European Red List of Marine Fishes

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Table of contents

Foreword

Europe is a continent rich in natural and cultural heritage, with a diverse range of natural conditions from offshore deep seas to high alpine mountain tops, from dry Mediterranean maquis in the south to the Arctic tundra in the far north. Possibly more than anywhere else in the world the European landscapes have been changed by human activities. In consequence, biodiversity loss is an enormous challenge in the EU today, with around one in four species currently being threatened with extinction.

Regional European Red Lists are an important tool to scientifically assess and communicate the status of species. They usefully complement the reporting under the Habitats and Birds Directives, as they usually address all species in a specific taxonomic group, not just those protected by EU legislation. They hence give important complementary and comprehensive information about the status of biodiversity in Europe.

Starting in 2007 with the launch of the European Red List of Mammals, all vertebrate groups have since been assessed according to the same IUCN Red List methodology; the current Red List for marine fishes is thus filling a gap for the last group of vertebrates that still remained to be assessed. Accordingly, for the first time ever, an assessment of the extinction risk for each and every vertebrate species occurring in the European Union (and in Europe) is now available.

Overall, the new European Red List of Marine Fishes shows that 7.5% of all marine fish species are threatened. This needs to be compared to the earlier assessments carried out for the other vertebrate species groups, which show that 17% of mammals, 13% of birds, 23% of amphibians, 20% of reptiles and 40% of freshwater fishes are threatened.

Looking at all marine fish species considered as not being in a secure status, the most frequently identified pressures are, over-exploitation (including unsustainable fishing, accidental by-catch and indirect effects on habitats), coastal and estuarine developments, energy production and mineral extraction, and marine pollution.

Remarkably however, the Red List assessment of marine fishes is also showing that species most at risk are not generally those that are subject to a targeted fisheries exploitation. It is rather the large-bodied, long- lived cartilaginous fishes (sharks, rays, skates, and sawfish) that appear to be in the worst condition, in particular in the Mediterranean Sea.

The report also shows that existing fisheries conservation measures have been successful for certain species, such as Atlantic Cod or Atlantic Bluefin Tuna, whose stocks have improved. However, for some other species, such as Atlantic Halibut, Atlantic Salmon and Turbot, additional efforts are still needed.

The European Red List of Marine Fishes, more than other Red List assessments so far, shows that the sustainable use of our wider environment and the maintenance of ecosystem services must come to the centre of our attention. Its findings are crucial for informing EU biodiversity and marine policy and effectively implementing EU legislation, such as the Common Fisheries Policy, the Marine Strategy Framework, the Birds and Habitats Directives and the Maritime Spatial Planning Directives, to improve the status of threatened marine species.

I hope that this European Red List of Marine Fishes will add another piece of evidence for the fact that our common efforts aimed at halting the loss of biodiversity and the implementation of related European legislation need to be continued and strengthened in the coming years.

Pia Bucella
Director
Directorate B: Natural Capital
European Commission

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All of IUCN's Red Listing processes rely on the willingness of scientists to contribute and pool their collective knowledge to make the most reliable estimates of species status. Without their enthusiastic commitment to species conservation, this kind of regional overview would not be possible.

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Expert participants at a Marine Fish Red List assessment workshop, October 2013, Málaga, Spain. © Mia T. Comeros-Raynal.

Expert participants at a Marine Fish Red List assessment workshop, March 2014, Brussels, Belgium. © Gina M. Ralph.

Expert participants at the Chondrichthyan Red List assessment workshop, June 2014, Plymouth, UK. © Rachel H.L. Walls.

Executive summary

Aim

The European Red List is a review of the conservation status of European species according to IUCN regional Red Listing guidelines. It identifies those species that are threatened with extinction at the regional level, so that appropriate conservation action can be taken to improve their status. This Red List publication summarises results for all described native European marine fishes.

Scope

All marine fishes, including all hagfish, cartilaginous fish and bony fish species native to or naturalised in Europe before AD 1500 (a total of 1,220 species), have been assessed in this Red List. The geographic scope encompasses the Mediterranean Sea, the Black Sea, the Baltic Sea, the North Sea and/or the European part of the Atlantic Ocean (i.e., the territorial waters and the Exclusive Economic Zones (EEZs) of all European countries in the Eastern part of the Atlantic Ocean, including the EEZs of the Macaronesian islands belonging to Portugal and Spain).

Status assessment

The status of all species was assessed using the *IUCN Red List Categories and Criteria* (IUCN 2012a), which are the world's most widely accepted system for measuring extinction risk. All assessments followed the *Guidelines for Application of IUCN Red List Criteria at Regional and National Levels* (IUCN 2012b).

These assessments were compiled based on the data and knowledge from a network of leading European and international experts on marine fish. The assessments were then completed and reviewed at three large workshops held in Spain, Belgium and the UK, as well as through email correspondence with relevant experts. More than 110 experts participated in the assessment and review process for European marine fishes. Assessments are available on the European Red List website and data portal: http://ec.europa.eu/environment/nature/conservation/species/redlist and http://www.iucnredlist.org/initiatives/europe.

Megrim (*Lepidorhombus whiffiagonis*), Least Concern. © OCEANA.

Results

Overall, 7.5% of the total of European marine fish species that were assessed in this study are considered threatened (i.e., assessed as having an elevated risk of extinction) in European waters. A further 2.6% (26 species) are considered Near Threatened. However, for 204 species (20.6%), there was insufficient scientific information available to be able to evaluate their risk of extinction and thus they were classified as Data Deficient (DD). When more data become available, some of these species might also prove to be threatened.

By comparison, of those other groups that were assessed comprehensively in Europe, 59% of freshwater molluscs, 40% of freshwater fishes, 23% of amphibians, 20% of reptiles, 17% of mammals, 16% of dragonflies, 13% of birds, 9% of butterflies and bees, 8% of aquatic plants and 2% of medicinal plants are threatened (IUCN 2011a, Nieto *et al.* 2014, Allen *et al.* 2014, BirdLife International 2015). Additional European Red Lists assessing a selection of species showed that 22% of terrestrial molluscs, 16% of crop wild relatives and 15% of saproxylic beetles are also threatened (IUCN 2011a). No other groups have yet been assessed at the European level.

Looking at the population trends of European marine fish species, 8.4% (83 species) have declining populations, 21.5% (212 species) are more or less stable and 1.7% (17 species) are increasing. The population trends for 676 species (68.4%) remain unknown. Eight of the 184 species (4.3%) that are endemic to Europe (i.e., they are found nowhere else in the world) are threatened (Critically Endangered, Endangered, or Vulnerable), highlighting the responsibility that European countries have to protect the global populations of these species.

Overall, the European areas with the highest diversity of species are the coast of Portugal, the Macaronesian islands and the western Mediterranean Sea. Hotspots of endemic species are found in the Mediterranean Sea, in particular along the European coast, including the Balearic, Ligurian, Tyrrhenian, Adriatic and Aegean Seas. Furthermore, the greatest concentrations of threatened species appear off the Iberian Peninsula, the Mediterranean Sea and the Canary Islands. Finally, the highest number of Data Deficient (DD) species is present near the Macaronesian islands, particularly in the Madeiran and Canarian archipelagos.

