireland), Ferdia Marnell (National Parks & Wildlife Service; NPWS), Tomás Murray (National Biodiversity Data Centre) and William Roche (Inland Fisheries Ireland; IFI).

This Red List assessment was supported by the compilation of data for the Exclusive Economic Zone of the Republic of Ireland and Northern Ireland Adjacent Waters Limit from national and international sources of marine biodiversity data. In total, the dataset compiled by the National Biodiversity Data Centre represents >57,000 records of 525,000 cartilaginous fish across 71 species from 1800-2014 (Fig. 3). Primary sources of data included: the International Council for the Exploration of the Sea Database of Trawl Surveys and associated Irish surveys conducted by the Marine Institute and the Department of Agriculture, Environment and Rural Affairs N.I.; Inland Fisheries Ireland extensive tagging data and transitional water surveys; data holdings within the National Biodiversity Data Centre and the Centre for Environmental Data and Recording N.I.; the Irish Specimen Fish Committee; the Irish Basking Shark Study Group; the Irish Whale and Dolphin Group and the Dublin Natural History Museum. Given the temporal distribution of the data supporting the Red List (see Fig. 3) and the large proportion of quantitative data available in the last 10 years, data are presented across two time periods, <2005 and 2005-2014. This approach facilitates the presentation of species' distributions as well as future iterations of this Red List where change in status will be assessed at decadal levels.

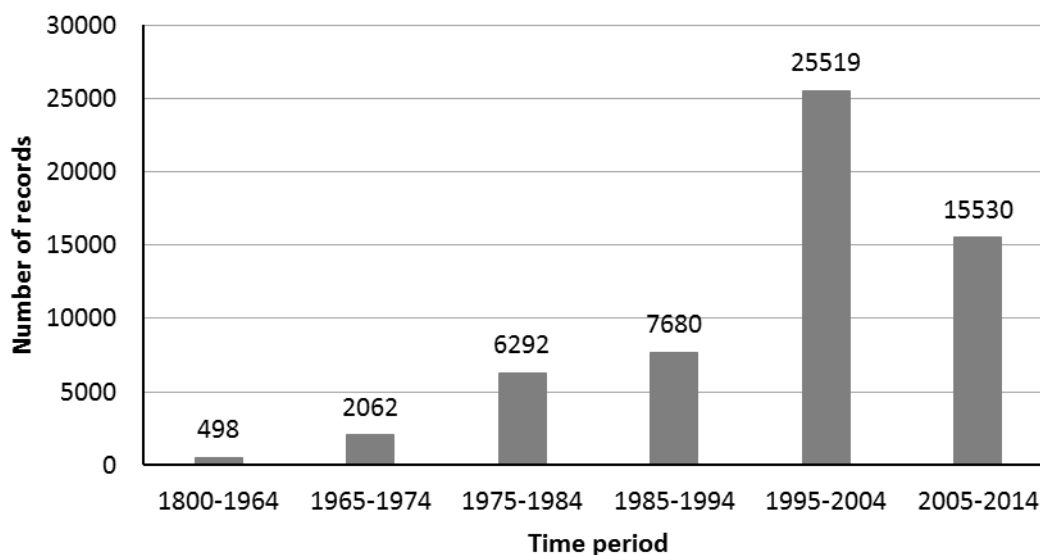


Figure 3. Number of records in the all-island database from 1800 to 1964, and for each decade thereafter to 2014.

Aims

The Ireland Red List of cartilaginous fish aims to:

- provide a full and objective assessment of extinction risk of sharks, rays, skates and chimeras from Irish waters, using the IUCN categories and criteria (IUCN, 2001) and guidance on regional assessments (IUCN, 2003)
- allow for direct comparisons with the European and Global assessments
- identify those species most in need of conservation interventions, with particular emphasis on issues where Ireland can make an important contribution
- identify the major threats to Ireland's cartilaginous fish so that appropriate mitigating measures can be identified and implemented.

Complete reassessment of this Red List is recommended in 2024

Table 2: Cartilaginous fish species excluded from the assessment and the rationale for exclusion.

Common name	Scientific name	Rationale for exclusion
Sharpnose sevengill shark	<i>Heptranchias perlo</i>	Few records, probably vagrant
Frilled shark	<i>Chlamydoselachus anguineus</i>	Few records, probably vagrant
Shortfin mako shark	<i>Isurus oxyrinchus</i>	Vagrant rarely recorded
Common thresher shark	<i>Alopias vulpinus</i>	Few records and at edge of distribution
False catshark	<i>Pseudotriakis microdon</i>	Few records and at edge of distribution
Bramble shark	<i>Echinorhinus brucus</i>	Few records, probably vagrant
Little sleeper shark	<i>Somniosus rostratus</i>	Few records, probably vagrant
Little gulper shark	<i>Squalus uyato</i>	One record and at edge of distribution
Arctic skate	<i>Amblyraja hyperborea</i>	Vagrant
Starry skate	<i>Amblyraja radiata</i>	Few records, probably vagrant
Pelagic stingray	<i>Pteroplatytrygon violacea</i>	Vagrant
Eagle ray	<i>Myliobatis aquila</i>	Few records and at edge of distribution
Devil ray	<i>Mobula mobular</i>	Few records and at edge of distribution

SUMMARY OF FINDINGS

The Red List assessment found that of the 58 species evaluated, 6 were Critically Endangered: Portuguese dogfish (*Centroscymnus coelolepis*); common (blue) skate (*Dipturus batis* (= *flossada*)); flapper skate (*Dipturus intermedia*); porbeagle shark (*Lamna nasus*); white skate (*Rostroraja alba*) and angel shark (*Squatina squatina*).

A further 5 species were assessed as Endangered: leafscale gulper shark (*Centrophorus squamosus*); basking shark (*Cetorhinus maximus*); common stingray (*Dasyatis pastinaca*); undulate skate (*Raja undulata*) and spurdog (*Squalus acanthias*).

An additional 6 species were assessed to be Vulnerable: longnose velvet dogfish (*Centroselachus crepidater*); kitefin shark (*Dalatias licha*); tope (*Galeorhinus galeus*); shagreen ray (*Leucoraja fullonica*); longnose skate (*Dipturus oxyrinchus*) and cuckoo ray (*Leucoraja naevus*).

Of the remaining species, 19 were assessed as Near Threatened and 22 species as Least Concern. No species were considered to be data deficient (Appendix 2; Figure 3).

During the data compilation process, more than 520,000 records of cartilagenous fish across 71 species were collated spanning the period from 1800-2014.

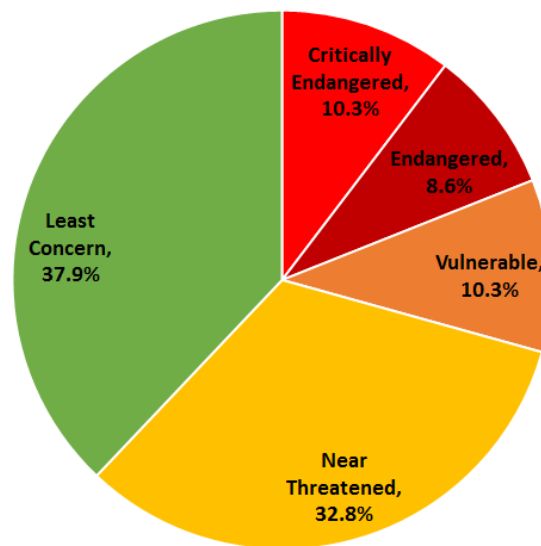


Figure 4: The number of species in each of the IUCN categories following the assessment.

The classification of the Portuguese dogfish, common (blue) skate, flapper skate, porbeagle shark, white skate and angel shark as Critically Endangered reflects the decline of these species throughout the north east Atlantic. The species in this category are mostly widely distributed or highly migratory. Their conservation must be on an international scale, however the particular importance of Irish waters be taken into account. These species currently receive a high level of protection under the EU Common Fisheries Policy, though this is not an effective measure in every case. For Portuguese dogfish, the main international threat (deep-sea fishing) occurs in Irish waters and their immediate vicinity. It is currently subject to a total allowable catch of zero, but this is ineffective because it is a discarded by-catch in international fisheries for deep water fish.

Porbeagle shark, though no longer targeted, is vulnerable as by-catch in some commercial fisheries across the eastern north Atlantic, but Irish waters are an important hotspot for the species. The three skate species and angel shark have known refuges in Irish waters, and Ireland is well placed to augment existing international conservation efforts. Indeed the Irish area is the last known refuge of the white skate in NW Europe, and one of the few known refuges for angel shark. These species, apart from Portuguese dogfish, are on the European Union's Common Fisheries Policy (CFP) Prohibited Species List, but as they are still taken as incidental by-catch, this measure is not very effective.

The Endangered classification was assigned to leafscale gulper shark, basking shark, common stingray, spurdog and undulate skate. The leafscale gulper shark, like Portuguese dogfish, is mainly threatened in and around Irish waters. Unlike that species, however, only a part of its life history is vulnerable in Irish waters. Undulate skate and common stingray are widely distributed, and endemic in the NE Atlantic, but have discrete and localised populations off southwest Ireland, both centered on Tralee Bay. Conservation/management actions for these two species will necessarily have a spatial dimension, with Ireland being well placed to make a significant contribution. Spurdog is a widely distributed species, but is vulnerable as by-catch in mixed bottom fisheries in Irish waters. However, all target fisheries have ceased. All target fisheries for basking shark are now banned, and the main threat is incidental by-catch or collisions with ships or fishing gear. Basking shark is on the CFP Prohibited Species List. The spurdog, undulate skate and leafscale gulper shark total allowable catch quotas (TAC) are currently set at zero. This measure is most effective for spurdog, though some unavoidable by-catch occurs in demersal fisheries. For leafscale gulper shark, the 0 tonnes TAC is not effective, due to continued by-catch. There is no management or conservation measure in place for common stingray.

Of the species in the Vulnerable category, two (longnose velvet dogfish and kitefin shark) are deep-sea species, one (tope) is a widely distributed migratory shark, shagreen and cuckoo ray are offshore shelf species, whilst longnose skate inhabits both shelf and deepsea habitats. The longnose velvet dogfish shares the vulnerability and susceptibility of Portuguese dogfish. The kitefin shark is equally vulnerable but less susceptible, as its main distribution is around the Azores. The two rays in this category are taken in international mixed demersal fisheries on the mid and outer shelf. Both are managed by the CFP as commercial species, though the mixed-species total allowable catch (TAC) is not a very efficient means to achieve sustainable harvesting. The longnose skate may be mis-classified in this category, and might be up-listed in the future, if better information becomes available. Currently it is rarely encountered, is vulnerable on account of its biology, and is susceptible to many fisheries but is not covered by any management or conservation legislation. Kitefin shark is on the CFP Prohibited Species List in its core distribution area, the Azores.

Comparison with other Red Lists

For the species evaluated in the Irish Red List, a comparison with the Global and Northeast Atlantic and European lists is provided in Table 3. Overall the numbers of species in each category were broadly comparable, though the Irish list process avoided using the Data Deficient category. The number of species in the three threatened categories was progressively higher moving from the global to the national level.

Table 3: Comparison of Irish, Northeast Atlantic and Global Red List designations for cartilaginous fish on the Irish species list. (Due to rounding not all columns may add to 100).

Category	Irish (%)	Europe (%)	Northeast Atlantic (%)	Global (%)
Critically Endangered	10	8	8	3
Endangered	9	14	10	6
Vulnerable	10	7	5	11
Near Threatened	32	15	23	18
Least Concern	38	49	50	47
Data Deficient	0	7	5	15

Threats to cartilaginous fish in Irish waters

The foremost risk in Irish waters is over-exploitation in commercial fisheries. This may be targeted fishing in the past as was the case for spurdog and porbeagle sharks, or as unintended by-catch in fisheries for other species, as is the case for the large bodied skates. At present there is no target fishery for any threatened species. However several of these continue to be taken as by-catch in other fisheries.

Fisheries in Irish waters can be divided into three main categories; pelagic (or mid water), demersal (or benthic) and deep-water (below 400-600 m depth). A large proportion of European fishing effort focuses on Irish waters, and on fish stocks in, or straddling, Irish waters.

Pelagic fisheries mainly target mackerel, herring, horse mackerel, blue whiting, sprat, tunas and boarfish. Fisheries for small pelagic species are almost exclusively by mid-water trawl. The main species which are vulnerable to such fishing are pelagic sharks and dogfishes, though by-catch is infrequent. Fisheries for large pelagic species (e.g. tunas) are either by mid-water trawl or by hook and line. Pelagic longline fishing results in a considerable by-catch of pelagic sharks. The countries involved in pelagic fishing are Ireland, UK, Norway, the Netherlands, France, Germany and Denmark. The Faroe Islands and Russia are also active, adjacent to but not in Irish waters. Albacore tuna fishing is conducted in Irish waters by Irish, UK, French and Spanish boats. Japan and other Pacific nations' vessels were previously active in targeting bluefin tunas beyond Irish territorial limits.

Demersal fishing mainly uses trawled gears in Irish waters, targeting a variety of species, such as gadoids, plaice/sole, hake, monkfish and/or megrims, separately but usually in a mix. The countries involved are France, UK, Ireland, Spain and Belgium. Demersal and shelf dwelling sharks, rays and dogfishes are all taken in these fisheries. There are also a few target fisheries for rays using trawl (Irish Sea, Donegal Bay), and using gillnets or other artisanal methods in coastal areas. Discarding is a feature of demersal fisheries in general. Discard survival would only be high if trawl towing time is short, and compression in the trawl cod end, due to weight of bulk catch, is limited. Gill net and longline fisheries, usually targeting hake, ling, pollack or monkfish are operated by vessels from Spain, France, UK and Ireland and elasmobranch by-catch is a feature of these fisheries also.

Deep-sea fishing takes place on the continental slopes, mainly off Donegal and northwards into the Scottish sector, and also around Rockall. The main fleet involved is French bottom trawlers, which target mixed teleosts with an unavoidable by-catch of deepwater sharks and rays.

Recreational angling is a potential threat to cartilaginous fish. However, in Irish waters, angling for these species is almost exclusively on a catch-and-release basis. This lessens the risk considerably, but it would be desirable to develop a national catch and release code of practice to ensure that threatened species are handled correctly by anglers before being returned alive to the water. Over the past decade anglers have become more cognisant of conservation requirements and the benefits of good handling. Many of the threatened species are tagged by charter boat angling skippers as part of a long-running Inland Fisheries Ireland tagging programme. In Northern Ireland tags issued under licence by the Department of Agriculture, Environment and Rural Affairs for tagging and releasing Common Skate (Flapper and Blue Skates) are also being applied to Porbeagle Shark.

Ship strikes and collisions with recreational craft are potential risks, though perhaps only of relevance to basking shark. Mitigation measures should include a code of conduct and educational programmes targeted at areas of high risk. Other threats that may become relevant in the future include habitat loss and pollution, but to date these are not considered to be of any significance in Ireland.

Management and conservation actions

The main body of measures for the management and conservation of cartilaginous fish in Irish waters is the European Union (EU) Common Fisheries Policy (CFP) framework. There are two main elements to this, the prohibited species list, and the catch quota system.

Species on the Prohibited Species List must not be fished, retained on board, transhipped or landed. The list appears in the annual EU Council Regulation covering fisheries management including quotas. Though the list is subject to annual review by the Council of the EU, it is essentially a long term strategy to prevent any fishing for species that are in need of conservation action.

The catch quota, or total allowable catch (TAC) system covers species that are managed to ensure maximum sustainable yield in commercial fisheries. Apart from several commercial ray species, no cartilaginous fish currently has an allowable catch level, because they cannot provide maximum sustainable yield (MSY). Managing stocks to MSY underpins the Common Fisheries Policy. Catch quotas are agreed by the EU Council annually for shelf species and biennially for deep-sea species.

There are several technical regulations in EU fisheries legislation. They are not designed to limit mortality, but to achieve other aims such as improved selectivity or elimination of undesired practices. Since 1997 it has been forbidden to target pelagic sharks, billfish or tunas with pelagic gillnets. This was in response to concerns of cetacean by-catch (EC Regulations 894/97 and 809/2007). There has been a general ban on removal of fins from sharks in European fisheries, since 2003 (EC 605/2013 and 1185/2003). This was in response to public concern about the practice of shark finning. There is a ban on gillnetting in depths deeper than 600 m in EU waters (EC Regulation 41/2007), and deeper than 200m in international waters (Northeast Atlantic Fisheries Commission). These measures were brought in to regulate ghost fishing (Hareide *et al.* 2005). The minimum trawl cod-end mesh size that can be used in demersal target fisheries for rays is 100mm, though meshes of 80mm are permitted if there is a by-catch of other species (EC Regulation 850/98). This measure is aimed at achieving improved selectivity of teleost species rather than for rays.

The Convention on Migratory Species (CMS or Bonn Convention) promotes international cooperation for migratory species. Species threatened with extinction are listed on CMS Appendix I. Parties that are range

states to Appendix I species are obliged to afford them strict protection through additional measures. Migratory species that need or would significantly benefit from international co-operation are listed in Appendix II of the Convention. CMS encourages, *inter alia*, the establishment of regional or global MoUs to promote cross-border conservation efforts. The Republic of Ireland, Northern Ireland (UK) and the European Union are all signatories to CMS.

CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is a multilateral treaty to regulate trade in plants and animals endangered with extinction. Appendix I covers species threatened with extinction that are affected by trade. Commercial trade in Appendix I species is illegal. Appendix II covers species that are not necessarily threatened with extinction, but may become so unless trade is regulated. International trade in specimens of Appendix II species may only take place by the granting of an export permit or re-export certificate, and requires proof that this would not be detrimental to the species. The Republic of Ireland, Northern Ireland (UK) and the European Union are signatories.

The Wildlife (Northern Ireland) Order 1985 (as amended in 2011) offers protection for common skate, angel shark and basking shark out to 6 nautical miles from baseline. There is no other domestic legislation covering any cartilaginous fish in Irish waters, north or south. Table 4 shows the relevant legal instruments and other international agreements in place for all cartilaginous fish species in Irish waters.

The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) seeks to identify species in its area that are being threatened and/or declining and are in need of protection. OSPAR lists such species, upon recommendation by contracting parties or observers. This list is not binding, but is intended to be used as a basis for future management/conservation action. OSPAR shares many of the species with other lists, but also considers thornback and spotted rays which are not of high conservation concern.

The Marine Strategy Framework Directive (MSFD), of the EU, aims to achieve Good Environmental Status (GES) of the EU's marine waters by 2020. It is the first EU legislative instrument related to the protection of marine biodiversity, as it contains the explicit regulatory objective that "biodiversity is maintained by 2020", as the cornerstone for achieving GES. The Directive enshrines in a legislative framework the ecosystem approach to the management of human activities having an impact on the marine environment, integrating the concepts of environmental protection and sustainable use. In order to achieve GES by 2020, each Member State is required to develop a strategy for its marine waters (or Marine Strategy). In addition, because the Directive follows an adaptive management approach, the Marine Strategies must be kept up-to-date and reviewed every 6 years. Though in its initial stages, the MSFD will provide a legal framework by which commercially exploited chondrichthyan fish must be maintained "within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock". The MSFD also has a biodiversity requirement that "the distribution and abundance of species are in line with prevailing physiographic, geographic and climate conditions".

Under the EU Water Framework Directive (WFD), River Basin Management Plans (RBMP) address the ecological and chemical status objectives of coastal water bodies (defined as marine waters extending to \leq 1km from baseline). Where required, programmes of measures will be implemented to ensure the water body meets WFD targets of Good Ecological Status (GES) by 2027. In coastal water bodies, under the WFD, GES refers to a defined biological objective based on physico-chemical and hydromorphological parameters. Fish community monitoring is required only for transitional waters, potentially valuable breeding and

nursery areas for some species, and includes assessments of species composition and abundance in addition to providing data on the presence of sensitive species.

The International Plan of Action for Conservation and Management of Sharks (IPOA-SHARKS) was developed through the United Nations Food and Agricultural Organisation (UN FAO) in 1998. It is a voluntary framework to achieve the conservation and management of cartilaginous fishes and their long-term sustainable use. The EU, through the European Commission, produced a framework IPOA in 2009. This encompasses existing EU fisheries legislation and envisages further measures in the future. EU Member States may also develop national IPOAs. These can include stronger measures than the EU framework.

There are no measures in Ireland to regulate ship strikes or harm by recreational vessels to surface swimming sharks. However the legal mechanism exists for countries to develop such measures, under the UN International Maritime Organisation (IMO), and examples exist elsewhere in the world for the protection of whales.

In Northern Ireland it is illegal to deliberately fish for common skate (flapper skate and blue skate) within 6 nautical miles of baseline. A small number of anglers have been issued with licences to tag and release skate for scientific purposes. Otherwise there is no domestic or EU legislation covering recreational angling for any cartilaginous species. However voluntary catch and release or tag and release codes of practice usually apply.

Table 4. Management and conservation measures in place for cartilaginous species in Irish waters, showing also the Red List designations.

Common name	Scientific name	Irish 2016	Europe 2015	NEA 2008	Global 2009	CFP Prohibited Species 2015	CFP allowable catch	OSPAR List	NI Wildlife Order	CITES	CMS
Angel shark	<i>Squatina squatina</i>	CR	CR	CR	CR	Yes		Yes	Yes		
Common (blue) skate	<i>Dipturus batis (= flossada)</i>	CR	CR	CR	EN	Yes		Yes			
Flapper skate	<i>Dipturus intermedia</i>	CR	CR	CR	CR	Yes		Yes			
Porbeagle	<i>Lamna nasus</i>	CR	CR	CR	VU	Yes		Yes		II	II
Portuguese Dogfish	<i>Centroscymnus coelolepis</i>	CR	EN	EN	NT		No	Yes			
White Skate	<i>Rostroraja alba</i>	CR	CR	CR	EN	Yes		Yes			
Basking shark	<i>Cetorhinus maximus</i>	EN	EN	EN	VU	Yes		Yes	Yes	II	I, II
Leafscale gulper shark	<i>Centrophorus squamosus</i>	EN	EN	EN	VU		No	Yes			
Spurdog	<i>Squalus acanthias</i>	EN	EN	EN	VU		No	Yes			II
Undulate Skate	<i>Raja undulata</i>	EN	NT	NT	EN		No				
Cuckoo ray	<i>Leucoraja naevus</i>	VU	LC	LC	LC		Yes				
Kitefin shark	<i>Dalatias licha</i>	VU	EN	EN	NT		No				
Shagreen Ray	<i>Leucoraja fullonica</i>	VU	VU	VU	VU		Yes				
Tope	<i>Galeorhinus galeus</i>	VU	VU	VU	VU	longline only					
Birdbeak dogfish	<i>Deania calcea</i>	NT	EN	NT	LC		No				
Blonde ray	<i>Raja brachyura</i>	NT	NT	NT	NT		Yes				
Bluntnose sixgill shark	<i>Hexanchus griseus</i>	NT	LC	NT	NT		No				
Greater lantern shark	<i>Etmopterus princeps</i>	NT	LC	LC	DD		No				
Knifetooth dogfish	<i>Scymnodon ringens</i>	NT	LC	LC	DD		No				
Norwegian skate	<i>Dipturus nidarosiensis</i>	NT	NT	NT	NT	Yes					
Sandy Ray	<i>Leucoraja circularis</i>	NT	EN	EN	EN		Yes				

Sharp-back Shark	<i>Oxynotus paradoxus</i>	NT	DD	DD	DD	No	
Black dogfish	<i>Centroscyllium fabricii</i>	LC	LC	LC	LC	No	
Mouse catshark	<i>Galeus murinus</i>	LC	LC	LC	LC	No	
Small-eyed ray	<i>Raja microocellata</i>	LC	NT	NT	LC	No	
Spotted Ray	<i>Raja montagui</i>	LC	LC	LC	LC		Yes
Thornback ray	<i>Raja clavata</i>	LC	NT	NT	NT	Yes	Yes
Velvet Belly Lantern Shark	<i>Etmopterus spinax</i>	LC	NT	NT	LC	No	
Bigeye thresher shark	<i>Alopias superciliosus</i>	NE	EN	NT	VU		II
Common thresher shark	<i>Alopias vulpinus</i>	NE	EN	NT	VU		II
Friiled shark	<i>Chlamydoselachus anguineus</i>	NE	LC		NT	No	
Gulper shark	<i>Centrophorus granulosus</i>	NE	CR	CR	VU	No	Yes
Shortfin Mako	<i>Isurus oxyrinchus</i>	NE	DD		VU		II

Current and future research priorities

While a Red List will identify the species most at risk of extinction within a geographical area, taking that further to categorize national conservation priorities will require further steps i.e. building upon the Red List but including other biological, financial, political and cultural factors to prioritise effort across species (Fitzpatrick *et al.*, 2007).

Research should ideally focus on the threatened, and the “Near Threatened” species, which can be separated into three groups:

The group of highest research priority consists of those species forming endemic or apparently endemic populations in Irish waters, namely: the angel shark, undulate skate, common stingray, white, blue, flapper and longnose skates and the sandy ray. Future work should focus on establishing population size, trends over time, connectivity with other populations and identification of critical habitats and locations for important life history stages, such as spawning and nursery areas. Population size estimates could variously be based on mark and recapture studies (e.g. Inland Fisheries Ireland tagging data), molecular genetics approaches (effective population size estimators) or a combination of both. The management of certain areas should be supported by a specific research and monitoring programme which would be linked to clear conservation and biodiversity objectives with appropriate performance indicators. Tralee Bay, where several of the threatened and near threatened species (e.g. angel shark, undulate skate, stingray and larger skates) occur, is an ideal candidate. Findings and outputs from a time-bound research programme there would also serve to inform future conservation management policy for Irish waters more generally.

An extension of citizen science programmes such as the Purse Search initiative would be a cost effective means to identify spawning and nursery areas for the skates and rays. Enhancing engagement with the recreational angling sector to facilitate improved reporting of ‘rare’ or threatened elasmobranch species is another example of a low cost citizen science programme. For both, the development and use of specific mobile phone apps would provide an informal but valuable reporting mechanism and increased public awareness of the issue of species conservation. The focus of the suite of activities above should be within Ireland, however, wider collaboration should take place to evaluate the importance of Irish refuges in the international context.

The second highest research priority belongs to species currently taken in commercial fisheries, where allowable catch is permitted, but which are in decline or over-fished; the cuckoo, shagreen and blonde rays and tope. Current scientific data are patchy for these species. Further work is required to identify the population size, trends over time, movements, migrations, critical habitats, spawning and nursery areas. The level of by-catch and discarding from commercial fisheries needs to be quantified, as does the rate of discard survival under normal fishing conditions. New demographic studies and stock assessments are required and should be used to identify sustainable fishing levels, and, where relevant suitable management measures, including technical measures.

The third level of priority is assigned to widely distributed and/or highly migratory species for which Ireland is an important part of a wider distribution, but for which Ireland can only contribute to a wider international effort. To this category belong most of the deep-sea species, porbeagle, blue shark, basking shark and spurdog. Some of these species are already receiving attention from the international scientific community, but these efforts must be intensified. Spurdog has a well developed population assessment model in place, and future work should focus on using this model to develop a rebuilding plan, with stock size targets, timelines and actions to achieve them. The situation for the deep-sea sharks is similar and the

international focus should be on incorporating existing knowledge into a rebuilding plan for the species assemblage as a whole. For blue shark, international efforts to achieve a population assessment through the International Convention for the Conservation of Atlantic Tunas (ICCAT) should continue, particularly to quantify total catch in the main fisheries by Japan, Spain and the USA. Tagging and other work on porbeagle and basking shark should continue and focus on identification of spawning, nurseries and other important areas. The most poorly understood component of this group are the deep-sea rays. Some work has been done on mapping their distributions, but additional studies are required together with fundamental work on their life histories where information is totally lacking.

SPECIES ACCOUNTS

A brief explanation of the headings in the species accounts is provided below:

- **Species name** and taxonomic authority
- **Common name** - English language name
- **Irish name** - common name as Gaeilge
- **Status** – Red list status for Ireland (identified during this assessment and using the IUCN categories and criteria (IUCN, 2001; 2012a)); red list status for the **North-east Atlantic** if available, (see Nieto *et al.*, 2015) and **the Global** red list status –taken from IUCN Red List of Threatened Species (IUCN, 2010)
- **Rationale for assessment** – a description of how the IUCN category was determined for Ireland. This will include information on any available population trend data. This section should be read in conjunction with the IUCN guidance documents that were used for this assessment (IUCN, 2001; 2003; 2012b).
- **Range, Distribution and Habitat** – a general description of the NEA distribution of the species, followed by a more detailed description of its distribution and habitat usage in Irish waters.
- **Biology / Ecology** – a brief overview, where known, of the species reproductive biology, life history and feeding ecology.
- **Human Impacts** – a brief outline of any significant activities impacting on the species conservation status in Ireland.
- **Management/conservation** – Any legal or international protection, management or conservation measures afforded the species.

OCEANIC AND PELAGIC SPECIES

Lamna nasus (Bonneterre, 1788)

Porbeagle

Irish name: Craosaire

Status

Ireland: Critically Endangered A2 bd. NE Atlantic: Critically Endangered. Global: Vulnerable.

Justification

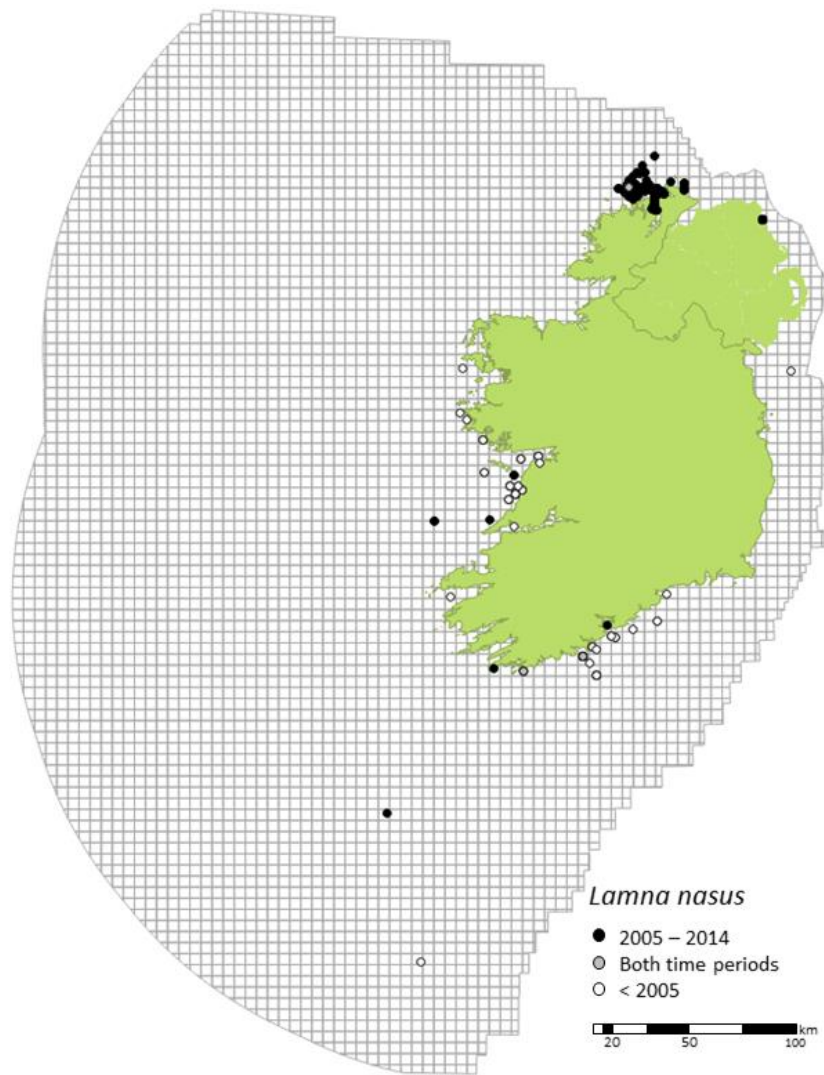
Porbeagles (*Lamna nasus*) are highly vulnerable to fishing mortality and very slow to recover from depletion due to their slow growth rate, low fecundity and late age at maturity. Northeast Atlantic porbeagles have been heavily exploited by commercial longline fisheries since the early 1900s for their high value meat. They have undergone significant declines in abundance due to this exploitation: over 90% decline from baseline in the northeast Atlantic and as such are listed as Critically Endangered.

Range, distribution and habitat

The porbeagle is a large pelagic, migratory, coastal and oceanic species found in temperate and cold-temperate waters worldwide. In the Northeast Atlantic porbeagles occupy a broad distributional range from the Barents Sea to northwest Africa. The Northeast Atlantic population is considered to be a single stock and is managed as such. There are also populations of porbeagles in the northwest Atlantic and in the south Atlantic.

It has long been considered that the north Atlantic populations comprised two distinct stocks of porbeagles: northeast and northwest (Campana *et al.*, 1999). This hypothesis is largely based on a relatively small number of conventional tag returns from Norwegian, US and Canadian tagging programmes. However a transatlantic migration has been reported (Green, 2007) and more recently a porbeagle tagged with a pop-up archival transmission tag off Ireland crossed over half of the North Atlantic before the tag was released (Bendall *et al.*, 2012). Furthermore, a recent study has confirmed that some gene flow occurs across the North Atlantic (Pade, 2009).

Porbeagles are found on all coasts of Ireland but are more common north of Lough Swilly in Donegal and also off the coasts of Galway, Clare and Cork. The Irish record rod caught porbeagle weighing 365lb was taken in 1932 in Keem Bay, Achill Island.



Biology and Ecology

The biology of porbeagles is well described for the Northwest Atlantic stock (Natanson *et al.*, 2002), where the age-at-maturity is estimated at 8 and 13 years for males and females, respectively. Less information is available for the Northeast Atlantic stock, though it is estimated that males and females do not mature until they are 1.7 and 2.0m fork length, respectively (Hennache & Jung, 2010). These lengths correspond to an estimated age-at-maturity of 7-8 years for males and approximately 20 years for females, showing them to be slow growing and late maturing. In Irish waters the majority of rod caught porbeagles are < 2.0m total length and the sex ratio is 1:1 (IFI, unpublished).

Porbeagles favour waters between 5-20°C and are among the small number of sharks that can actually maintain a higher body temperature than the water around them. They are recorded in Irish waters between June and October (angling data), where they feed mainly on boney fish such as pollock, whiting, blue whiting, mackerel and also herring.

Trend

Porbeagles have undergone significant declines in abundance due to commercial exploitation: over 90% decline from baseline in the Northeast Atlantic and over 80% decline from baseline in the northwest Atlantic

(ICCAT/ICES, 2009). This is confirmed by unpublished tagging data from Inland Fisheries Ireland which also imply a very modest increase in CPUE in recent years.

Human impacts

Porbeagles were common in the northeast Atlantic and because of this they were fished commercially for most of the 19th and 20th centuries. The main countries involved were Norway, Denmark, Spain and France. Landings of porbeagles peaked in the period of 1933-1939 when 2,000 to 4,000 tonnes were landed by Norway annually. The porbeagle fishery subsequently declined but continued in various countries until 2010 when targeted fishing for porbeagle in EU waters became illegal. The species continues to be a by-catch in some fisheries, including the international blue whiting trawl fishery, and some bottom trawl fisheries.

Management/Conservation

This species is on the EU CFP Prohibited Species List, and was previously regulated by a TAC, which since 2010 was set at zero TAC. It is subject to a management plan in Canadian waters where it is targeted commercially. In 2012 the North East Atlantic Fisheries Commission (NEAFC) prohibited all directed fishing in international waters. In March 2013 porbeagle was listed on Appendix II of CITES. It is also listed on Appendix II of the Convention on Migratory Species from 2008.

Cetorhinus maximus (Gunnerus, 1765)

Basking Shark

Irish name: Liamhán gréine

Status

Ireland: Endangered A1abd. NE Atlantic: Endangered A2abd. Global: Vulnerable A2ad+3d.

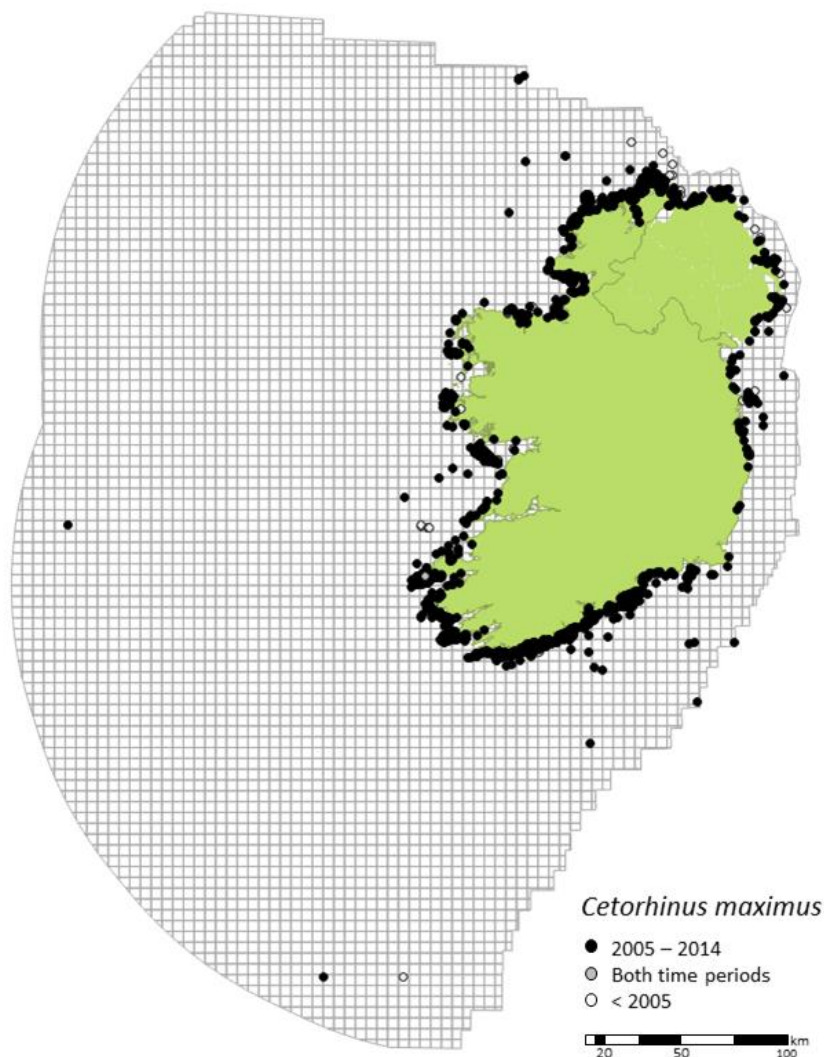
Justification

Basking sharks (*Cetorhinus maximus*) have a long history of exploitation, particularly in the Northeast Atlantic. Annual catches by former directed fisheries in Norway, Ireland and Scotland fell by approximately 90% during a period approximating half a generation. The species is susceptible to exploitation due to its large size and aggregating behaviour. Although the fishery has ceased, population recovery in basking sharks can be very slow due to low productivity and late age at maturity. For these reasons basking shark is assessed as “Endangered”.

Range, distribution and habitat

The basking shark is a very large, filter-feeding species that is migratory and widely distributed, but only regularly seen in a few coastal locations and probably never abundant. In the eastern Atlantic, basking sharks are distributed from Iceland, Norway and as far north as the Russian White Sea (southern Barents Sea), south to the Mediterranean and occasionally as far south as Senegal (Compagno, 1984; Konstantinov and Nizovtsev, 1980). A single population is believed to exist in the Northeast Atlantic although there is one report of an east-west trans-Atlantic migration (Gore *et al.*, 2008). Trans-equatorial migrations and migrations into tropical areas and mesopelagic depths are also reported in the North Atlantic, including autumn southward movements to areas off North Africa (Madeira) for overwintering (Witt *et al.*, 2013). Migration and levels of mixing between populations have yet to be fully determined. An active research and conservation interest in this species in recent years has led to an increase in the number of sightings reported

around Ireland. In Irish waters basking sharks are most commonly observed off the coasts of Donegal, Mayo, Cork and Kerry.



Biology and Ecology

Little is known about the biology of this species. The reproductive biology is considered to be similar to that of other lamnoid sharks (Kunzlik 1988). Pairing takes place in early summer following courtship behaviour (Sims *et al.*, 2000b), with wounds caused by copulation having been recorded in British waters in May by Matthews (1950). A single functional ovary contains a very large number of small eggs. Estimates for gestation period range from 12-36 months (Parker and Stott 1965, Pauly 1978, 2002, Compagno 1984a). The smallest free-swimming individuals recorded are about 1.7-1.8m (Parker and Stott 1965; Sims *et al.* 1997). However, the young are very rarely encountered until they reach more than 3 m in length. Males become sexually mature at a length of 5-7m and females at 8.1-9.8m (Compagno 1984a).

Basking sharks are plankton feeders and are often associated with high levels of chlorophyll and surface aggregations of zooplankton, particularly along tidal and shelf-break fronts. They are most often observed when feeding in surface waters by swimming open-mouthed and continuously filtering the water.

Trend

A decline is inferred from landing records over time. The target fishery ceased even though markets still existed for the species. This implies that the population did not recover, and is assumed to have stabilised at a low level (ICES, 2005).

Human impacts

In Irish waters there were three main fisheries for basking waters; the 18th to 19th Century Sunfish Bank fishery, the mid-20th Century Achill Island fishery, and the modern Norwegian fishery (ICES, 2006; McNally, 1976; Parker and Stott, 1965). Records suggest that the initial fishery was active for several decades between 1770 and 1830, with at least 1,000 sharks caught per year. In the early 1830s, sharks became very scarce and the fishery collapsed in the second half of the 19th Century. This scarcity of sharks lasted for several decades. In the middle of the 20th Century a new fishery began at Achill Island, where between 1,000 and 1,800 sharks were taken each year from 1951 to 1955. Thereafter annual catches dropped to around 480 in 1956 -1960, around 100 in 1961-65, and then about 50-60 for the remaining years of the fishery. Basking shark was also targeted by Norwegian harpoon vessels in the Celtic Seas until comparatively recently. Today the species is an occasional by-catch in demersal trawl fisheries and entanglement in static fishing gear. They are also susceptible to collisions with vessels.

Management/Conservation

This species is on the EU CFP Prohibited Species List. It is also protected in Northern Ireland, (since 2011) and on the high seas of the Northeast Atlantic and the Mediterranean (2012, through NEAFC). It is listed on Appendices I and II of the Convention on Migratory Species, and on Appendix II of CITES.