The main threats to European marine fishes are overfishing, coastal development, energy production and mining, and pollution.

Recommendations

- Use the European and national Red Lists of marine fishes to inform revisions and implementation of relevant European legislation (including the Marine Strategy Framework Directive and the Maritime Spatial Planning Directive) to improve the status of threatened marine species, and to improve the knowledge of Data Deficient species.
- Continue, and where necessary, expand multi-national fisheries conservation initiatives and management of commercially shared stocks of exploited species, particularly in the Mediterranean and Black Seas.
- Take immediate measures to (i) reduce target and incidental catches of species assessed as threatened (i.e., Critically Endangered, Endangered and Vulnerable), (ii) enact measures to ensure sustainable management of species threatened by exploitation, and (iii) set and enforce science-based fishing opportunities and multi-annual management plans for all commercial species, especially those fisheries that target or affect species assessed as threatened and Near Threatened based on exploitation.
- Ensure compliance with the requirements under the Common Fisheries Policy (CFP) to apply the precautionary approach by harvesting species at levels to ensure Maximum Sustainable Yield (MSY) for all EU fisheries, especially those for highly migratory species.
- Ensure compliance with the requirements, under the Common Fisheries Policy (CFP) to apply the ecosystem-based management of fisheries.
- Improve collection of fisheries-dependent data of commercial fisheries, in particular data on catch composition, by-catch, landings, discards, and catch per unit effort, and where not already in place, establish monitoring schemes for small scale artisanal and recreational (line and spear) fisheries.
- Require fully documented fisheries and proper mapping of fisheries and fishing effort deployed though control technologies such as Vessel Monitoring System (VMS), Vessel Detection System (VDS) and/or Automatic Identification System (AIS).
- Expand fisheries-independent data collection monitoring, especially for Data Deficient species, and monitoring of threatened species that are not

currently sampled effectively, and ensure that such data are exchanged with relevant scientific bodies and Regional Fisheries Management Organisations (RFMO) (e.g., ICES, GFCM, NEAFC, ICCAT).

- Improve EU and RFMO requirements for species-specific reporting of catches and landings of all species, especially chondrichthyans, and for quality assurance of these data so that improved analyses of long-term trends can be undertaken.
- Carry out analyses of species trends in both the Northeast Atlantic and the Mediterranean Sea. In particular in the Mediterranean Sea, although there is the ongoing MEDITS survey, there is an urgent need for the development of region-wide time-series analyses of these data.
- For those taxa with threatened species and taxonomic problems, improved species identification is required in all data collection exercises (including both commercial landings as well as scientific surveys). For that purpose, trainings of species identification to fishers should be provided, in particular for sharks, skates and rays species, with a view to ensuring that these species are not confused and that juveniles in particular can be distinguished.
- Ensure that all designated Marine Protected Areas (MPAs) and areas restricted to fisheries, at the national, regional (Regional Seas Conventions) and European levels (Natura 2000 network) provide adequate protection to threatened marine fishes and particularly protect critical habitats for key life cycle stages (e.g., spawning, pupping, nursery and feeding grounds).
- Fully adopt and enforce fisheries management measures for designated MPAs with the view to alleviate pressure on marine fish species and on the habitats that are necessary for their conservation.
- Expand area-based conservation measures to meet and exceed the globally agreed-upon Aichi Target 11 of 10% coverage of each marine region, by identifying and establishing Fish Stock Recovery areas, as per the Common Fisheries Policy provisions, to protect spawning grounds and concentration of juvenile fish for those commercial fish species assessed as Critically Endangered, Endangered, Vulnerable and Near Threatened.
- Revise the list of threatened European marine fishes regularly, and whenever new data becomes available.
- Conduct basic biological research for deep-sea and Data Deficient species, especially those that are or have been commercially exploited (e.g., Orange Roughy, *Hoplostethus atlanticus,* and the wolf-fishes, *Anarhichas* spp.).

1. Background

1.1 The European context

Europe's marine environment includes a vast expanse of the northeastern Atlantic Ocean, the brackish waters of the Baltic Sea, the warm salty waters of the Mediterranean Sea and the murky depths of the Black Sea (Figure 1).

The European marine area comprises *~ca.* 18,000,000 km², almost twice that of the land area, and the coastline totals around 250,000 km. Its deepest point reaches to 6,500 metres, almost 600 nautical miles off the northwest Portuguese coast in the Atlantic Ocean. In the Mediterranean Sea, the deepest waters are found to the south of Greece, with sea bottom areas there reaching 5,200 metres of depth (Coll *et al.* 2012). In the Black Sea, the bottom reaches 2,563 metres depth, ~30 nautical miles north of the Turkish coast. In contrast, the deepest parts of the Baltic Sea, 13 nautical miles east of the Swedish coast, are 450 metres deep (General Bathymetric Chart of the Oceans 2014).

In this context, the European submarine extension – as occurs on the land – displays rather heterogeneous physical and chemical characteristics, enabling the co-existence of a large variety of ecosystems that are inhabited by a great diversity of species. Characteristics such as substrate, salinity, etc. can change drastically. The European marine area covers warm temperate, cold temperate and arctic waters, including the largest warm temperate sea area of the world (Briggs 1974). For example, water temperature can reach almost 30°C in the Mediterranean Sea around Cyprus, and drop to below 0°C in the Atlantic, Baltic and Barents Seas close to Poland and Russia (Sea-temperature 2015). The European Nature Information System (EUNIS) classifies, based on the variety of depths and substrata, almost 1,000 habitat types present in European marine areas, from littoral, infralittoral, circalittoral and sublittoral rocks and sediments to the deep-sea bed, together with the pelagic water column and ice-associated marine habitats. The European marine areas also have significant presence of transitional water habitats (river mouths, lagoons etc.) and, due to the freshwater input and low salinity, the whole or most of some European enclosed seas function as transitional waters (i.e., the Black Sea, the Baltic Sea, the Azov Sea). Taking into account that Europe's deepest areas are larger

Portuguese Blenny (*Parablennius ruber*), Least Concern. © Robert A. Patzner.

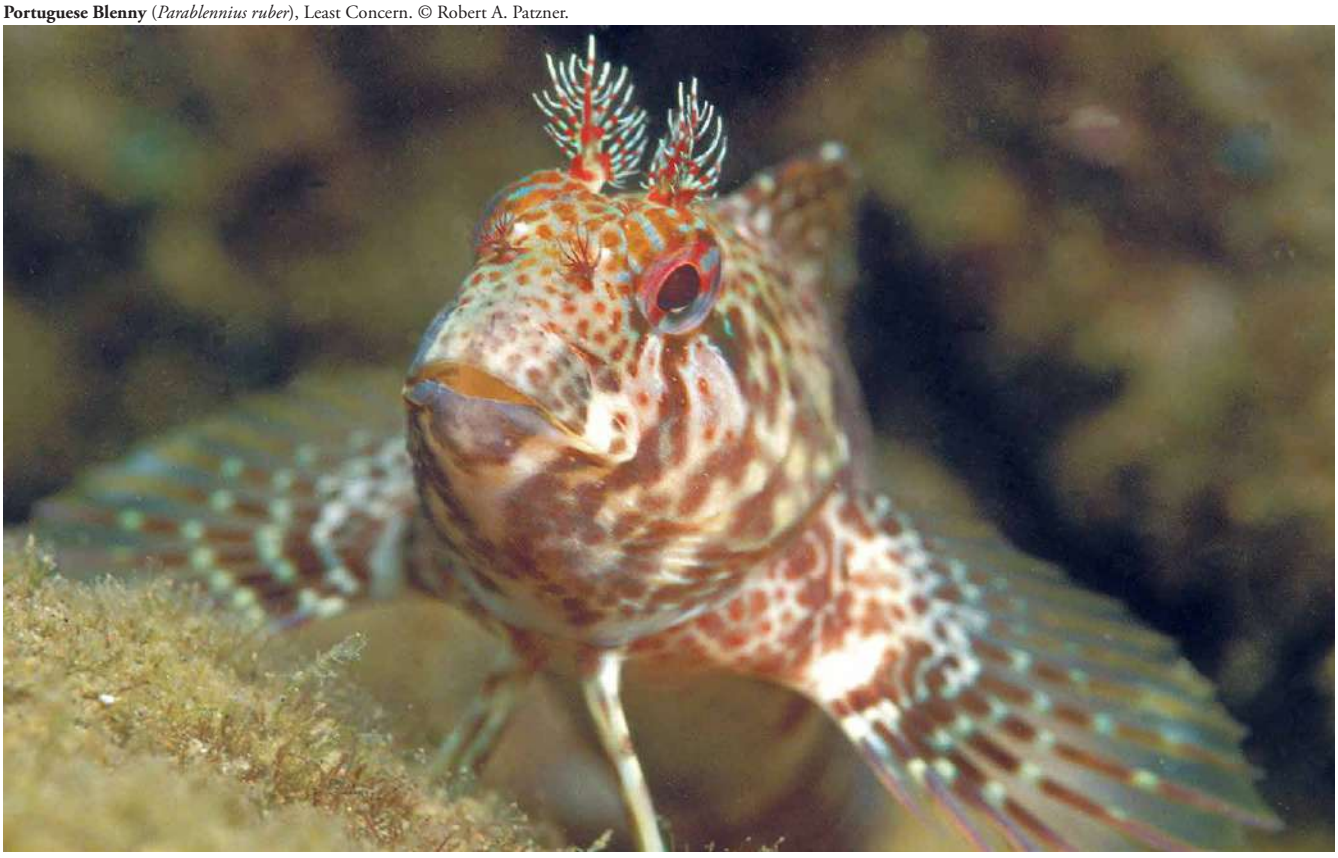
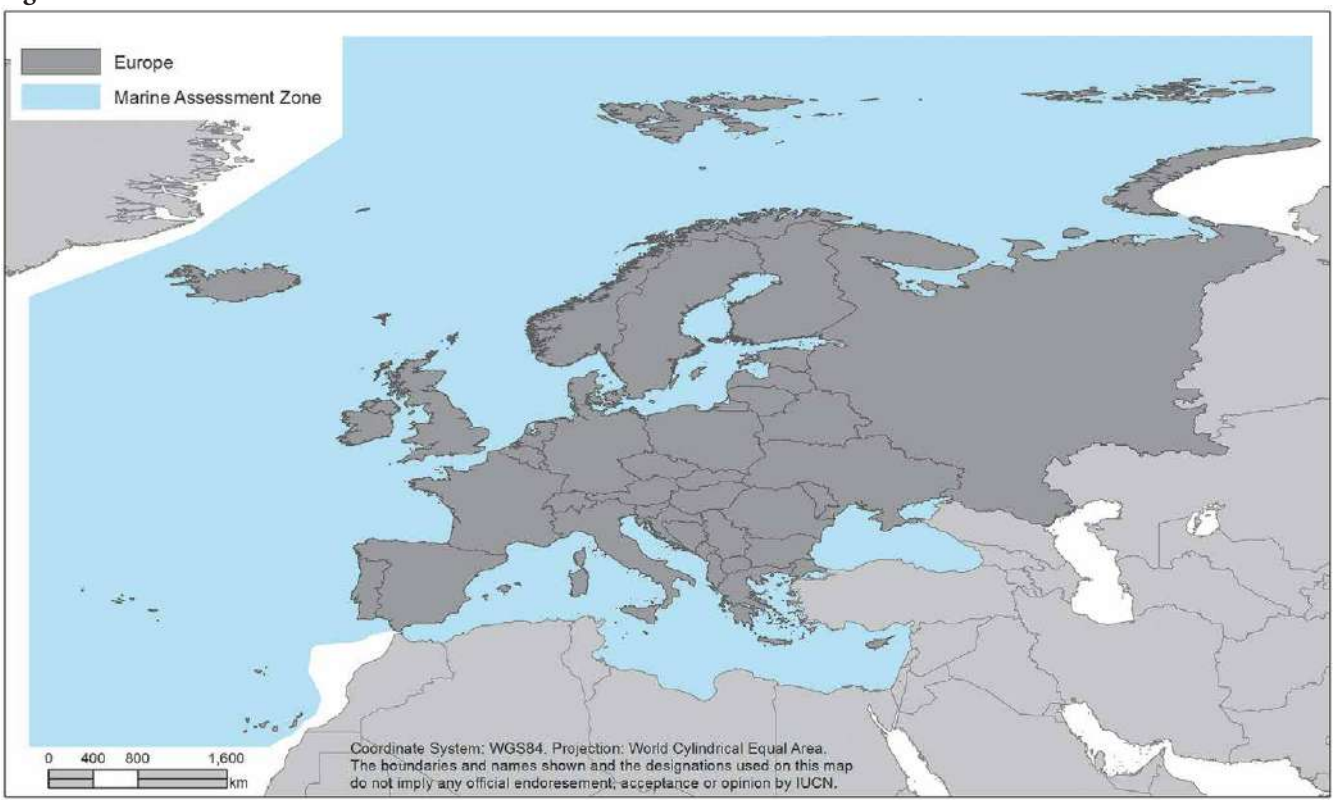


Figure 1. Marine assessment boundaries.



and less known than coastal ones, the numbers related to European marine biodiversity are expected to be higher.

From a geographical perspective, 17.8% of the European seabed belongs to the continental shelf, while 82.2% goes beyond 200 m deep, including abyssal plains. The European sea bottom landscape is covered by a multitude of different features, such as seamounts rising thousands of meters from the sea floor (e.g., the Gorringe Bank, Northeast Atlantic), and escarpments falling from the continental shelf to the abyssal plain (e.g., the Emile Baudot Escarpment in the western Mediterranean), and includes many other features such as ridges, canyons, mud volcanoes, pockmarks fields, hydrothermal vents, etc. – all of them accommodating a high variety of associated habitats and species. The topography of these marine features interacts with oceanographic events – ocean fronts, eddies, upwellings and other physical features that are closely related to biological hotspots and in some cases with highly productive areas.