Galeorhinus galeus (Linnaeus, 1758)

Tope

Irish name: Gearrthóir

Status

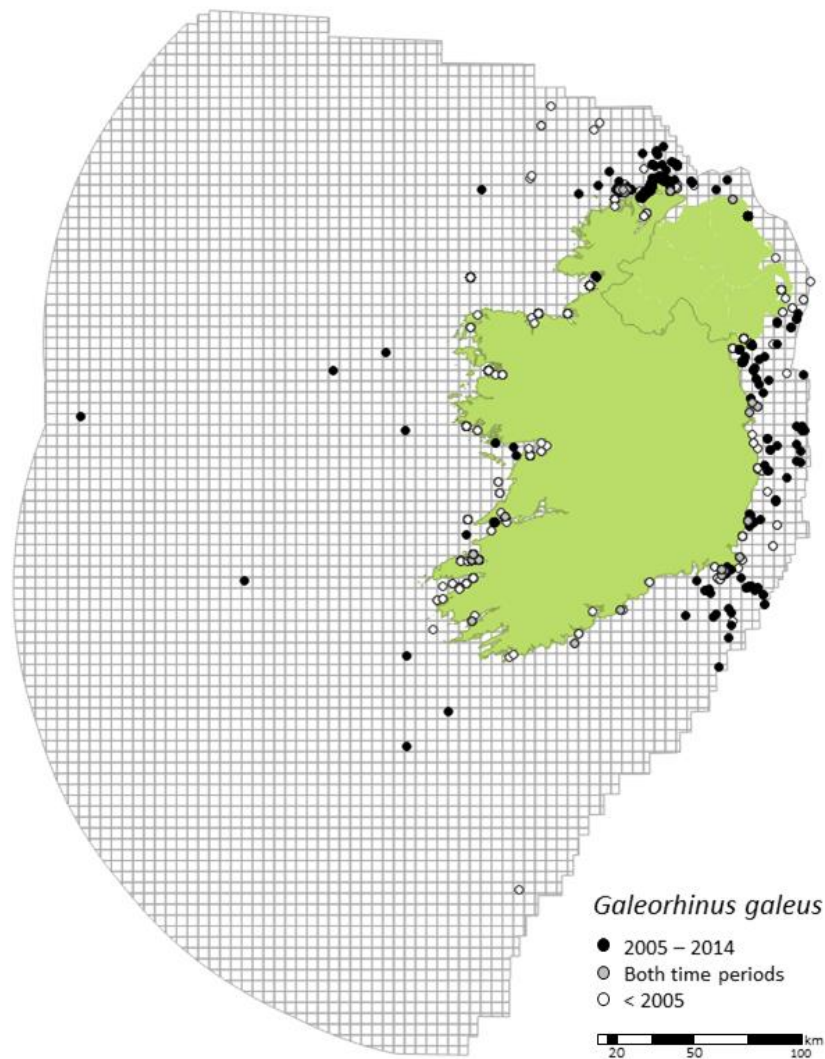
Ireland: Vulnerable A2 bd. NE Atlantic: Vulnerable A2bd. Global: Vulnerable A2bd+3d+4bd

Justification

Data on tope (*Galeorhinus galeus*) are limited, as landings are often included as "dogfishes and hounds". An exploratory assessment of CPUE trends from over 20 years of trawl survey data from the Northeast Atlantic suggests a decline in abundance (Dureuil 2013). Given the low productivity and recovery rate of this species, it is classified as "Vulnerable" and should be monitored closely.

Range, distribution and habitat

Tope is widespread in the eastern Atlantic, ranging from Iceland and Norway to South Africa, including the Mediterranean Sea. It also occurs off Australia and New Zealand, the southwest Atlantic (Brazil to Argentina) and the eastern Pacific (Compagno, 1984). There is believed to be a single stock of Tope in the northeast Atlantic region (ICES 2012). This is supported by tagging work conducted by Inland Fisheries Ireland showing wide migrations between the North Sea, west of Scotland and Ireland as far south as the Canary Islands, the Azores, northwest Africa and the western Mediterranean (Fitzmaurice et al. 2003e). It is suggested that the northeast Atlantic and Mediterranean stock of tope is isolated from other stocks around the world, with little to no gene flow between them (Chabot and Allen 2009).



Biology and Ecology

Life-history data for tope in the Northeast Atlantic are limited. The maximum reported length in the northeast Atlantic area was 169cm TL for a female in the North Sea (McCully *et al.*, 2013). The length at maturity of this species in the Northeast Atlantic was suggested, based on modelled data, to be 155 cm for females and 121cm for males (Dureuil 2013), based on data from the Azores, Madeira (Couto 2013) and the Mediterranean Sea (Capape and Mellinger 1988, Capape *et al.* 2005). On this basis the age at 50% maturity was estimated as 21 years for females and 12 years for males. Longevity of tope in the Northeast Atlantic was estimated to be 55 years (Dureuil 2013). In Ireland tags have been returned from tope at liberty for almost 20 years (IFI, unpublished), while this has extended to 35 years in Australia (Moulton *et al.*, 1989).

Trend

An exploratory assessment of CPUE trends from over 20 years of trawl survey data from the Northeast Atlantic suggests a decline in abundance (Dureuil 2013).

Human impacts

There are no targeted commercial fisheries, but it is taken as by-catch in trawl, gillnet and longline fisheries, including demersal and pelagic set gears, though it is sometimes discarded. It was a by-catch in the now defunct drift net fisheries for salmon around the Irish coast. Tope is also an important target species in

recreational sea angling in several areas, with anglers and angling clubs following catch and release protocols and many of these fish are subsequently tagged.

Management/Conservation

In the UK fishing for tope other than by rod and line (with anglers fishing using rod and line from boats not allowed to land their catch) is prohibited and there is a bycatch limit of 45 kilograms per day for commercial fisheries targeting other species (ICES 2012). Tope is on the CFP Prohibited Species List, but for longline fishing only.

Prionace glauca (Linnaeus, 1758)

Blue Shark

Irish name: Siorc gorm

Status

Ireland: Near Threatened. NE Atlantic: Near Threatened. Global: Near Threatened.

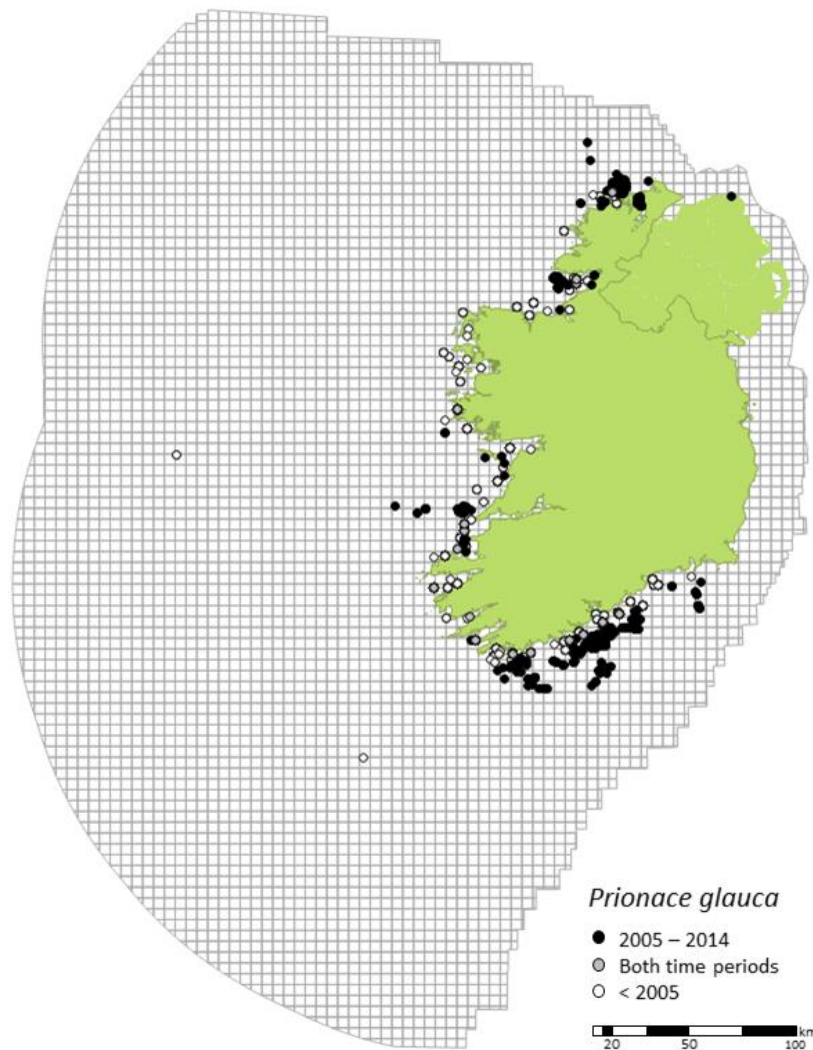
Justification

Given the current state of knowledge it is difficult to determine the status of blue shark (*Prionace glauca*) stocks with a high degree of confidence, but on the basis of high catch rates, high consumer demand and at present a conflicting picture of population trends, it is evaluated as Near Threatened.

Range, distribution and habitat

The blue shark has a circumglobal distribution and is common in pelagic oceanic waters throughout the tropical and temperate oceans worldwide. It has one of the widest ranges of all the shark species. It is oceanic and pelagic, found from the surface to about 350m depth. There is considered to be one stock of blue shark in the North Atlantic (ICES, 2013) and this is supported by extensive tagging studies in Ireland (Fitzmaurice *et al.*, 2003b) and the USA (Kohler *et al.*, 1998).

In the North Atlantic blue sharks migrate northward during the summer and so occur primarily between June and September in Irish waters. Their arrival in Irish waters is often associated with sea surface temperature reaching 15°C. They are most abundant off the south west and west coast and are targeted mainly by charter angling vessels (Fitzmaurice *et al.*, 2003b).



Biology and Ecology

The Blue Shark reaches a maximum length of about 380cm TL. About 50% of males in the Atlantic are sexually mature by 218cm, although some may reach maturity as small as 182cm. Females are sub-adult from 173-221cm and fully mature from 221cm (Pratt, 1979). The length-at-birth is 30-50cm and the average fecundity is 25-50 pups (ICES, 2013). Life-history information from blue sharks caught in Irish waters is limited. The age range of samples caught in Irish waters indicates that the population occurring north of Biscay is composed mainly of sub-7-year-olds (Henderson *et al.*, 2001). In Irish coastal waters the sex ratio is skewed towards females (Fitzmaurice *et al.*, 2003b), but further offshore it is more balanced (MacNaughton *et al.*, 1998).

Trend

Conflicting signals are available from various sources. Catch rates from Irish recreational catches showed a decline over time (Fitzmaurice *et al.*, 2005), and have stabilised at this level in the past decade (Wogerbauer *et al.*, 2016), but this may not be indicative of the overall stock situation. The latest assessment by ICCAT (2015) suggests that the stock is not over-fished and is above the level that is consistent with maximum sustainable yield.

Human impacts

There are no large-scale directed fisheries for blue sharks but they are a major bycatch of longline and driftnet fisheries for tunas and billfish, where they can comprise up to 70% of the total catches and thereby exceed the actual catch of targeted species (ICCAT, 2005). Much of this bycatch is often unrecorded. Since 1998 there has been a Basque artisanal longline fishery targeting blue shark and other pelagic sharks in the Bay of Biscay (Díez *et al.*, 2007). Observer data indicated that substantially more sharks are caught as bycatch than reported in catch statistics.

It is difficult to accurately quantify landings of blue shark in the North Atlantic, as data can be incomplete, and generic reporting of shark catches has resulted in under-estimation. Landings data from different sources (ICCAT, FAO and national statistics) vary significantly. Regardless, estimated North Atlantic landings were in the region of 30,000t from 1997 to 2007. Since then estimated landings have increased significantly.

Blue sharks are also caught in considerable numbers in recreational fisheries. These fisheries are mainly catch and release in the Northeast Atlantic but in the Northwest Atlantic blue sharks are frequently landed by anglers.

Management/Conservation

There are no measures regulating the catches of blue shark in the North Atlantic.

SHELF AND COASTAL SPECIES

Squatina squatina (Linnaeus, 1758)

Angel shark

Irish name: Bráthair

Status

Ireland: Critically endangered A2bd. NE Atlantic: Critically endangered. A2bcd+3d. Global: Critically Endangered A2bcd+3d.

Justification

Numbers of angel sharks (*Squatina squatina*) encountered in tagging programmes conducted by anglers and Inland Fisheries Ireland show a decline of over 90% since the 1980s (Wogerbauer *et al.*, 2014). This warrants a critically endangered listing.

Range, distribution and habitat

This species' range encompasses the Atlantic coasts of Europe from Ireland and Britain to Morocco, the Canaries, the Mediterranean coasts of Europe, Africa and the Levant, and the Black Sea (Whitehead *et al.*, 1984). Tagging data from Inland Fisheries Ireland show that Tralee Bay is the main centre of its distribution in Ireland, (>90% of total tagged), with Clew Bay a secondary area. This species is known to make extensive migrations southwards from the Tralee Bay area to the Celtic Sea shelf and Bay of Biscay (Fitzmaurice *et al.*, 2003a). The species may overwinter in St. George's Channel (ICES, 2014b). Recent reports of angel sharks have also been received from inner Galway Bay (Peter Tyndall, pers. comm.).

Biology and Ecology

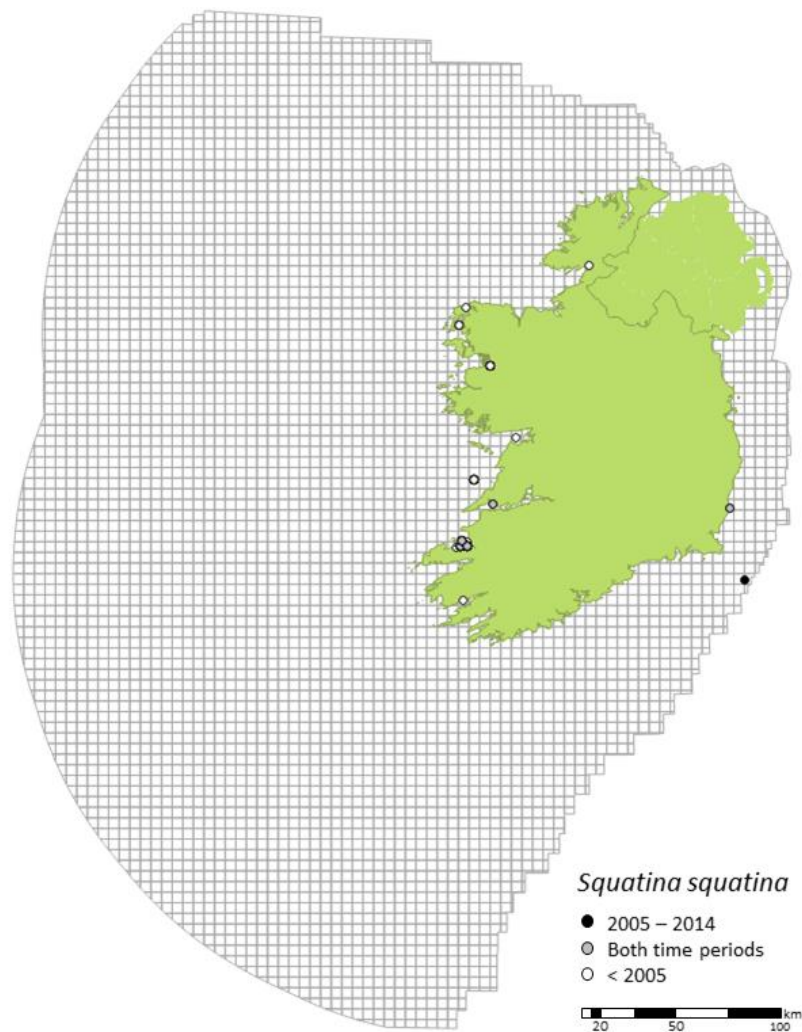
A medium bodied shark which has a skate-like appearance. It reaches up to 2.5m TL. It inhabits sandy and muddy bottoms, in shallow depths of 5-100m (Whitehead *et al.*, 1984). Angel shark is live bearing, producing 7-25 embryos. Its gestation period is 10 months and neonates are 20-30cm TL (Roux, 1984).

Trend

Numbers tagged and recaptured since the 1980s, in a tagging programme conducted by anglers working with Inland Fisheries Ireland, show a decline of over 95%. Even in its core area of Tralee Bay, few angel sharks have been encountered in the last 15 years.

Human impacts

This species is especially vulnerable to coastal fisheries using static nets. In Tralee Bay, one of its main centres, it is particularly vulnerable to static net fisheries targeting crustaceans (BIM, 2012). It is also an occasional by-catch in mixed trawl fisheries, particularly in St. George's Channel.



Management/Conservation

It is prohibited to fish for, land or tranship this species under EC fisheries management legislation. This is the highest conservation designation afforded under the Common Fisheries Policy. It is protected in Northern Ireland Inshore Waters out to 6 nautical miles.

Rostroraja alba (Lancepède, 1803)

White skate

Irish name: Sciata bán

Status

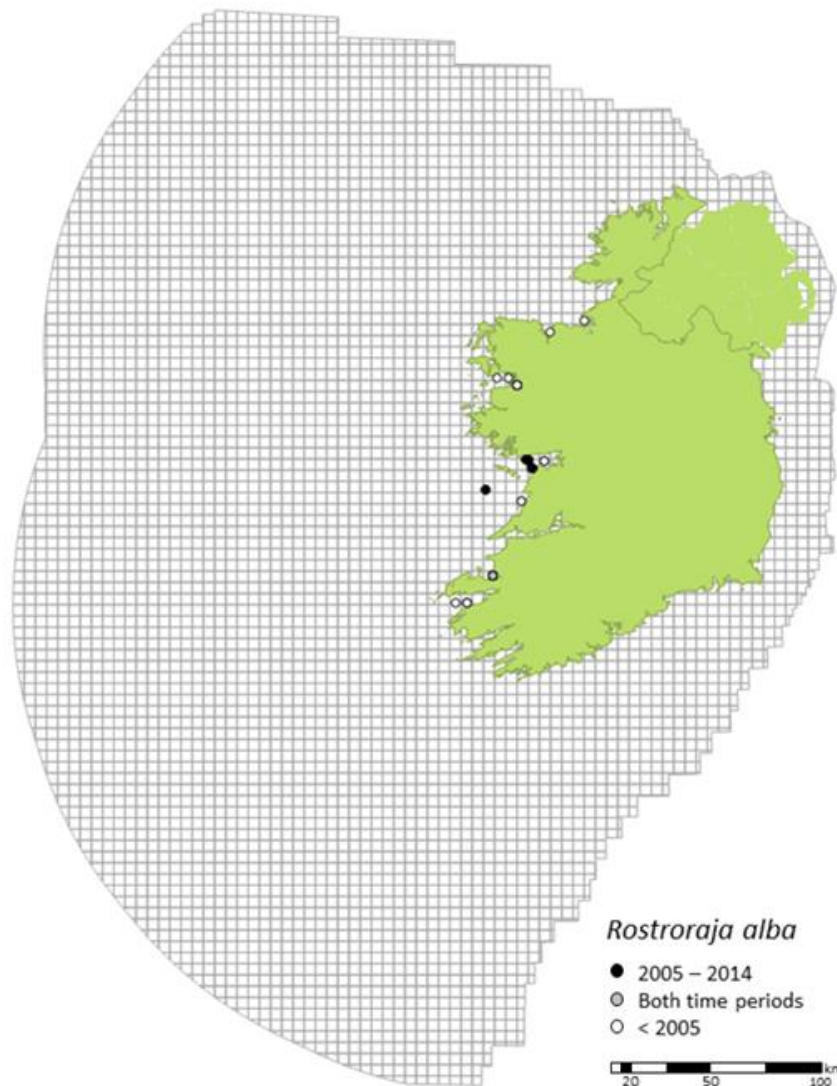
Ireland: Critically endangered A2bd. NE Atlantic: Critically Endangered A2bd. Global: Endangered A2cd+4cd.

Justification

Declines in geographical range have occurred in the Northeast Atlantic and anecdotal evidence suggests this species, including localized populations have been extirpated. Only two locations have yielded confirmed reports of this species in recent years, both on the west coast of Ireland.

Range, distribution and habitat

It ranges, in the Atlantic, from western Ireland to South Africa, extending through the western Mediterranean to Tunisia and western Greece. It also occurs in the southwest Indian Ocean (Stehmann and Burkel, 1984a). It occurs on sandy bottoms in coastal waters to the upper slope region between about 40 to 400 m and exceptionally down to 500m (Capape 1976, Stehmann and Burkel 1984a, Serena 2005). In Ireland the species is confined to the Tralee Bay region and to a lesser extent, Galway Bay (Varian *et al.*, 2011) and these are the only known refuges for the species in the north east Atlantic.



Biology and Ecology

This is a large bodied, slow growing and late maturing species (Kadri *et al.*, 2014). Maximum recorded size is 200cm TL (Bauchot 1987). Estimates of total length at maturity varied between two studies from North Africa: 130cm (males) and 120cm (females) (Capapé, 1976) and 119cm for males, and 129cm for females (Kadri *et al.*, 2014). These authors report age at maturity as 20 and 23 years, for males and females, and the oldest male reported in that study was 32 years, whereas the oldest female was 35 years. The longevity was estimated at 51 and 76 years for males and females, respectively. A captive white skate at the Galway

aquarium laid an egg at the age of 7, though this may not be indicative of conditions in the wild (Burke, pers. comm.). Gestation period may be about 15 months (Stehmann and Burkel 1984a) and females produce between 55 and 156 ova per year (Serena 2005), with 1-2 egg capsules reported to be contained in each female's oviducts at a time (Kadri *et al.* 2014).

Trend

No information is available.

Human impacts

This species is especially vulnerable to coastal fisheries using static nets. In Tralee Bay, one of its known refuges, it is particularly vulnerable to static net fisheries targeting crustaceans.

Management/Conservation

It is prohibited to fish for, land or tranship this species under EC fisheries management legislation. This is the highest conservation designation afforded under the Common Fisheries Policy.

Dipturus batis – complex A (= *flossada*) (Linnaeus, 1758)

Common Skate

Irish name: Sciata coiteann

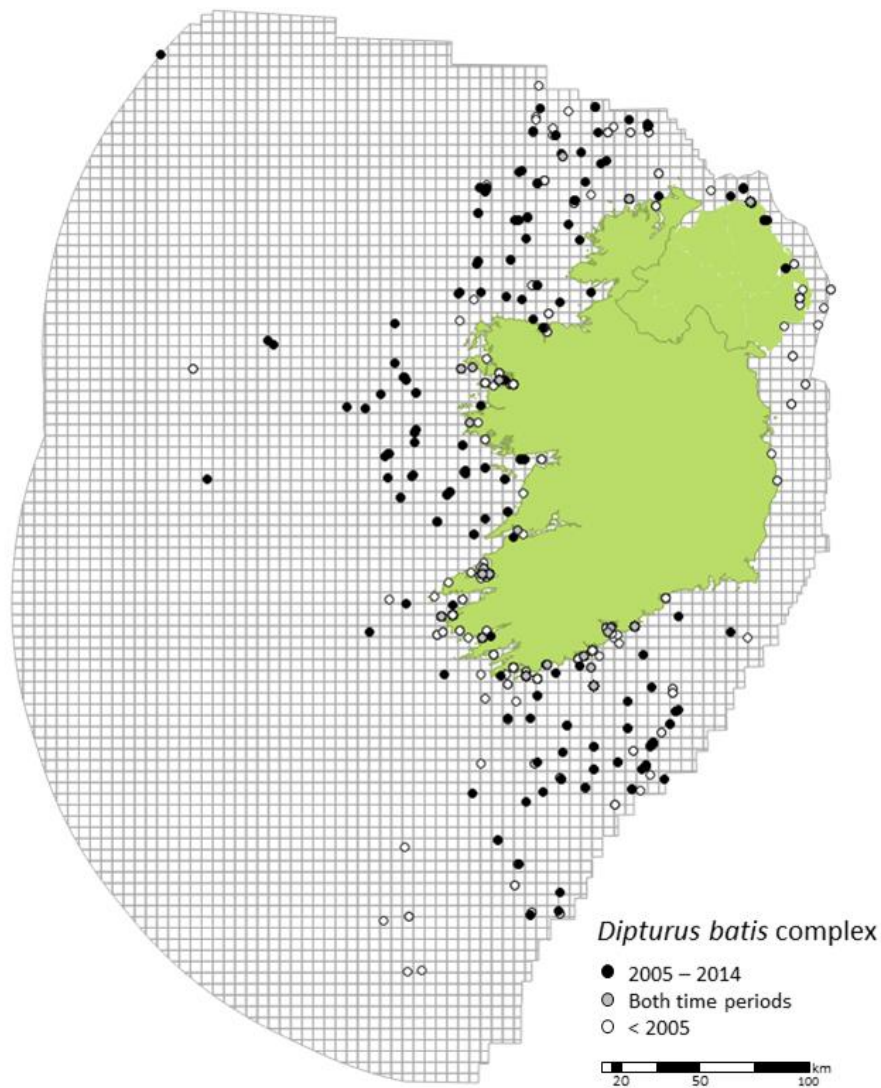
In a revision of European rajids, Clark (1926) recognised *Raja batis* ("Raia batis") as valid and *Raja intermedia* Parnell, 1837 as a junior synonym, hence blue skate was combined with flapper skate. This grouping remained until 2010 when separate species were re-established (Iglesias *et al.*, 2010; Griffiths *et al.*, 2010). Blue skate are distinguished morphologically from flapper skate by several diagnostic characteristics reported in Iglesias *et al.* (2010) and genetically in Griffiths *et al.* (2010). The revised nomenclature remains to be accepted by the International Commission on Zoological Nomenclature (ICZN). Therefore they are referred to here as the, smaller-bodied, blue skate (*D. batis*-complex A, = *D. cf. flossada* of Iglesias *et al.* 2010) and the larger-bodied flapper skate (*D. batis*-complex B; = *D. cf. intermedia* of Iglesias *et al.* 2010). Much of the distributional and biological information collected from 1926 to 2010 relates to the complex, and little species-specific data exist. For this reason, records for the two species, combined are displayed below, and records for each individual species shown thereafter.

Status

Ireland: Critically Endangered A2 bcd. NE Atlantic: Critically Endangered A2 bcd. Global: Critically Endangered A2 bcd.

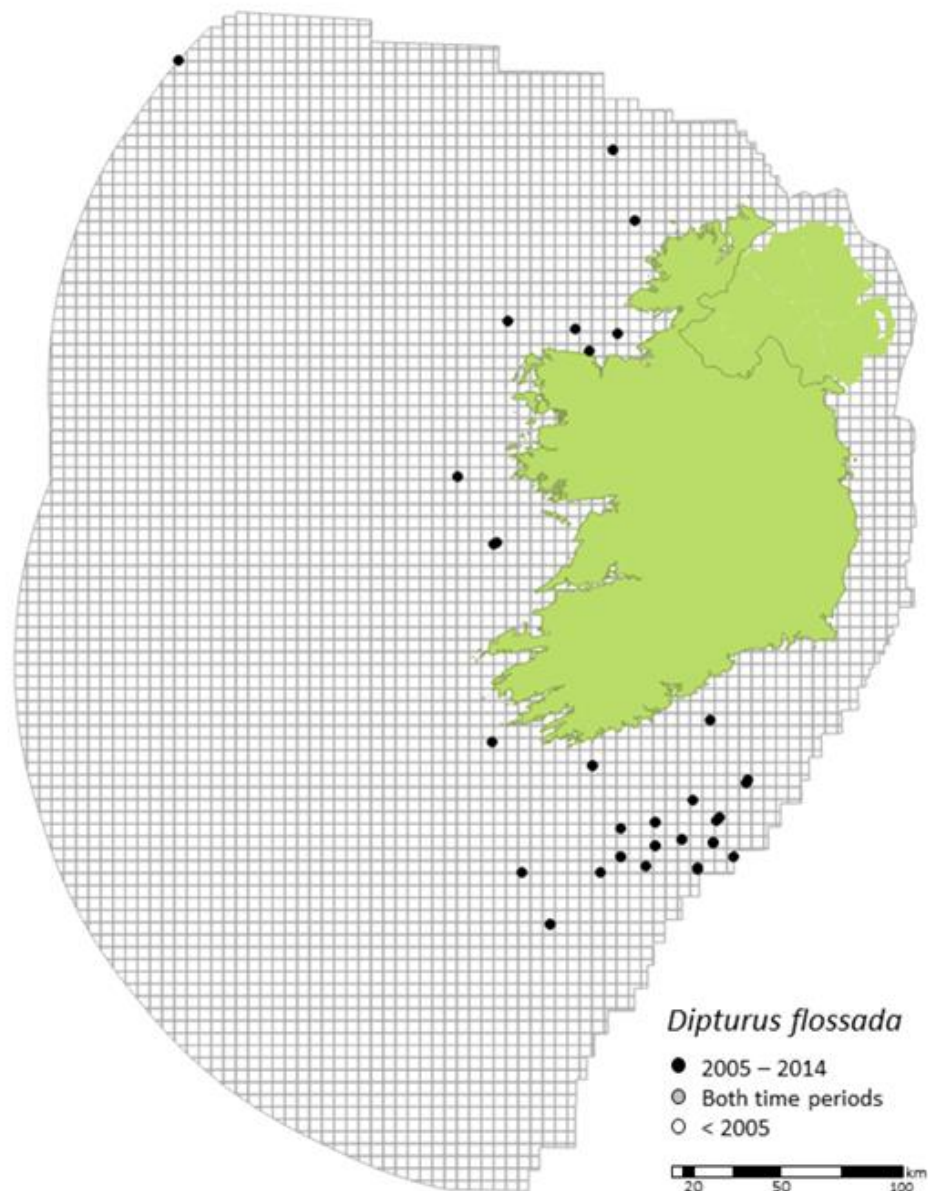
Justification

The species complex is susceptible to exploitation due to its large size, aggregating behaviour, low productivity and late age at maturity. The reasons for the declines documented in the literature have not ceased. For these reasons the species is assessed as Critically Endangered.



Range, distribution and habitat

Historical distribution data are confounded by misidentification and taxonomic issues though the blue skate appears to have a more southerly distribution than the flapper skate (Griffiths *et al.*, 2010). The historical geographical range of *D. batis*-complex may have covered much of the continental shelf of the Northeast Atlantic, from Madeira and the coast of northern Morocco in the south, to Iceland in the north (Stehmann and Bürkel 1984a). At the start of the twentieth century it was considered to have a wide distribution over the shallower waters of the continental shelf surrounding the British Isles, albeit more common in western regions (Walker and Heessen 1996). Though individual specimens are reported very occasionally from the Irish Sea, outer Bristol Channel and central and northern North Sea, the current range tends to occupy the deeper waters off Iceland, the western seaboard of the British Isles, including the Celtic Sea, along the edge of the continental shelf, and in the Bay of Biscay and Atlantic Iberian waters (ICES 2010, 2012). The species' northerly limits are not known precisely, however confirmed specimens are known from Iceland, Rockall Bank and the western Isles off Scotland (58°N). The bathymetric ranges of the species are poorly known generally, as is their western distribution ranges, but blue skate has been taken from depths between 54 and 422m (Griffiths *et al.*, 2010; ICES 2013).



Biology and Ecology

Historical life history data are confounded by misidentification and taxonomic issues. The length at 50% maturity is estimated to be 115.0 and 122.9cm total length for male and females, respectively (Iglesias *et al.*, 2010). The age at 50% maturity is estimated as 11 years (Iglesias *et al.*, 2010). The maximum lengths and weight (eviscerated) observed by Iglesias *et al.* (2010) were 143.2cm and 15.2kg. Based on records of egg cases of *Dipturus batis* complex, Tralee and Dingle Bays are nurseries (Varian *et al.*, 2011). Other refuges of the complex include Lough Swilly, north Antrim, Clew, Killala and Galway Bays (Fitzmaurice *et al.*, 2003c).

Dipturus batis-complex preys mostly on crustaceans and teleost fish, but it is also a predator of sharks and rays (Steven, 1947), suggesting that its decline may affect populations of smaller-bodied rays.

Trend

Although there is little information on either species in the *Dipturus batis* complex, the complex as a whole is considered to be depleted in the waters around Ireland. Individuals are now rarely recorded in surveys (ICES, 2014) although they are regularly captured in inshore waters in specific areas.

Human impacts

Common skate was historically one of the most abundant and widely distributed skates in the northeast Atlantic; in the late 19th Century it was described as very common in inshore areas of the western English Channel, and at least as common as smaller *Raja* species (Heape 1887). Catch rates of this species in this area declined during the 20th century. By the 1920s it was uncommon in inshore areas of the Western English Channel and by the 1970s common skate was considered extirpated from the Irish Sea (Brander 1981). They also disappeared from the southern and central North Sea (Walker 1999, Rogers and Ellis 2000), although individual specimens are reported occasionally from these areas (e.g., Ellis *et al.*, 2002, Ellis *et al.*, 2005). It has been taken in targeted fisheries where/when abundant, and continues to be a bycatch elsewhere within its range.

Management/Conservation

It is prohibited to fish commercially for, land or tranship this species under EC fisheries management legislation. This is the highest conservation designation afforded under the Common Fisheries Policy. It was removed from the Irish Specimen Fish Committee listings in 1976 due to an observed decline in numbers. It has gradually recovered and in 2016 was restored to the ISFC list of eligible species for catch and release, primarily to facilitate the collection of distribution data. In Northern Ireland it is illegal to deliberately fish for common skate within 6 nautical miles of baseline. A small number of anglers have been issued with licences to tag and release them for scientific purposes.

Dipturus batis – complex B (= *intermedia*) Parnell, 1837

Flapper skate

Irish name: Sciata coiteann

In a revision of European rajids, Clark (1926) recognised *Raja batis* (“*Raia batis*”) as valid and “*Raja intermedia*” Parnell, 1837 as a junior synonym, hence blue skate was combined with flapper skate. This grouping remained until 2010 when separate species were re-established (Iglesias *et al.* 2010; Griffiths *et al.* 2010). Blue skate are distinguished morphologically from flapper skate by several diagnostic characteristics reported in Iglesias *et al.* (2010) and genetically in Griffiths *et al.* (2010). The revised nomenclature remains to be accepted by the International Commission on Zoological Nomenclature (ICZN). Therefore they are referred to here as the, smaller-bodied, blue skate (*D. batis*-complex A, = *D. cf. flossada* of Iglesias *et al.* 2010) and the larger-bodied flapper skate (*D. batis*-complex B; = *D. cf. intermedia* of Iglesias *et al.* 2010). Much of the distributional and biological information collected from 1926 to 2010 relates to the complex, and little species-specific data exist.

Status

Ireland: Critically Endangered A2 bcd. NE Atlantic: Critically Endangered A2 bcd. Global: Critically Endangered A2 bcd.

Justification

The species complex is susceptible to exploitation due to its large size, aggregating behaviour, low productivity and late age at maturity. The reasons for the declines documented in the literature have not ceased. For these reasons the species is assessed as “Endangered”.

Range, distribution and habitat

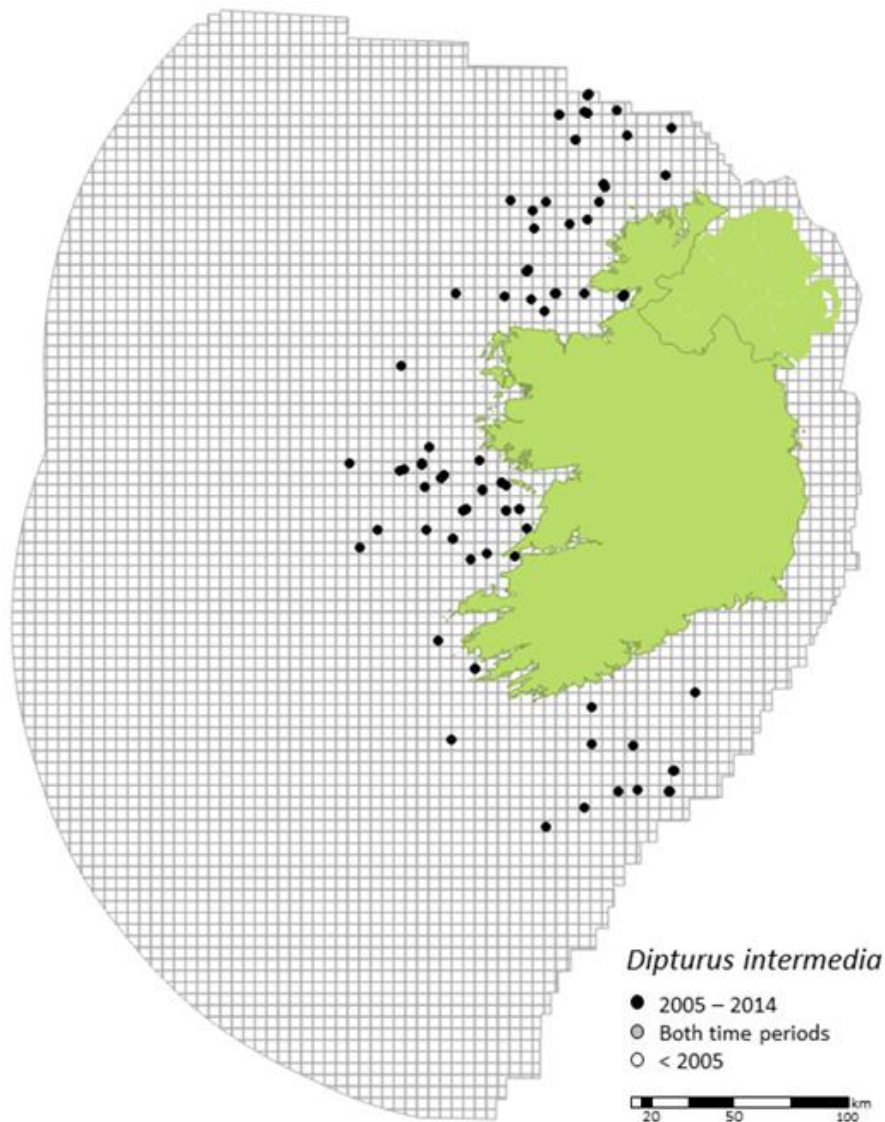
Historical distribution data are confounded by misidentification and taxonomic issues though the flapper skate appears to have a more northerly distribution than the blue skate (Griffiths *et al.*, 2010). The historical geographical range of *D. batis*-complex may have covered much of the continental shelf of the North-east Atlantic, from Madeira and the coast of northern Morocco in the south, to Iceland in the north (Stehmann and Bürkel 1984a). At the start of the twentieth century it was considered to have a wide distribution over the shallower waters of the continental shelf surrounding the British Isles, albeit more common in western regions (Walker and Heessen 1996). Though individual specimens are reported very occasionally from the Irish Sea, outer Bristol Channel and central and northern North Sea, the current range tends to occupy the deeper waters off Iceland, the western seaboard of the British Isles, including the Celtic Sea, along the edge of the continental shelf, and in the Bay of Biscay and Atlantic Iberian waters (ICES 2010, 2012). Based on records of egg cases of *Dipturus batis* complex, Tralee and Dingle Bays are nurseries (Varian *et al.*, 2011). However other nurseries are likely to exist. Other refuges of common skate *sensu D. batis* include Lough Swilly, Antrim, Clew, Killala and Galway Bays (Fitzmaurice *et al.*, 2003c). Historically, common skates were also taken by recreational anglers in Belfast and Strangford Loughs and Lough Foyle.

Biology and Ecology

Historical life-history data are confounded by misidentification and taxonomic issues. The length at 50% maturity is estimated to be 185.5 and 197.5cm total length for male and females, respectively (Iglesias *et al.*, 2010). The age at 50% maturity is estimated as 19-20 years (Iglesias *et al.*, 2010). The maximum lengths and weight (eviscerated) observed by Iglesias *et al.* (2010) were 228.8cm and 78kg. Electronic tagging studies have revealed that the species exhibits pronounced site fidelity to highly localised areas (Wearmouth and Sims, 2009).

Trend

Although there is little information on either species in the *Dipturus batis* complex, the complex is considered to be depleted in the waters around Ireland. Individuals are now rarely recorded in surveys (ICES, 2014) though it is still regularly taken by recreational anglers in certain areas.



Human impacts

Common skate was historically one of the most abundant and widely distributed skates in the northeast Atlantic, though catch rates of this species in this area declined during the 20th century. By the 1970s common skate was considered extirpated from the Irish Sea (Brander 1981), and they also disappeared from the southern and central North Sea (Walker 1999, Rogers and Ellis 2000). Though individual specimens are reported occasionally from these areas (e.g., Ellis et al. 2002, Ellis et al. 2005), Flapper skate are now only regularly observed off northern and north-western Scotland, along the edge of the continental shelf (>150 m depth) and in relatively low numbers in the Celtic Sea (only 8 of 1201 *D. batis*-complex were identified as Flapper skate; ICES 2012). Though there are currently no target fisheries for these species they may be caught as bycatch in mixed demersal fisheries and mortality rate of discarded skates is unknown.

Management/Conservation

It is prohibited to fish for, land or tranship this species under EC fisheries management legislation. This is the highest conservation designation afforded under the Common Fisheries Policy. In Northern Ireland it is

illegal to deliberately fish for common skate within 6 nautical miles of baseline. A small number of anglers have been issued with licences to tag and release them for scientific purposes.

Squalus acanthias Linnaeus, 1758

Spurdog

Irish name: Fíogach gobach

Status

Ireland: Endangered A2bd. NE Atlantic: Endangered A2bd. Global: Vulnerable A2bd+3bd+4bd.

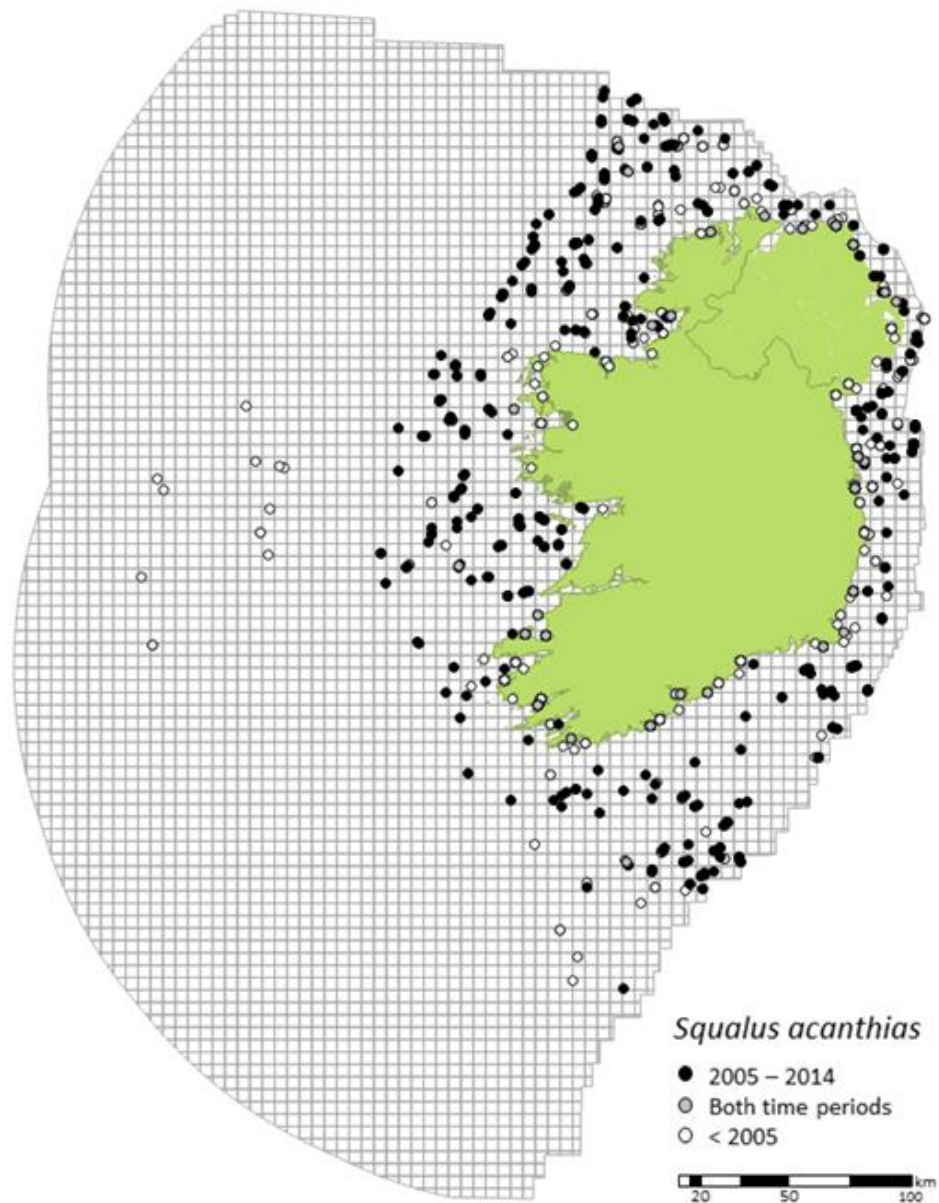
Justification

A new stock assessment for the Northeast Atlantic stock estimates a decline in biomass of 81% from initial levels (ICES, 2014a). This assessment shows that spurdog (*Squalus acanthias*) in Irish waters meets the criteria for Endangered, A2bd.

Range, distribution and habitat

This is a small benthic-pelagic shark of temperate continental shelf seas worldwide (Compagno, 1984). In Irish waters, the spurdog belongs to the northeast Atlantic population, which stretches from Portugal to Norway, including the North Sea (ICES, 2014b). It occurs from coastal waters to depths of 900 m, but mostly in waters of less than 200m deep. Usually coastal and demersal, they migrate north and south as well as near shore and offshore in waters of 7 to 15°C water (Compagno 1984). This is a benthic-pelagic species. It is not known to associate with any particular habitat (McMillan and Morse 1999).

Spurdog are thought to mate in winter (Castro 1983, Compagno 1984). Possible mating sites have been suggested in the central Irish Sea, the southern Celtic Sea and the east coast of England (Dureuil, 2013). Vince (1991) found evidence for the presence of larger females and males in the North Sea, and Holden (1965) found females larger than 80 cm northeast of Scotland in summer. Hickling (1930) reported spawning grounds from the west of Ireland and the Celtic Sea, and Fahy (1988) confirmed that inshore waters off southwest Ireland, particularly the mouth of the Shannon, were a spawning ground. Vince (1991) suggested that females might give birth in the eastern Celtic Sea and Holden (1965) reported parturition to occur along the Norwegian coast and north of Scotland. Dureuil (2013) found the highest numbers of pups northwest of Scotland, based on survey data from 1985-2012.



Biology and Ecology

In the Northeast Atlantic, spurdog mature at 74 to 92.5cm (females) and 57.5 to 64cm (males) (Holden and Meadows 1962, Sosinski 1978, Fahy 1989, Henderson *et al.*, 2002). The maximum age is at least 40 years (Fahy 1989). The gestation period ranges from 18 to 25 months (Ford 1921, Gauld 1979, Jones and Ugland 2001) and breeding takes place every other year (Holden and Meadows 1962, Sosinski 1978, Fahy 1989). Fecundity increases with size (Ellis and Keable 2008). The embryonic development starts in November (Ford, 1921). The length at birth ranges from 19-31cm (Ford 1921, Gauld 1979) and pupping occurs from late August to December (Ford 1921, Holden and Meadows 1962, Gauld 1979, Jones and Ugland 2001). Copulation is assumed to occur offshore soon after the females give birth (Holden 1965). In accordance, Jones and Ugland (2001) observed fertilization from October to February.

Trend

A new stock assessment for the Northeast Atlantic stock provides an estimated decline in total biomass of 81% from initial levels. The updated ICES assessment is based on a new population model with density dependence incorporated.

Human impacts

This species was targeted by Irish gillnetters off western Ireland, Norwegian longliners in the North Sea and UK longliners in the Irish Sea. These fisheries have all ceased. However the species continues to be taken as a by-catch particularly in mixed demersal fisheries. It was formerly also a by-catch in coastal driftnet fisheries for salmon in Irish waters and an accidental catch in mid-water trawling targeting herring. Spurdog are targeted by anglers operating on a catch and release basis.

Management/Conservation

This species is subject to a zero tonne TAC under EC legislation since 2011. This measure is not entirely effective, as unavoidable by-catch is discarded. However the measure disincentivises intentional targeting of spurdog as either a clean catch or as part of mixed catches.

Raja undulata Lancepède, 1802

Undulate Skate

Irish name: Roc dústríochta

Status

Ireland: Endangered B1abi)iv). NE Atlantic: Near Threatened. Global: Endangered A2bd+3d+4bd.

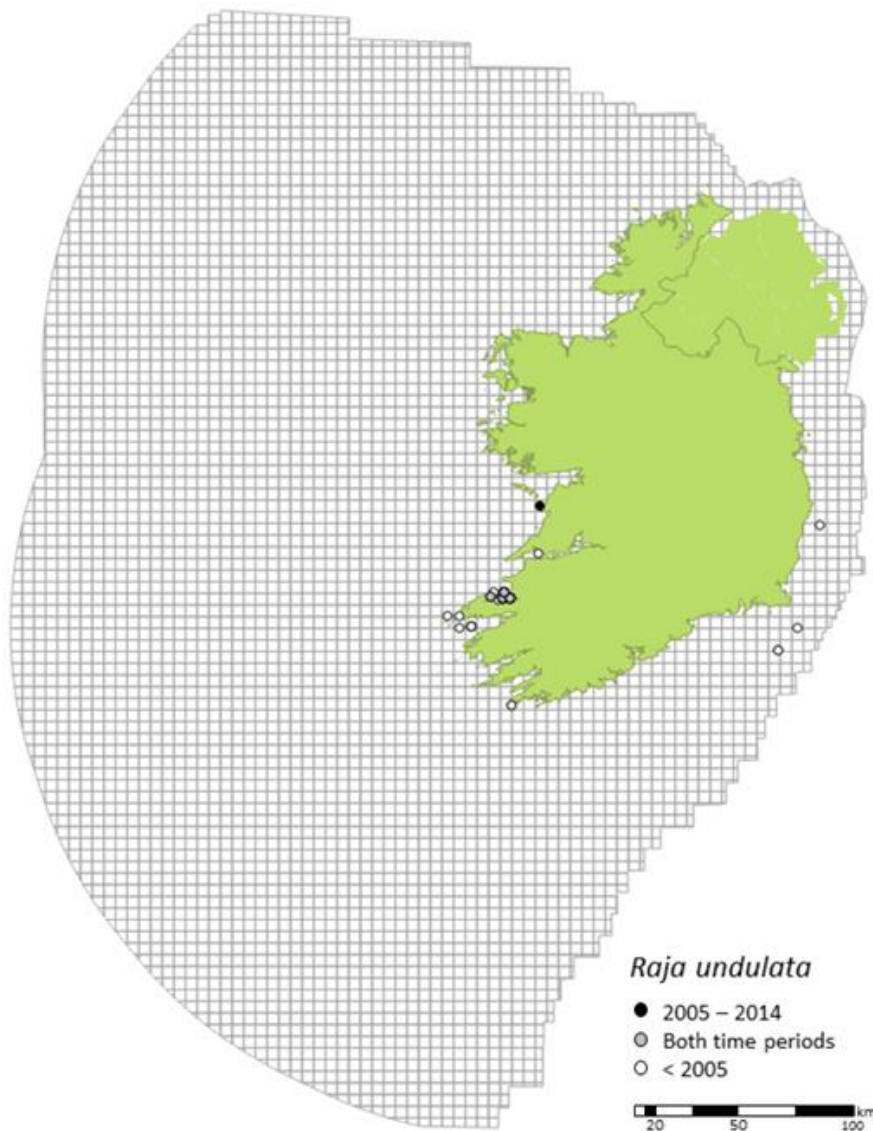
Justification

Its patchy distribution means that populations are widely separated, probably with little exchange. In the areas where it is known to be locally common, available data suggest declines have occurred. The extent of occurrence of *R. undulata* in Irish waters is severely restricted and its distribution is limited to Tralee Bay and the immediate vicinity. There is sufficient information to show that it does not warrant any designation other than “Endangered”.

Range, distribution and habitat

The undulate skate is a medium-sized, inshore skate that has a patchy distribution in the northeast and eastern central Atlantic, with discrete areas where it may be locally common (southwestern Ireland, eastern English Channel, southern Portugal). It also occurs in the Mediterranean Sea, where it appears to be rare. The Undulate Skate occurs in shelf waters down to about 200 m depth, although it is more common in shallow waters.

In Irish waters the undulate skate distribution is centred on Tralee Bay (Varian *et al.*, 2011) with records southward to Mizen Head and northward to the Aran Islands (Fitzmaurice *et al.*, 2003f; Ellis *et al.*, 2012). Over 99% of all undulate skate tagged in Ireland (1972-2014) were from Tralee Bay (Wogerbauer *et al.*, 2014). The population in Ireland is isolated from other populations in the Atlantic (ICES, 2014a,b).



Biology and Ecology

In the neighbouring Normano-Breton Gulf stock which is comparable in characteristics, the length-at-maturity (L_{50}) has been preliminarily estimated as 78cm and 82cm for males and females, respectively (Stéphan *et al.*, 2014). The observed length range was from 18–99cm for males and 18–103cm for females (Stéphan *et al.*, 2014). Combined data from the North Sea and Celtic Sea ecoregions indicate a length-at-first-maturity of 80cm and 79cm for males and females respectively, and a length-at-maturity (L_{50}) of 83cm TL for males (McCully *et al.*, 2012). The observed length range was 22–89cm TL and 17–60cm TL for males and females, respectively (McCully *et al.*, 2012). Throughout the species' range neonates, juveniles and egg-laying females have been observed in estuarine and lagoon habitats.

Trend

An index of fish tagged and recaptured by Inland Fisheries Ireland shows a decline of 60–80% since 1981 (ICES, 2014). However, the trend since 2006 may be confounded due to reduced angling effort arising from a reduction in the size of the local angling charter fleet.

Human impacts

As a coastal and inner shelf species it is susceptible to bycatch of trawl and gill net fisheries. It is particularly vulnerable to static net fisheries, targeting shell fish, in its core range in Tralee Bay. The majority of tagged undulate skate recaptures from 1970 to 2014 was due to recreational angling (operating on a catch and release basis), but at least 28% were attributed to commercial fishing (Wogerbauer *et al.*, 2014).

Management/Conservation

This species is managed as an exception to the generic skate and ray total allowable catch (TAC) under the EU CFP. It must not be targeted, when accidentally caught, it must not be harmed but released immediately.

Dasyatis pastinaca (Linnaeus, 1758)

Common Stingray

Irish name: Roc an gha nimhe coiteann

Status

Ireland: Endangered B1, B2a, biii. NE Atlantic: Vulnerable A2d. Global: Data deficient.

Justification

The common stingray has a patchy distribution in Irish waters and is known to occur seasonally in Tralee Bay. This apparently represents an isolated population, and given its small extent of occurrence and area of occupancy it warrants being classified as “Endangered”.

Range, distribution and habitat

The common stingray is a wide ranging species throughout the Eastern Atlantic, occurring from southern Norway southwards to the Mediterranean and Black Seas, and onwards via the Canaries to South Africa. It occurs from the shore to about 200m depth, but is more commonly found in shallow waters (<50m).

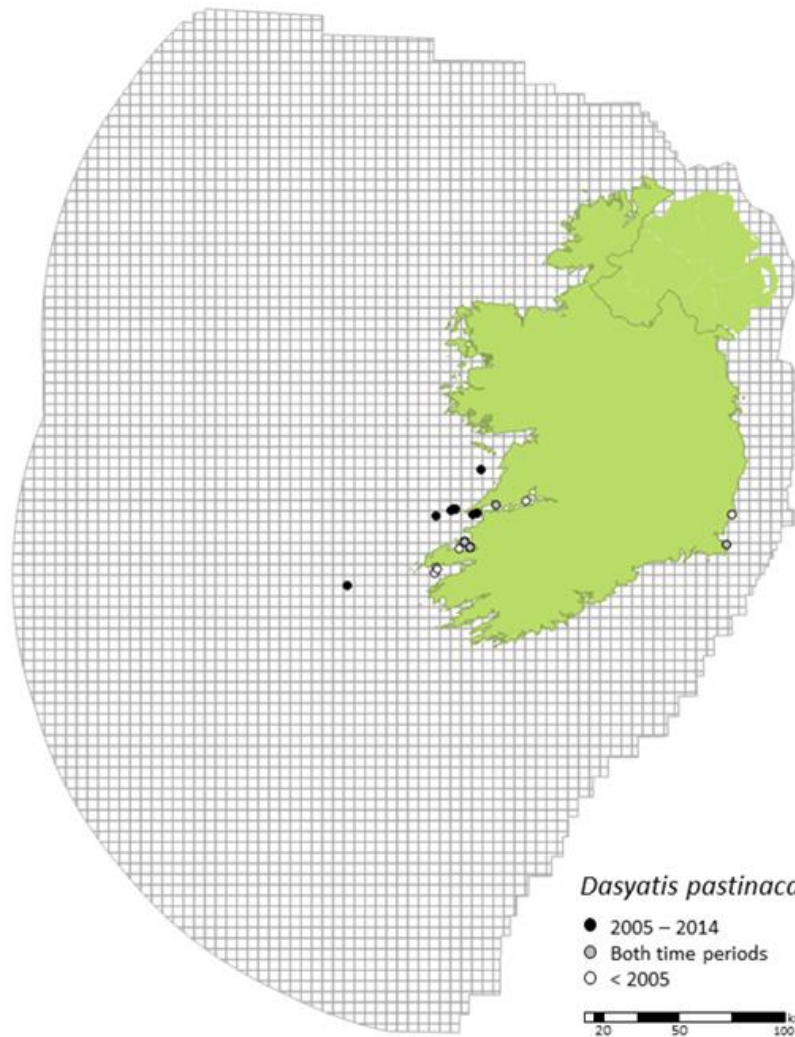
In the Northeast Atlantic the common stingray is less abundant than in the Mediterranean and has reportedly disappeared from the Bay of Biscay. Although the species has been recorded from all around the Irish coast, it seems to be more common, at least locally, in the south and south-west. Almost 84% of all the rod and line caught specimen common stingray (weighing ≥ 13.6 kg) recorded by the Irish Specimen Fish Committee (ISFC) since 1960 were captured in Tralee Bay.

Biology and Ecology

Life-history data for the common stingray in the Northeast Atlantic is not available. In the Eastern Mediterranean the maximum age observed was 10 years and the parturition time of common stingray occurred in summer (from May to September) (Ismen, 2003). Males matured at 43cm TL (22cm disc width (DW)) and females at 46cm TL (24cm DW). The maximum reported size is 140cm DW and 250cm TL (Serena *et al.*, 2009).

Trend

No information is available.



Human impacts

The seasonally shallow depth distribution makes the common stingray more vulnerable to small-scale inshore fisheries than to offshore trawling. Sting ray specimens are caught by anglers, operating on a catch and release basis, in shallow waters from April to September.

Management/Conservation

There are no measures in place for this species.

Dipturus oxyrinchus (Linnaeus, 1758)

Long nosed skate

Irish name: Sciata socfhada

Status

Ireland: Vulnerable, A2bd. NE Atlantic: Near Threatened. Global: Near Threatened.

Justification

The low abundance of this species throughout recorded history and its current rarity in Irish waters makes it very difficult to classify. There have been no records in Irish shelf waters since 2008. It is recorded in low but stable numbers on the Rockall Bank, however the time series in that area is short (1999-present). Given that there is a slight apparent decline per year in surveys, with probability of capture lessening over time and given that exploitation in mixed demersal and deepwater fisheries is still ongoing, a designation of Vulnerable (A2bd) seems the most applicable. However there is a danger that this species may be up-listed in future so extra attention is required.

Range, distribution and habitat

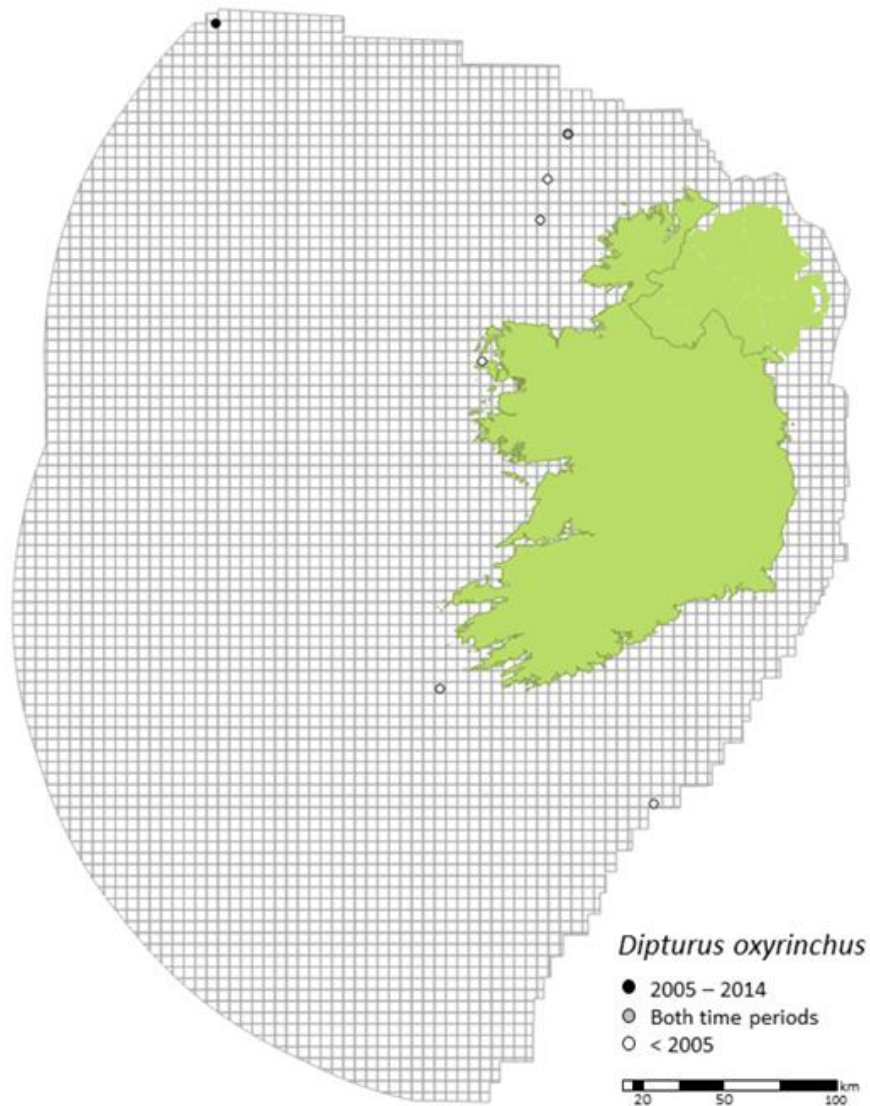
Long nosed skate is endemic to the Northeast Atlantic and Mediterranean, though the populations in each area are known to be genetically distinct (Griffiths *et al.*, 2011). It occurs in the Atlantic from southern Norway, the Shetlands, Faroe Islands and Rockall Bank south to the Canaries. Its range extends round the entire Mediterranean margin, and it is a demersal species occurring in a wide range of depths from 90-900m (Stehmann and Burkel, 1984a). It is unclear if the skates on the Rockall Bank and those previously recorded from Irish shelf waters are from the same population, though there are no natural barriers for a deep-sea species like this.

Biology and Ecology

The biology of this large bodied skate is poorly known. It is egg laying with the spawning season stretching from spring to early summer. It reaches up to 150cm TL (Stehmann and Burkel, 1984a). Length at maturity is estimated as 83cm TL for males and 104cm TL for females. Both sexes are estimated to reach sexual maturity from 6-8 years (Serena *et al.* 2011). The estimated longevity off Tunisia is 26 and 38 years for males and females, respectively (Kadri *et al.*, 2015).

Trend

Between the late 1960s and 2002 UK ground fish surveys very occasionally reported this species in very low numbers in the Celtic Sea and off southwest Ireland at depths of 111–159m (Ellis *et al.* 2005). There have been no recent reports from those surveys, and only 6 records from the Irish Groundfish Survey (begun 2003) with none since 2008. It is known to occur in small but stable numbers on the Rockall Bank (UK-Scotland surveys) and in Norwegian and Biscayan waters. An unconfirmed report of an egg case from Barley Cove, Co. Cork has been shown to have been instead a blue skate (Sarah Varian, pers. comm.). This species has been reported extinct in the Irish Sea (Dulvy *et al.*, 2000), though this is contested by Ellis *et al.* (2002) who argue that it never occurred there. The lack of recent records from Irish shelf waters leads to concerns that this species may be mis-classified. Extra attention is required to obtain a better classification of this species by the time of the next Red List process.



Human impacts

Because of its wide depth range it is vulnerable as a by-catch in almost all mixed demersal fisheries, including deepwater fisheries on the slopes of the continental shelf and the Rockall Bank.

Management/Conservation

There are no management or conservation measures in place for this species.

Leucoraja naevus (Müller and Henle, 1841)

Cuckoo ray

Irish name: Roc na súl dubh

Status

Ireland: Vulnerable A2bd. NE Atlantic: Least concern. Global: Least concern.

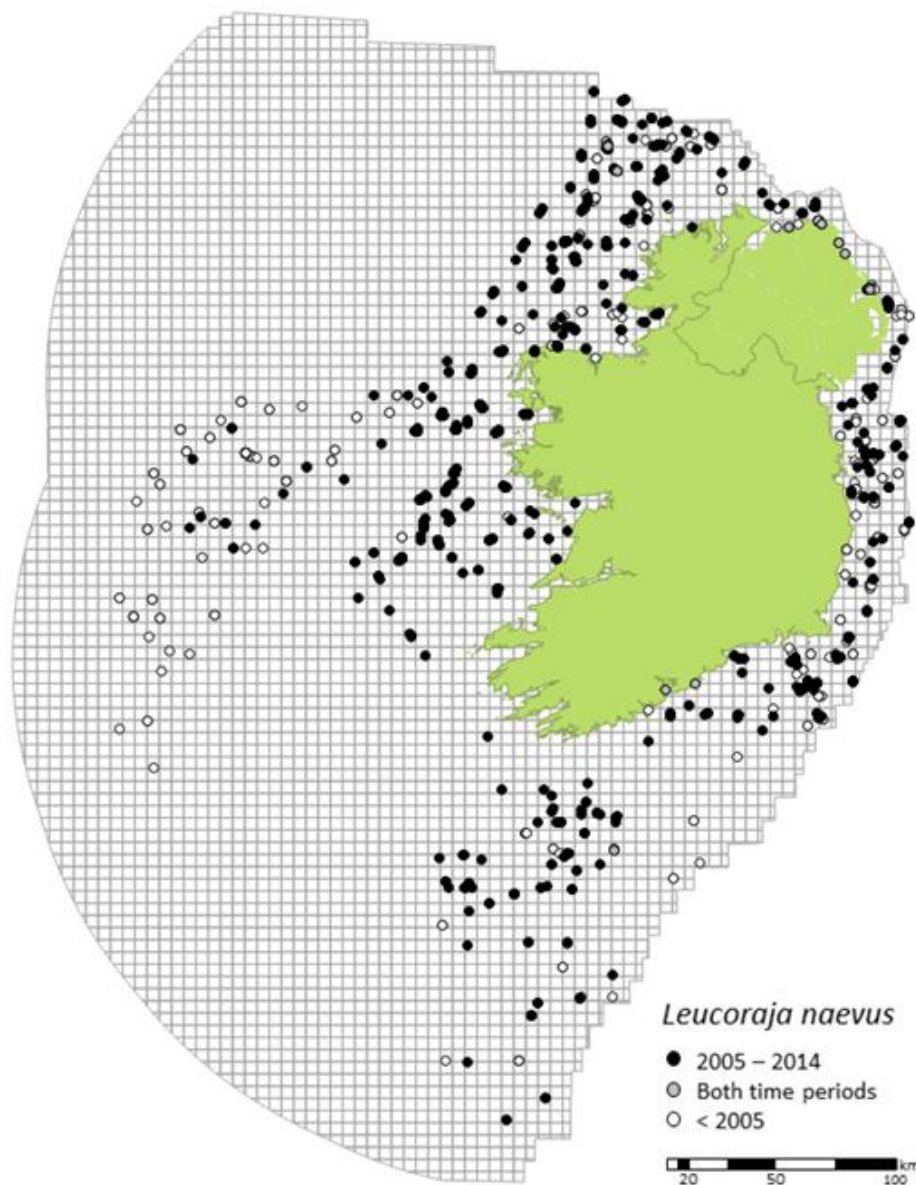
Justification

Abundance indices from trawl surveys show an overall decline of about 45% since the 1990s. This implies that a listing of Vulnerable is warranted.

Range, distribution and habitat

Leucoraja naevus is a small-bodied skate with a wide geographic distribution in the Northeast Atlantic and Mediterranean Sea (Stehmann and Bürkel, 1984a; Ellis *et al.* 2005). In Atlantic waters the species occurs off coasts northward from the Shetland Isles and southern Norway in the north, to Morocco in the south, and also reported from Senegal (Stehmann and Bürkel 1989).

ICES considers that a single population is found in Irish waters, and includes the Irish and Celtic Seas, Biscay, the west of Ireland and Scotland (ICES, 2014a,b). However, further analyses by Moriarty *et al.* (2015) suggest that the population to the west and north of Ireland is separate from that in the Irish/Celtic Seas and in Biscay. The Causeway coast was a hotspot for the species for recreational boat anglers with occasional fish recorded off the south coast.



Biology and Ecology

The length-at-maturity (L_{50}) in the Celtic seas has been estimated as 57.3cm TL and 59.8cm TL for males and females, respectively (McCully *et al.*, 2012). The observed length range was 11–72cm TL and 10–69cm TL for males and females, respectively (McCully *et al.*, 2012). Age at maturity for females and males is estimated at 7.4 years and 6.8 years, respectively, in the North Sea (Walker 1999). In the Irish Sea the length and age at 50% maturity for males and females was reported as 56.9 and 56.2cm TL and 4.2 and 4.3 years, respectively (Gallagher *et al.*, 2005). Juvenile *L. naevus* have been observed to be abundant in the southern Irish Sea and St George's Channel and in the Celtic Sea (Ellis *et al.*, 2005).

Cuckoo skate is found on the continental shelf and slope at depths of 20-500m. It is typically an offshore species, occurring further offshore than, for example, spotted skate and thornback skate. It is abundant on coarse sand/gravel substrates in the Irish Sea and western English Channel. The scarcity of egg case records on the coast (Varian *et al.*, 2011) implies that its nurseries are off shore.

Trend

The population around Ireland, the Celtic Sea and Bay of Biscay shows an overall decline over time. There is evidence that the species is being over-exploited in relation to sustainable fishing rates in this area (ICES, 2014).

Human impacts

This species is widely taken as retained bycatch in mixed demersal fisheries through much of its range, smaller specimens are also discarded. It is vulnerable to capture in many offshore demersal mixed fisheries. Due to it occurring further offshore than other skates (e.g. blonde and thornback skates), it is of less importance to recreational fisheries.

Management/Conservation

This species is managed as part of the generic maximum total allowable catch (TAC) for named skate species, in the waters west of the British Isles. The Irish Specimen Fish Committee (ISFC) reduced the cuckoo skate specimen weight to 1.8kg in 2010 following a sustained decline in the numbers of specimens being recorded since the late 1980s (ISFC, unpublished). No response has been observed in terms of increased returns.

Leucoraja circularis (Couch, 1838)

Sandy Skate

Irish name: Roc gainmheach

Status

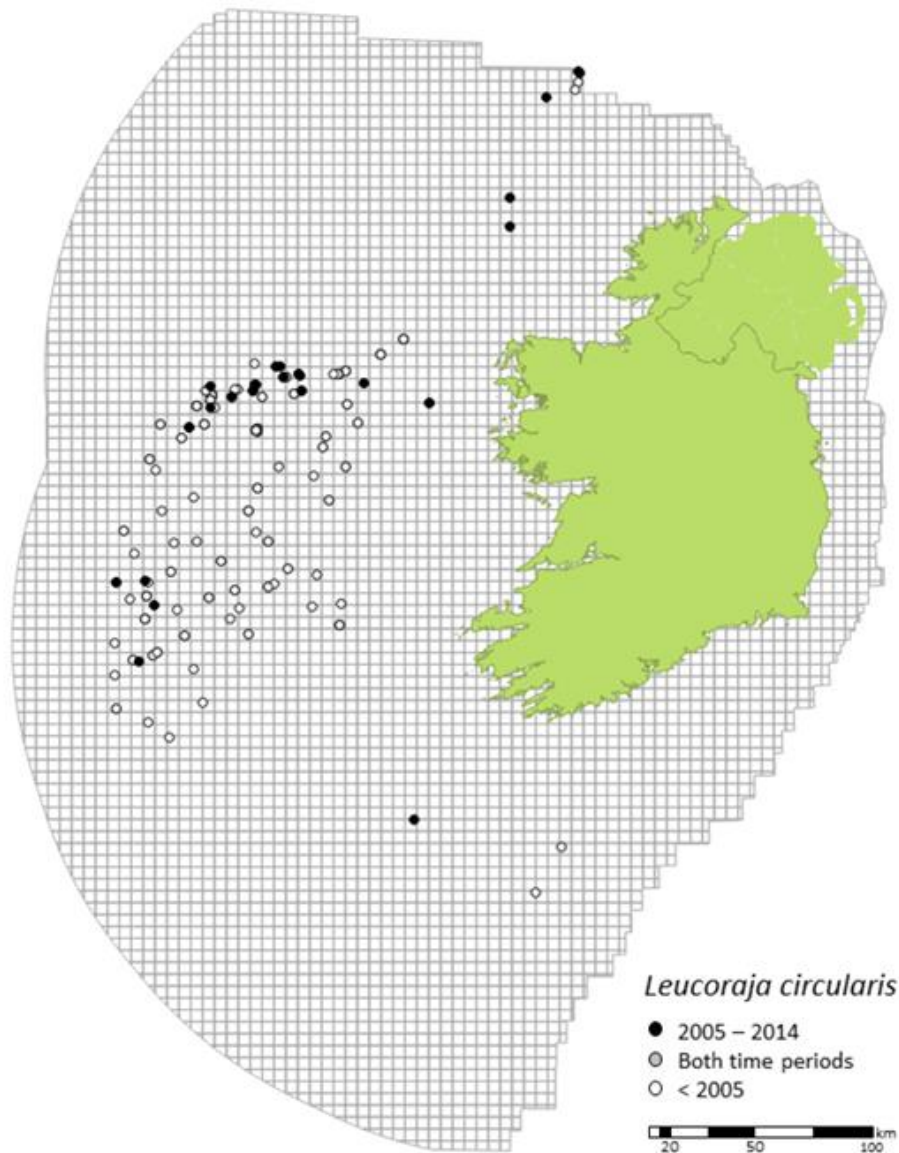
Ireland: Near Threatened. NE Atlantic: Endangered A2bcd. Global: Endangered A2bcd.

Justification

The relatively large body-size (120cm) would indicate that this species is susceptible to over-fishing. Given the very low (but stable over the last decade) catch levels in the Porcupine Bank survey, and the declines in catches outside Irish waters this species is classified as “Near Threatened” in Irish waters. There is evidence that the population on the Porcupine Bank may be an isolated one, and therefore further attention is required for this species in the future.

Range, distribution and habitat

Sandy skate (*Leucoraja circularis*) is a medium-bodied skate found in the northeast Atlantic and Mediterranean (Stehmann and Bürkel, 1984a). It is primarily encountered on the northwest and west edges of the Porcupine Bank. It appears to be a rare species and given the limited number of authenticated records, the exact distribution is uncertain. However ICES considers a single population to exist in the waters west and southwest of Ireland (ICES, 2014a,b).



Biology and Ecology

The life-history characteristics of this species are unknown in the northeast Atlantic. The maximum recorded size is 120cm TL (Serena 2005).

Trend

There is insufficient information, because this species is not well selected in most surveys. However catch rates from the Spanish trawl survey on the Porcupine Bank are stable at a low level. These data are not considered to be a reliable indicator of trends in population over time however (ICES, 2014).

Human impacts

This species is a bycatch in mixed trawl fisheries operating in the outer parts and edge of the continental shelf. The relatively large body-size (120cm) would also indicate that this species is vulnerable to over-fishing. Due to its offshore habitat preference, it is of no importance to recreational fisheries.

French landings data for this species have declined from about 500 tonnes per year in the early 1990s to less than 40 tonnes in 2012, although there is concern over species identification and the quality of species-specific data. Species-specific landings data prior to this are not available. English surveys in the North Sea and Celtic Sea have not recorded this species since 1996 and 1997 respectively, although it is still recorded in various Scottish surveys around northwestern Scotland and on the Porcupine Bank. Most of the recent captures of this species in Scottish surveys have been made in waters of 180–500m depth, suggesting that the main part of the distribution is now in deeper water, along the edge of the continental shelf and on offshore banks.

Management/Conservation

This species is managed as part of the generic maximum total allowable catch (TAC) for named skate species, in the waters west of the British Isles.

Leucoraja fullonica (Linnaeus, 1758)

Shagreen Skate

Irish name: Roc úcaire

Status

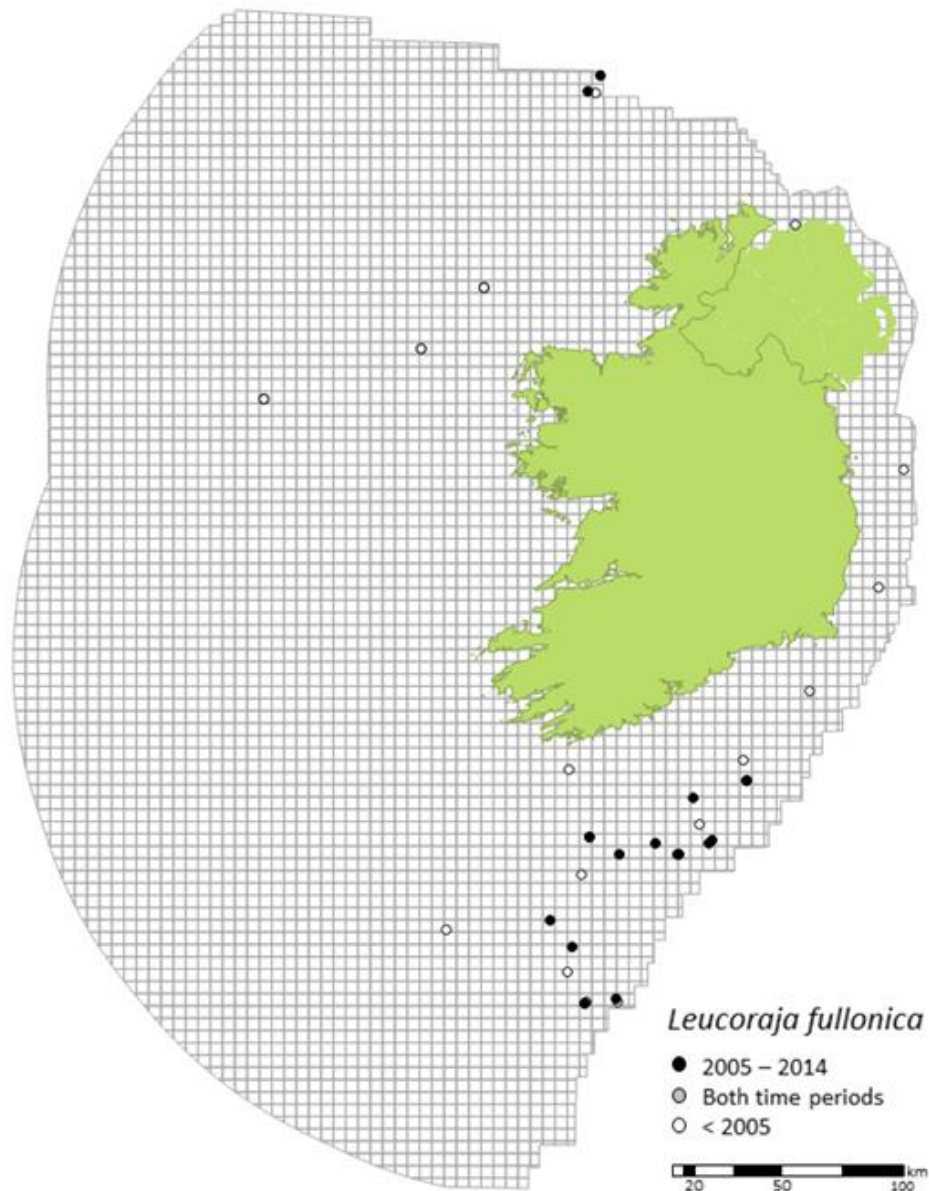
Ireland: Vulnerable A2bd. NE Atlantic: Vulnerable A2bd. Global: Vulnerable A2bd.

Justification

Downward trends in survey indicators of abundance imply that a Vulnerable listing is warranted.

Range, distribution and habitat

The Shagreen skate (*Leucoraja fullonica*) is a medium-bodied skate found in the Northeast Atlantic and Mediterranean (Stehmann and Bürkel, 1984a). It is an offshore species, usually occurring on the outer parts of the continental shelf, at depths of 30–550m (Stehmann and Bürkel, 1984a). In Atlantic waters it is distributed from Madeira and northern Morocco northwards to Iceland, Faeroe Islands and Norway, including the Skagerrak (Stehmann and Bürkel 1984a). It is also present but rare in the Norwegian Sea, Icelandic waters and east of Greenland (ICES 2012). It has not been encountered in the North Sea in recent years, and West of Scotland, including at Rockall Bank, Shagreen skate now only appears occasionally in surveys (ICES 2012), however, it may be distributed outside some of the areas covered by such internationally coordinated surveys. From similar survey catches, the species is also known to exist in low numbers in the Bay of Biscay region, Iberian waters and around the Azores and mid-Atlantic ridge. However ICES considers a distinct population to exist in the waters west and southwest of Ireland (ICES, 2014a,b).



Biology and Ecology

McCully *et al.* (2012) reported a small number of specimens (n=34); 17 males (21–96cm TL) and 17 females (24–70cm TL). All 17 females were immature, but two of the larger males (75 and 96cm TL) were mature the largest immature male was 82cm TL. Nothing else is known about the life-history of this species.

Trend

Catch rates from the French trawl survey in the Celtic Sea show a decline of about 65% since the late 1990s (ICES, 2014).

Human impacts

This species is a bycatch in mixed trawl fisheries operating in the outer parts and edge of the continental shelf.

Management/Conservation

This species is managed as part of the generic maximum total allowable catch (TAC) for named skate species, in the waters west of the British Isles

Tetronarce nobiliana Bonaparte, 1835

Electric ray

Irish name: Roc nimhe

Status

Ireland: Near Threatened. NE Atlantic: Least concern. Global: Data deficient.

Justification

This is a rare species that is only infrequently encountered. The exact status of this species is unknown and given the paucity of data, viviparous breeding and large body size of the species it is classified as “Near Threatened”.

Range, distribution and habitat

This species has a wide distribution in the Northeast Atlantic, occurring from Ireland and the UK to Morocco and the Mediterranean Sea (Stehmann and Bürkel 1984). It is usually found at depths ranging from 10-150m but specimens have been recorded down to 800m.

Biology and Ecology

Little is known about the biology or ecology of this species in the Northeast Atlantic. Unlike other ray species occurring in Irish waters it is benthopelagic, swimming in the water column and migrating over long distances (Stehmann and Bürkel 1984). A viviparous species, it reaches a maximum size of about 180cm total length (TL) (McEachran and Carvalho 2002). Up to 60 embryos have been reported in large females, gestation period is about 12 months and size at birth is 20-25cm TL (McEachran and Carvalho 2002). In the Mediterranean Sea the smallest adult male was reported to be 55cm TL, whereas the smallest female was 90cm TL (Capapé *et al.*, 2006).

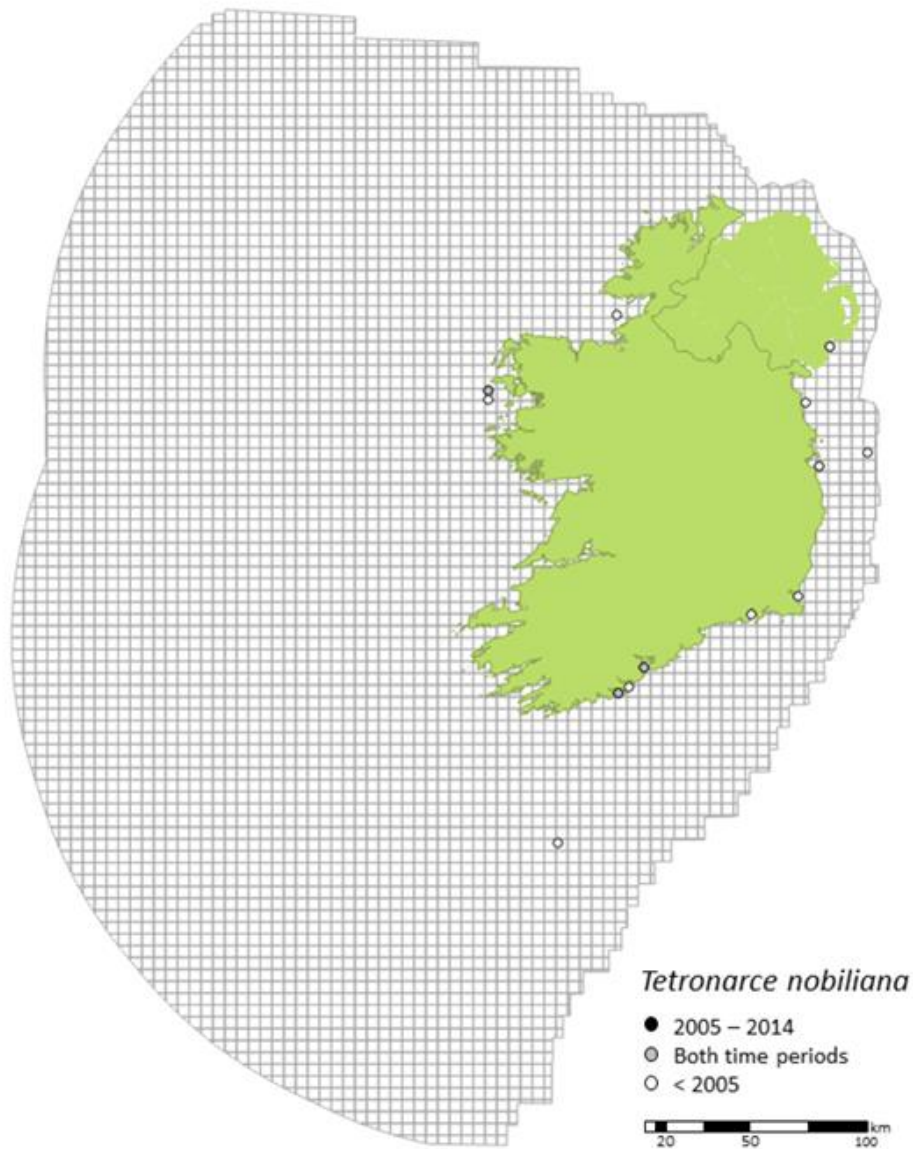
Trend

No information is available.