More than 26,000 marine species and 9,000 genera have been registered by the European Census of Marine Life, excluding viruses and bacteria (Vandepitte *et al.* 2011, Narayanaswamy *et al.* 2013). Approximately half of the species belong to three main taxonomic groups, as registered by the European Node of the international Ocean Biogeographic Information System (EurOBIS) and/or the European Register of Marine Species (ERMS) databases: Crustacea (over 7,000 species), Mollusca (nearly 4,000 species) and Plantae (2,600 species) (Vandepitte *et al.* 2011). Regarding marine fishes, 1,349 species have been registered in the ERMS database (Costello *et al.* 2006) and almost 2,000 are included in the EurOBIS database (Vandepitte *et al.* 2011).

These numbers are constantly changing because the number of marine research projects has grown exponentially throughout European waters in recent decades. Thanks to the use of modern tools and technologies for collecting data, such as Remotely Operated Vehicles (ROV), and for analysing data (e.g., Geographic Information Systems, GIS), our knowledge of European marine biodiversity is increasingly detailed although still incomplete. The obtained information is enabling scientists to discover new species and describe new habitats, as well as gaining a better understanding of ecosystem functioning, together with the effects of human influence. Nevertheless, research of the deepest environments is quite recent and there are significant gaps in knowledge that remain to be filled.

Europe's regional seas are also amongst the most productive in the world, offering a wide range of ecosystem goods and services which, in turn, support the livelihoods of over 5.4 million people across the EU and

generate a gross added value of almost 500 billion Euro per year (EC Nature and Biodiversity Newsletter 2015).

However, our marine habitats and species are under pressure and are seriously affected by numerous threats. Human activities and exploitation are changing species abundances and distributions, and the distribution and quality of notably sensitive and essential marine habitats. Both direct and indirect human activities are causing serious degradation and loss of European marine biodiversity. Because of these concerns, European legislation and several international conventions aim to reduce this loss of biodiversity and safeguard the most sensitive European marine ecosystems.

In the European Union, the Natura 2000 network designated under the EU Birds and Habitats Directives provides a cornerstone for European designation of Marine Protected Areas (MPAs). Currently, almost 4% of EU waters have been designated as part of the Natura 2000 network of MPAs (EC Nature and Biodiversity Newsletter 2015), and almost 6.4% of European waters have been designated as MPAs (both as part of the Natura 2000 network and other forms of protection). However this falls short of the global target of 10% of MPAs by 2020 as agreed on in the Aichi Biodiversity Targets (Target 11; CBD 2011).

1.2 European marine fishes: diversity and endemism

The wide latitudinal gradient included in the European marine assessment region encompasses a great diversity of sub-tropical, temperate, and Arctic marine fishes. The most comprehensive list of marine fishes present in the assessment region is the 1984-1986 *Fishes of the Northeastern Atlantic and Mediterranean* (Whitehead *et al.* 1984-1986), which was updated and published electronically in 1996 (Hureau *et al.* 1996). This checklist reported 1,256 species in 218 families, representing about 7.1% of the approximately 17,700 valid marine fishes known globally (Eschmeyer 2015).

However, not all species are originally native to European waters. In the case of the Mediterranean Sea, the Suez Canal provides an ongoing route for migration of Indo-Pacific species (Golani and Appelbaum-Golani 2010), termed "Lessepsian migrants", and the Straits of Gibraltar of Atlantic species into the Mediterranean Sea (Golani *et al*. 2002). In the Northeast Atlantic, there is ongoing northward migration of sub-tropical species due to increasing sea surface temperatures (Simpson *et al.* 2011). A checklist of the 1,220 native marine species which were assessed regionally is provided in Appendix 1.

Europe's marine fishes belong to four major taxonomic groups: the Myxini, the Petromyzontida, the Chondrichthyes and the Actinopterygii. The Myxini include the hagfishes and there are three species native to Europe. The Petromyzontida, or the lampreys, are a group of parasitic and non-parasitic freshwater and anadromous species. Although some utilize marine habitats, all 13 European representatives were assessed as part of the European Red List of Freshwater Fishes (Freyhof and Brooks 2011) and thus are not included here. Chondrichthyans, the cartilaginous fishes, include the sharks, rays and chimaeras. The 132 species of chondrichthyans native to European waters belong to

Striped Goby (*Gobius vittatus*), Least Concern. © Robert A. Patzner.

Table 1. Diversity and endemism in marine fishes in Europe.

Class	Order	Number of species	Number of endemic species (% endemic)
Actinopterygii	Anguilliformes	50	5 (10%)
	Ateleopodiformes	1	0
	Atheriniformes	2	0
	Aulopiformes	44	1 (2.3%)
	Batrachoidiformes	1	0
	Beloniformes	17	0
	Beryciformes	10	0
	Cetomimiformes	7	0
	Clupeiformes	7	1 (14.3%)
	Gadiformes	83	20 (24.1%)
	Gasterosteiformes	1	1 (100%)
	Gobiesociformes	11	5 (45.5%)
	Lampriformes	8	0
	Lophiiformes	58	6 (10.3%)
	Mugiliformes	1	0
	Myctophiformes	67	1 (1.5%)
	Notacanthiformes	10	0
	Ophidiiformes	38	5 (13.2%)
	Osmeriformes	64	2 (3.1%)
	Perciformes	327	78 (23.9%)
	Pleuronectiformes	42	6 (14.3%)
	Polymixiiformes	1	0
	Saccopharyngiformes	6	1 (16.7%)
	Salmoniformes	1	0
	Scorpaeniformes	58	18 (31%)
	Stephanoberyciformes	15	0
	Stomiiformes	110	2 (1.8%)
	Syngnathiformes	19	12 (63.2%)
	Tetraodontiformes	20	0
	Zeiformes	6	0
Chondrichthyes	Carcharhiniformes	27	2 (7.4%)
	Chimaeriformes	9	1 (11.1%)
	Hexanchiformes	4	0
	Lamniformes	11	0
	Rajiformes	50	15 (30%)
	Squaliformes	28	1 (3.6%)
	Squatiniformes	3	1 (33.3%)
Myxini	Myxiniformes	3	0
Total		**1,220**	**184 (15.1%)**

This table includes species that are native or naturalised since before AD 1500; species introduced after this date are not included. Species of marginal occurrence in Europe are included (232 species).

32 families, and appear to be intrinsically more sensitive to population declines than many other marine fish taxa (Dulvy *et al.* 2005, 2014). The final group, the Actinopterygii or bony fishes, harbour the greatest number of species.

For the purposes of this report, endemic species are those that are known only from the European Marine Assessment Zone (Figure 1). Of the 1,220 species, 15.1% (184 species) are considered endemic to the assessment region based on known, suspected, or inferred occurrences (Table 1). This is substantially lower than the >80% of the freshwater fish diversity of Europe which is known to be endemic (Freyhof and Brooks 2011). However, fishes in marine environments typically have lower rates of endemism than fishes in freshwater environments due to the much larger habitats and higher levels of connectivity in marine systems. The low rate of endemism is also a function of how this geopolitical region was defined, as it includes the Macaronesian islands but excludes the Atlantic coasts of Morocco and Western Sahara.

1.3 The economic value of European marine fishes

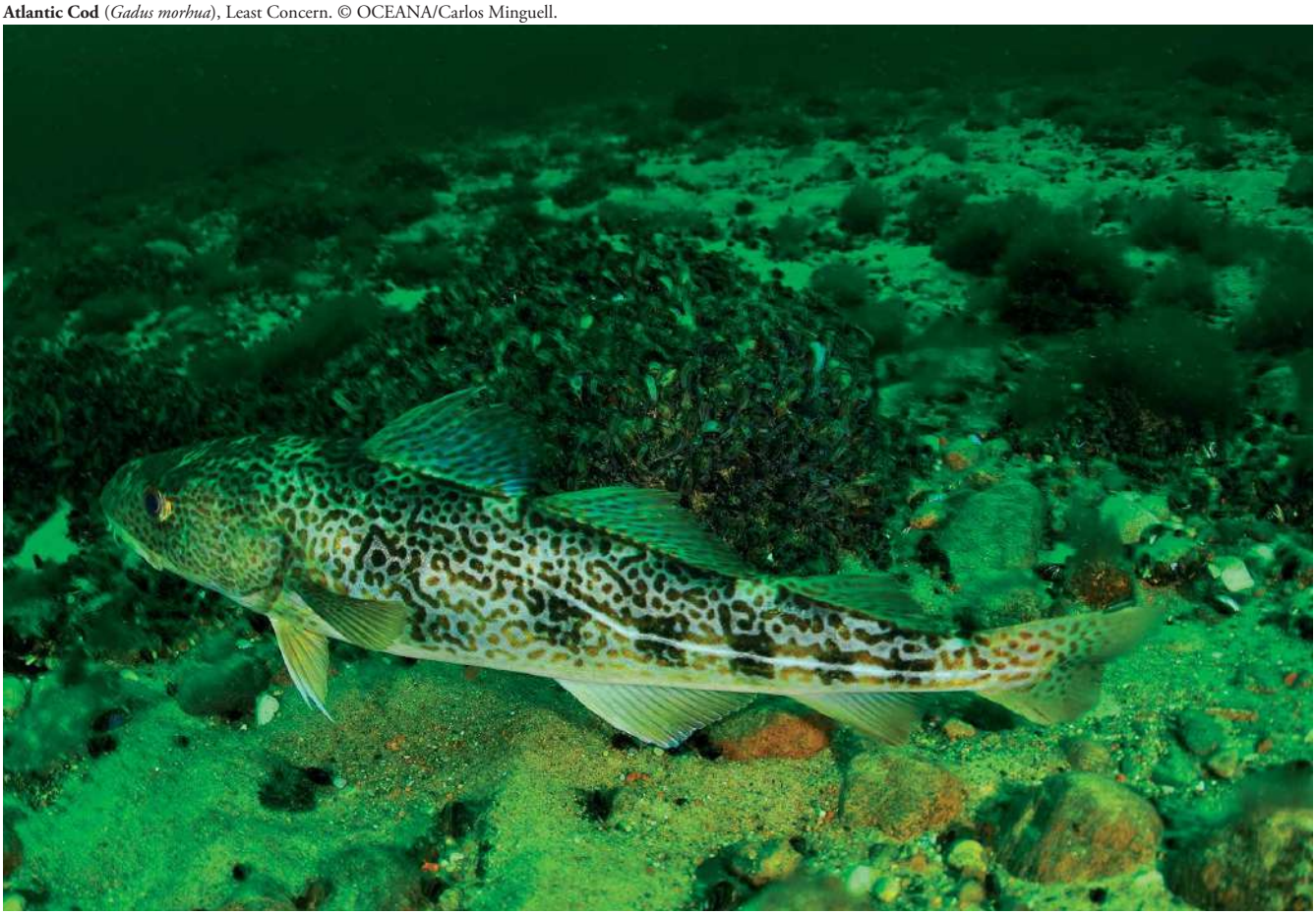
Healthy and well-managed marine fish populations are vital to ensuring future prosperity, preserving cultural identity and improving the ecological health of European coastal communities. Historically, freshwater fisheries supported food security in Europe for over 10,000 years. The population boom during the Middle Ages (500–1500 AD) caused major declines in freshwater fish populations, and forced expansion of fishing pressure to marine waters (Hoffmann 2005). As European human populations continued to grow, demands on marine resources grew in turn and expansion in fishing fleets and harvests continued. In the 1960s and 1970s, in response to the decline in shallow water marine species, larger and more powerful vessels began to fish in deeper waters (Roberts 2002), and improved technology (more accurate navigation and fish detection equipment) enabled increased catch per unit effort (CPUE).

Maximum sustainable yield (MSY) is the theoretical largest yield (or catch) that can be taken from a species' stock into the future and is one of the primary methods for fisheries management. In 2014, 41% of the 46 European stocks for which MSY assessments are available were considered overfished, and an additional 45% of 38 stocks for which MSY assessments are not available were considered outside of safe biological limits; the state of 47 stocks was unknown due to poor data (EC 2014). Although this is a substantial improvement from the 94% overfished (32 of 34 stocks) and 65% (26 of 40 stocks) outside safe biological limits in 2005 (EC 2014), it puts an enormous strain on the fishers, their communities and the industries indirectly associated with fishing, such as port and processing facilities and fish markets. It has been estimated that rebuilding global fisheries may only take 12 years and could result in a net gain of 600-1,400 US billion dollars over the next 50 years (Sumaila *et al.* 2012). This rebuilding has the potential to be a huge boon to the European economy and for all fishers, including the recreational fishing industry, the annual value of which has been estimated at 25 billion Euro (Dillon 2004).

Additionally, artisanal or local small-scale fishing boats that make up 75–80% of the European fishing fleet would gain from rebuilding fisheries in the region; for these fishers, fishing is an important, and sometimes the only, source of income. For example, over 99% of the artisanal fishers in the Asturias region of Spain cited fishing as their only income source (García de la Fuente *et al.* 2013). Culturally, many of these people come from a lineage of fishers and often work with family members; the kinship with family and community and the passing down of fishing knowledge through generations constitutes the cultural backbone of many fishing communities. Moreover, small-scale fishers develop an intimate and detailed knowledge of the areas they exploit, gaining traditional ecological knowledge that often emphasizes the time, location and scale of potential fish harvests (McGoodwin 2001). Because these fishers work close to their home port, they are invested in sustainable exploitation of their fishing grounds and maintaining the good health of local ecosystems, thus representing an important potential for informing fisheries management and policies (McGoodwin 2001). In contrast, some other EU fisheries are in crisis because they are unprofitable, overcapitalised and overfished (Abernethy *et al.* 2010, Vasilakopoulos *et al.* 2014, Smith and Garcia 2014).

All these stakeholders share the common goal of improving the ecological health of European coastal communities, which in turn will facilitate building sustainable fisheries that can be preserved through generations. Rebuilding fisheries requires improving the ecological health of the marine ecosystem by ending overfishing, and the first step involves knowing the status and extinction risk of marine fish populations.

Atlantic Cod (*Gadus morhua*), Least Concern. © OCEANA/Carlos Minguell.