Human impacts

As a coastal and inner shelf species it is susceptible to bycatch of trawl and gill net fisheries. It is not consumed and is usually discarded, resulting in limited catch data. Further research is required to determine the impact of fishing activities on the species.

Very few data are available on population or catch trends from scientific surveys, although surveys suggest that this species is rarely caught. Went (1978) noted captures from the south and west coasts and single specimens from the north-west and the Irish Sea. Only four specimen electric ray (specimen weight is ≥ 9.072 kg) have been reported to ISFC from 1977 to 2015. The most recent was in 2002 and all were taken in summer months (August and September) with three being taken on the south coast.



Management/Conservation

There are currently no EU limits on landings or proposals for management of this species.

Raja brachyura Lafont, 1873

Blonde Skate

Irish name: Roc fionn

Status

Ireland: Near Threatened. NE Atlantic: Near Threatened. Global: Near Threatened.

Justification

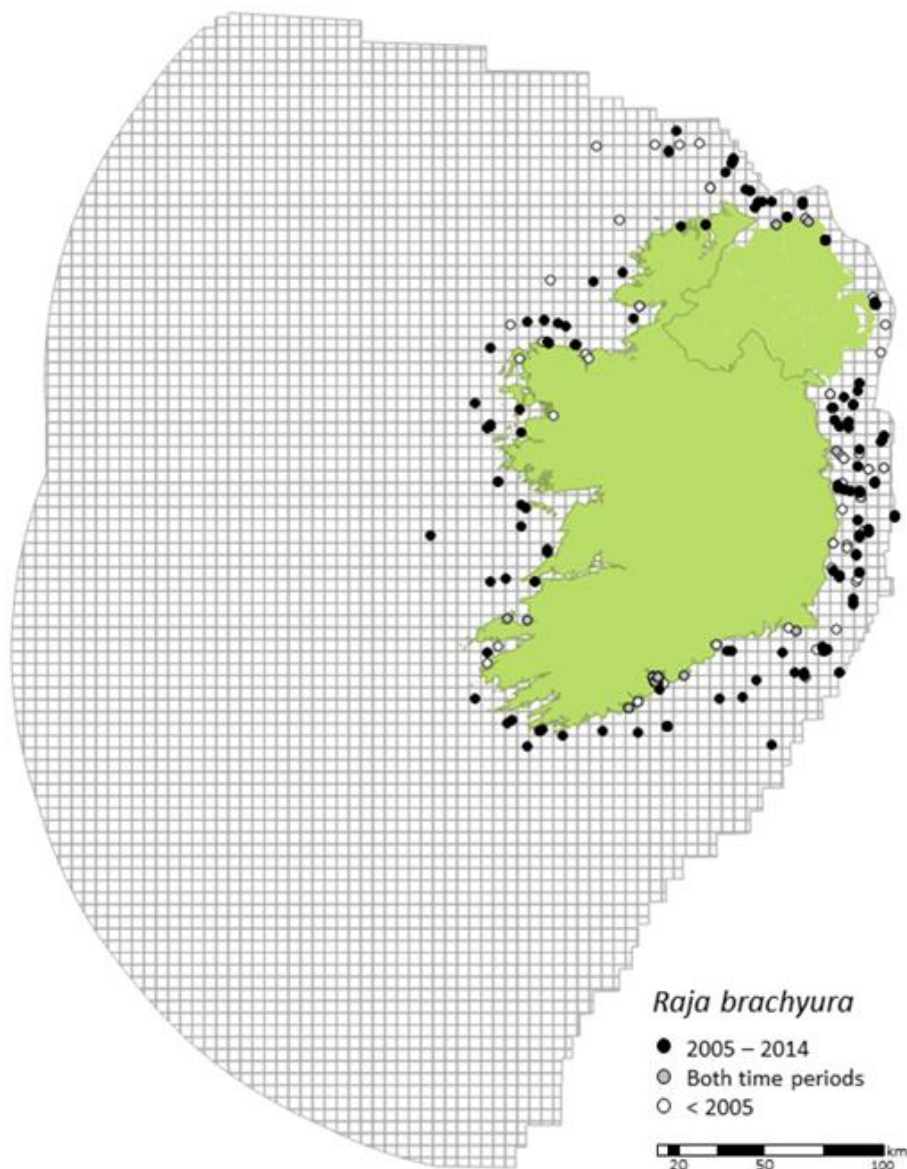
As a coastal and inner shelf species it is a bycatch of trawl and gill net fisheries. Although locally abundant in some areas, survey data indicate that declines may have occurred. This species, like other relatively large

skates, is slow growing making it vulnerable to depletion. Given observed and inferred declines, and continued high levels of exploitation, this species is assessed as “Near Threatened”.

Range, distribution and habitat

Raja brachyura (blonde skate) is a medium-bodied skate species with a wide geographic distribution in the Northeast Atlantic and Mediterranean Sea (Stehmann and Bürkel, 1984a). It is relatively common in the inshore and shelf waters (down to about 150m) in the English Channel and Irish Sea, Bristol Channel and St George’s Channel (Fahy 1989, 1991; Ellis *et al.*, 2005a).

The species is often associated with sandbanks and commonly occurs from 14–146m (Ellis *et al.*, 2005). In the Irish and Celtic Sea *R. brachyura* has a patchy distribution but can be locally abundant on particular grounds. ICES considers that a single population exists off Ireland, encompassing the Irish and Celtic Seas and the Bristol Channel.



Biology and Ecology

Combined data from the North Sea and Celtic Sea ecoregions indicate length-at-maturity (L_{50}) of 78.2cm TL and 85.6cm TL for males and females, respectively (McCully *et al.*, 2012). The observed length range was 13–

100cm TL and 12–102cm TL for males and females, respectively (McCully *et al.*, 2012). The connectivity among stocks in these ecoregions is unknown. In the Irish Sea the length and age at 50% maturity for males and females was reported as 81.9 and 83.7cm TL and 4.6 and 5.5 years, respectively (Gallagher *et al.*, 2005). Juvenile *R. brachyura* have been recorded in the Bristol Channel, Cardigan Bay and Irish Sea, and off Poole and in Start Bay within the English Channel (Ellis *et al.*, 2005). Egg case records suggest that the south coast from Tralee Bay to Waterford constitute nurseries (Varian *et al.*, 2011).

Trend

The only trend information available is for juveniles, and shows an increase over time. There is no information on adult population trends, but available evidence suggests that the population is over-exploited. Specimen fish numbers from 1954 – 2015 (Irish Specimen Fish Committee reports) show periodic peaks in abundance since the 1960s with a decline observed since the late 2000s.

Human impacts

As a coastal and inner shelf species it is a by-catch of trawl and gill net fisheries in the Irish Sea, Celtic Sea and in the Bristol Channel. Other landings come from inshore fisheries on the south, west and northwest coasts. As one of the larger species in the skate complex, it may be targeted in some local, seasonal fisheries.

Management/Conservation

This species is managed as part of the generic maximum total allowable catch (TAC) for named skate species, in the waters west of Ireland and the UK.

Scyliorhinus stellaris (Linnaeus, 1758)

Bull huss

Irish name: Fíogach mór

Status

Ireland: Least concern. NE Atlantic: Near Threatened. Global: Near Threatened.

Justification

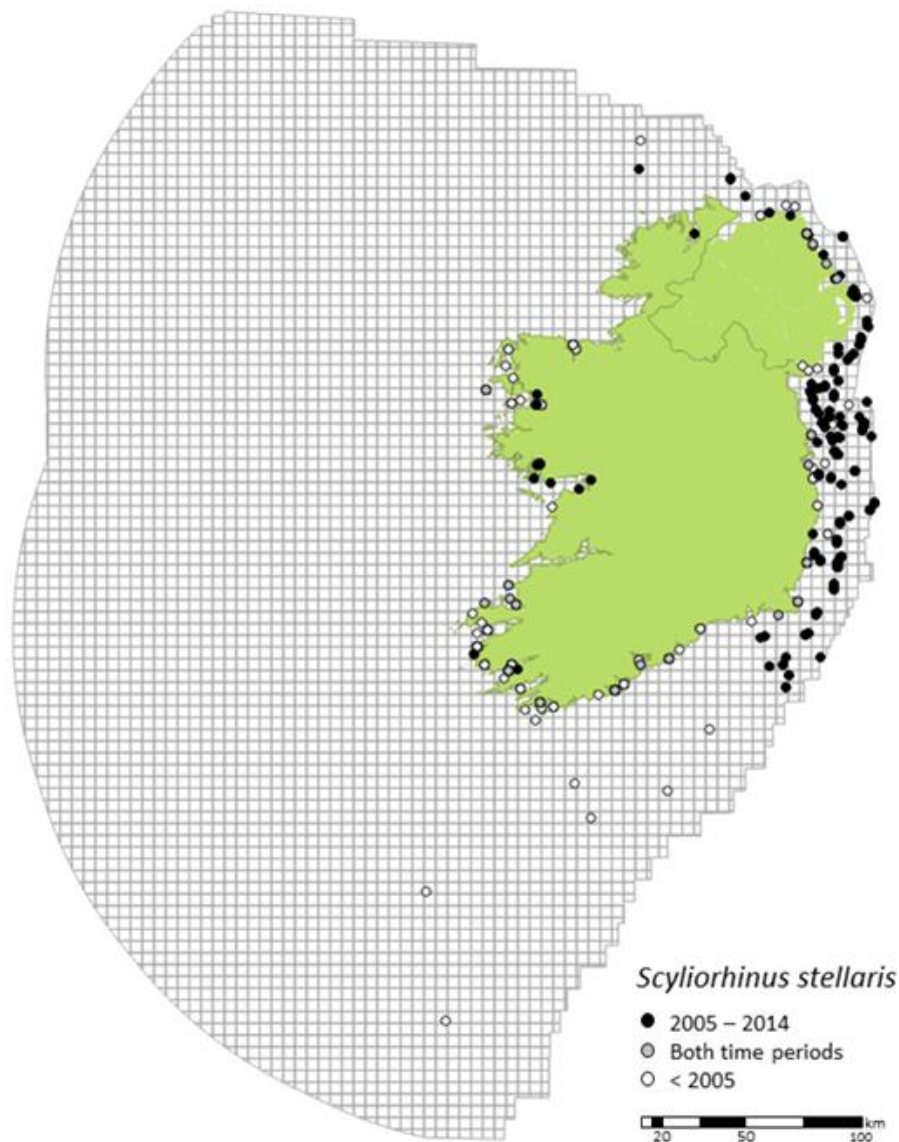
Given upward trends in its abundance, likely high reproductive output and not being vulnerable to commercial fisheries, a designation of Least Concern is warranted.

Range, distribution and habitat

This species is mainly found from southern Ireland and Britain, the southern North Sea to Morocco, and throughout the Mediterranean. A demersal species found over rocky bottoms down to about 65m (Quero, 1984b), the bull huss has been shown to demonstrate strong site fidelity (Simms *et al.*, 2005).

Biology and Ecology

This medium bodied shark reaches from 130-162cm TL. It is an egg laying species (Quero, 1984b). Little further information on the species exists.



Trend

The UK-Irish Sea and Bristol Channel beam trawl survey shows an overall increase since the early 1990s. Bull huss have been reported consistently by anglers to the ISFC since the 1960s.

Human impacts

This species is sometimes taken as a discarded by-catch in demersal fisheries. Because it is mainly found in rocky inshore areas, which are avoided by many commercial fishers, it is rarely caught. Its survivability upon being discarded is very high. Consequently it is not very vulnerable to fisheries.

Management/Conservation

There are no management measures in place for this species.

Raja microocellata, Montagu, 1818

Small-eyed ray

Irish name: Roc mionsúileach

Status

Ireland: Least concern. NE Atlantic: Near threatened. Global: Least concern.

Justification

Given its restricted and patchy, fragmented geographical distribution and localised abundance, local populations may potentially be vulnerable to declines caused by over-fishing, habitat degradation and other anthropogenic disturbance. Catch rates in a scientific trawl survey (1993-2013) of the Bristol Channel have been stable over the longer time series, although catch rates (all individuals) have declined in the most recent years therefore it should be closely monitored and reevaluated in the short term.

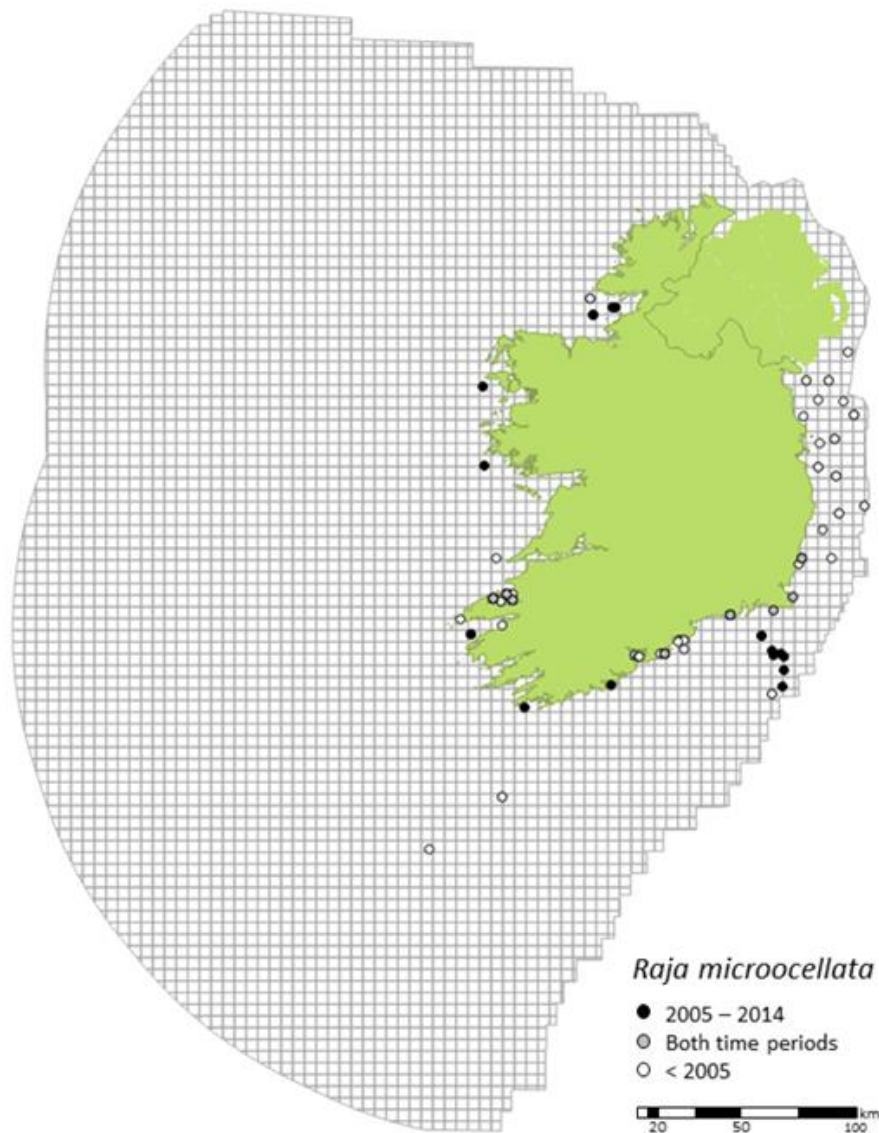
Range, distribution and habitat

Raja microocellata (small-eyed ray, also known as the painted ray) is a medium-bodied species restricted primarily to the Atlantic coasts of Northwest Europe (Stehmann and Bürkel 1989) and is most abundant in bays and other inshore sandy areas (Ellis *et al.*, 2005). Although occasional specimens of *R. microocellata* are caught in the southern Irish Sea, the main concentration of this species is in the Bristol Channel, with larger individuals occurring slightly further off-shore. The species seems to have a fragmented population, possibly due to the fragmented nature of its favoured inshore, sandy habitat.

In Irish waters it is locally common along the south coast and particularly in Youghal Bay, Ballycotton Bay and in the Tralee Bay/Castlegregory area where it is targeted by shore anglers. Separate populations appear to exist off the west coast. The population comprises the inner Celtic Sea and Bristol Channel (ICES, 2014a,b).

Biology and Ecology

Combined data from the North Sea and Celtic Sea ecoregions indicate length-at-maturity (L_{50}) of 68.9cm TL and 77.9cm TL for males and females, respectively (McCully *et al.*, 2012). The observed length range was 13–80cm TL and 12–85cm TL for males and females, respectively (McCully *et al.*, 2012). Fecundity has been estimated at 54-61 eggs per year, with egg-laying activity peaking between June and September (Ryland and Ajayi 1984). Size at birth is approximately 10cm TL (Ryland and Ajayi 1984). The feeding habits have been described for those populations inhabiting Carmarthen Bay (Ajayi 1977, 1982) and the Cove of Bertheaume in Brittany (Rousset 1987) and it is known that they feed on a variety of crustaceans and teleosts. Juveniles predate primarily on small shrimps and amphipods, with fishes (e.g. sand eels and dragonets) becoming more important in the diets of larger individuals. Neonatal *R. microocellata* are caught infrequently by fisheries surveys, but are comparatively abundant in beach seine surveys along the sandy shores of the northern Bristol Channel (Ellis *et al.*, 2005).



Trend

Survey based indicators showed a stable trend from the mid 1990s to the late 2000s with a more recent decline of 27% (ICES, 2014). In contrast, recreational catches (based on numbers of specimen skate ≥ 4.54 kg, all of which are released) have increased in the recent years.

Human impacts

As a coastal and inner shelf species it is a bycatch of trawl and gill net fisheries. It is mainly caught in the Bristol Channel but other landings come from inshore fisheries on the south, west and northwest coasts. Due to its restricted distribution, inshore habitats and overall scarcity it may be at risk from overfishing and habitat disturbance.

Management/Conservation

This species is managed as part of the generic maximum total allowable catch (TAC) for named skate species, in the waters west of the British Isles.

Raja montagui Fowler, 1910

Spotted ray

Irish name: Roc mín

Status

Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

Populations of *Raja montagui* appear to be stable throughout its range despite being commonly landed in fisheries. Their small body size is likely to mean this species has greater resilience to fishing impacts compared to larger-bodied skate species. Given these reasons it is classified as “Least Concern”.

Range, distribution and habitat

One of the most common ray species in Irish waters the spotted ray (*Raja montagui*) is a small-bodied species with a wide geographic distribution in the Northeast Atlantic and Mediterranean (Stehmann and Bürkel, 1984a). Within the Northeastern Atlantic it tends to occur in inshore waters and shallow shelf seas, in depths of 8 to 283m (Ellis *et al.*, 2005a), though it is most abundant in waters less than 100m. Juveniles tend to occur closer inshore on sandy sediments, with adults also common further offshore on sand and coarse sand-gravel substrates. ICES considers two separate stocks around Ireland. The first is in the Irish and Celtic Seas and Bristol Channel. The second is west of Scotland, and northwest and west of Ireland (ICES, 2014a,b).

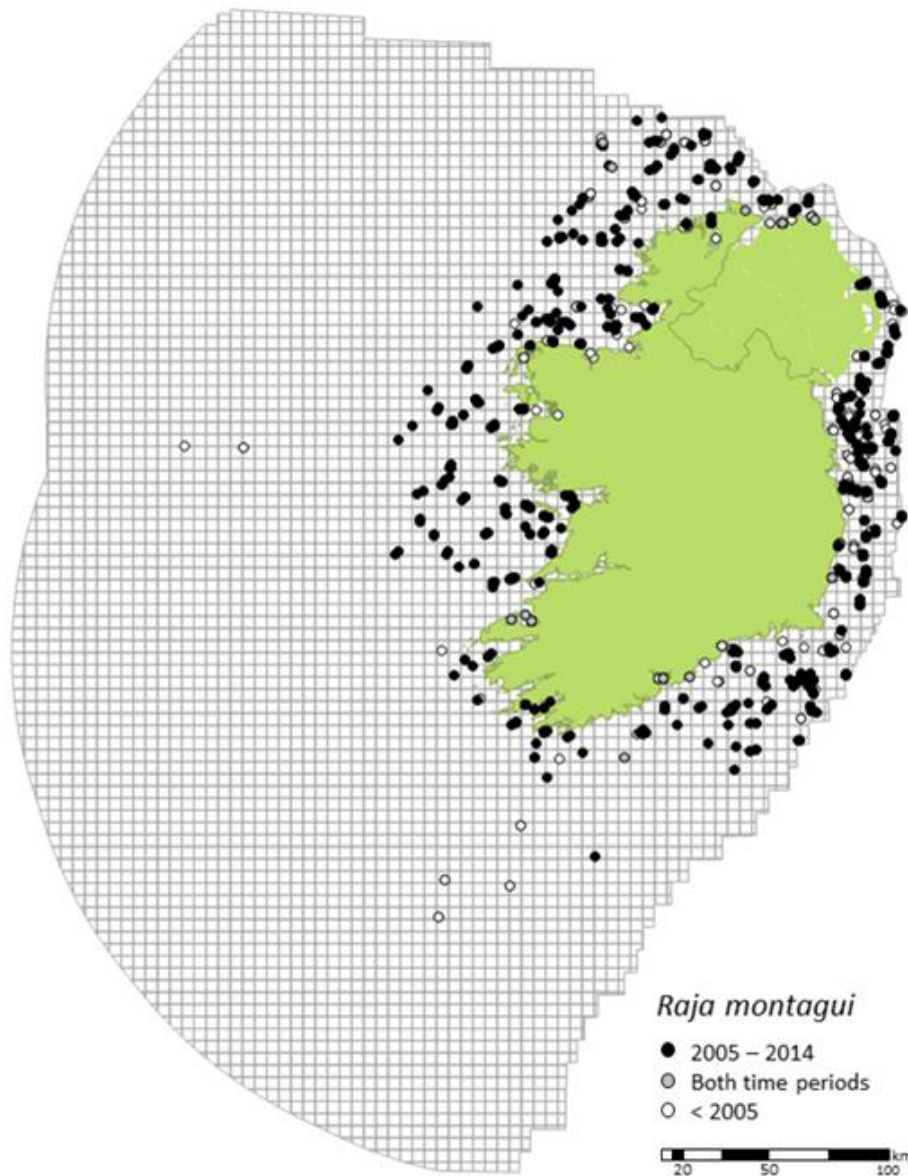
Biology and Ecology

Combined life-history data from the North Sea and Celtic Sea ecoregions indicate length-at-maturity (L_{50}) of 50.9cm TL and 62.5cm TL for males and females, respectively (McCully *et al.*, 2012). The observed length range was 10–67cm TL and 10–76cm TL for males and females, respectively (McCully *et al.*, 2012). In the Irish Sea the length and age at 50% maturity for males and females was reported as 53.7 and 57.4cm TL and 3.4 and 4.1 years, respectively (Gallagher *et al.*, 2005).

Juveniles and egg cases are often abundant in inshore sheltered nursery areas and a high abundance of juveniles have been recorded in Cardigan Bay, off the east coast of Ireland and around Anglesey (Ellis *et al.*, 2005). Separate nurseries are likely to occur, based on egg case records, from Dublin to Waterford; Tralee and Dingle Bays, and some bays in Connacht (Varian *et al.*, 2011).

Trend

The population of spotted ray in the Irish and Celtic Seas has increased over time and is at the highest level since the indices began in the early 1990s. However there is evidence that the stock is being fished at levels above those that are sustainable (ICES, 2014). The population off north western and western Ireland has increased since the early 2000s (ICES, 2014). Recreational angling data (ISFC, unpublished) shows that fewer specimen fish (≥ 2.29 kg) have been recorded since the 1990s which may indicate reductions in numbers of larger fish.



Human impacts

As a coastal and inner shelf species it is susceptible to bycatch of trawl and gill net fisheries. Preliminary studies of catch rates in beam trawl surveys in the English Channel and Irish Sea appeared stable when this species was last assessed (Ellis *et al.*, 2005b), and IBTS data in the North Sea were also relatively stable (ICES 2006). These catch rates refer to all individuals caught and not just mature fish.

Management/Conservation

This species is managed as part of the generic maximum total allowable catch (TAC) for named skate species, in the waters west of Ireland and the UK.

Raja clavata Linnaeus, 1758

Thornback ray

Irish name: Roc garbh

Status

Ireland: Least concern. NE Atlantic: Near threatened. Global: Near threatened.

Justification

Updated population assessments for the northwest Ireland and Irish/Celtic Sea populations show that it is increasing in abundance in recent years. There is sufficient information to show that it does not warrant any designation other than “least concern”.

Range, distribution and habitat

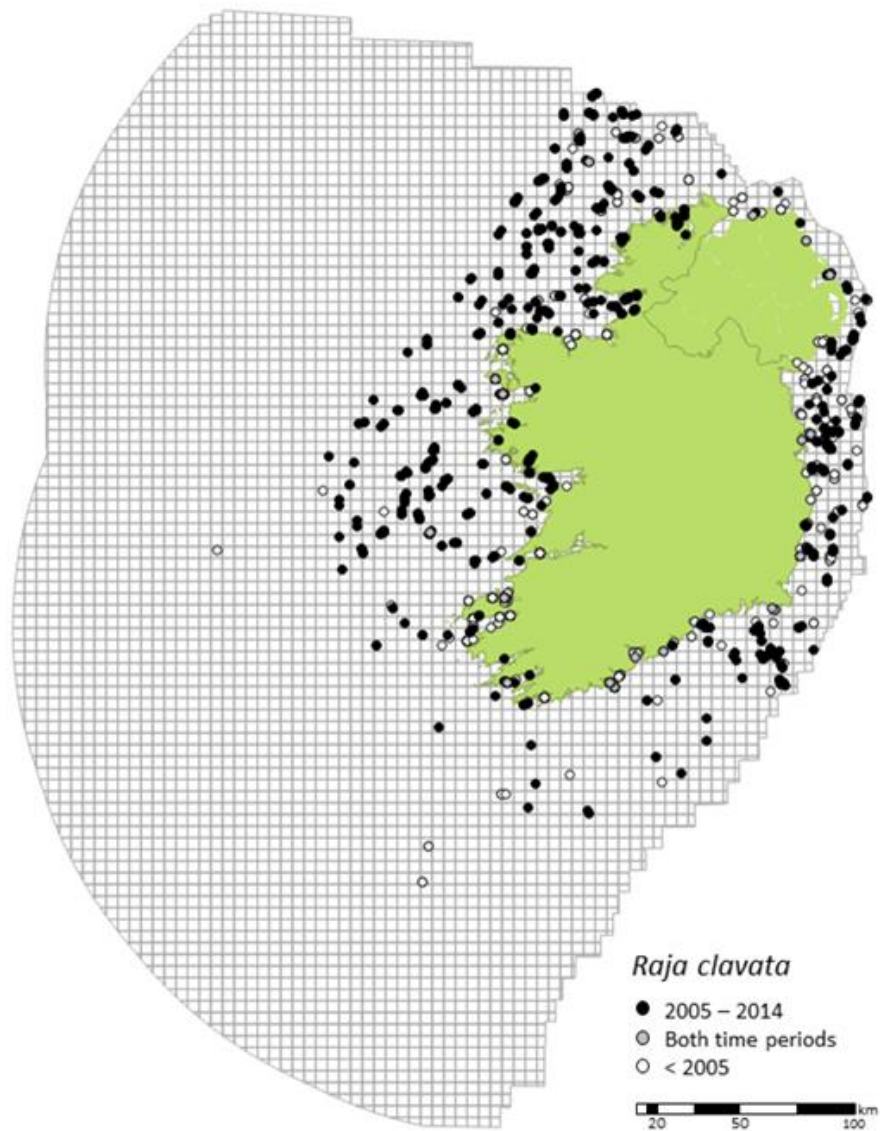
This is a medium-bodied ray, found in the coastal waters of the eastern Atlantic, from the Faroe Islands, Iceland, and Norway to South Africa, in the Mediterranean, the Mid-Atlantic Ridge south from Iceland, and in the southwestern Indian Ocean (Stehmann and Burkel, 1984a). The species is mainly found on hard seabed (e.g. gravel and pebble), in areas of intermediate to strong tidal currents at depths of 7–192m (Ellis *et al.*, 2005). Genetic studies have revealed population segregation in *R. clavata* between the Mediterranean region, the Azores, and the European shelf waters (Chevolot *et al.*, 2006); however, the regional population structure of this species remains poorly known. ICES considers two main populations around Ireland, one in the Irish and Celtic Seas, the other off northwest Ireland (ICES, 2014a,b).

Biology and Ecology

The observed length range was 10–89cm TL and 10–98cm TL for males and females, respectively (McCully *et al.*, 2012). Maximum age is reported at 12 years (Ryland and Ajayi, 1984), maturing at age 6 and length 65–71cm (Gallagher *et al.*, 2005), with estimated fecundity from 60–140 eggs per year (Holden, 1975). ICES considers three separate populations around Ireland, NW Ireland/W Scotland, western Ireland and Irish/Celtic Seas/Bristol Channel. The species moves inshore in spring/summer. The species forms localised populations along the south and west coasts, with some degree of interchange between them (Fitzmaurice *et al.*, 2003). Spawning areas include Tralee Bay (Fitzmaurice *et al.*, 2003; Varian *et al.*, 2011), but also Dingle Bay and the east coast from Dublin to Wexford (Varian *et al.*, 2011). Known nurseries are in inshore areas, including northern Bristol Channel, Cardigan Bay, Luce Bay, and Solway Firth (Ellis *et al.*, 2005).

Trend

In the Irish and Celtic Sea/Bristol Channel stock, the population size indicator has increased markedly since the early 2000s. The north-west Ireland/west Scotland stock has increased less markedly over the same period (ICES, 2014a;b). Specimen catches have declined since the 1990s and no large fish (≥ 8 kg) have been recorded by ISFC since 2007.



Human impacts

As a coastal and inner shelf species it is a bycatch of trawl and gill net fisheries. It is mainly caught close to the coasts of the Irish Sea by beam and otter trawlers, and also in the Bristol Channel. Other landings come from inshore fisheries on the south, west and northwest coasts. As one of the larger species in the skate complex, it may be targeted in some local, seasonal fisheries. Localised fisheries on the west coast may disproportionately impact on individual populations especially on the west coast. Small numbers are taken by recreational anglers in some areas.

Management/Conservation

This species is managed as part of the generic maximum total allowable catch (TAC) for named ray species, in the waters west of Ireland and the UK.

Mustelus asterias Cloquet, 1821

Starry smooth-hound

Irish name: Scoirneach ballach

There is longstanding confusion regarding the identification and nomenclature of *Mustelus* species in the Northeast Atlantic. The characteristic white spots of *Mustelus asterias* have long been used to differentiate it from the common smooth-hound *Mustelus mustelus*, however the appearance of these spots displays much intraspecific variability (Farrell, 2010). Based on detailed analyses by Farrell (2010) and Farrell *et al.* (2009), there is no evidence of *M. mustelus* occurring in the northeast Atlantic region north of Portuguese waters. On this basis, all records of *Mustelus* spp. in this region should be considered to be *M. asterias*.

Status

Ireland: Least concern. NE Atlantic: Near threatened. Global: Least concern.

Justification

Abundance trends from the International Bottom Trawl Survey (IBTS) in the Northeast Atlantic appear to be stable or increasing at the present time. However there has been an increase in reported landings from this region. The species is assessed as “Least Concern” in this region due to the increasing abundance. Nonetheless, population trends and catch levels should be carefully monitored.

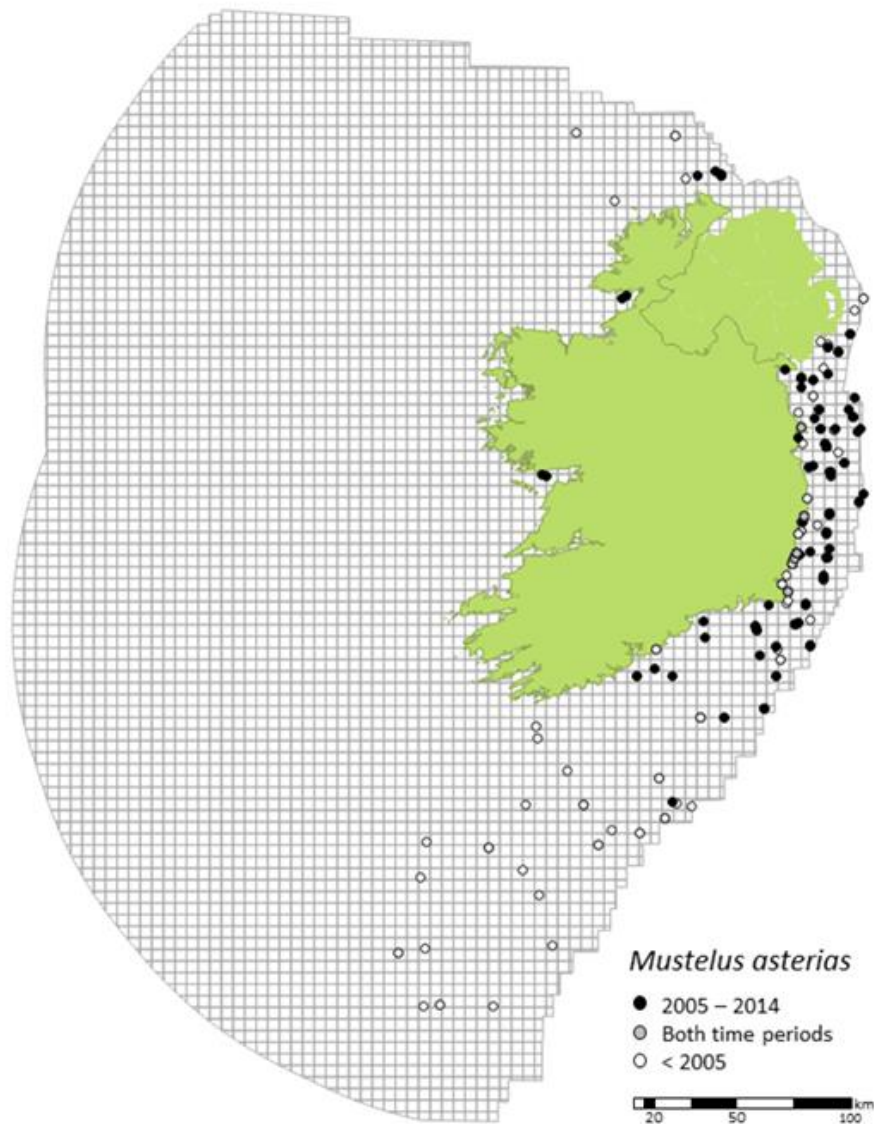
Range, distribution and habitat

M. asterias is abundant in the Northeast Atlantic Ocean (Irish Sea, North Sea, English Channel, Celtic Sea, Bristol Channel and Bay of Biscay) and also occurs in the Mediterranean Sea. The southern limit of its distribution is reported as Mauritania (Compagno, 1984). In Irish waters they are most commonly encountered off the shallow sandy beaches of the coast of Wicklow and Wexford though there appears to be a northern increase in their distribution in recent years.

Biology and Ecology

In the NE Atlantic the length and age at 50% maturity for males and females are estimated to be 78cm TL and 4-5yrs and 87cm TL and 6 yrs, respectively (Farrell *et al.*, 2010b,c). Longevity is estimated to be 13 and 18.3 years for males and females, respectively. *Mustelus asterias* is an aplacental viviparous species, which exhibits geographic variation in its reproductive traits. In the Northeast Atlantic ovarian fecundity ranged from 8 to 27 oocytes and observed uterine fecundity from 6 to 18 embryos (Farrell *et al.*, 2010c). The average length at birth was 30cm TL. Gestation period was ~ 12 months, followed by a resting period of ~12 months, resulting in a biennial reproductive cycle. Parturition occurs from April to July and neonates have been observed in shallow waters off sandy beaches on the southeast coast of Ireland (Farrell, 2010a). No published information exists on the location of parturition and nursery areas of *M. asterias*, however neonates and juveniles are also periodically abundant in shallow areas of the English Channel, southern North Sea/Thames Estuary and Bristol Channel (Ellis *et al.*, 2005). In the Irish Sea, large pregnant females (> 90cm TL) are seasonally abundant in May off Holyhead, Wales (Farrell, 2010a).

M. asterias have a crushing dentition and feed primarily on crabs, specifically the swimming crabs *Liocarcinus holsatus* and *Liocarcinus depurator* (Ellis *et al.*, 1996).



Trend

Abundance trends from the International Bottom Trawl Survey (IBTS) in the Northeast Atlantic appear to be stable or increasing at the present time.

Human impacts

Mustelus asterias are caught seasonally as bycatch in trawl and gillnet fisheries some of which discard or land the species, depending on market demands (ICES 2012). ICES landing statistics combine dogfish and hounds together and so there are little accurate data on North Atlantic landings, and levels of bycatch are unknown. Annual reported landings of *Mustelus* spp. (most likely *M. asterias*) from the Northeast Atlantic appear to have increased steadily from an average of around 500t, in the 1980s up to approximately 3,000t in 2009 (ICES 2012).

In some areas, such as the Irish Sea, Bristol Channel, English Channel, they are a relatively important sport fish though almost all anglers practice catch and release for this species.

Management/Conservation

There are currently no management measures in place for this species.

Scyliorhinus canicula (Linnaeus, 1758)

Lesser-spotted Dogfish

Irish name: Catsúileach ballach

Status

Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

The species is assessed as “Least Concern” because overall population trends appear to be stable and there is no evidence to indicate that the population has declined significantly.

Range, distribution and habitat

Lesser-spotted dogfish (*Scyliorhinus canicula*) is widespread in the northeast and eastern central Atlantic from the Shetland Islands and Norway in the north, to western Africa (Morocco, Western Sahara and Mauritania to Senegal, possibly along the Ivory Coast) in the south, including the Mediterranean and Black seas (Compagno *et al.*, 2005, Serena 2005). In Irish waters it is common on all coasts and is one of the most abundant elasmobranch species. The species is widespread and abundant on a variety of substrates (sandy, coralline algal, gravelly or muddy bottoms).

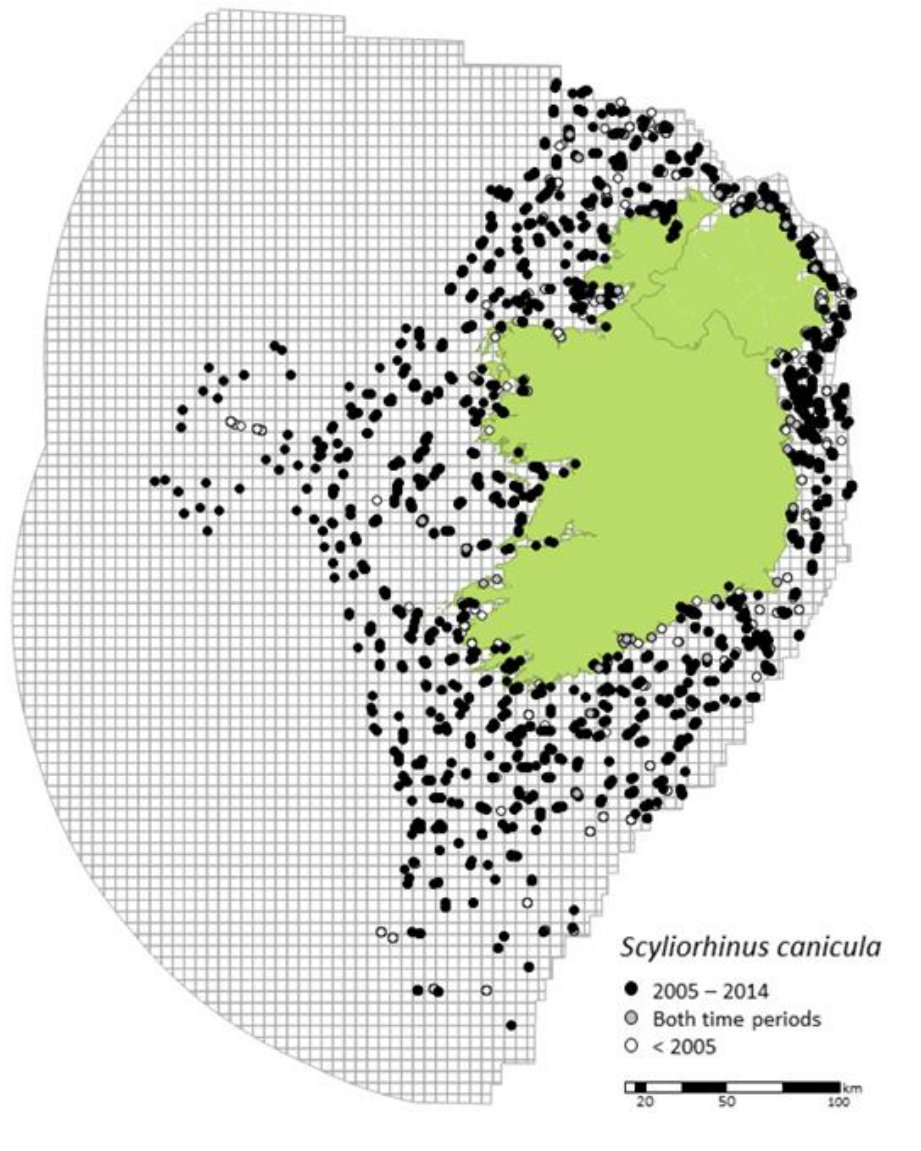
Biology and Ecology

Lesser-spotted dogfish is an oviparous species that deposits eggcases protected by a horny capsule with long tendrils, commonly known as mermaid’s purse. These eggcases are often deposited on macroalgae (e.g., *Fucus*, *Laminaria* and *Himanthalia*) in shallow coastal waters (Compagno 1984). Further from shore, eggcases are deposited on sessile erect invertebrates, including sponges, hydroids, soft corals and bryozoans (Ellis and Shackley 1997).

In the Northeast Atlantic, females reach maturity at 52-65cm TL, and males at 49-55cm TL (Ellis and Shackley 1997). The species has an annual cycle with a protracted 10-11 month breeding season. Extrapolating egg-laying rates in captive specimens to a whole year provides an estimated fecundity of 29-62 eggs/year for Northeast Atlantic populations (Ellis and Shackley 1997). Size at birth is 7-11cm total length.