1.4 Assessment of species extinction risk

The conservation status of plants, animals and fungi is one of the most widely used indicators for assessing the condition of ecosystems and their biodiversity. Conservation status assessments are intended to be policy-relevant, and can be used to inform conservation planning and priority setting processes, but they are not intended to be policy-prescriptive, and are not in themselves a system for setting biodiversity conservation priorities. At the global scale, the primary source of information on the conservation status of plants and animals is the IUCN Red List of Threatened Species™ (www.iucnredlist.org).

The *IUCN Red List Categories and Criteria* (IUCN 2012a) are designed to determine a taxon's relative risk of extinction, with the main purpose of cataloguing and highlighting those taxa that are facing a higher risk of extinction. The IUCN Red List provides taxonomic, distribution, ecological, threat and conservation status information on taxa that have been evaluated using the IUCN Categories and Criteria.

The IUCN Red List Categories (Figure 2) are based on a set of quantitative criteria linked to population trends, size and structure, and species' geographic ranges. There are nine categories, with species classified as Vulnerable (VU), Endangered (EN) or Critically Endangered (CR) considered "threatened". When conducting regional or national assessments, the IUCN Red List Regional Guidelines (IUCN 2012b) are applied, and two additional categories are used: Regionally Extinct (RE), and Not Applicable (NA) (Figure 2). A species was assessed as Not Applicable if less than 1% of its global range was considered to occur within the European marine assessment region.

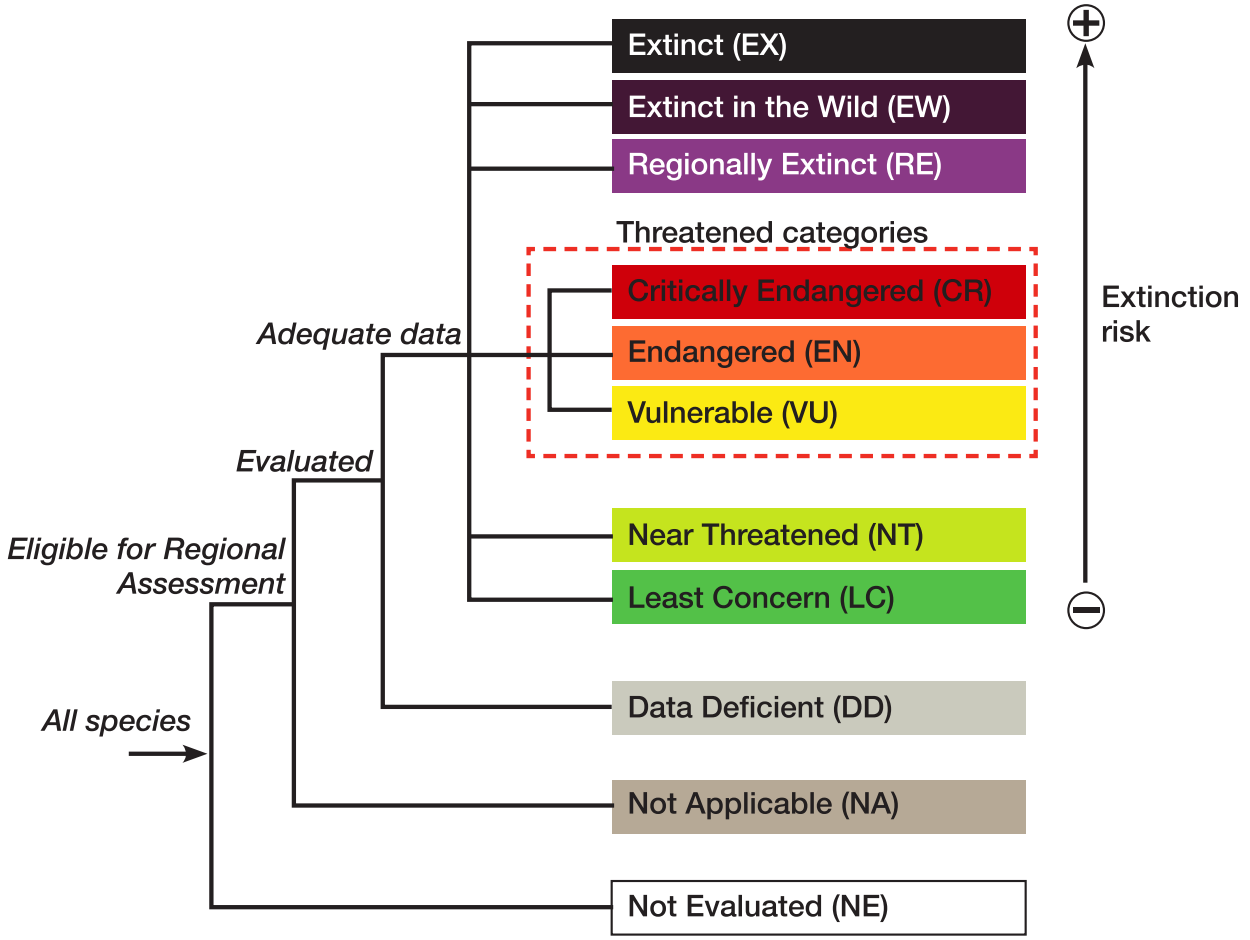
The IUCN Red List categorises species solely on the basis of indicators of extinction risk. However, previous studies have found that economically exploited marine fishes that are classified as threatened have almost certainly declined to the point where fisheries scientists would classify them as overfished, and thus these two measures are generally compatible (Dulvy *et al*. 2005, 2006; Davies and Baum 2012), though exceptions may occur. The majority of marine fishes that qualified for a threatened category were assessed under Criterion A, which is based on the rate of decline over the longer timeframe of three generation lengths or ten years. Generation length, defined by the Red List as the average age of the current cohort of reproducing individuals, can be calculated in

several different ways depending on the data available (IUCN 2014). For fishes with stock assessments and age class data, estimates of numbers of individuals and mortality rates in each age class were used to determine generation length. For fishes without age class data, the average age of reproducing adults was calculated as the median age between age of first reproduction and historical maximum longevity. In some cases, calculation of generation length using both methods for the same species can yield different values, resulting in an overestimation or underestimation of generation length depending on the method chosen. In these cases, decline was calculated over the range of generation length values, with the final Red List Category classification based on supporting data and information within the range of population decline under Criterion A.

It should also be noted that the IUCN assessments presented here have been done on a species-level basis. Some species have multiple, distinct stocks in European waters, and these stocks can be subject to different levels of exploitation. Accordingly, these stocks may have different statuses.

As the extinction risk of a species can be assessed at global, regional or national levels, a species may have a different Red List Category in the global Red List than in the regional Red List. For example, a species that is common worldwide and classed as Least Concern (LC) in the global Red List could face a high level of threat in a particular region and therefore be listed as threatened in the regional Red List. Logically, an endemic species should have the same category at regional and global levels, as it is not present in any other part of the world.

Figure 2. The IUCN Red List Categories at the regional scale.



Brown Comber (*Serranus hepatus*), Least Concern. © Robert A. Patzner.