Trend

Survey catch rates are either stable or increasing in most parts of its range. Some suggested declines in small parts of its range (ICES, 2012).



Human impacts

As a coastal and inner shelf species it is susceptible to bycatch of trawl and gill net fisheries. In some areas larger specimens may be landed for human consumption or they may be landed as bait for whelk fisheries. They have a high survivorship when discarded from trawl fisheries (Revill *et al.*, 2005).

Management/Conservation

There are currently no EU limits on landings or proposals for management of this species.

DEEPWATER SPECIES

Centroscymnus coelolepis Barbosa du Bocage and de Brito Capello, 1864

Portuguese dogfish

Irish name: Fíogach Portaingéalach

Status

Ireland: Critically endangered A2bd. NE Atlantic: Endangered. Global: Near threatened.

Justification

Estimated abundance has declined by 83% between 1993 and 2007 (Dobby *et al.*, 2010), the causes of this reduction have not ceased and exploitation levels are still high.

Range, distribution and habitat

This is a medium sized benthopelagic shark found the eastern Atlantic, from Iceland to Senegal, mid-Atlantic from the Azores and Madeira north to Iceland, the western Atlantic from the Delaware Bay north to the Grand Banks, the SW Atlantic from Namibia to South Africa (Compagno, 1964), Japan (Yano and Tanaka, 1983), New Zealand (Clark and King, 1987). It occurs at depths from 270 – 3,675m (Compagno, 1984). It occurs all along the Irish continental slope at depths from 600m to at least 1,900m and along the eastern slopes of the Rockall plateau (Connolly and Kelly, 1994; Connolly *et al.*, 1997). ICES considers that a single stock exists in the Northeast Atlantic (ICES WGEF 2005), and this has been supported by Verissimo *et al.* (2012).

Biology and Ecology

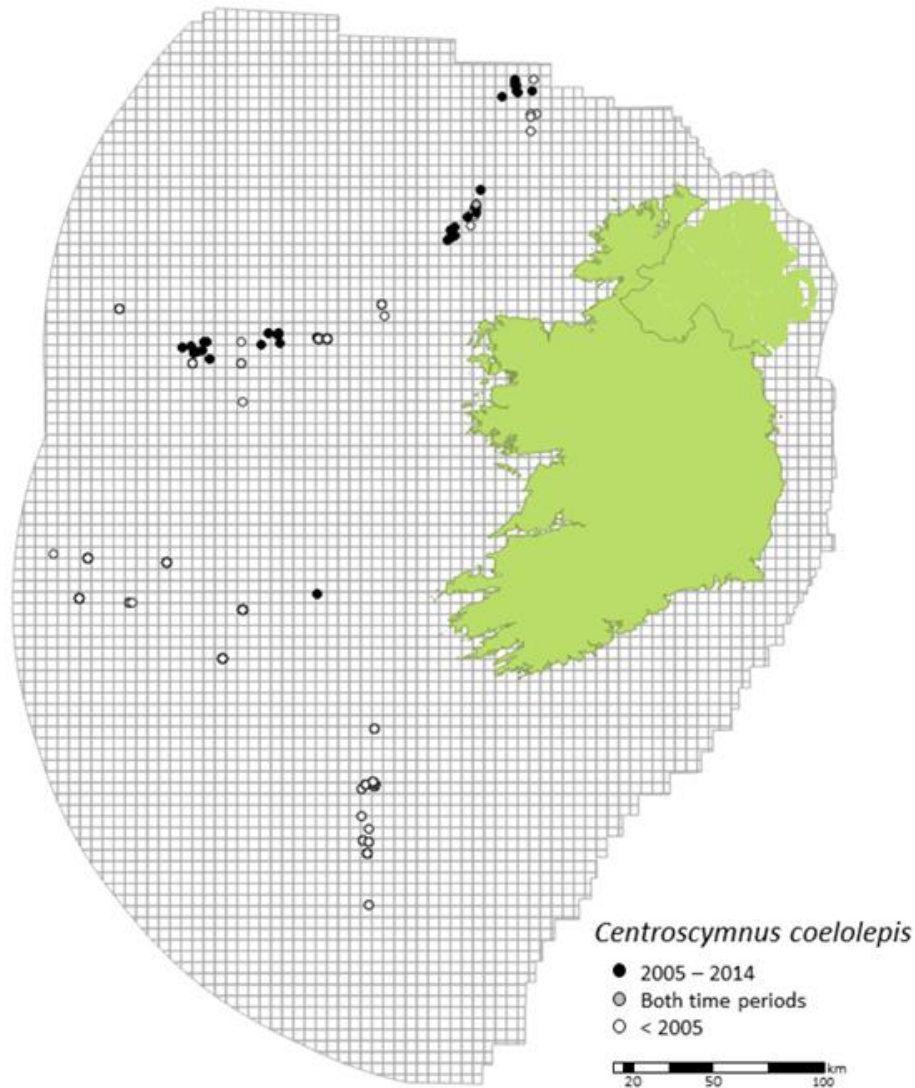
The length range for males in Irish waters is 68cm to 109cm and for females 71cm to 121cm (Clarke, 2000) with only one neonate ever encountered (Clarke *et al.* 2001a). Size at maturity occurs at 86cm and 102cm for males and females respectively. Fecundity is in the range 8-21 pups (Clarke *et al.* 2001b). Age, growth and gestation are currently unknown.

Trend

Population abundance has declined by 83% from 1993 to 1997, or by 78% by 2009 (Dobby *et al.*, 2010). There is no evidence to suggest that this decline has been reversed since (Neat *et al.*, 2015).

Human impacts

This species was commercially exploited from 1989 until the mid 2000s. Portuguese dogfish continues to be taken as by-catch in mixed fisheries for deepwater species west and north of Ireland. This by-catch is unavoidable because the fisheries take place within its depth range. Survival of discarded by-catch will be very low for deepwater species such as this. These fisheries target other species for which sizeable total allowable catches exist. This species is particularly vulnerable to exploitation in Irish waters because its entire reproductive cycle is vulnerable to the deepwater fishery.



Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species. The species is recommended for additional conservation measures by OSPAR.

Centrophorus squamosus (Bonnaterre, 1788)

Leaf scale gulper shark

Irish name: Siorc slogach gainneach duille

Status

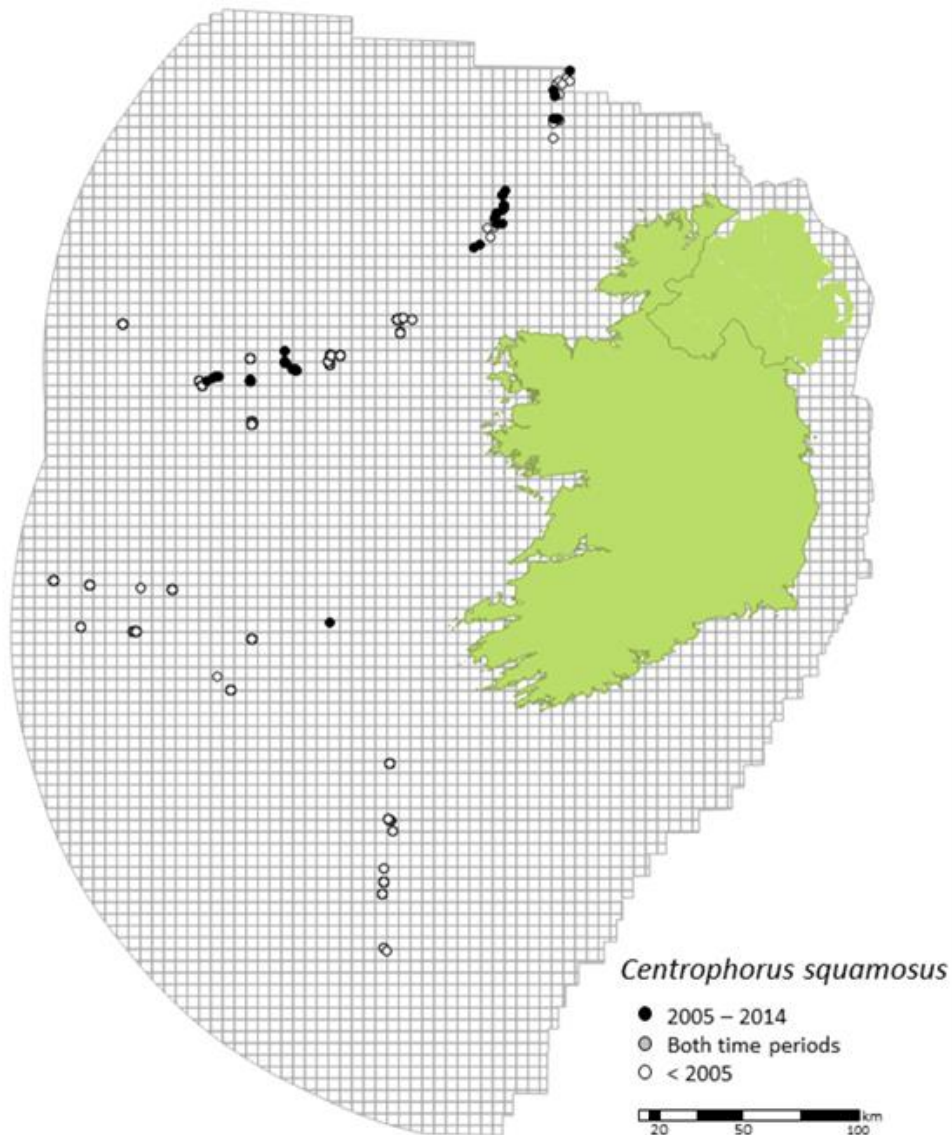
Ireland: Endangered A2abd. NE Atlantic: Endangered. Global: Vulnerable.

Justification

Observed population abundance declined by 70% in its core distribution area (Sub-area VI) between 1994 and 2001 (ICES WGEF, 2005, Table 3.11). The causes of this reduction have not ceased and exploitation levels are too high.

Range, distribution and habitat

This species occurs in the eastern Atlantic Ocean from Iceland to Senegal, the Azores, Madeira, Gabon to Zaire and the Cape coast of Africa. It is also found in western Indian Ocean, the Phillipines, Japan, southeastern Australia and New Zealand (Compagno 1984). It was recorded in the western Indian Ocean (Forster *et al.* 1970) and also on the Faraday Seamount and Reykjanes Ridge areas of the Mid-Atlantic Ridge (Hareide and Garnes, 1998). It has recently been confirmed from the Galapagos Islands (Alcuna-Marreno *et al.*, 2013). It has been recorded at depths of 229 – 2,359m (Compagno, 1984). It occurs all along the Irish continental slope from 610m to about 1,400m but peak abundance is between 700 and 800m and along the eastern slopes of the Rockall plateau (Connolly and Kelly, 1994; Connolly *et al.*, 1997).



Biology and Ecology

In Irish waters the length range is 80-145cm (Clarke, 2000). Small sharks are never encountered in Scottish, Irish or Spanish waters (Bañón *et al.*, 2006; Clarke *et al.*, 2002a), but are found in Portugal and Madeira (Figueiredo *et al.*, 2008). In the north Atlantic, pupping is known to occur only at Madeira (Severino *et al.*, 2009). The age range is 21-71 years, while size at maturity is 102 and 128cm for males and females respectively (Clarke *et al.*, 2002). Fecundity is reported as 7 near-term embryos (Bañón *et al.*, 2006) or 5 (Severino *et al.*, 2009). ICES considers that a single stock exists in the Northeast Atlantic (ICES WGEF 2005), and this has been supported by Verissimo *et al.* (2012).

Trend

Observed population abundance declined by 70% in its core distribution area (west of Scotland) and 77% west of Ireland, between 1994 and 2001. Elsewhere the trends have been downward also, including a 66% decline in Portugal (ICES WGEF, 2005, Table 3.11). There is evidence of significant decline from 1999-2013 (Neat *et al.*, 2015).

Human impacts

This species was commercially exploited from 1989 until the mid 2000s. It continues to be taken as by-catch in mixed fisheries for deepwater species west and north of Ireland. This by-catch is unavoidable because the fisheries take place within its depth range. Survival of discarded by-catch will be very low for deepwater species such as this. These fisheries target other species for which sizeable total allowable catches exist. This species is less vulnerable than Portuguese dogfish in Irish waters because part of its reproductive cycle is beyond the spatial extent of the fishery.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species. The species is recommended for additional conservation measures by OSPAR.

Centroselachus crepidater (Barbosa du Bocage and de Brito Capello, 1864)

Longnose velvet dogfish

Irish name: Fíogach slim socfhada

Status

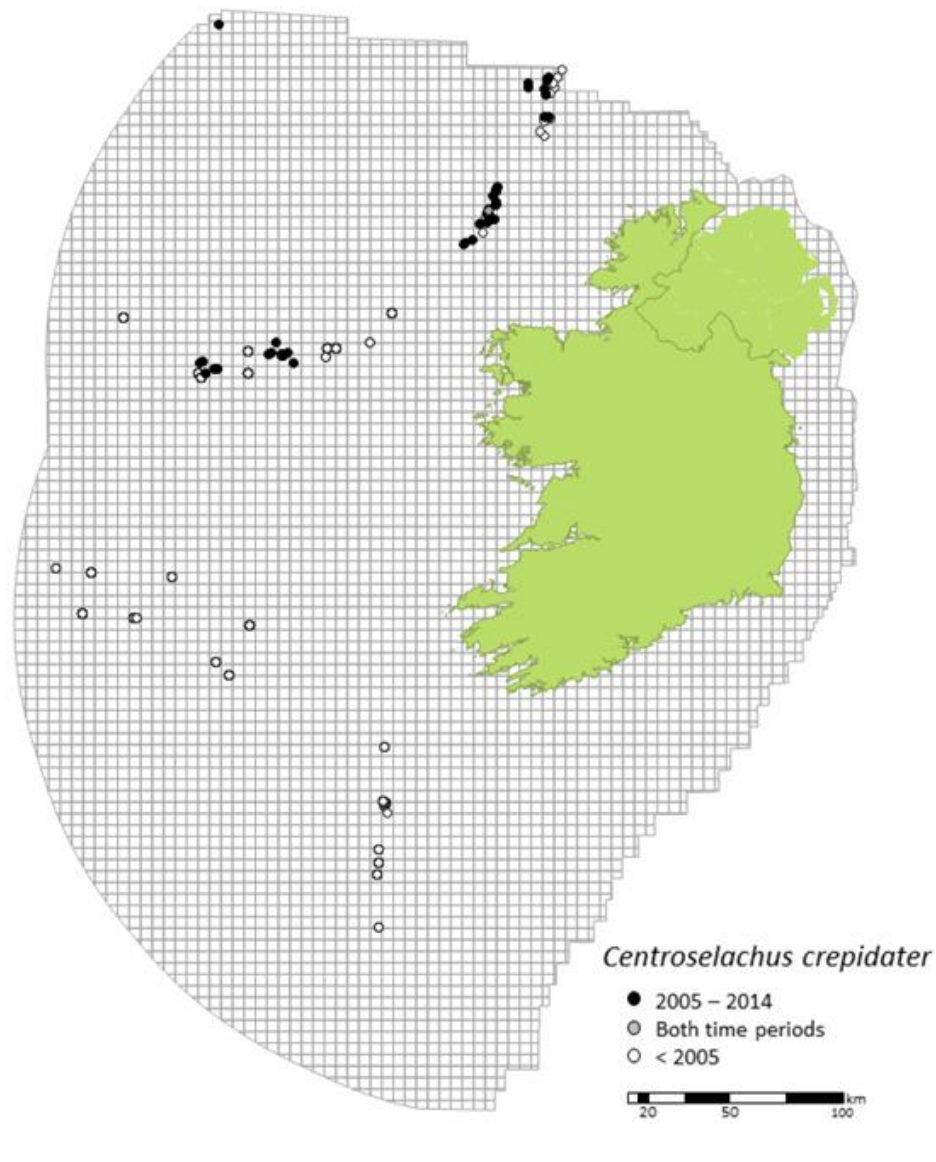
Ireland: Vulnerable A2 bd. NE Atlantic: Least concern. Global: Least concern.

Justification

Despite the European Union (EU) zero Total Allowable Catch (TAC) regulation on this and other deepwater sharks, this species is still extensively taken as by catch in various fisheries. The productivity and rebound potential of this species is likely to be low in keeping with other similar deepwater sharks, such as *Centrophorus squamosus* and *Centroscymnus coelolepis*. It is long lived and has a low reproductive output. Given its decline in abundance, its low productivity and high vulnerability to continued fishing (and discarding) in the Northeast Atlantic, a designation of Vulnerable is warranted. The causes of this reduction have not ceased and exploitation levels are too high (A2abd).

Range, distribution and habitat

This species has a wide but patchy distribution. In the Northeast Atlantic it occurs from Iceland south to west Africa, including Madeira. It also occurs in the Gulf of Guinea, off Namibia, Madagascar, SW India, SE Australia, New Zealand and southern Japan. It also occurs on the Mid Atlantic Ridge, south of the Faraday Seamount (Hareide and Garnes, 2001). It occurs mainly in depths of 500m to 1,300m, being maximally abundant at 1,000m (Gordon, 1999). It seems likely that a single population exists in the northeast Atlantic, from Iceland to Senegal.



Biology and Ecology

Maximum age in Australia is 54 for females and 34 for males. Age at maturity is approximately 9 years for males and 20 years for females (Irvine *et al.*, 2006). In the Northeast Atlantic, size at maturity is 60-68cm total length (TL) and 77-88 cm TL for males and females respectively. Length at 50% maturity is 57.2cm TL for males and 75.4cm TL for females (Moore *et al.*, 2013). *C. crepidater* from southeastern Australia has a mean litter size of six and the reproductive cycle is non-continuous with no seasonal trend (Daley *et al.*, 2002). Although the length of gestation is unknown, it seems reasonable to assume that the reproductive cycle (follicle development, gestation and resting period) would exceed one year and it is probably two or more years. If a cycle of two years were assumed, an annual fecundity of three would indicate a maximum

productivity of 102 offspring per lifetime. However, if the cycle were three years, the maximum productivity would only be 68 offspring per lifetime.

Trend

There was a significant decline in Scottish survey abundance indices over the period 1998-2013, of about 70% (Neat *et al.*, 2015).

Human impacts

By-catch is unavoidable because the species' bathymetric range is within the deepwater fisheries' depth range. Survival of discarded by-catch will be very low for deepwater species such as this.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Dalatias licha (Bonneterre, 1788)

Kitefin shark

Irish name: Siorc eitleoige

Status

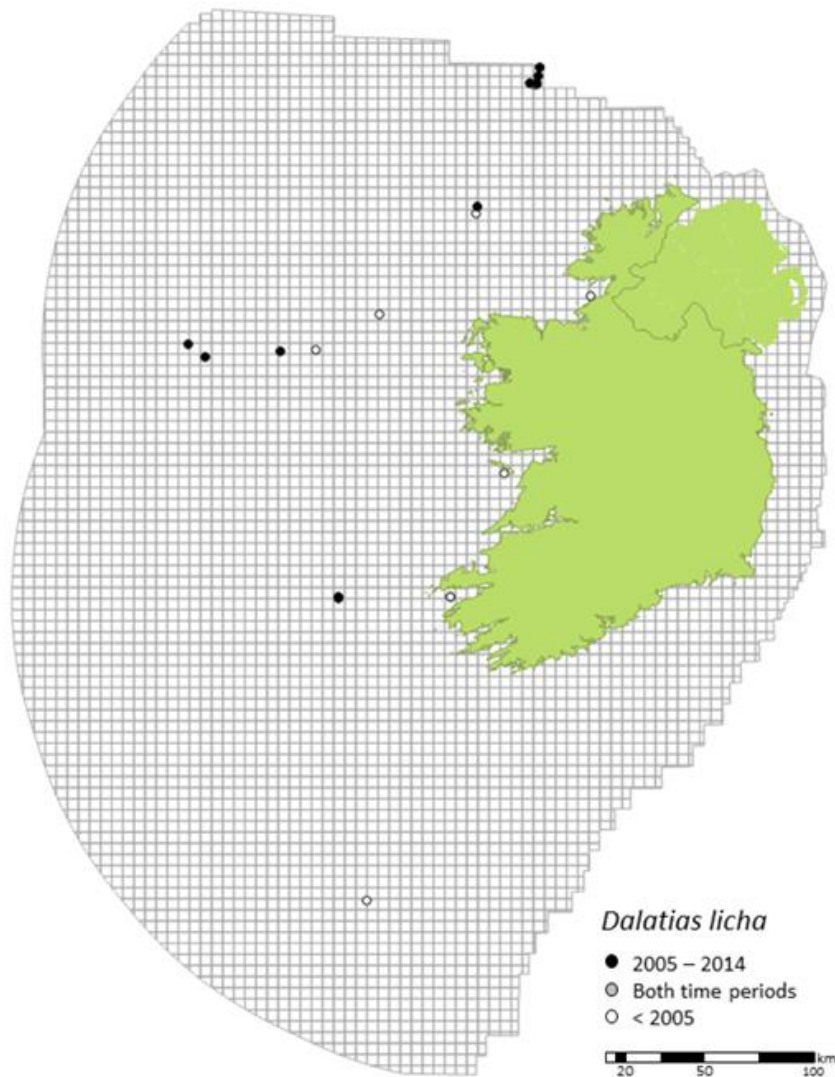
Ireland: Vulnerable A1b. NE Atlantic: Endangered. Global: Near threatened.

Justification

This large species is likely to have a low resilience to fishing due to its conservative life history. It showed a decline in its core area of abundance, in the Azores. Elsewhere, including Ireland, it is a rare species. There are documented declines of more than 50% in the Azores. The causes of these declines (targeted fishing) have now ceased. Therefore a designation of Vulnerable is appropriate.

Range, distribution and habitat

This species occurs in the Atlantic, Indian and Pacific Oceans. In the Atlantic it occurs from Mauritania, Azores and Madeira, north to Scotland and Georges Bank also in the western Mediterranean (McEachrann and Branstetter, 1984). It occurs on the Faraday Seamount on the mid-Atlantic Ridge (Hareide and Garnes, 2001). It also occurs at Hawaii, southern Japan, southeast Africa, south Australia and all around New Zealand (Compagno *et al.*, 2005). It has also been recorded off Brazil (Soto and Mincarone, 2001). It is found in warm-temperate and tropical areas from 37m down to 1,800m depth, most commonly below 200m, primarily at 300-600m (Compagno 1984, McEachran & Branstetter 1984). This species is not common in Irish waters, and the main centre of abundance of the Northeast Atlantic population is of the Azores (ICES, 2005).



Biology and Ecology

This is a relatively large bodied deepwater shark, up to 180cm TL (McEachran and Branstetter, 1984). Length at maturity for females is between 123cm TL and 157cm TL (da Silva, 1988). Maximum size is reportedly 180cm TL, though 120cm is a more common length (Bauchot 1987). Pupping occurs throughout the year, with greater activity during the summer and autumnal months (Bini 1976, Tortonese 1956). This species produces from 3 (Lo Bianco, 1909) to 16 pups per litter (Bauchot 1987, Ebert *et al.*, 2013), but usually 6-8 (Bini 1976, Tortonese 1956). Size at birth is approximately 30cm TL (Lo Bianco 1909). This is likely to be a long lived species, though data are lacking.

Trend

In its core range in the north Atlantic (Azores) it declined by over 50% between 1972 and 2002 (ICES, 2005).

Human impacts

This species was commercially exploited from 1989 until the mid 2000s. It continues to be taken as by-catch in mixed fisheries for deepwater species west and north of Ireland. This by-catch is unavoidable because the fisheries take place within its depth range. Survival of discarded by-catch will be very low for deepwater species such as this. However, as the core area of abundance is not in Irish waters, the fisheries here will have limited impact. The targeted fishery in the Azores has now ceased.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Deania calcea (Lowe, 1839)

Birdbeak dogfish

Irish name: Fíogach éansocach

Status

Ireland: Near Threatened. NE Atlantic: Near Threatened. Global: Least concern.

Justification

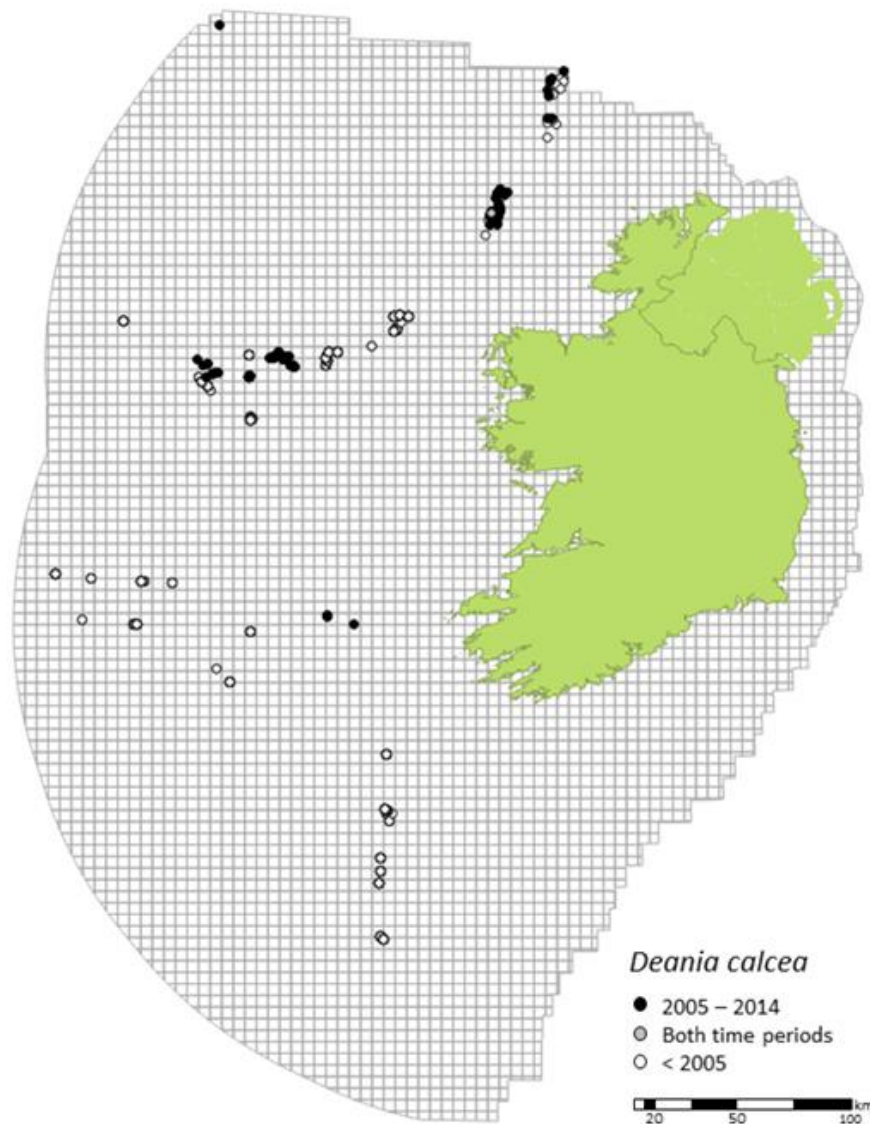
This common species is widely distributed in the Northeast Atlantic, and part of its life history is beyond the range of fisheries. It is more resilient to fishing than some other deepwater sharks, and no declines in abundance have been documented to date. However it is discarded dead in large quantities in several fisheries. Therefore a designation of Near Threatened is appropriate.

Range, distribution and habitat

The birdbeak dogfish (*Deania calcea*) is found in the eastern north Atlantic from Iceland and the Faroes to west Africa, and Madeira, also off Namibia, Chile, New Zealand, south Australia and Honshu (Japan) (Compagno 1984). It is also found on the Reykjanes Ridge and the Faraday Seamount areas of the Mid-Atlantic Ridge, though not on the Hecate Seamount (Hareide and Garnes, 1998). Based on available evidence, a single population exists in the Northeast Atlantic, from Iceland to Portugal and possibly the Azores (Clarke, 2000). It is a highly migratory species (Clark and King, 1989). It occurs in depths of 500-1,400m (McEachran and Branstetter, 1984).

Biology and Ecology

This species is relatively slow growing and reaches a maximum age of 35 years, and matures at 85cm TL in males and 105cm TL in females. Mean ovarian fecundity was 13, and though gravid females are extremely rare, 2 sharks yielded counts of 8 and 14 embryos. (Clarke *et al.*, 2002b). Clark and King (1989) suggested a 4-year interval between gestations in this species, in New Zealand.



Trend

Abundance indices from Scottish trawl surveys in the Rockall Trough fluctuated without an obvious trend since 2000 (Neat *et al.*, 2015).

Human impacts

This species has been taken as a discarded by-catch since 1989 in mixed fisheries for deepwater species west and north of Ireland. This considerable by-catch is unavoidable because the fisheries take place within its depth range. Survival of discarded by-catch will be very low for deepwater species such as this. This species is less vulnerable than some deepwater sharks because part of its reproductive cycle, including pregnant females and juveniles, is beyond the spatial extent of the fishery.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Hexanchus griseus (Bonneterre, 1788)

Bluntnose Sixgill Shark

Irish name: Siorc liath

Status

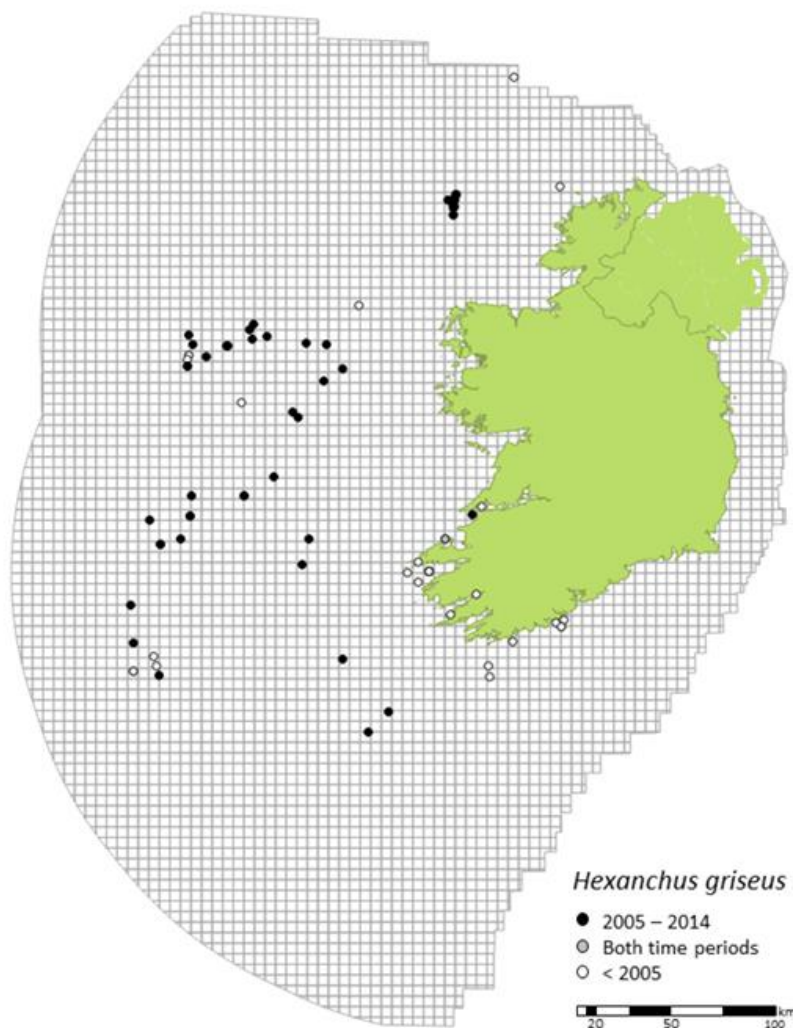
Ireland: Near Threatened. NE Atlantic: Near Threatened. Global: Near Threatened.

Justification

Given the life-history characteristics and suspected low productivity of this species, together with its distribution in areas of intensive commercial fishing this species is classified as “Near Threatened” and should be monitored and reassessed in the short term.

Range, distribution and habitat

The Bluntnose Sixgill (*Hexanchus griseus*) is a deep-benthic, littoral and semipelagic shark, not known to be epipelagic. It is found worldwide but has a patchy distribution in boreal, temperate and tropical seas (Ebert and Stehmann 2013). In the Northeast Atlantic region it is distributed from Norway to Portugal, including Iceland and the Faroe Islands, and also in the Mediterranean Sea (Ebert and Stehmann 2013).



Biology and Ecology

Little is known about the biology or ecology of this species in the Northeast Atlantic. In South African waters male maturity was estimated at approximately 310cm total length and females were fully mature by at least 420cm TL (Ebert, 2002). Newborns were captured at the same location over three consecutive summer seasons, indicating the location of a possible pupping ground. Longevity, pupping interval and mating behaviour are unknown. Reproductive cycle is possibly biannual with 12 month resting followed by 12 month gestation periods for the female (Ebert and Stehmann 2013). Andrews *et al.*, (2009) stated that the six-gill shark is both an active predator and a passive scavenger which can feed on a wide variety of food items.

Trend

Unknown

Human impacts

There are no target fisheries for this species in the Northeast Atlantic though they are occasionally caught as bycatch in shelf waters. Levels of bycatch and discarding are unknown. In recent years this species has been targeted by charter boat anglers (one boat which operates on a catch and release basis) off the coast of Clare.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Etmopterus princeps Collett, 1904

Greater lantern shark

Irish name: Lóchransiorc mór

Status

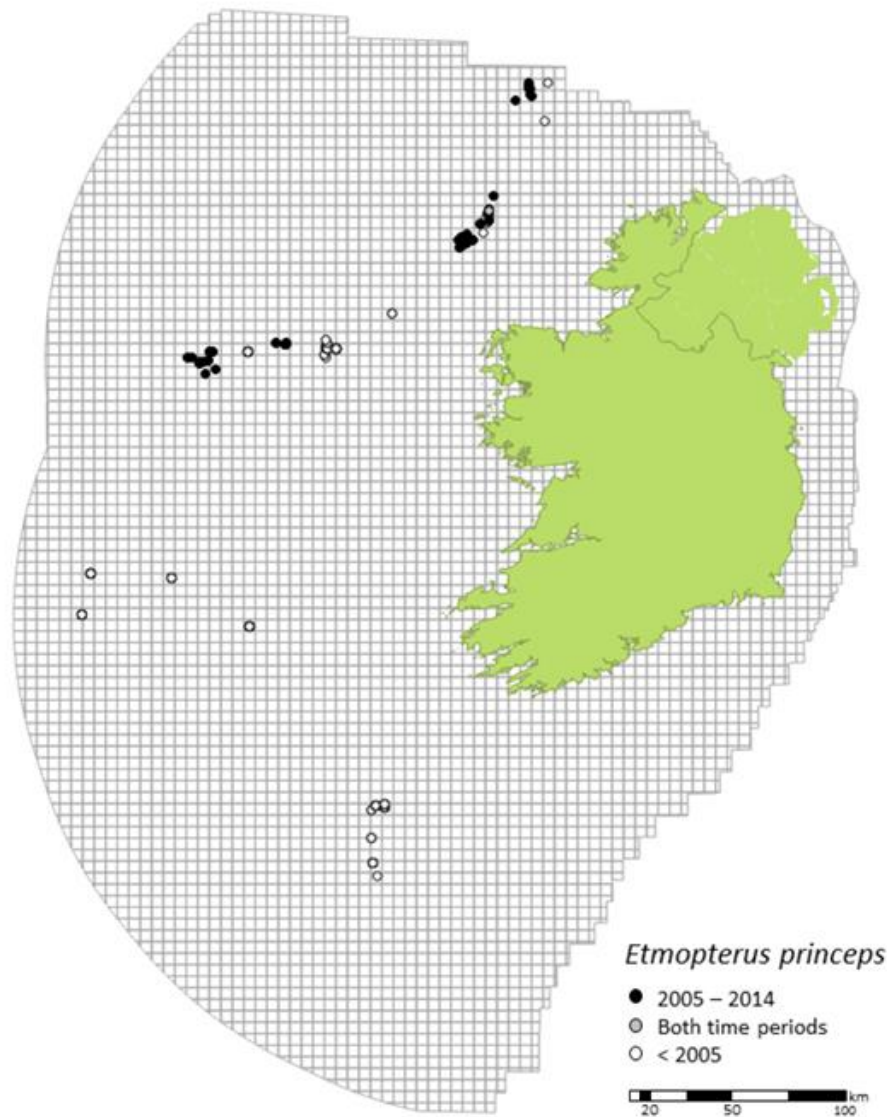
Ireland: Near threatened. NE Atlantic: Least concern. Global: Data deficient.

Justification

This small species is probably more resilient to fishing pressure than many deepwater sharks. Given its wide distribution in the NE Atlantic, with a bathymetric distribution partially beyond the range of deepwater fisheries, and its life history, a designation of Near Threatened is appropriate.

Range, distribution and habitat

Best available evidence indicates that this is endemic to the Atlantic. However, there are unconfirmed reports from the western Pacific (Compagno *et al.*, 2005). In the Atlantic it occurs from Iceland to Gibraltar, and from Nova Scotia to north-east USA (McEachran and Branstetter, 1984). It is also found along the northern Mid Atlantic Ridge (Hareide and Garnes, 2001). In the Rockall Trough it has a broad depth range from 500 to 2,000m, but is maximally abundant at 1,500m (Gordon, 1999). However off Iceland it is most abundant between 800 and 1,000m.



Biology and Ecology

This is a relatively small and among the most fecund deepwater shark. Maximum size was 89cm TL in Iceland (Jakobsdottir, 2001) and 84cm in Ireland (Mulvey, 2000). Length at maturity in Iceland was 57cm TL for males and 62cm TL for females (Jakobsdottir, 2001), whilst in Ireland it was 57cm TL and 69cm TL for males and females respectively (Mulvey, 2000). Average ovarian fecundity in Irish waters was 18 (Mulvey, 2000). There appear to be at least 2 breeding seasons annually, in June and July, and in October (Ebert and Stehmann 2013).

Trend

Scottish scientific survey abundance has fluctuated without trend from 2000 to 2012 (ICES, 2013; Neat *et al.*, 2015).

Human impacts

Some by-catch is unavoidable because a sizeable part of the species' bathymetric range is within the deepwater fisheries' depth range. Survival of discarded by-catch will be very low for deepwater species such as this.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Apristurus manis (Springer, 1979)

Ghost shark

Irish name: Catsúileach taibhsiúil

Status

Ireland: Near Threatened. NE Atlantic: Least concern. Global: Least concern.

Justification

This rare species' restricted and potentially discontinuous range is primarily within the depth range of fishing activities; therefore a designation of Near Threatened is appropriate.

Range, distribution and habitat

This uncommon species occurs in the Rockall Trough and Porcupine Bank from 658-1740m (Compagno *et al.*, 2005) and also has been recorded off the Block Canyon and Bear Seamount in the northwest Atlantic (Castro, 2011). It has been recently confirmed from the Mid Atlantic Ridge (Bergstad *et al.*, 2008).

Biology and Ecology

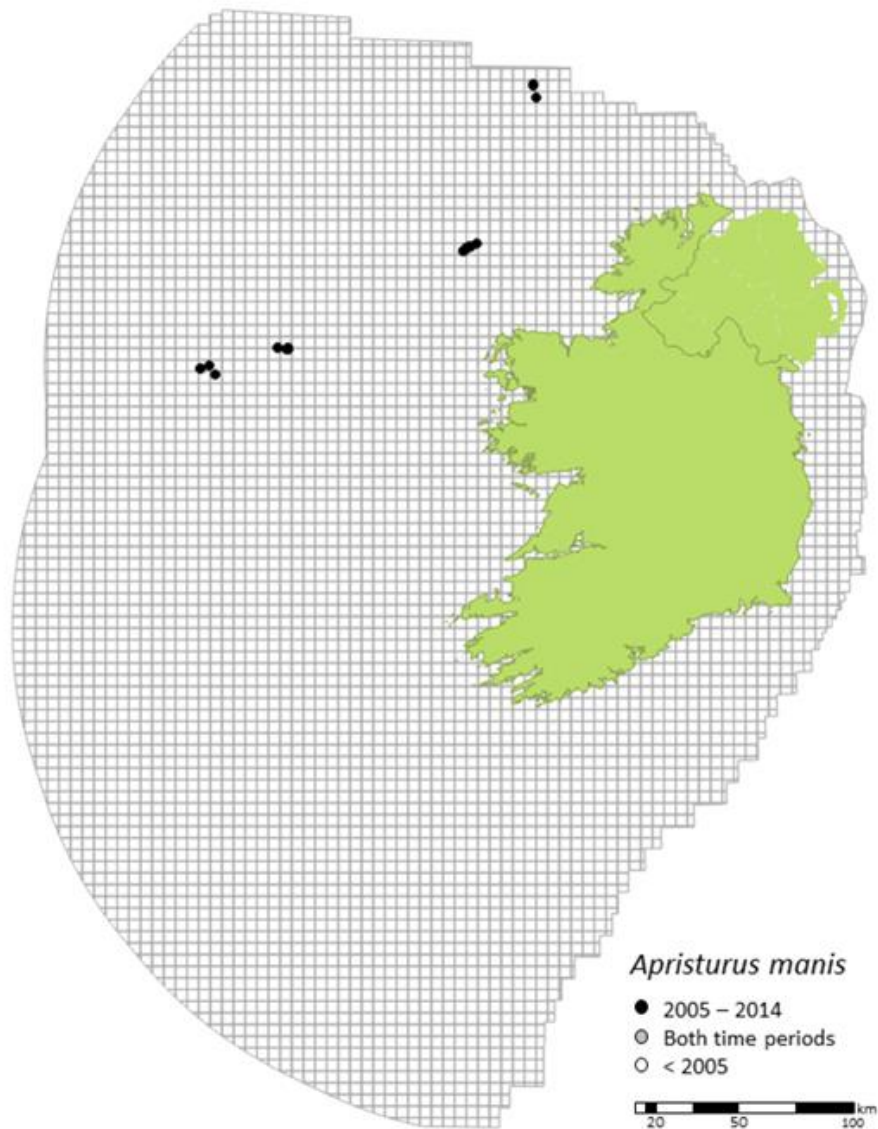
A poorly known benthic catshark of the Atlantic continental slopes recorded at depths of 658 to 1,740m. Little is known of its biology. Maximum size is at least 85cm TL (Compagno *et al.*, 2005), with size at maturity between 64 and 71cm (Castro, 2011). This is among the less frequently recorded catsharks in recent Irish deepwater surveys (e.g. Hareide *et al.*, 2012).

Trend

No information is available.

Human impacts

Some by-catch is unavoidable because the species' upper bathymetric range is within the deepwater fisheries' depth range. If a particular life history stage is more susceptible to fishing in the shallower part of its range, then the species may be more vulnerable to fishing.



Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Apristurus melanoasper Iglesias, Nakaya and Stehmann, 2004

Black rough scale catshark

Irish name: Catsúileach garbh dubh

Status

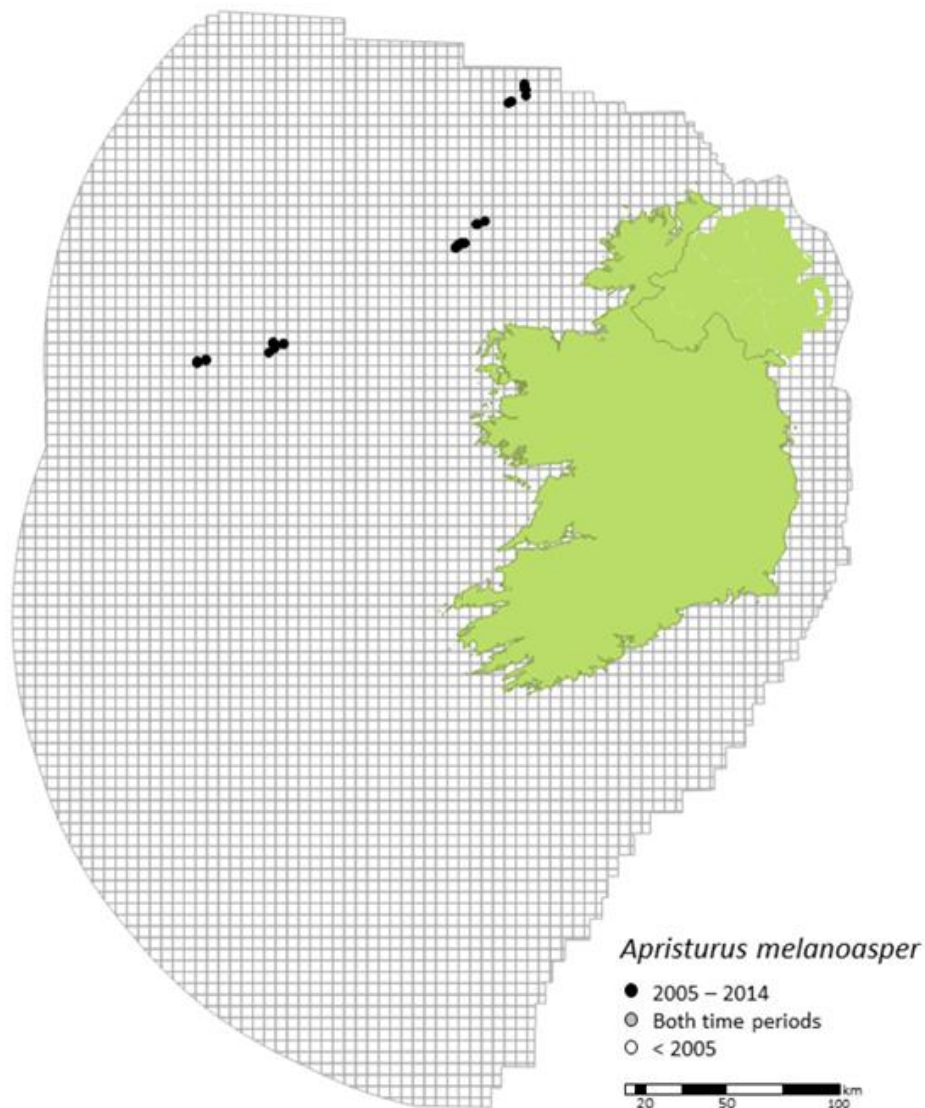
Ireland: Near Threatened. NE Atlantic: Data deficient. Global: Data deficient.

Justification

This rare species' restricted and potentially discontinuous range is mainly within that of fishing activities; therefore a designation of Near Threatened is appropriate.

Range, distribution and habitat

This species occurs off eastern North America, and also off France, Ireland and the UK (Castro, 2011; Iglésias *et al.* 2004). This species occurs on the slope at 512–1,520m but generally deeper than 1,000 m (Iglésias *et al.* 2004).



Biology and Ecology

Very little is known of the biology. Maximum recorded size is 76.1cm TL (Iglésias *et al.* 2004). Unusually, size at maturity appeared to be smaller in females than males, however the species is known from relatively few specimens and more investigation is required (Iglésias *et al.* 2004). This is among the least frequently recorded catsharks in Irish deepwater surveys, (e.g. Johnston *et al.*, 2012).

Trend

No information is available.

Human impacts

Some by-catch is unavoidable because the species' upper bathymetric range is within the deepwater fisheries' depth range. If a particular life history stage is more susceptible to fishing in the shallower part of its range, then the species may be more vulnerable to fishing.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Apristurus microps (Gilchrist, 1922)

Smalleye catshark

Irish name: Catsúileach mionsúileach

Status

Ireland: Near Threatened. NE Atlantic: Least concern. Global: Least concern.

Justification

This rare species' restricted and probably discontinuous range is partially within the depth range of fishing activities; therefore a designation of Near Threatened is appropriate.

Range, distribution and habitat

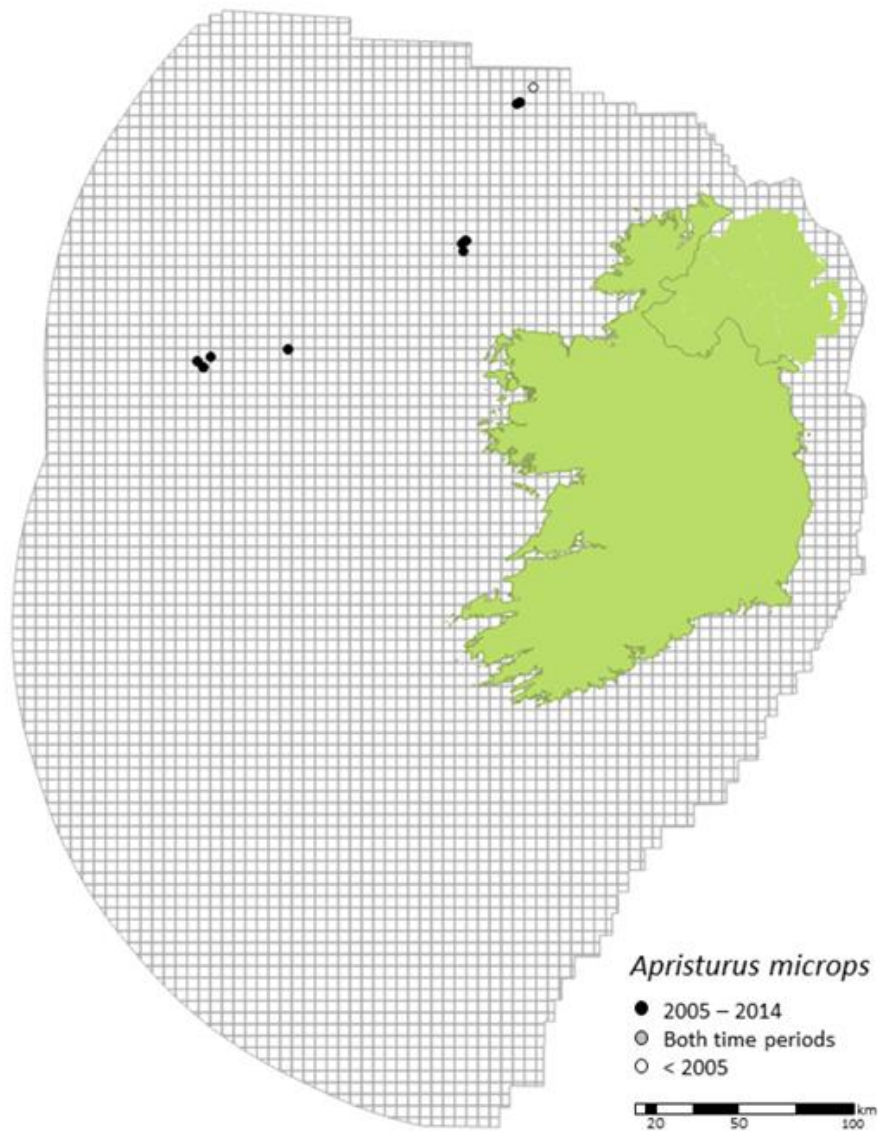
This catshark occurs in the Northwest and Northeast Atlantic (Ireland to Iceland) and off South Africa, from 700-2,200m (Compagno *et al.*, 2005).

Biology and Ecology

In South Africa, males ranged in size from 34.8 to 61.0cm TL with females ranging from 32.2 to 56.7cm TL. Length at maturity was 50.8cm TL (males) and 48.3cm TL (females). Little else is known of its biology, but gravid specimens were found in summer and winter off South Africa, indicating a protracted breeding cycle (Ebert *et al.*, 2006). This catshark is rarely encountered, and only in small numbers, in Irish deepwater surveys, (e.g. Hareide *et al.*, 2012).

Trend

No information is available.



Human impacts

Some by-catch is unavoidable because the species' upper bathymetric range is within the deepwater fisheries' depth range. If a particular life history stage is more susceptible to fishing in the shallower part of its range, then the species may be more vulnerable to fishing.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Scymnodon ringens Barbosa du Bocage and de Brito Capello, 1864

Knifetooth dogfish

Irish name: Fíogach scianfhiacaile

Status

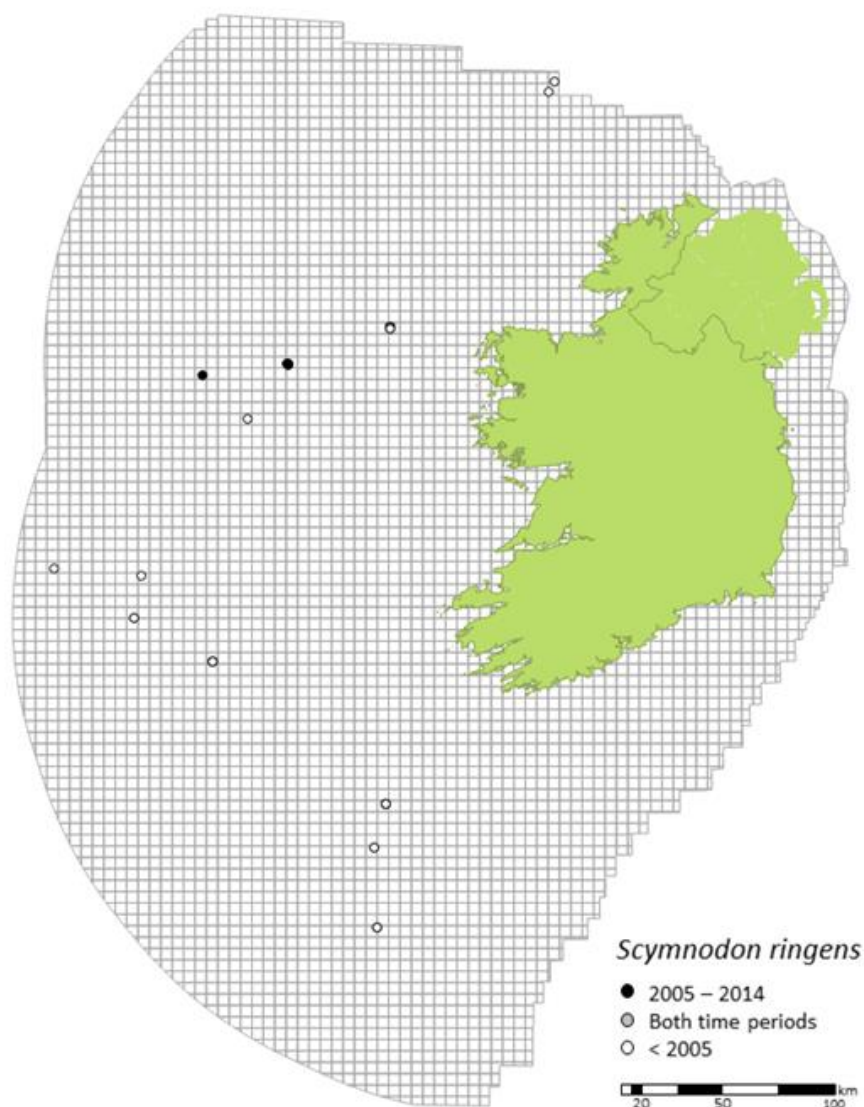
Ireland: Near threatened. NE Atlantic: Least concern. Global: Data deficient.

Justification

Given the lack of population status information on this relatively rare species, its probable low productivity and high vulnerability to continued fishing (and discarding) and its endemism in the Northeast Atlantic, a Near Threatened listing is warranted.

Range, distribution and habitat

This is a little known deepwater shark, found at depths of 200–1,600 m. It appears to be confined to the Northeast Atlantic slope from Scotland to Senegal (McEachrann and Branstetter, 1984). It is maximally abundant between about 600 and 700 m (Gordon, 1999).



Biology and Ecology

The knifetooth dogfish is a relatively uncommon, little-known shark. It inhabits deepwater, temperate to

subtropical waters and is found on or near the sea bottom at depths of 200–1,600m. It is a live bearer. Maximum size is reported at about 110cm TL (McEachran and Branstetter, 1984). No further information on the species is available.

Trend

No information is available.

Human impacts

By-catch is unavoidable because the species' bathymetric range is within the deepwater fisheries' depth range.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Oxynotus paradoxus Frade, 1929

Sharp-back shark

Irish name: Siorc seol-eiteach

Status

Ireland: Near threatened. NE Atlantic: Data deficient. Global: Data deficient.

Justification

This relatively rare deep water species has a wide distribution in the Northeast Atlantic. Its life history is unknown, but it can be inferred that it is not very resilient to fishing pressure. It is susceptible to fisheries in Irish waters. Therefore, a designation of Near Threatened is appropriate.

Range, distribution and habitat

This species is endemic to the north Atlantic. It occurs along the Atlantic slope from Scotland (including the northern North Sea), to Senegal (Quero, 1984a). Also it occurs at the Azores (Azevedo *et al.*, 2003) and on the Mid-Atlantic Ridge, north of the Azores (Hareide and Garnes 2001). It occurs in depths of 265 to 720m (Quero, 1984a).

Biology and Ecology

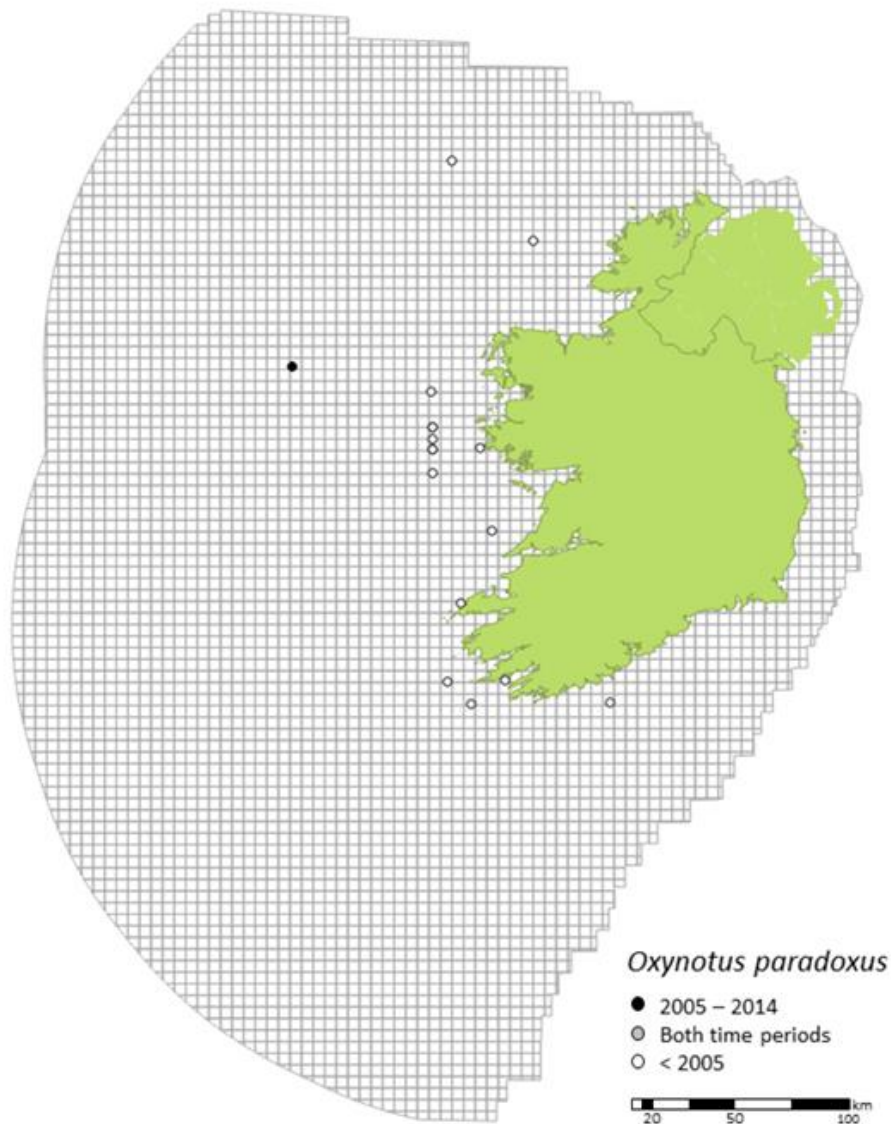
There is little information on this live-bearing species. Length at birth is 25cm and its maximum size is 118cm, but more usually 70-85cm TL (Quero, 1984a), thus neonates are about 30% of the maternal length. The body is laterally compressed and very rigid. It therefore seems unlikely that fecundity could be higher than 3-6 pups per female.

Trend

No information is available.

Human impacts

By-catch is unavoidable because the species' bathymetric range is within the deepwater fisheries' depth range.



Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Dipturus nidarosiensis (Storm, 1881)

Norwegian skate

Irish name: Sciata Ioruach

Status

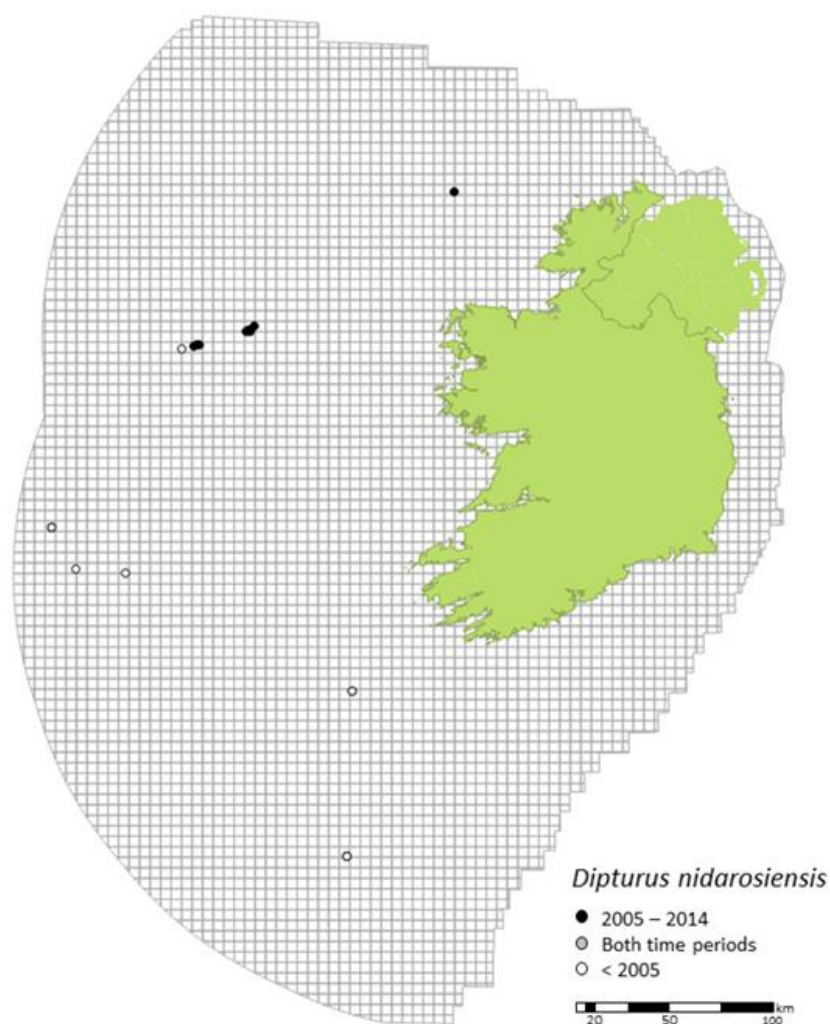
Ireland: Near threatened. NE Atlantic: Near threatened. Global: Near threatened.

Justification

Given that this rare species' bathymetric range is within that of existing Atlantic deep water fisheries, within its restricted range a designation of Near Threatened is appropriate.

Range, distribution and habitat

This species is confined to the Northeast Atlantic (Stehmann and Bürkel, 1984a), but was recently confirmed from the western Mediterranean (Cannas *et al.*, 2010). In the Atlantic it occurs in the fjords of central and southern Norway, southern Iceland, Rockall Trough and west of the British Isles (Stehmann and Bürkel, 1984a). It has also been confirmed from the the Bay of Biscay (ICES, 2007), and northern Norway (Williams *et al.*, 2008). It is a deep water species occurring in depths of 140m to 1000m (Williams *et al.* 2008; Stehmann and Bürkel, 1984a).



Biology and Ecology

This is a large, poorly documented skate, attaining at least 230cm total length (TL) (Ebert and Stehman, 2013). Like other skates, this species is oviparous.

Trend

No information is available.

Human impacts

This species is vulnerable to fisheries throughout its range in the Atlantic, though not in the Mediterranean. Longline fisheries for Greenland halibut in Norway and Iceland and for ling and tusk in these areas, Rockall and west of Scotland and Donegal/Mayo take this species as discarded by-catch. It is also caught in mixed fisheries for deep water fish on the continental slopes and the Rockall Bank.

Management/Conservation

This species is on the CFP Prohibited List, but only for the waters west of Ireland and Britain (ICES Sub-areas VI and VII). This legislation may not be effective as most discarded Norwegian skates from deep water would not survive.

Neoraja caerulea (Stehmann, 1976)

Blue skate

Irish name: Roc gorm

Status

Ireland: Near threatened. NE Atlantic: Least concern. Global: Least concern.

Justification

Given that this rare species' bathymetric range is within that of existing fisheries and its restricted range a designation of Near Threatened is appropriate. Further information on this species and its interactions with fisheries is urgently required.

Range, distribution and habitat

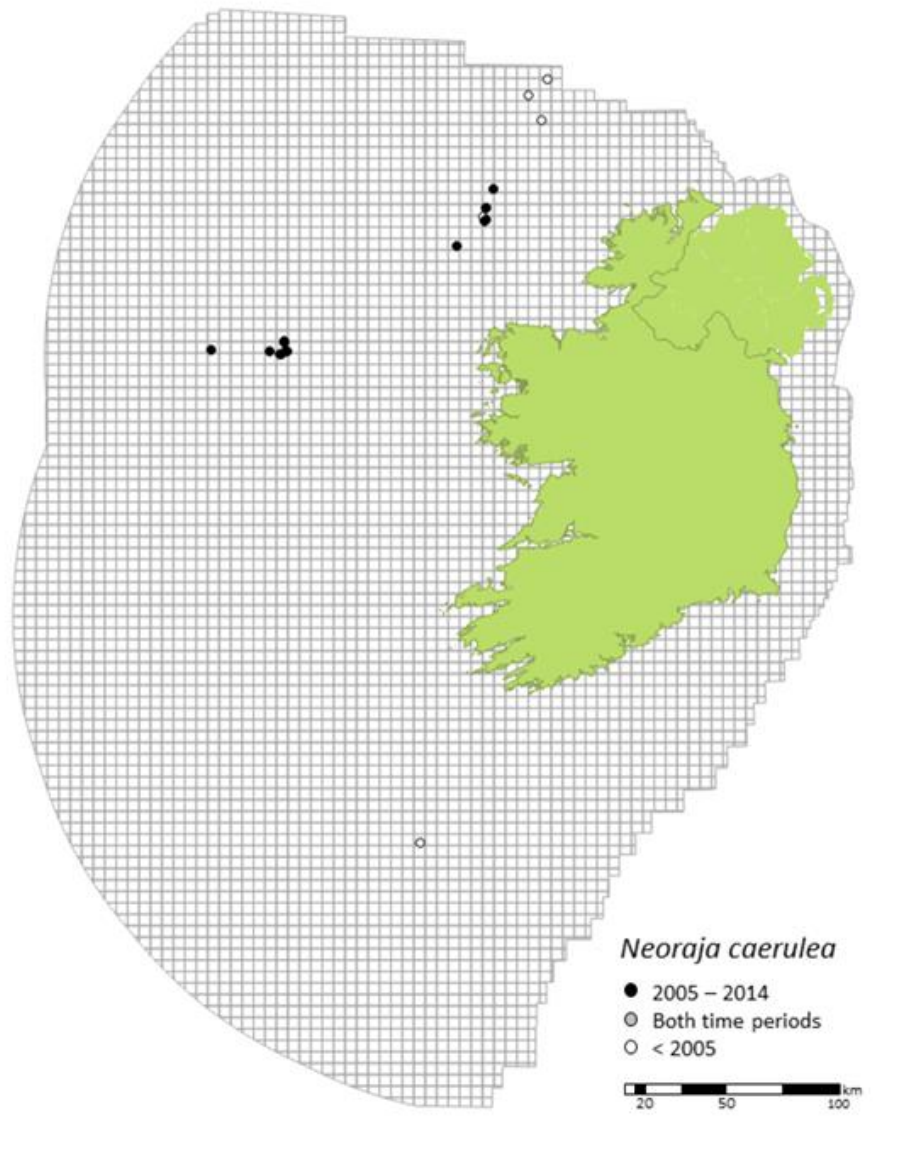
It is apparently endemic to the Northeast Atlantic, in depths of 600-1260m (Stehmann and Burkel, 1984a). It has been recorded along the Rockall Trough, west off Scotland and Ireland, Bay of Biscay and NW Spain (Connolly et al, 1999; Ebert and Stehmann, 2013; Gordon and Duncan, 1989; Lorange *et al.*, 2002; Rodriguez-Cabello *et al.*, 2013).

Biology and Ecology

This small-bodied skate occurs on muddy sand substrates, (Stehmann 1976). It attains a maximum size of 32cm TL (adult male) (Stehmann and Bürkel 1984a, Quéro *et al.* 2003). Maturity for males between 20 and 25cm; a male 19.6cm was immature while one of 27cm was mature (Ebert and Stehmann, 2013). Little other information on its life history exists. Its diet consists of polychaetes and amphipods (Gordon and Duncan, 1989).

Trend

No information is available.



Human impacts

This is a rare species whose range is restricted to a portion of the Northeast Atlantic. Its depth range is well within the range of deepwater fisheries. It can be expected to be a discarded by-catch in these fisheries that have been taking place since the late 1980s. As such, it is vulnerable to overfishing.

Management/Conservation

There are no management or conservation measures for this species in Irish waters.

Chimaera opalescens Luchetti, Iglesias and Sellos, 2011

Opal rabbitfish

Irish name: Ciméara ópalach

Status

Ireland: Near threatened. NE Atlantic: Least concern. Global: Not evaluated.

Justification

Given that this species' preferred depth range is largely within the range of current fishing activity, its likely unproductive life history characteristics, and the suspected high rate of mortality to discards, it is assessed as Near Threatened on the basis of a future suspected decline of >20% in three generations, leading to concern that it may soon qualify for Vulnerable A3bd.

Range, distribution and habitat

This newly described species has been reported from the north-eastern Atlantic ranging from the 48° and 57° N latitude (Luchetti *et al.*, 2011). Latitudinal segregation of trawls indicated the highest species concentration between 57° and 59° N (Holt *et al.*, 2013). The species has been recorded off Greenland by Møller *et al.*, (2004) under the name *C. monstrosa* (Luchetti *et al.*, 2011).

Biology and Ecology

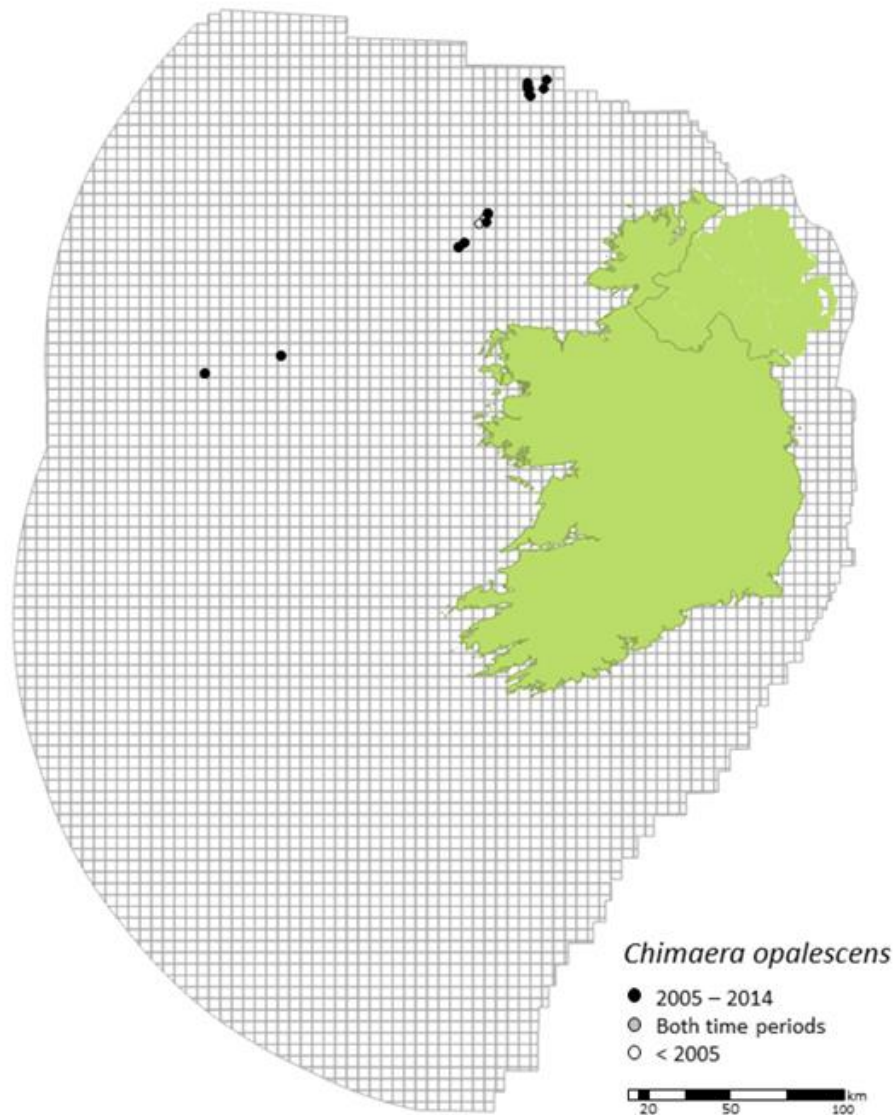
It is thought to reach maturity at >50cm TL, whereas sub-adults range between 42 and 50cm TL and juveniles are considered to be anything smaller than 42cm TL (Holt *et al.*, 2013). Maximum described TL for males is 96cm and 109cm for females (Luchetti *et al.*, 2011).

Trend

No information is available.

Human impacts

This species has been taken as a discarded by-catch since 1989 in mixed fisheries for deepwater species west and north of Ireland. This considerable by-catch is unavoidable because the fisheries take place within its depth range. Survival of discarded by-catch will be very low for deepwater species such as this. This species may be slightly less vulnerable than *C. monstrosa* because of its deeper distribution.



Management/Conservation

This species is not subject to any formal management in European Union or Irish legislation.

Malacoraja krefftii Stehmann, 1977

Kreft's skate

Irish name: Sciata Krefft

Status

Ireland: Near Threatened. NE Atlantic: Least concern. Global: Least concern.

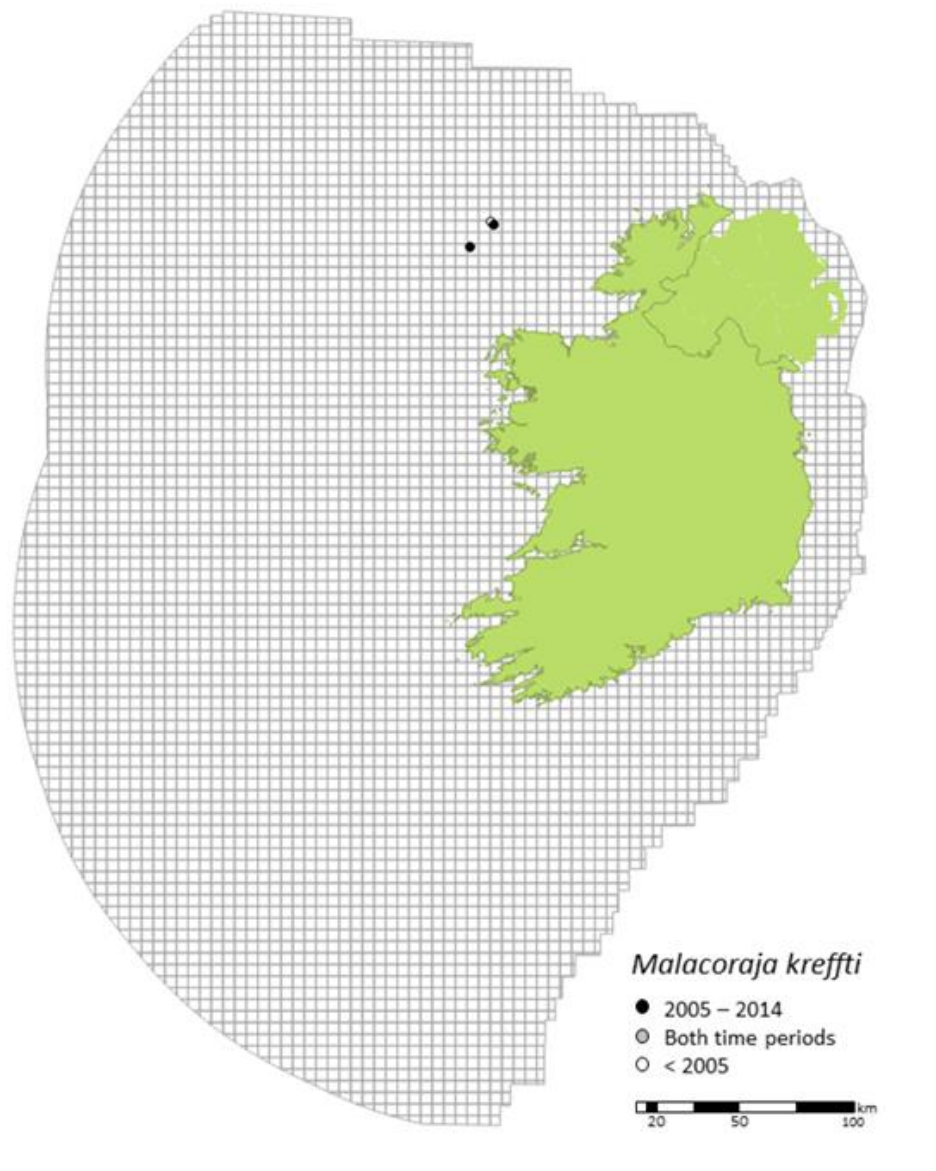
Justification

All records of this species are in the range 1,000m to 1,500m, placing the species partly within the range of deepwater fisheries, in part of its range. In view of its exposure to fisheries west of Scotland and Ireland, and

its apparently restricted distribution (Ireland to Iceland), it is therefore considered to be Near Threatened at present.

Range, distribution and habitat

This benthic species appears to be endemic to the northeastern north Atlantic, and has been recorded, from very few specimens, at depths of 1,000 to 1,500m on deep continental slopes of the Rockall Trough, and off south-west Iceland at 1,100m (Stehmann 1977, 1993). More recently Krefft's skate has been reported off southwestern Iceland (Jónsson and Pálsson 2006) and the Porcupine Seabight (Dransfeld *et al.*, 2007, Johnston *et al.*, 2010).



Biology and Ecology

Only very limited information is available about this species' life history. A female measuring 48.8cm total length (TL) was thought to be probably mature (Stehmann, 1993) and the smallest mature male measured 51.5cm TL (Stehmann 1977). The largest known individual of the species measured 57cm TL (Stehmann 1993), although the species probably grows to about 70cm TL (Stehmann and Bürkel 1984a). Krefft's skate is oviparous, but further information about the egg cases is currently unknown (Ebert and Stehmann 2013).

Trend

No information is available.

Human impacts

Given that this species occurs in depths of less than 1,300m, it can be expected to be an unavoidable by-catch in mixed deepwater trawl fisheries, and possibly directed fisheries especially for Greenland halibut. Because its range extends deeper than most fisheries this may provide some refuge. However the importance of the shallower part of its range to its life cycle is unknown. Given its endemism in an area where there have been and continue to be deepwater fisheries, it is vulnerable to fisheries.

Management/Conservation

There are no management or conservation measures for this species in Irish or European waters.

Chimaera monstrosa Linnaeus, 1758

Rabbitfish

Irish name: Ciméara

Status

Ireland: Near threatened. NE Atlantic: Near Threatened. Global: Near threatened.

Justification

Given that this species' preferred depth range is entirely within the range of current fishing activity, its unproductive life history characteristics, and the suspected high rate of mortality to discards, it is assessed as Near Threatened on the basis of a future suspected decline of >20% in three generations, leading to concern that it may soon qualify for Vulnerable A3bd.

Range, distribution and habitat

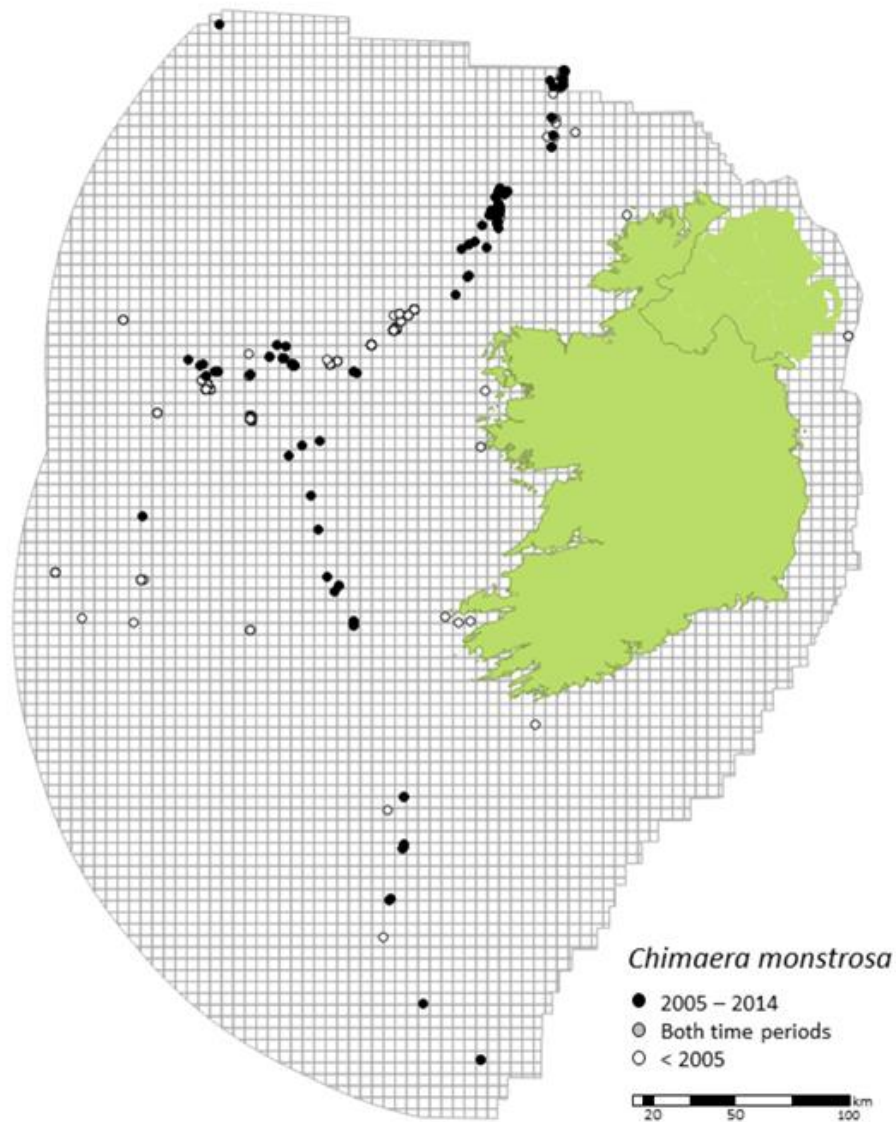
This species is widespread in the Northeast Atlantic from Iceland, Norway and the Faroe Islands south to Morocco and in the Mediterranean east to Greece. It is present in waters of 300-1,000m (Stehmann and Bürkel, 1984b). It is also present on the Mid Atlantic Ridge (Hareide and Garnes, 2001) and on Hatton Bank (Clarke and Moore, 2002).

Biology and Ecology

The species attains sizes of up to 100cm TL. The maximum age estimates observed were 30 years for males and 26 years for females. Estimated age at first maturity was 13.4 years for males and 11.2 years for females (Calis *et al.*, 2005). This species is egg-laying with the spawning season in spring and summer (Stehmann and Bürkel, 1984b).

Trend

No information is available.



Human impacts

This species has been taken as a discarded by-catch since 1989 in mixed fisheries for deepwater species west and north of Ireland. This considerable by-catch is unavoidable because the fisheries take place within its depth range. Survival of discarded by-catch will be very low for deepwater species such as this.