1.5 Objectives of the assessment

The European regional assessment has four main objectives:

- to contribute to regional conservation planning through provision of a baseline dataset reporting the conservation status of European marine fish species;
- to identify those priority geographic areas and habitats needing to be conserved to prevent extinctions and to ensure that European marine fishes reach and maintain a favourable conservation status;
- to identify the major threats and to propose potential mitigating measures and conservation actions to address them;
- to strengthen the network of experts focused on marine fish conservation in Europe, so that the assessment information can be kept current, and expertise can be targeted to address the highest conservation priorities.

The assessment provides three main outputs:

- summary reports on the status of all 1,220 European marine fish species;
- a freely available database holding the baseline data for monitoring the status and distribution of European marine fishes;
- a website and data portal (http://ec.europa.eu/environment/nature/conservation/species/redlist and www.iucnredlist.org/initiatives/europe) showcasing these data in the form of species factsheets for all European marine fishes included in this study, along with background and other interpretative material.

The data presented in this report provide a snapshot based on the knowledge available at the time of writing. The database will continue to be updated and made freely and widely available. IUCN will ensure wide dissemination of this information to relevant decision makers, non-governmental organizations (NGOs), scientists and practitioners to inform the implementation of conservation actions on the ground.

2. Assessment methodology

2.1 Geographic scope

The geographic scope of the European Red List assessment encompasses the Mediterranean Sea, the Black Sea, the Baltic Sea, the North Sea and/or the European part of the Atlantic Ocean (i.e., the territorial waters and the Exclusive Economic Zones (EEZs) of all European countries in the eastern part of the Atlantic Ocean, also including the EEZs of the Macaronesian islands belonging to Portugal and Spain), the North Sea and the Northeastern Atlantic Ocean, excluding the EEZs of Greenland, Morocco and Western Sahara.

2.2 Taxonomic scope

The European Red List of Marine Fishes has assessed the status of all primarily marine fishes, including all hagfishes, cartilaginous and bony fish species, native to Europe or naturalised there before AD 1500, with resident, breeding populations. All other fish species in this region were previously assessed in the European Red List of Freshwater Fishes (Freyhof and Brooks 2011), which included a small number of species (e.g., *Dicentrarchus labrax, Pleuronectes platessa, Petromyzon marinus,* several mugilids, etc.) that inhabit both marine and freshwaters, and hence have not been considered as part of this assessment.

The online electronic version of the *Catalogue of Fishes* (Eschmeyer 2015) was used as the taxonomic standard for this project, resulting in a total of 1,220 species. Species that are of marginal occurrence in Europe (232 species) were classed as Not Applicable (NA) (i.e. species whose population in Europe represents less than 1% of the total population). All non-native marine fishes (i.e., Lessepsian migrants to the Mediterranean from the Red Sea and known Atlantic vagrant species in the Mediterranean Sea) were excluded from the assessment.

2.3 Assessment protocol

For all the marine fish species assessments, the following data were compiled:

- Taxonomic classification
- Geographic range and list of countries of occurrence (including a distribution map)
- Population information and overall population trends
- Habitat preferences and primary ecological requirements, including pertinent biological information (e.g., size and age at maturity, generation length, maximum size and age, etc.)
- Major threats
- Conservation measures (in place, and needed)
- Species utilisation
- Other general information
- IUCN Red List Category and Criteria and rationale
- Key literature references

The task of collecting the initial data was divided taxonomically. Experts and IUCN Global Marine Unit researchers collected information on each species based on published and unpublished data and their personal expert knowledge and opinion. The IUCN Species Information Service (SIS) was used to enter and store all species data.

Three workshops were held throughout the three-year duration of the project to review and discuss a selection of species assessments and distribution maps, add new information to the assessments, and agree on the final IUCN Red List Category and Criteria for the species. The first workshop was held in Málaga, Spain in October 2013 and was attended by 21 experts. The second workshop was held in Brussels, Belgium in March 2014 and was attended by 16 experts. These two workshops focused on assessing bony fishes. The last workshop focused on chondrichthyan species and was held in Plymouth, UK in May 2014; 14 experts participated. The remaining species were reviewed and discussed by email correspondence with relevant experts.

Following the workshops, the data were edited, and outstanding questions were resolved through communications with the experts. Consistency in the use of IUCN Criteria was checked by IUCN staff. The resulting finalised IUCN Red List assessments are a product of scientific consensus concerning species status and are supported by relevant literature and data sources.

Expert participants at a Marine Fish Red List assessment workshop, October 2013, Málaga, Spain. © Mia T. Comeros-Raynal.

2.4 Species mapping

Generalized distribution maps were created for each species in ArcGIS 10.1 from occurrence records, as well as inferred and suspected presence based on species-specific habitat and depth preferences. Areas where the presence of the species was uncertain or where the species had disappeared (i.e., is now extinct) were not mapped.

For shallow-water coastal fishes, the distribution maps were standardized using a basemap of a maximum depth of 200 m with a 100 km buffer zone extending from the coastline (Comeros-Raynal *et al.* 2012). Although this method overestimates the geographical range of species with very shallow depth distributions, it provides a consistent representation of the distribution for most coastal species. However, it does not accurately reflect the distributions of more oceanic species; thus, species with known oceanic tendencies (e.g., pelagic species such as Atlantic Bluefin Tuna (*Thunnus thynnus)* or deep sea species such as Orange Roughy *(Hoplostethus atlanticus))* were digitized by hand, including known and inferred occurrences. Each map was reviewed by taxonomic experts and edited to reflect the best available information on the species' ranges.

Spatial analyses were conducted on all marine fishes native to Europe or naturalised there prior to AD 1500 with resident, breeding populations. Therefore, non-native species and those with only marginal occurrence in European waters were excluded (i.e., Not Applicable (NA) species). The distribution polygon for each of these native, resident species was transformed into the World Cylindrical Equal Area Projected Coordinate system and converted into a 10 km by 10 km raster grid. A cell was considered occupied if the species' distribution polygon overlapped the grid cell and was assigned a value of 1, while all unoccupied cells were assigned "No Value". For all characteristics of interest, the number of species in each grid cell was calculated by summing the number of occupied cells. Richness grids were calculated for all marine fishes (excluding NA species), threatened, endemic and Data Deficient species (see Section 3.4).

3. Results

3.1 Threat status

The conservation status and extinction risk of marine fishes was assessed at the European level.

7.5% of these species (excluding those assessed as Not Applicable) are considered threatened (i.e., assessed as having an elevated risk of extinction) in Europe. However, the proportion of threatened marine fish species is uncertain given the high number of Data Deficient (DD) species, and could lie between 6% (if all DD species are not threatened) and 26.6% (if all DD species are threatened) for Europe (IUCN 2011b, Table 2). Thus, the mid-point figures provide the best estimation of the proportion of threatened species (IUCN 2011b).

Table 2. Proportion of threatened marine fishes in Europe.

	% threat
Lower bound (CR+EN+VU) / (assessed – EX)	6.0%
Mid-point (CR+EN+VU) / (assessed – EX – DD)	7.5%
Upper bound (CR+EN+VU+DD) / (assessed – EX)	26.6%

Table 3. Summary of numbers of marine fish species within each category of threat.