Rhinochimaera atlantica Holt and Byrne, 1909

Straightnose rabbitfish

Irish name: Ciméara úi Bhroin

Status

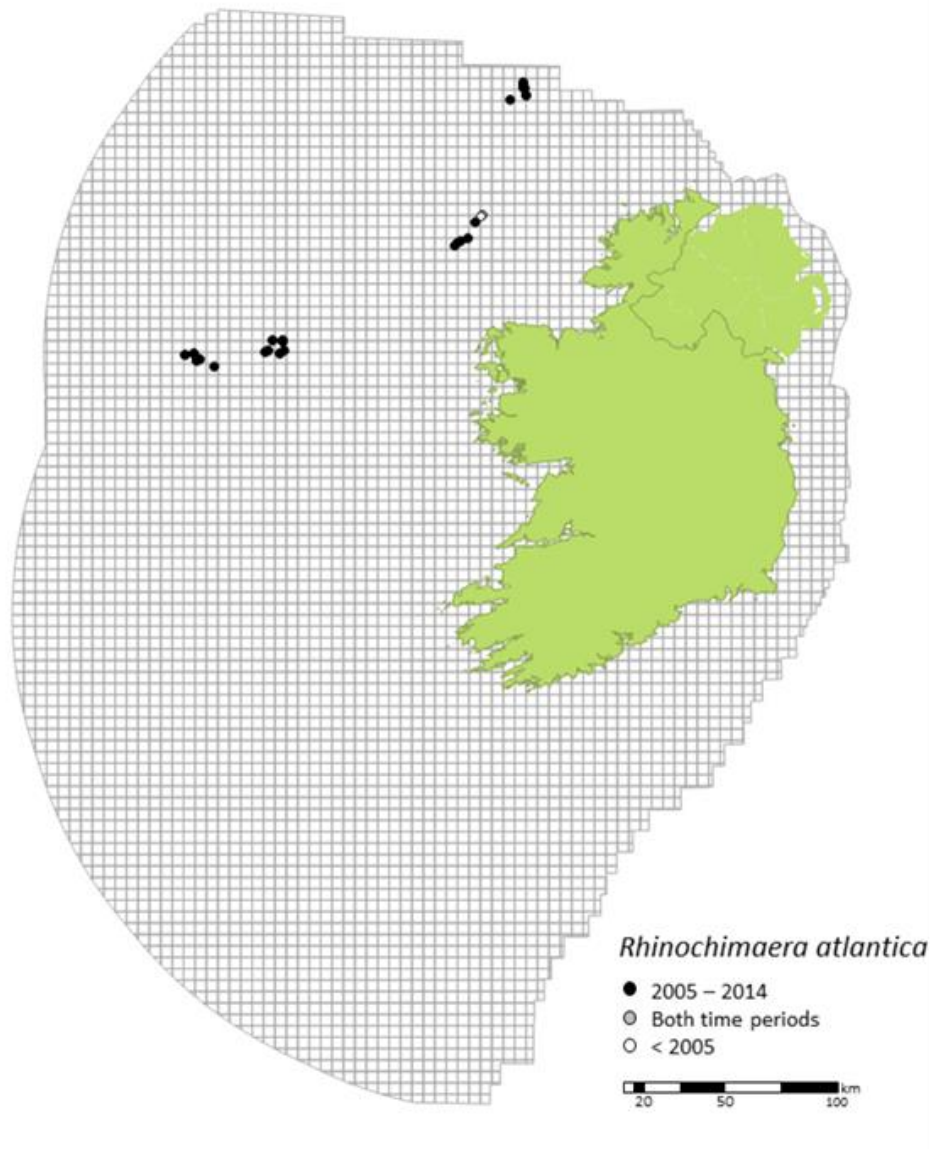
Ireland: Near threatened. NE Atlantic: Least concern. Global: Least concern.

Justification

This uncommon species' restricted spatial distribution and depth range is mostly within the range of deepwater fisheries in the Northeast Atlantic. Therefore a designation of Near Threatened is appropriate.

Range, distribution and habitat

This species occurs on the continental slopes from Biscay to Iceland in the Northeast Atlantic, and from Nova Scotia to New England in the Northwest Atlantic (Stehmann and Bürkel, 1984c). It is recorded at depths of 400 to 1,500 m (Ebert and Stehmann, 2013).



Biology and Ecology

Little is known of its biology. Maximum length for adult males is about 107cm TL and 127cm TL for females. Size at birth is about 15cm TL (Ebert and Stehmann, 2013).

Trend

No information is available.

Human impacts

Some by-catch is unavoidable because the species' upper bathymetric range is within the deepwater fisheries' depth range.

Management/Conservation

This species is not subject to any formal management in European Union or Irish legislation.

Hydrolagus mirabilis (Collett, 1904)

Large-eyed rabbitfish

Irish name: Ciméara mórshúileach

Status

Ireland: Near threatened. NE Atlantic: Least concern. Global: Least concern.

Justification

Given that this species' preferred depth range is entirely within the range of current fishing activity, its unproductive life history characteristics, and the suspected high rate of mortality to discards, it is assessed as Near Threatened on the basis of a future suspected decline of >20% in three generations, leading to concern that it may soon qualify for Vulnerable A4d.

Range, distribution and habitat

Present in the Northeast Atlantic from Iceland to the Irish Atlantic slope off Ireland, Scotland, the Hebrides, northern Spain (Stehmann and Bürkel 1984b) and probably also off the northwest African coast (Ebert and Stehmann 2013). It is also present off Morocco, Sahara Republic, Senegal, and Mauritania (Quero *et al.* 1990), off Namibia (Kreff 1990) and the Mediterranean (Hassan, 2013). It occurs at depths of 450-1,200m (Stehmann and Bürkel 1984b).

Biology and Ecology

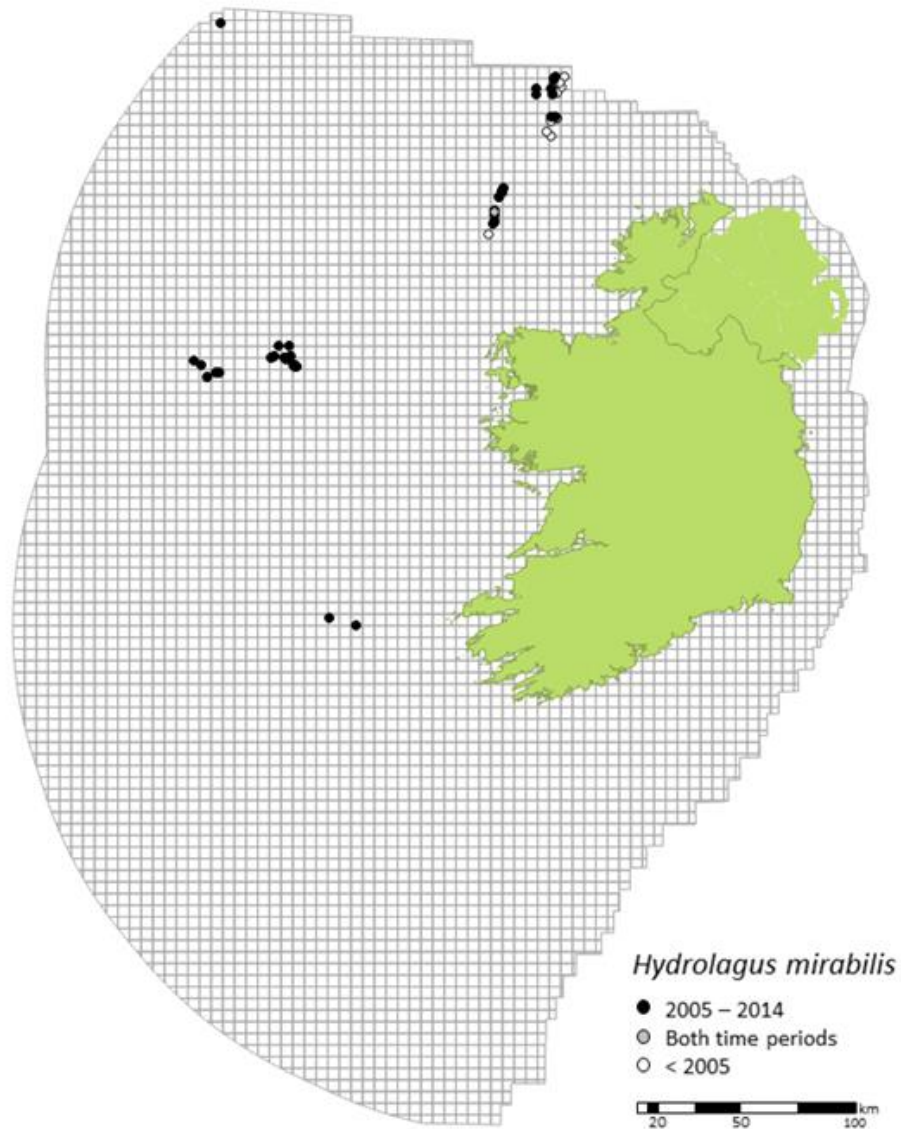
Adult males and females are segregated in relation to mean depth; adult females are more common in deeper waters, and adult males in shallower waters. Adult females occur at similar depths to juveniles suggesting this depth may serve as a possible birthing ground for the species (Holt *et al.*, 2013). Maximum total length recorded is 80cm (Stehmann and Bürkel 1984b). The adult female part of the population is present in the deeper part of its range (Holt *et al.*, 2013).

Trend

No information is available.

Human impacts

Some by-catch is unavoidable because the species' upper bathymetric range is within the deepwater fisheries' depth range.



Management/Conservation

This species is not subject to any formal management in European Union or Irish legislation.

Apristurus aphyodes Nakaya and Stehmann, 1998

White ghost shark

Irish name: Catsúileach bán-taibhsiúil

Status

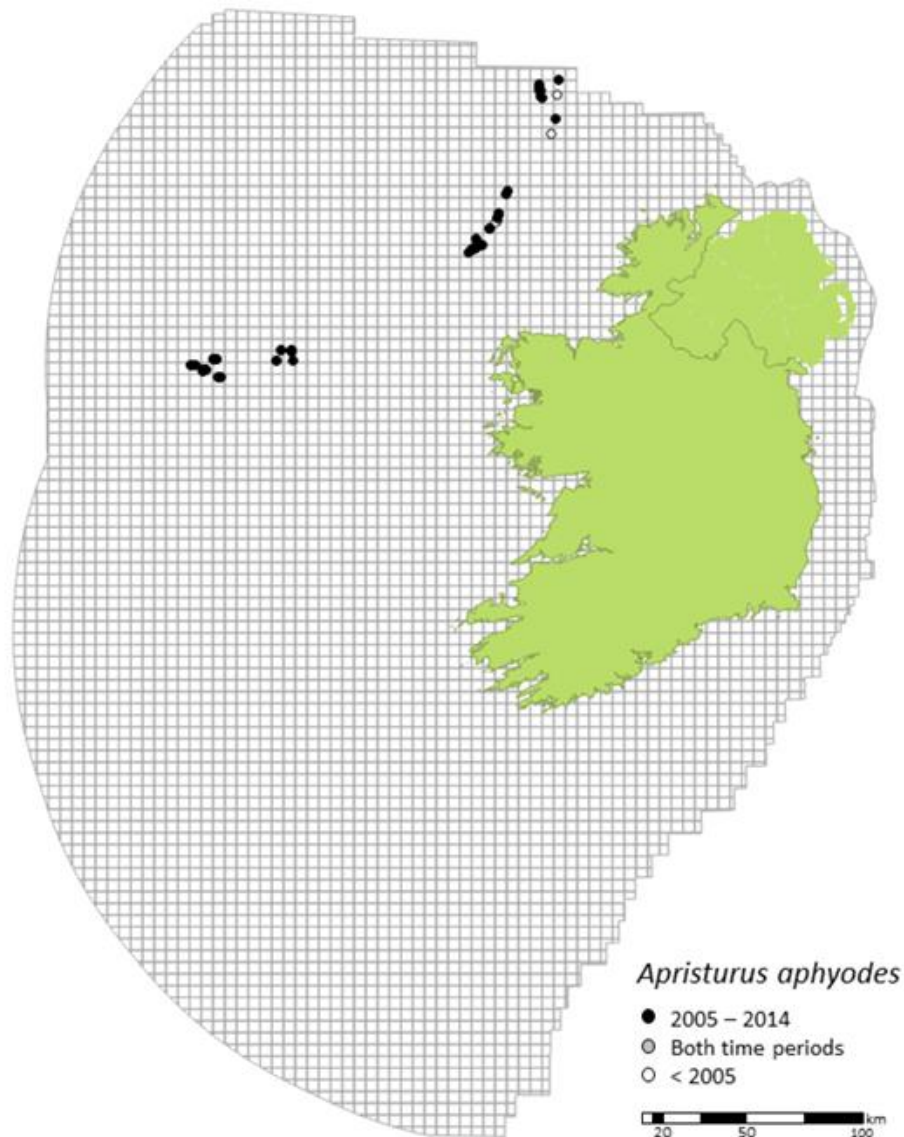
Ireland: Least Concern. NE Atlantic: Least concern. Global: Least concern.

Justification

This species has a restricted geographic range, but is only partially within the depth range of fishing activities and has demonstrated an increase in abundance in recent years, therefore a designation of Least Concern is appropriate.

Range, distribution and habitat

This species appears to be endemic in the Northeast Atlantic slope (Compagno et al. 2005) at 1,014 to 1,800 m depth from the northern Bay of Biscay and Porcupine Seabight to Lousy Bank (Nakaya and Stehmann 1998).



Biology and Ecology

Length range in the Rockall trough was 36-52cm TL and 34-55cm TL for males and females respectively. Length at 50% maturity was reported as 49.9cm TL and 56.9cm TL for males and females respectively (Moore *et al.*, 2013). Reproduction is oviparous but egg cases are unknown (Nakaya and Stehmann 1998). Egg cases are attached to hard substrates and/or biogenic structures as they are laid. This is among the most

frequently recorded catsharks in Irish deepwater surveys, (e.g. Johnston *et al.*, 2012).

Trend

There has been a significant increase in numbers observed in Scottish surveys 1999-2013 (Neat *et al.*, 2015).

Human impacts

Some by-catch is unavoidable because the species' upper bathymetric range is within the deepwater fisheries' depth range. If a particular life history stage is more susceptible to fishing in the shallower part of its range, then the species may be more vulnerable to fishing.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Apristurus laurussonii (Saemundsson, 1922)

Iceland catshark

Irish name: Catsúileach Inse Túile

Status

Ireland: Least concern. NE Atlantic: Least concern. Global: Data deficient.

Justification

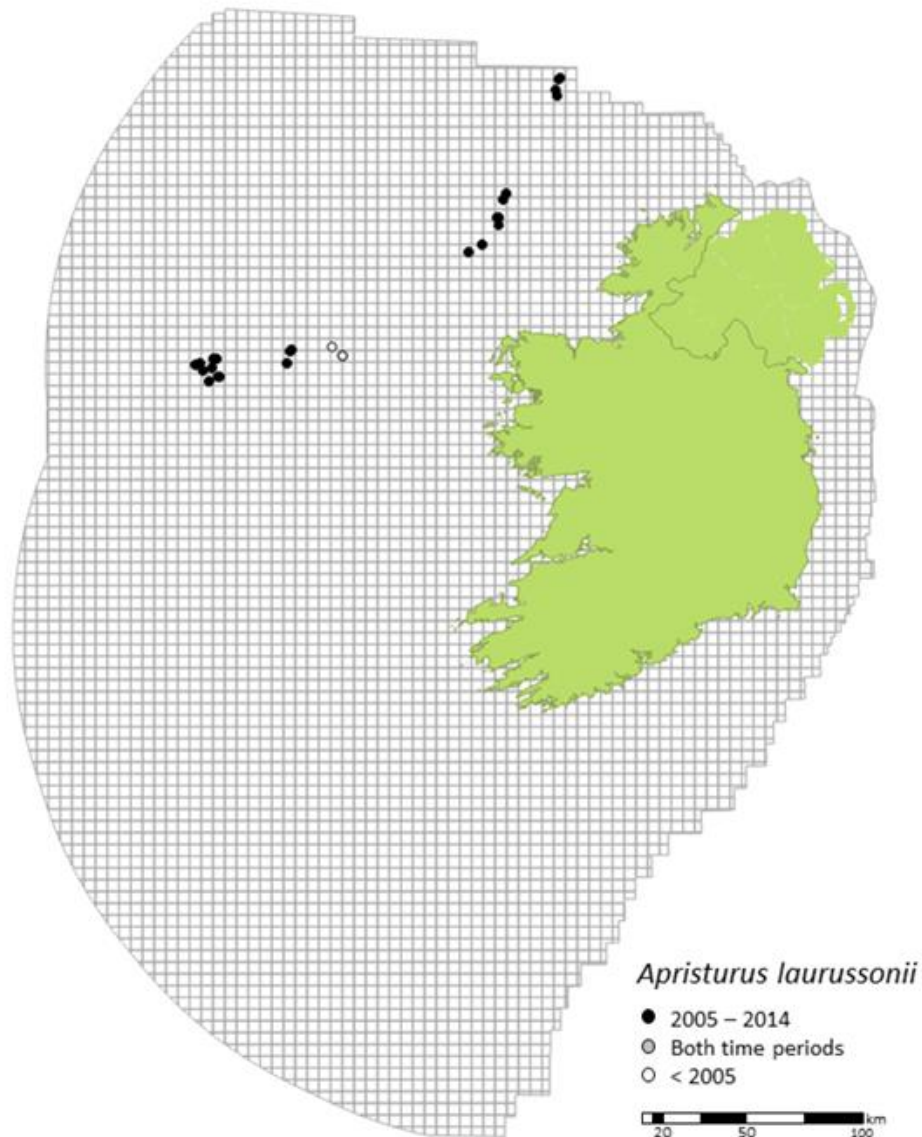
Although reported to be a relatively common by-catch in several deepwater trawl fisheries, these fisheries do not overlap with the majority of its habitat so it can be inferred that the risk of overexploitation is low. It is therefore considered to be Least Concern.

Range, distribution and habitat

A common, deepwater catshark on the continental slope in parts of the North Atlantic (Iceland, Ireland, Canary Islands and Madeira) at depths of 560 to 2,060m (Compagno *et al.* 2005, Nakaya and Sato 1998). It possibly occurs further south to equatorial Africa (Compagno *et al.* 2005). This is among the more frequently recorded catsharks in recent Irish deepwater surveys, (e.g. Hareide *et al.*, 2012).

Biology and Ecology

Maximum size recorded is approximately 72cm total length (TL) (Nakaya and Sato 1998, 1999). The smallest mature female reported is 59.2cm TL (Nakaya and Sato 1998, 1999). Reproduction is oviparous with one egg per oviduct. The egg cases are attached to hard substrates and/or biogenic structures as they are laid. There is little published information on its life history.



Trend

No information is available.

Human impacts

Some by-catch is unavoidable because the species' upper bathymetric range is within the deepwater fisheries' depth range.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Centroscyllium fabricii (Reinhardt, 1825)

Black dogfish

Irish name: Fíogach dubh

Status

Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

The Black Dogfish (*Centroscyllium fabricii*) is very widely distributed around the world in quite deep waters. Available data show no evidence of any declines in abundance. Its bathymetric and geographic range is largely outside the reach of deepwater fisheries, so it can be inferred that the risk of overexploitation is low. It is therefore considered to be Least Concern.

Range, distribution and habitat

This species is confined to the Atlantic. In the north Atlantic it occurs from Virginia north to Baffin Island and Greenland and southwards to Sierra Leone. Separate populations are reported off Liberia, and from Namibia to South Africa, with uncertain occurrences in the Caribbean and off Florida (Compagno, 1984; Compagno *et al.*, 2005). In the southwest Atlantic, it has been recorded from the Beagle Channel at the southern tip of Argentina (Menni *et al.*, 1993). In temperate northeast Atlantic waters the species occurs mainly from 1,300 to 1,500m (Gordon, 1999). It is tolerant of low temperatures (Kulka, 2006; Jakobsdottir, 2001), enduring lower temperatures than many other deep-sea sharks. Variations in its bathymetric distribution between regions implies that its distribution is more governed by temperature.

Biology and Ecology

The black dogfish is a relatively small (to at least 107cm total length) deepwater, schooling shark of the outer continental shelf and slope found at depths from 180 to 2,250m (mostly below 275m) (Ebert and Stehmann 2013). Size at maturity is from 51-70cm and 46-63cm in females and males respectively (Yano 1995, Jakobsdottir 2001). It appears that breeding takes place throughout the year (Jakobsdottir 2001). Reports of litter size vary but it has been reported at a mean of 16.4 (range 4-40) (Yano 1995). Size at birth has been reported from 15-20cm (Ebert and Stehmann 2013) and maximum size is 107cm in the North Atlantic Ocean (Ebert and Stehmann 2013).

Trend

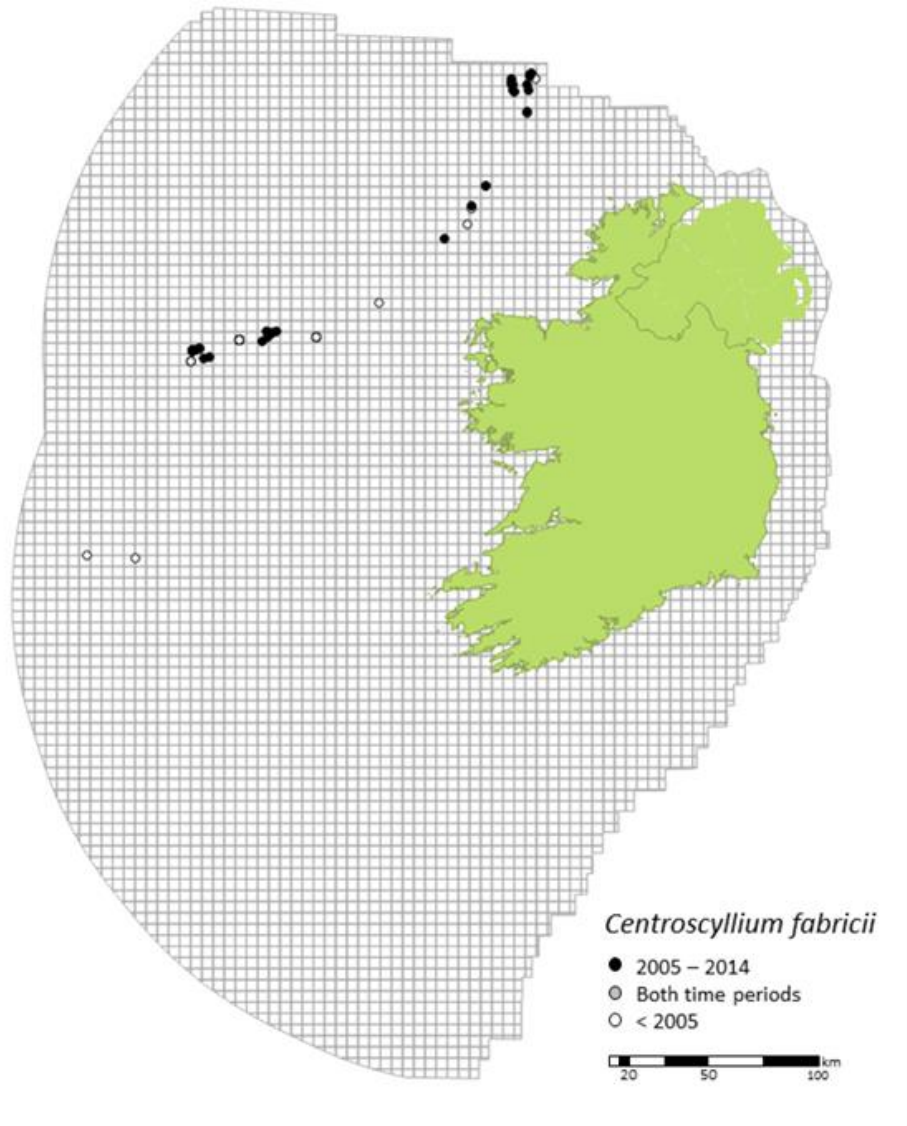
Abundance indices from Scottish trawl surveys in the Rockall Trough fluctuated without trend since 2000 (ICES, 2013; Neat *et al.* 2015).

Human impacts

Some by-catch is unavoidable because the species' upper bathymetric range is within the deepwater fisheries' depth range.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.



Galeus melastomus Rafinesque, 1810

Blackmouth catshark

Irish name: Catsúileach béaldubh

Status

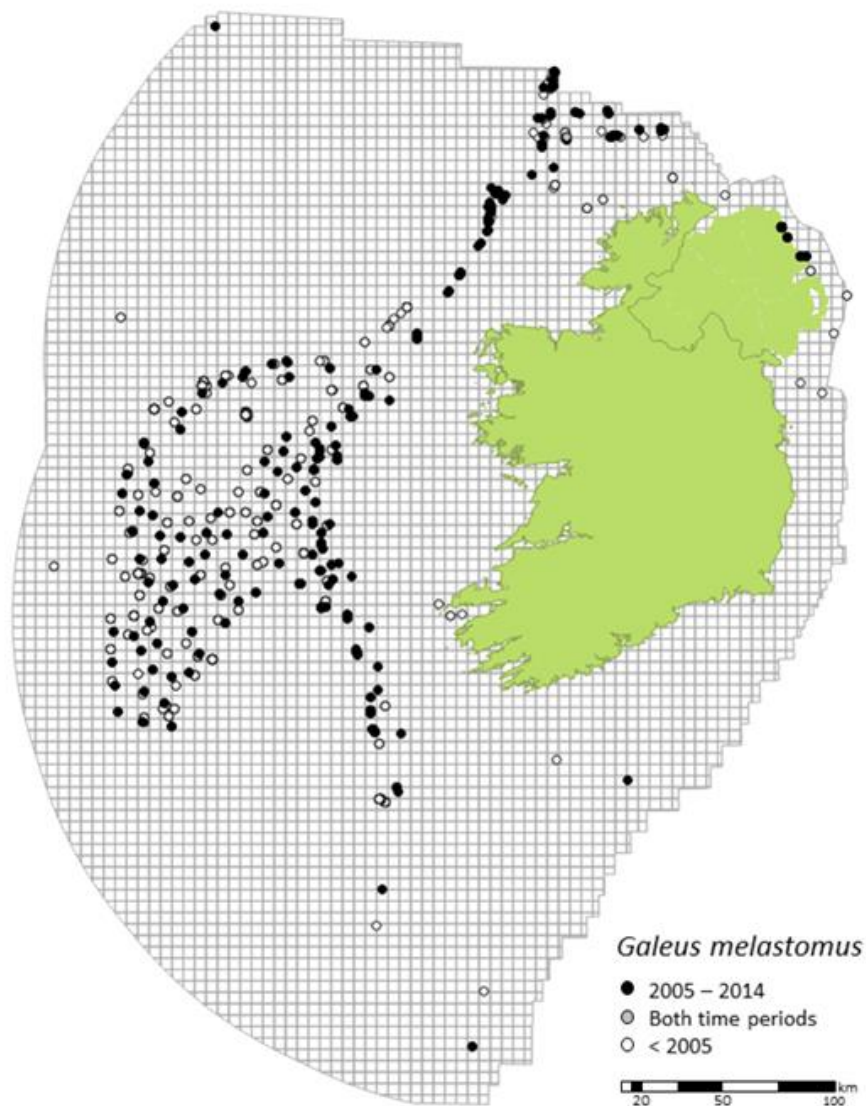
Ireland: Least concern. NE Atlantic: Least Concern. Global: Least Concern.

Justification

This species displays no declines in abundance, and is widely distributed in the NE Atlantic. Given these considerations and its more resilient life history in comparison to many deepwater sharks, a designation of Least Concern is appropriate.

Range, distribution and habitat

It occurs in the northeast and eastern central Atlantic: from Faroe Islands and Trondheim, Norway, northern area of the mid-Atlantic Ridge, Reykjanes Ridge, southwest Iceland (Hareide and Garnes 2001), southwards to Senegal and Azores, and in the Mediterranean (Compagno 1984). It occurs mainly in depths of 200-1,200m (Quero, 1984). It also occurs occasionally in shelf waters, including the North Channel (Irish Specimen Fish Committee, 2014), in waters of 55-200m



Biology and Ecology

This species attains lengths of at least 61cm TL (males) and 93cm TL (females) (Quero, 1984). In Atlantic Portuguese waters, this small catshark attains maturity at 49cm TL (males) and 69cm TL (females) (Costa *et al.*, 2005). Peak egg-laying occurs in winter in Portugal (Costa *et al.*, 2005). In the French Mediterranean, maximum annual egg production was estimated as 93 per year (Capapé *et al.*, 1984).

Trend

Abundance indices from Scottish trawl surveys in the Rockall Trough fluctuated with a weakly positive trend since 1999 (ICES, 2013; Neat *et al.*, 2015).

Human impacts

By-catch is unavoidable because the bathymetric range of the species is within the depth range of the shelf and deepwater fisheries. This species is a discarded by-catch in deepwater fisheries, and also in fisheries targeting hake, anglerfish, megrim and in some cases Norway lobster.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Galeus murinus (Collett, 1904)

Mouse catshark

Irish name: Catsúileach luiche

Status

Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

This species displays no declines in abundance, and is widely distributed in the NE Atlantic. Given these considerations and its more resilient life history in comparison to many deepwater sharks, a designation of Least Concern is appropriate.

Range, distribution and habitat

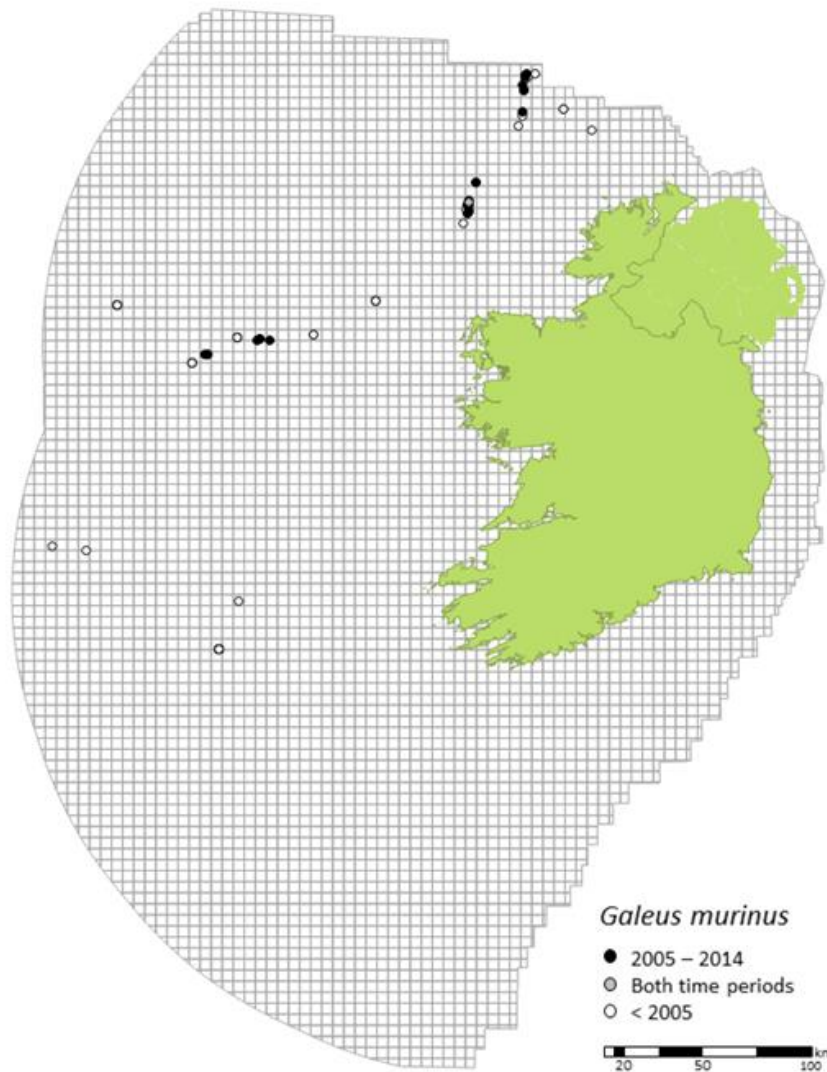
Northeast Atlantic and eastern central Atlantic: known from the west coast of Iceland to the Faroes Channel (Quero, 1984), the Rockall Trough (Mauchline and Gordon, 1983) the Porcupine Bank slopes (Connolly *et al.*, 1999), Bay of Biscay (Rodriguez Cabello, 2013) and on the Mid Atlantic Ridge north of the Hecate Seamount (Hareide and Garnes, 2001). It occurs in depths of 380-1,200m (Quero, 1984).

Biology and Ecology

There is little published information on its biology. This egg laying species carries only a single egg case per oviduct carried at the same time (Iglésias *et al.* 2002).

Trend

Abundance indices from Scottish trawl surveys in the Rockall Trough fluctuated without apparent trend since 2000 (ICES, 2013; Neat *et al.* 2013).



Human impacts

By-catch is unavoidable because the species' bathymetric range is within the deepwater fisheries' depth range.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Etmopterus spinax (Linnaeus, 1758)

Velvet belly lantern shark

Irish name: Lóchrannsiorc slimbhoilg

Status

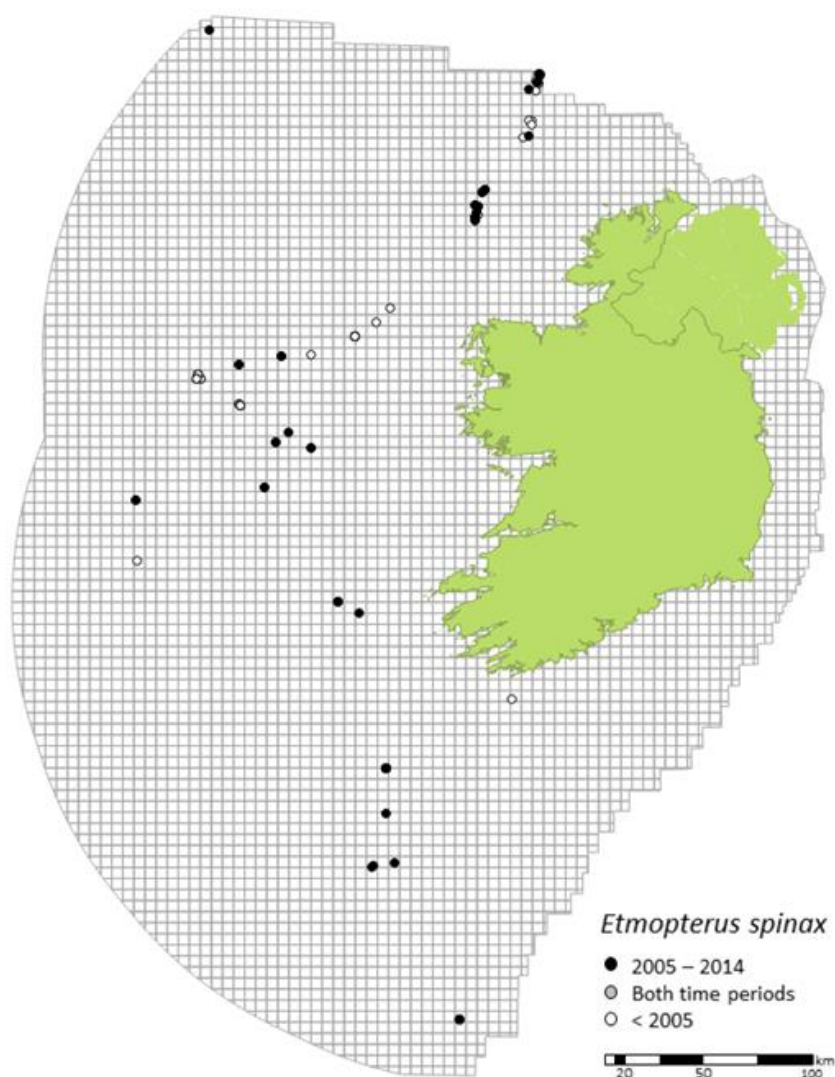
Ireland: Least concern. NE Atlantic: Near threatened. Global: Least concern.

Justification

Given that abundance as measured by the Scottish scientific survey has fluctuated without trend from 2000 to 2012 a designation of Least Concern is warranted.

Range, distribution and habitat

This is the shallowest-dwelling of Irish deep sea sharks, and is endemic to the eastern Atlantic and Mediterranean (McEachran and Branstetter, 1984). It occurs in the eastern Atlantic from mid Norway and Iceland to Gabon, and in the western Mediterranean, in depths of 70-2,000m, but mostly below 200m (McEachran and Branstetter, 1984). Its distribution south of Mauritania does not appear to be continuous (Compagno *et al.*, 2005). It is found on the bottom (Compagno *et al.*, 2005), but also occurs well up in the water column (Hickling, 1963).



Biology and Ecology

This is a small bodied shark with maximum size of 45cm (McEachran and Branstetter, 1984). Maximum age, in Portugal, was reported as 11 years by Coelho and Erzini (2008). These authors report age at maturity as

being 3.97 for males and 4.67 for females. Ovarian fecundity in Portugal was 10 eggs (Coelho and Erzini 2008), and in British waters 14 (Hickling, 1963). Mean uterine fecundity in Portugal was 7.6 (Coelho and Erzini 2008).

Trend

Scottish scientific survey abundance indices in the Rockall Trough have fluctuated without trend from 2000 to 2012 (ICES, 2013). Spanish scientific survey abundance indices on the Porcupine Bank have also fluctuated without trend from 2001 to 2012 (ICES, 2013; Neat *et al.*, 2015).

Human impacts

This species is a by-catch in upper slope fisheries, particularly for Norway lobster, *Nephrops norvegicus*, on the Porcupine Bank. Some by-catch is unavoidable because the species' bathymetric range is within both shelf and deepwater fisheries' depth range. Survival of discarded by-catch is very low for deepwater species such as this.

Management/Conservation

This species is subject to a zero total allowable catch and quota under European Union legislation. This legislation is ineffective at preventing catches of this species.

Rajella fyllae (Lütken, 1887)

Round ray

Irish name: Roc cruinn

Status

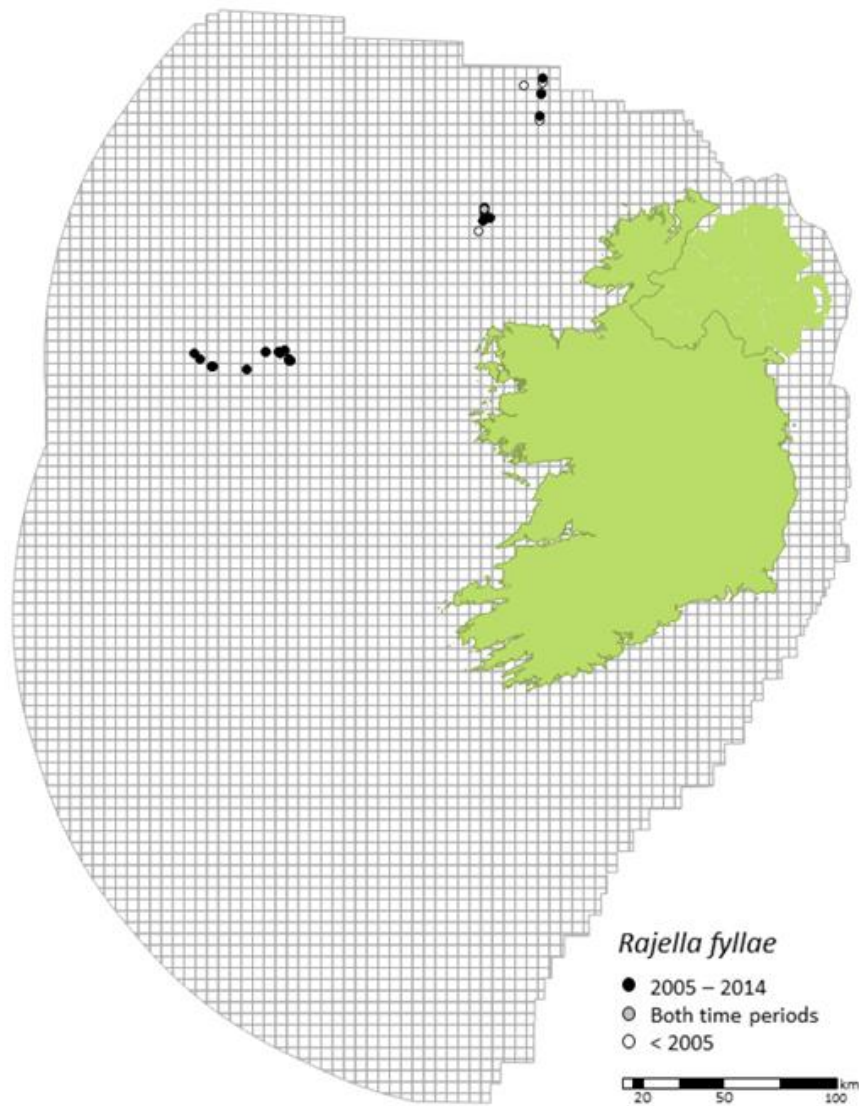
Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

This deepwater species' wide range, and its bathymetric distribution, partly below fisheries in much of that range, implies that a designation of Least Concern is appropriate.

Range, distribution and habitat

It occurs in the Northeast and Northwest Atlantic. In the northeast Atlantic, it occurs from the southeastern part of the Barents Sea to southern Norway, southern Greenland, Iceland, Faroe Islands to Shetlands, western coasts of British Isles and Bay of Biscay (Stehmann and Bürkel 1984a; Dolgov *et al.*, 2005). In the Northwest Atlantic, it occurs from Greenland to Nova Scotia, Canada, including the Labrador Shelf, Grand Banks and the French Territory of Saint Pierre and Miquelon, Gulf of St Lawrence and the Scotian Shelf (Leim and Scott 1966; Stehmann and Bürkel 1984a). It is found in cold waters of less than 7°C in depths of 170 – 2,050m (Stehmann and Bürkel, 1984).



Biology and Ecology

Very little is known of the biology of this small-bodied species. Maximum recorded size in the Barents Sea is 57cm TL (Dolgov *et al.* 2005).

Trend

No information is available.

Human impacts

This species is vulnerable to some fisheries for deepwater fish, Greenland halibut and redfish in parts of its range. However a part of its distribution is beyond any fisheries.

Management/Conservation

There are no management or conservation measures for this species in Irish waters.

Rajella kukujevi (Dolganov, 1985)

Mid-Atlantic ray

Irish name: Sciata Lár-Atlantach

Status

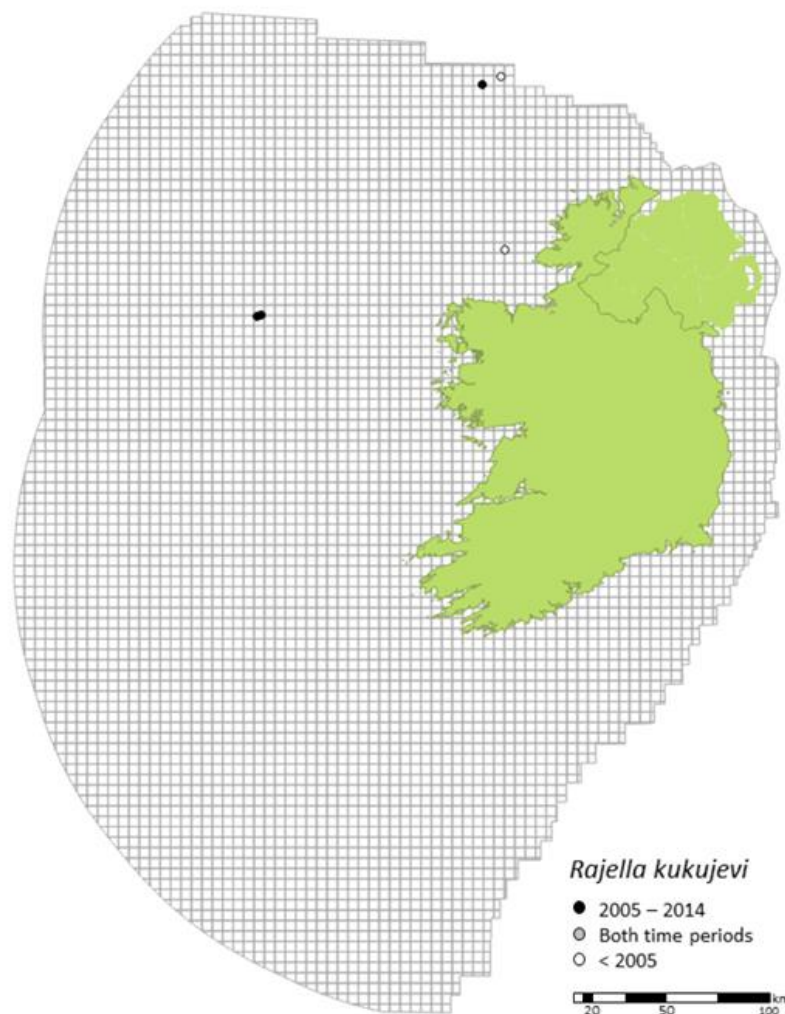
Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

This deepwater species' wide range, and its bathymetric distribution below fisheries in much of that range implies that a designation of Least Concern is appropriate.

Range, distribution and habitat

This deepwater species is endemic to the Northeast Atlantic and found from the mid-Atlantic ridge to Iceland (Dolganov, 1985), Ireland (Clarke, 2000), Bay of Biscay (Rodríguez-Cabello *et al.* 2012) and Faroes EEZ, west of Scotland and Ireland with one record south to Bay of Biscay (Clarke, 2000; Dolganov, 1985; Rodríguez-Cabello *et al.*, 2012). Most frequently caught off the Rockall Trough, Bill Bailey, Lausy and Hatton banks and southwestern corner of Faroes EEZ (Dolganov 1985, Clarke 2000, Orlov unpubl. data). It is found at depths of 775–1,500m, with the majority of individuals captured at depths greater than 1,000m (ICES 2006).



Biology and Ecology

There is little information on its life history. In Irish waters specimens have been recorded up to 82cm TL (Clarke, 2000).

Trend

No information is available.

Human impacts

This species is vulnerable to some fisheries for deepwater fish, Greenland halibut and redfish in parts of its range. However a large part of its distribution is beyond any fisheries.

Management/Conservation

There are no management or conservation measures for this species in Irish waters.

Rajella bathyphila (Holt and Byrne, 1908)

Deep-water skate

Irish name: Sciata Holt

Status

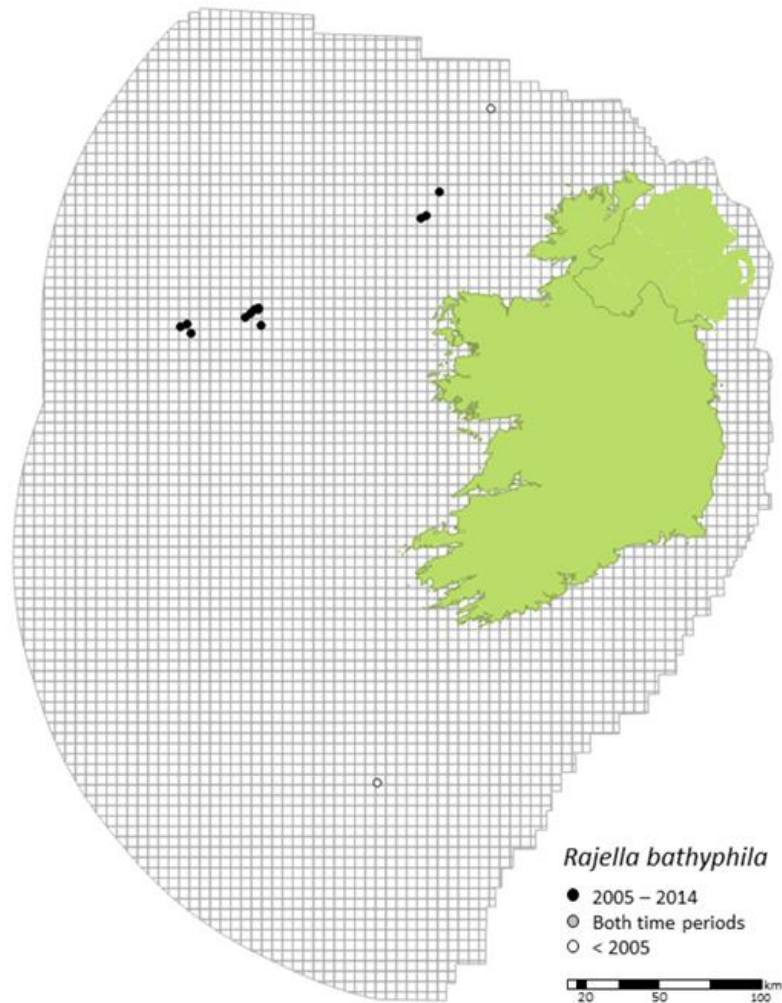
Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

This rare species is found mainly at depths greater than any deepwater fisheries, past or present. This implies that a designation of Least Concern is appropriate.

Range, distribution and habitat

A very deep water species found in the eastern and western North Atlantic. It occurs in the Denmark-Strait, and also in the Rockall Trough/Porcupine Slopes (Stehman and Burkel, 1984). It has also been recorded off Iceland, including Reykjanes Ridge,, in the northern region of the Bay of Biscay and south to off Rio de Oro in Western Sahara (Stehmann 1978, Stehmann 1995). It also occurs around Greenland (Nakaya 1995) and Norway (Bruni et al. 2006). In the Northwest Atlantic, it occurs in Baffin Bay (Jorgensen *et al.*, 2011), the Flemish Cap (Vazquez *et al.*, 2013) however Stehmann (1978) cautioned that all specimens previously identified as *Raja (Rajella) bathyphila* from southwest of the Grand Banks should be treated as *Rajella bigelowi*. It may occur throughout the area in very deep water and on the Mid-Atlantic Ridge (Stehmann 1978, Stehmann 1995).



Biology and Ecology

There is no known information on its life history or ecology.

Trend

No information is available.

Human impacts

This species occurs deeper than any deep water fisheries and is not vulnerable to exploitation on this basis.

Management/Conservation

There are no management or conservation measures for this species in Irish waters.

Amblyraja jenseni (Bigelow and Schroeder, 1950)

Shorttail skate

Irish name: Sciata earrghearr

Status

Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

This rare species is found only at depths within deepwater fisheries in Irish waters. However its wide range in the Atlantic, including some areas where it is not fished, implies that a designation of Least Concern is appropriate.

Range, distribution and habitat

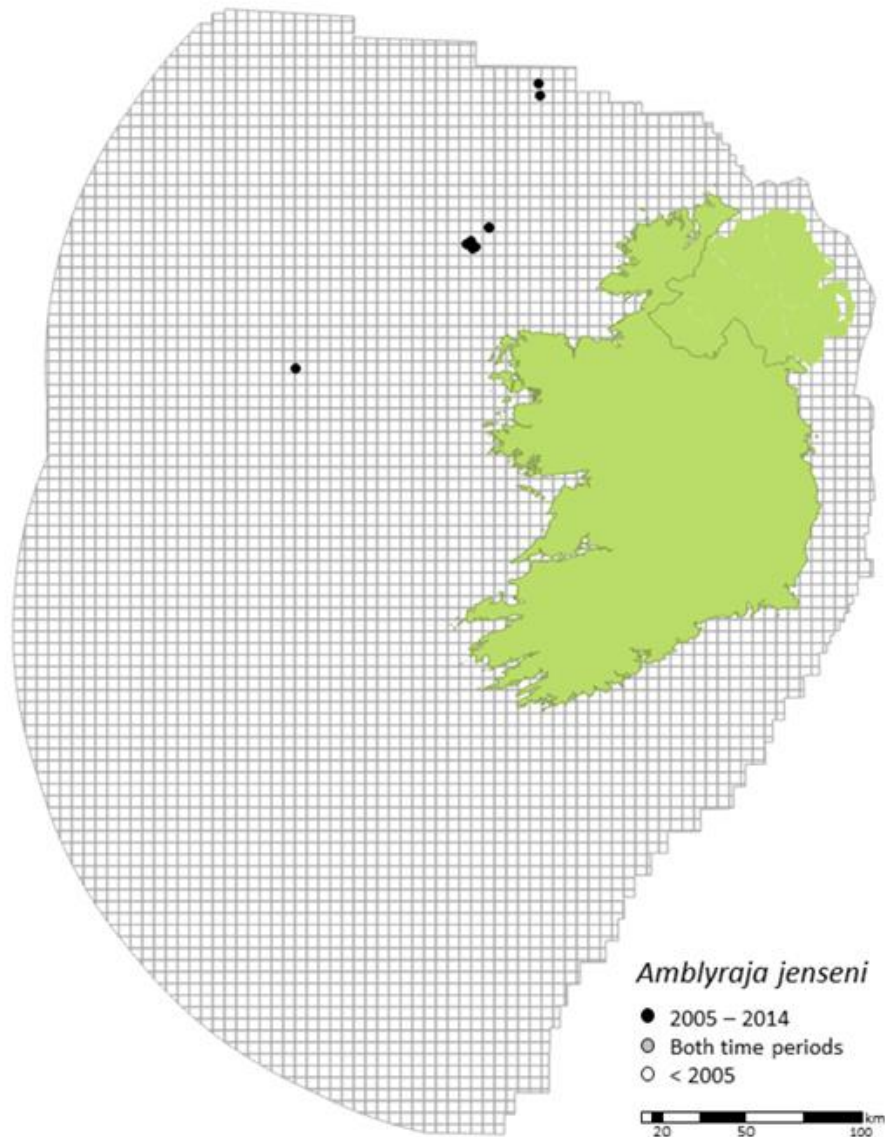
Orlov *et al.* (2006) suggest this species may have a continuous range in the northern Atlantic, from the USA coast to waters off Ireland, including the Mid-Atlantic ridge. In the northwest Atlantic it occurs in slope waters of the Labrador Shelf, the Flemish Cap, the Grand Banks and Scotian Shelf to southern New England, USA (Alpoim *et al.* 2002, Bigelow and Schroeder 1953, Templeman 1965, Leim and Scott 1966, Moore *et al.* 2003). In the Northeast Atlantic it has been recorded in waters north of Ireland (Gordon and Duncan 1987, 1989; Johnston *et al.*, 2010; Quero *et al.*, 2000), within the Rockall Trough west of Scotland and in the Porcupine Seabight west of Ireland (Ebert and Stehmann 2013). The species has also been recorded in deep waters along west Greenland, in Denmark Strait, and around Iceland (Jónsson and Pálsson 2006). It occurs in a great range of depths from 167 to 2,548m (Orlov *et al.* 2006).

Biology and Ecology

Largest specimens have been recorded on the Mid-Atlantic ridge 92.61cm TL, with considerably smaller skates found on the USA and European continental slopes (49.68cm TL and 46.85cm TL, respectively) (Orlov *et al.* 2006). Overall, mean TL for female skates is 72.31cm and for males, 80.3cm TL (Orlov *et al.* 2006). Maximum recorded size is 112cm TL (Orlov 2006).

Trend

No information is available.



Human impacts

This species is vulnerable to deep water trawl and long line fisheries in the Northeast Atlantic. In most of the rest of its range there is little fishing effort.

Management/Conservation

There are no management or conservation measures for this species in Irish waters.

Bathyraja pallida (Forster, 1967)

Pale skate

Irish name: Roc bánlíoich

Status

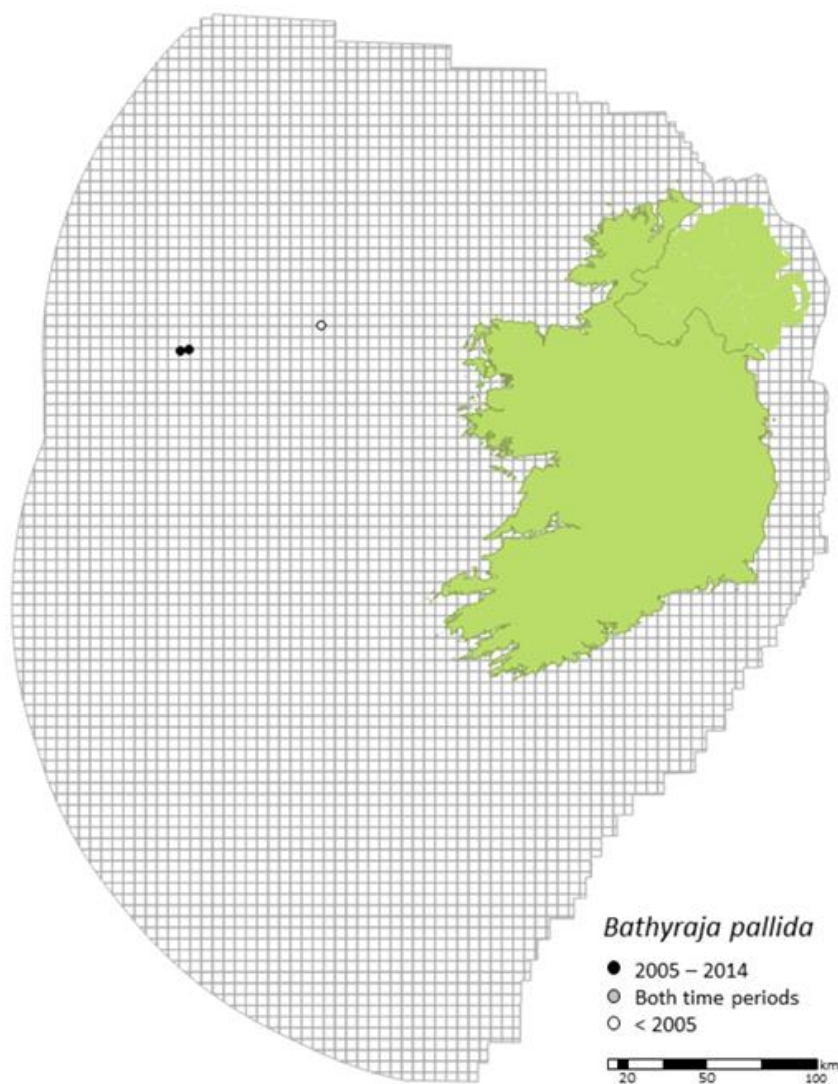
Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

This rare species is found only at depths greater than any deepwater fisheries, past or present. This implies that a designation of Least Concern is appropriate.

Range, distribution and habitat

This species is endemic in the Northeast Atlantic from 1,370 to 2,360m. It is known from occasional captures from the Mid-Atlantic ridge to northern Bay of Biscay, Rockall Trough and Porcupine Bank and the Porcupine Seabight (Forster 1967, 1968; Gordon and Duncan 1987; Clarke 1999; Johnston *et al.*, 2010; Orlov *et al.*, 2006).



Biology and Ecology

Almost no information is available on its biology. Its maximum recorded size is 162cm TL (Clarke 2000). Fecundity may be as low as 2 egg cases, based on observations by Clarke, 1999. Juveniles feed on polychaete worms, amphipods, isopods and copepods (Gordon and Duncan 1989).

Trend

No information is available.

Human impacts

This species is almost entirely beyond the scope of any fisheries at present.

Management/Conservation

There are no management or conservation measures for this species in Irish waters.

Rajella bigelowi (Stehmann, 1978)

Bigelow's ray

Irish name: Roc Bigelow

Status

Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

This is a relatively widely distributed species for which most records exceed 1,000m depth. The majority of its range being outside that of current deepwater fisheries implies a designation of Least Concern.

Range, distribution and habitat

It is distributed in waters of 367–4,156m depth (mostly below 1,000m) on continental slopes, abyssal plains and deepwater rises (Orlov *et al.* 2006). It has been recorded from the Rockall Trough, the Azores, western Atlantic (Grand Banks to Gulf of Mexico) (Stehmann and Burkel, 1984a), from Greenland (Nakaya 1995), Rockall Bank (Clarke and Moore, 2002) Iceland (Jónsson and Pálsson 2006), Rockall Trough, Porcupine Seabight, western Bay of Biscay (Spain), northern Morocco, Azores Islands, off Rio del Oro (western Sahara) and Guinea Conakry, including the mid-Atlantic ridge (Orlov *et al.* 2006).

Biology and Ecology

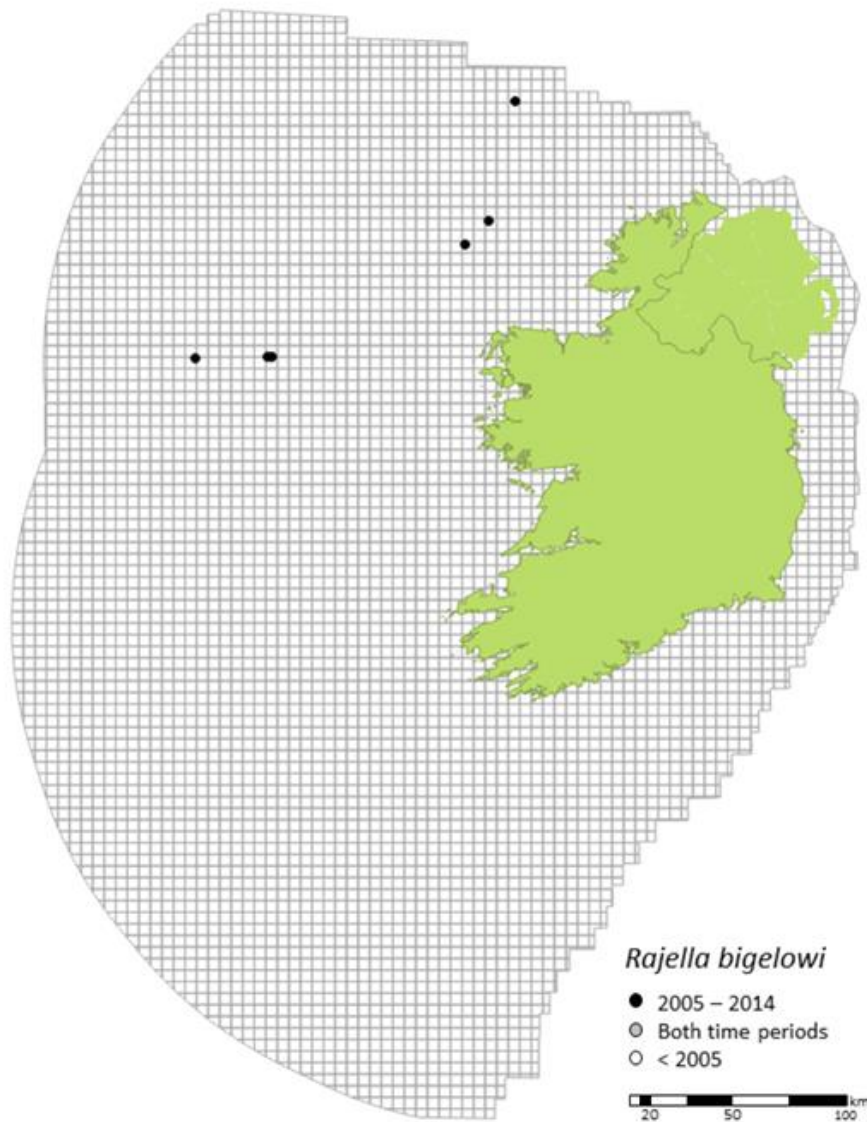
No information is available on the biology of this species.

Trend

No information is available.

Human impacts

This species is largely beyond the scope of any fisheries at present. However in Irish waters it can be expected to be a discarded by-catch in deepwater fisheries.



Management/Conservation

There are no management or conservation measures for this species in Irish waters.

Bathyraja richardsoni (Garrick, 1961)

Richardson's skate

Irish name: Sciata geal

Status

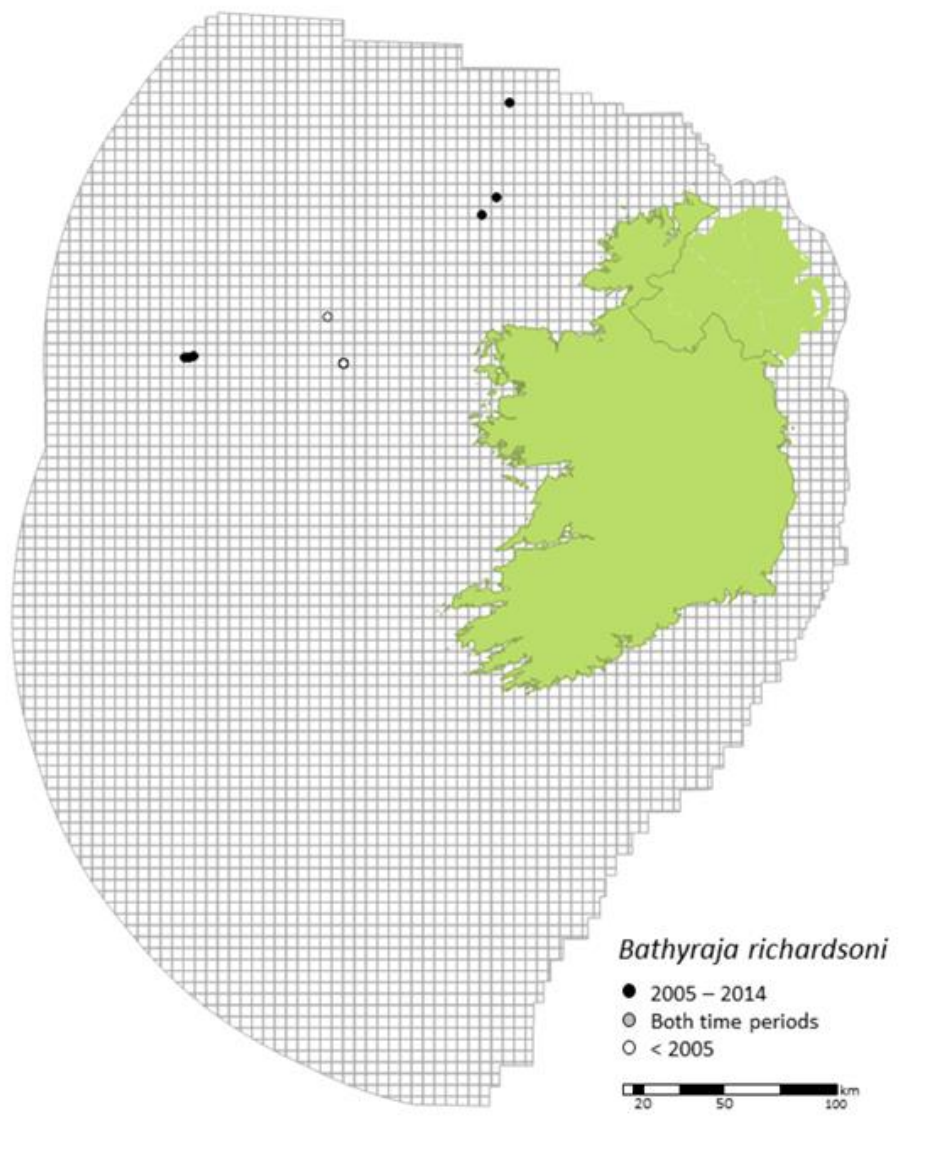
Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

This species is found widely in the north Atlantic, at great depths. Its bathymetric and geographic range is largely outside the reach of deepwater fisheries, so it can be inferred that the risk of overexploitation is low. It is therefore classified as Least Concern.

Range, distribution and habitat

In the Northeast Atlantic, it has been recorded from northern Bay of Biscay, Rockall Trough, west of Scotland and Ireland and the mid-Atlantic Ridge (Clarke, 1999; Ebert and Stehman, 2013; Johnson *et al.* 2010; Gordon and Duncan, 1987; Orlov, 2006). In the northwest Atlantic, it has been recorded from the southern Labrador Shelf, Canada to Georges Bank (Stehmann and Burkel, 1984a). The first northwest Atlantic records, taken on survey longlines between 1965 and 1967, comprised 18 mature specimens taken at depths between 1,370 and 2,360m (Templeman 1973). Recently this skate was found off the Azores and in the Mid-Atlantic ridge area (Orlov 2006). In the southwest Pacific, there is one record known (holotype) off New Zealand (Garrick 1961) and one off Australia (Last and Stevens 2009).



Biology and Ecology

B. richardsoni is a large-bodied skate, which reaches a maximum size of 174cm total length (Tempelman 1973) and size at birth is 18.2 to 24.5cm TL. Its diet consists primarily of teleost fishes and crustaceans (Templeman 1973).

Trend

No information is available.

Human impacts

This species is almost entirely beyond the scope of any fisheries at present.

Management/Conservation

There are no management or conservation measures for this species in Irish waters.

Harriotta raleighana Goode and Bean, 1895

Bentnose rabbitfish

Irish name: Ciméara socfhada

Status

Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

This uncommon species' depth range is mostly below the range of deepwater fisheries. Therefore a designation of Least Concern is appropriate.

Range, distribution and habitat

This species is widespread worldwide, in the NE Atlantic (Iceland to Biscay), Northwest Atlantic (Nova Scotia to Chesapeake Bay), Brazil, New Zealand, California and Japan. Its depth range is 360-2,000m (Stehmann and Bürkel, 1984c).

Biology and Ecology

The adult female part of the population is present in the deeper part of its range (Holt *et al.*, 2013)

Trend

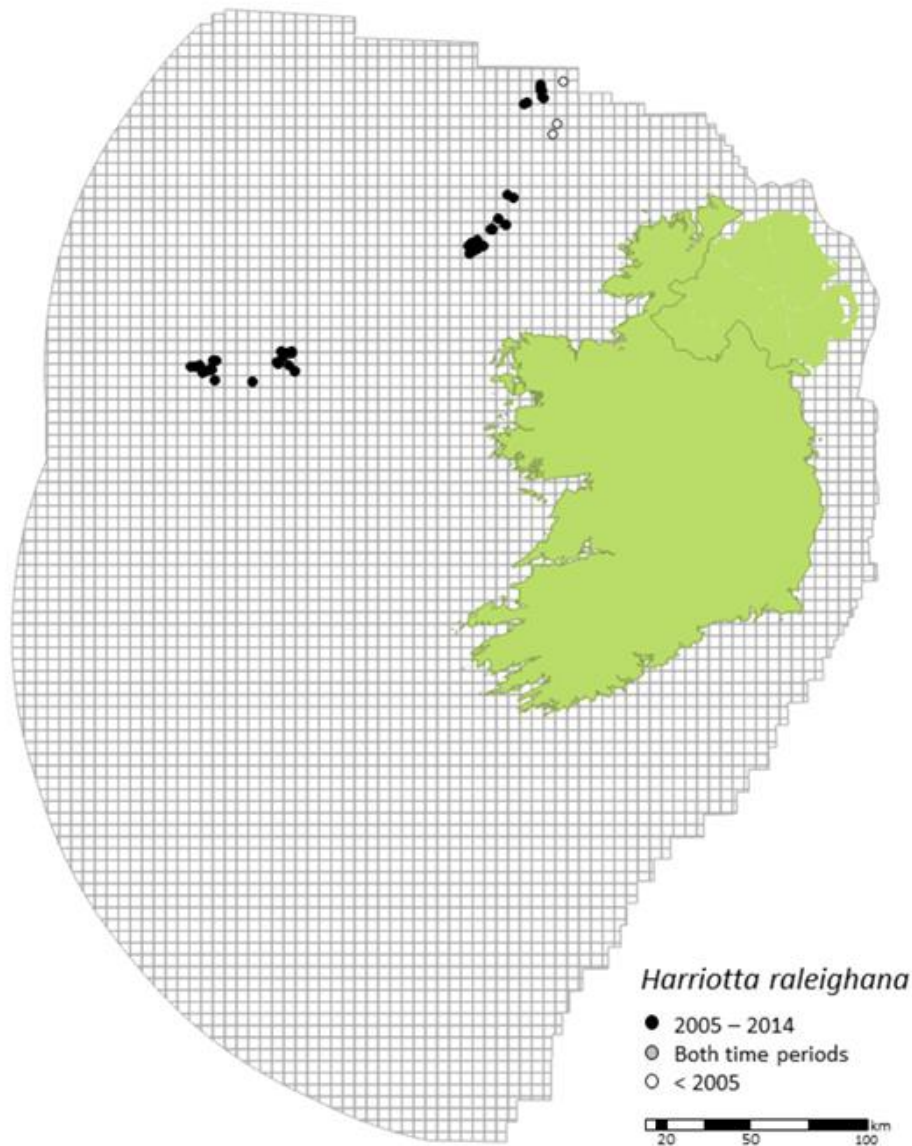
No information is available.

Human impacts

Some by-catch is unavoidable because the species' upper bathymetric range is within the deepwater fisheries' depth range.

Management/Conservation

This species is not subject to any formal management in European Union or Irish legislation.



Hydrolagus affinis (de Brito Capello, 1867)

Small-eyed rabbitfish

Irish name: Ciméara mionsúileach

Status

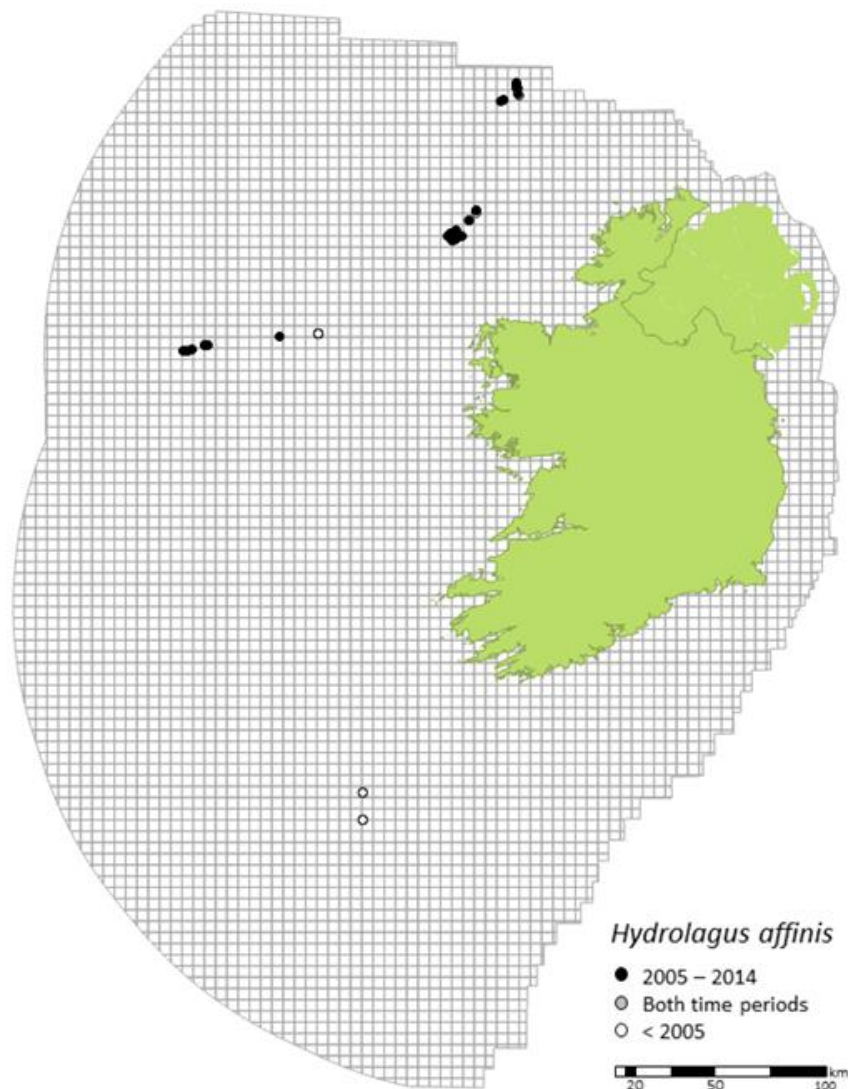
Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

This species' depth range is mostly below the range of deepwater fisheries. Therefore a designation of Least Concern is appropriate.

Range, distribution and habitat

Occurs on deepwater slopes of the north Atlantic (Portugal to Rockall Trough) and NW Atlantic from Newfoundland to Cape Cod, at depths of 300 to 2,410m, generally in waters near or below 1,000m (Ebert and Stehmann 2013; Stehmann and Bürkel 1984b). It is also present off Greenland (Møller *et al.*, 2004).



Biology and Ecology

Maximum total length (TL) with intact filamentous tail is about 147cm (96cm body length); maximum female TL at least 125cm, total body length (BDL) 86cm; male TL uncertain. Minimum size at maturity is attained in males at 66cm body length and in females at 68.5cm body length. Size at birth uncertain, but the smallest free-swimming individual was 32cm TL (14cm BDL). Nothing is known of the reproductive biology of this species (Ebert and Stehmann 2013).

Trend

No information is available.

Human impacts

Some by-catch is unavoidable because the species' upper bathymetric range is within the deepwater fisheries' depth range.

Management/Conservation

This species is not subject to any formal management in European Union or Irish legislation.

Hydrolagus pallidus Hardy and Stehmann, 1990

Pale ghost shark

Irish name: Ciméara taibhsiúil

Status

Ireland: Least concern. NE Atlantic: Least concern. Global: Least concern.

Justification

This rare species' depth range is mostly below the range of deepwater fisheries. Therefore a designation of Least Concern is appropriate.

Range, distribution and habitat

This recently described species is present in the Northeast Atlantic from the southern Bay of Biscay to western Scotland within the Rockall Trough, Iceland, Greenland and the Mid-Atlantic Ridge, including the Azores. It occurs at depths of 1,011m to 2,075m (Clarke, 2000; Ebert and Stehmann 2013). It is also reported from the Canary Islands (Brito *et al.* 2003).

Biology and Ecology

Maximum total length is at least 137cm for females and for males at least 136 cm (Ebert and Stehmann 2013). There is little other information on this species.

Trend

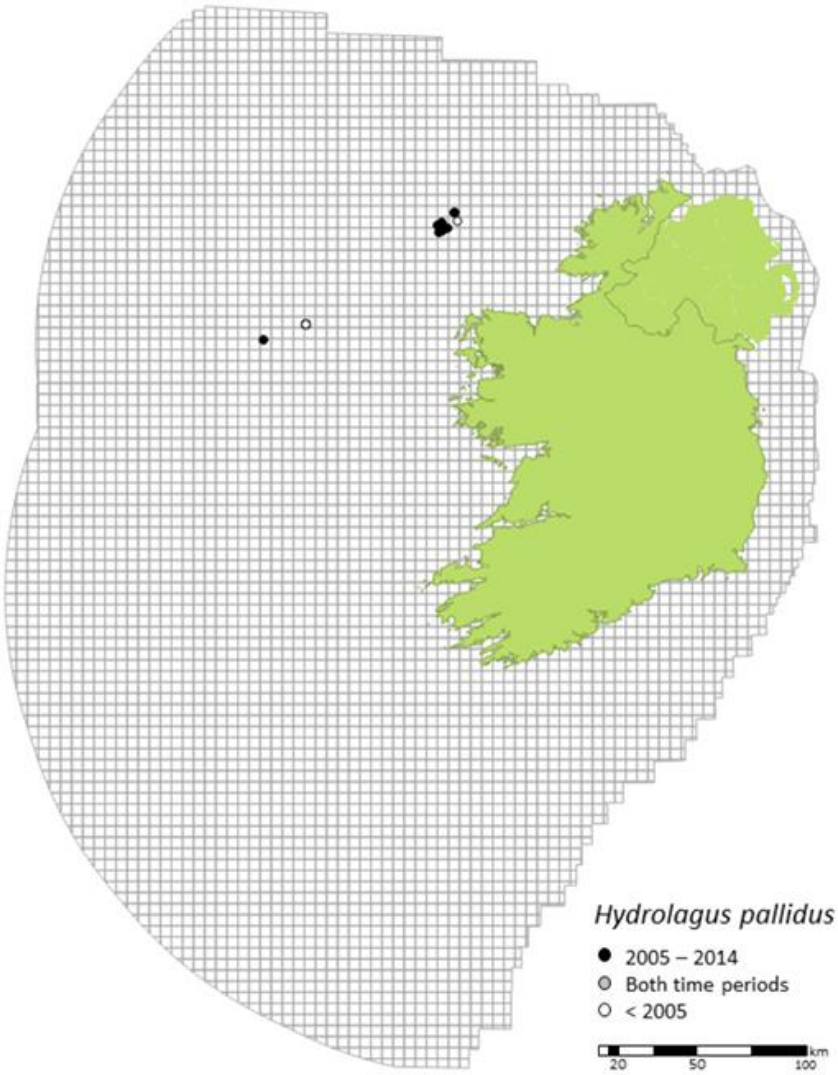
No information is available.

Human impacts

This species is largely beyond the range of deepwater fisheries at present.

Management/Conservation

This species is not subject to any formal management in European Union or Irish legislation.



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APPENDIX 1 – SUMMARY OF THE CRITERIA USED TO EVALUATE THREAT CATEGORY (IUCN, 2012).

Use any of the criteria A–E	Critically Endangered	Endangered	Vulnerable
A. Population reduction			
	Declines measured over the longer of 10 years or 3 generations		
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3 & A4	≥ 80%	≥ 50%	≥ 30%
<p>A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased, based on and specifying any of the following:</p> <ul style="list-style-type: none"> (a) direct observation (b) an index of abundance appropriate to the taxon (c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality (d) actual or potential levels of exploitation (e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites. <p>A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible, based on (a) to (e) under A1.</p> <p>A3. Population reduction projected or suspected to be met in the future (up to a maximum of 100 yrs) based on (b) to (e) under A1.</p> <p>A4. An observed, estimated, inferred, projected or suspected population reduction (up to a maximum of 100 years) where the time period must include both the past and the future, and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible, based on (a) to (e) under A1.</p>			
B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
AND at least 2 of the following:			
(a) Severely fragmented, OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals.			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals.			
C. Small population size and decline			
Number of mature individuals	< 250	< 2,500	< 10,000
AND either C1 or C2:			
C1. An estimated continuing decline of at least:	25% in 3 years or 1 generation	20% in 5 years or 2 generations	10% in 10 years or 3 generations
	(up to a max. of 100 years in future)		
C2. A continuing decline			
AND (a) and/or (b):			
(a i) Number of mature individuals in each subpopulation:	< 50	< 250	< 1,000
or			
(a ii) % individuals in one subpopulation =	90–100%	95–100%	100%
(b) Extreme fluctuations in the number of mature individuals.			
D. Very small or restricted population			
Either:			
Number of mature individuals	< 50	< 250	D1. < 1,000 AND/OR
VU D2. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.			D2. typically: AOO<20 km ² or number of locations ≤ 5
E. Quantitative Analysis			
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations (100 yrs max.)	≥ 20% in 20 years or 5 generations (100 years max.)	≥ 10% in 100 years

APPENDIX 2 – RED LIST STATUS OF CARTILAGINOUS FISH SPECIES IN IRELAND

IRL 2016 - Red list status for Ireland based on this assessment; CR - Critically Endangered, EN – Endangered, VU - Vulnerable, NT - Near Threatened, LC - least concern; NE - not evaluated (see individual species accounts for justifications and details).

Scientific name	Common name	IRL 2016
<i>Centroscymnus coelolepis</i>	Portuguese dogfish	CR
<i>Dipturus batis (= flossada)</i>	Common skate	CR
<i>Dipturus intermedia</i>	Flapper skate	CR
<i>Lamna nasus</i>	Porbeagle	CR
<i>Rostroraja alba</i>	White skate	CR
<i>Squatina squatina</i>	Angel shark	CR
<i>Centrophorus squamosus</i>	Leafscale gulper shark	EN
<i>Cetorhinus maximus</i>	Basking shark	EN
<i>Dasyatis pastinaca</i>	Common stingray	EN
<i>Raja undulata</i>	Undulate skate	EN
<i>Squalus acanthias</i>	Spurdog	EN
<i>Centroselachus crepidater</i>	Longnose velvet dogfish	VU
<i>Dalatias licha</i>	Kitefin shark	VU
<i>Dipturus oxyrinchus</i>	Longnosed skate	VU
<i>Galeorhinus galeus</i>	Tope	VU
<i>Leucoraja fullonica</i>	Shagreen ray	VU
<i>Leucoraja naevus</i>	Cuckoo ray	VU
<i>Apristurus manis</i>	Ghost shark	NT
<i>Apristurus melanoasper</i>	Black roughscale catshark	NT
<i>Apristurus microps</i>	Smalleye catshark	NT
<i>Chimaera monstrosa</i>	Rabbitfish	NT
<i>Chimaera opalescens</i>	Opal chimaera	NT
<i>Deania calcea</i>	Birdbeak dogfish	NT
<i>Dipturus nidarosiensis</i>	Norwegian skate	NT
<i>Etmopterus princeps</i>	Greater lantern shark	NT
<i>Hexanchus griseus</i>	Bluntnose sixgill shark	NT
<i>Hydrolagus mirabilis</i>	Large-eyed rabbitfish	NT
<i>Leucoraja circularis</i>	Sandy ray	NT
<i>Malacoraja krefftii</i>	Krefft's ray	NT
<i>Neoraja caerulea</i>	Blue ray	NT
<i>Oxynotus paradoxus</i>	Sharp-back shark	NT
<i>Prionace glauca</i>	Blue shark	NT
<i>Raja brachyura</i>	Blonde ray	NT
<i>Rhinochimaera atlantica</i>	Straightnose rabbitfish	NT
<i>Scymnodon ringens</i>	Knifetooth dogfish	NT
<i>Tetronarce nobiliana</i>	Electric ray	NT
<i>Amblyraja jenseni</i>	Shorttail ray	LC
<i>Apristurus aphyodes</i>	White ghost shark	LC
<i>Apristurus laurussonii</i>	Iceland catshark	LC
<i>Bathyraja pallida</i>	Pale skate	LC

<i>Bathyraja richardsoni</i>	Richardson's skate	LC
<i>Centroscyllium fabricii</i>	Black dogfish	LC
<i>Etmopterus spinax</i>	Velvet belly lantern shark	LC
<i>Galeus melastomus</i>	Blackmouth dogfish	LC
<i>Galeus murinus</i>	Mouse catshark	LC
<i>Harriotta raleighana</i>	Bentnose rabbitfish	LC
<i>Hydrolagus affinis</i>	Small-eyed rabbitfish	LC
<i>Hydrolagus pallidus</i>	Pale ghost shark	LC
<i>Mustelus asterias</i>	Starry smooth hound	LC
<i>Raja clavata</i>	Thornback ray	LC
<i>Raja microocellata</i>	Small-eyed ray	LC
<i>Raja montagui</i>	Spotted Ray	LC
<i>Rajella bathyphila</i>	Deep-water ray	LC
<i>Rajella bigelowi</i>	Bigelow's ray	LC
<i>Rajella fyllae</i>	Round ray	LC
<i>Rajella kukujevi</i>	Mid-Atlantic ray	LC
<i>Scyliorhinus canicula</i>	Lesser-spotted dogfish	LC
<i>Scyliorhinus stellaris</i>	Bull huss	LC
<i>Alopias vulpinus</i>	Thresher shark	NE
<i>Amblyraja hyperborea</i>	Arctic skate	NE
<i>Amblyraja radiata</i>	Starry ray	NE
<i>Chlamydoselachus anguineus</i>	Frilled shark	NE
<i>Echinorhinus brucus</i>	Bramble shark	NE
<i>Isurus oxyrinchus</i>	Shortfin mako shark	NE
<i>Heptranchias perlo</i>	Sharpnose seven-gill shark	NE
<i>Mobula mobular</i>	Devil ray	NE
<i>Myliobatis aquila</i>	Eagle ray	NE
<i>Pseudotriakis microdon</i>	False catshatk	NE
<i>Pteroplatytrygon violacea</i>	Pelagic stingray	NE
<i>Squalus uyato</i>	Little gulper shark	NE
<i>Somniosus rostratus</i>	Little sleeper shark	NE