IUCN Red List Categories	Number of species (number of endemics)
Extinct (EX)	0
Extinct in the Wild (EW)	0
Regionally Extinct (RE)	0
Critically Endangered (CR)	15 (2)
Endangered (EN)	22 (4)
Vulnerable (VU)	22 (2)
Near Threatened (NT)	26 (3)
Least Concern (LC)	699 (120)
Data Deficient (DD)	204 (53)
Total number of species assessed*	**988 (184)**

*This table does not include the Not Applicable species in Europe (232 species) (species introduced after AD 1500 or species of marginal occurrence).

In Europe, 15 species (1.5%) are Critically Endangered, 22 species (2.2%) are Endangered, and 22 species (2.2%) are Vulnerable. A further 2.6% (26 species) are classified as Near Threatened. For a fifth of the species in Europe (204 species, 20.6%) (Table 3, Figure 3), there were insufficient data to evaluate their risk of extinction and so they were classified as Data Deficient. As more data become available, it is possible that some of these species may also prove to be threatened.

By comparison, 59% of freshwater molluscs, 40% of freshwater fishes, 23% of amphibians, 20% of reptiles, 17% of mammals, 16% of dragonflies, 13% of birds, 9% of butterflies and bees, 8% of aquatic plants and 2% of medicinal plants are threatened, groups that were comprehensively assessed for the European region (IUCN 2011a, BirdLife International 2015, Nieto *et al.* 2014, Allen *et al.* 2014). Additional European Red Lists assessing a selection of species showed that 22% of terrestrial molluscs, 16% of crop wild relatives and 15% of saproxylic beetles are also threatened (IUCN 2011a). No other groups have yet been assessed at the European level.

Marine fish species classed as threatened (Critically Endangered, Endangered, or Vulnerable) at the European level are listed in Table 4.

Figure 3. IUCN Red List status of marine fishes in Europe.

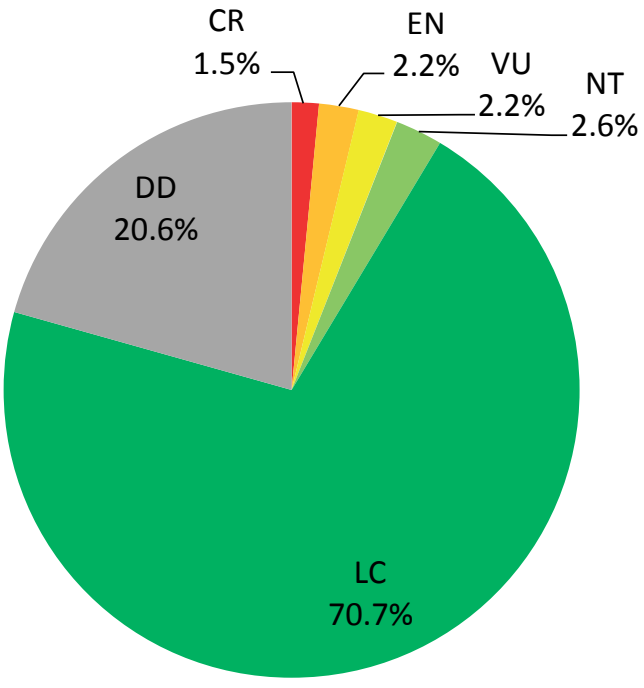


Table 4. Threatened marine fish species at the European level.

Class	Order	Family	Species	European Red List status	Endemic to Europe?
Chondrichthyes	Lamniformes	Lamnidae	*Carcharodon carcharias*	CR	No
Chondrichthyes	Lamniformes	Lamnidae	*Lamna nasus*	CR	No
Chondrichthyes	Lamniformes	Odontaspididae	*Carcharias taurus*	CR	No
Chondrichthyes	Lamniformes	Odontaspididae	*Odontaspis ferox*	CR	No
Chondrichthyes	Rajiformes	Gymnuridae	*Gymnura altavela*	CR	No
Chondrichthyes	Rajiformes	Myliobatidae	*Pteromylaeus bovinus*	CR	No
Chondrichthyes	Rajiformes	Pristidae	*Pristis pectinata*	CR	No
Chondrichthyes	Rajiformes	Pristidae	*Pristis pristis*	CR	No
Chondrichthyes	Rajiformes	Rajidae	*Dipturus batis*	CR	No
Chondrichthyes	Rajiformes	Rajidae	*Leucoraja melitensis*	CR	Yes
Chondrichthyes	Rajiformes	Rajidae	*Rostroraja alba*	CR	No
Chondrichthyes	Squaliformes	Centrophoridae	*Centrophorus granulosus*	CR	No
Chondrichthyes	Squatiniformes	Squatinidae	*Squatina aculeata*	CR	No
Chondrichthyes	Squatiniformes	Squatinidae	*Squatina oculata*	CR	No
Chondrichthyes	Squatiniformes	Squatinidae	*Squatina squatina*	CR	Yes
Actinopterygii	Gadiformes	Macrouridae	*Coryphaenoides rupestris*	EN	No
Actinopterygii	Perciformes	Anarhichadidae	*Anarhichas denticulatus*	EN	No
Actinopterygii	Perciformes	Epinephelidae	*Epinephelus marginatus*	EN	No
Actinopterygii	Perciformes	Gobiidae	*Pomatoschistus tortonesei*	EN	Yes
Actinopterygii	Scorpaeniformes	Sebastidae	*Sebastes mentella*	EN	No
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus longimanus*	EN	No
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus plumbeus*	EN	No
Chondrichthyes	Lamniformes	Alopiidae	*Alopias superciliosus*	EN	No
Chondrichthyes	Lamniformes	Alopiidae	*Alopias vulpinus*	EN	No
Chondrichthyes	Lamniformes	Cetorhinidae	*Cetorhinus maximus*	EN	No
Chondrichthyes	Rajiformes	Mobulidae	*Mobula mobular*	EN	Yes
Chondrichthyes	Rajiformes	Rajidae	*Leucoraja circularis*	EN	Yes
Chondrichthyes	Rajiformes	Rajidae	*Raja radula*	EN	Yes
Chondrichthyes	Rajiformes	Rhinobatidae	*Glaucostegus cemiculus*	EN	No
Chondrichthyes	Rajiformes	Rhinobatidae	*Rhinobatos rhinobatos*	EN	No
Chondrichthyes	Squaliformes	Centrophoridae	*Centrophorus lusitanicus*	EN	No
Chondrichthyes	Squaliformes	Centrophoridae	*Centrophorus squamosus*	EN	No
Chondrichthyes	Squaliformes	Centrophoridae	*Deania calcea*	EN	No
Chondrichthyes	Squaliformes	Dalatiidae	*Dalatias licha*	EN	No
Chondrichthyes	Squaliformes	Echinorhinidae	*Echinorhinus brucus*	EN	No
Chondrichthyes	Squaliformes	Somniosidae	*Centroscymnus coelolepis*	EN	No
Chondrichthyes	Squaliformes	Squalidae	*Squalus acanthias*	EN	No
Actinopterygii	Beryciformes	Trachichthyidae	*Hoplostethus atlanticus*	VU	No
Actinopterygii	Gadiformes	Lotidae	*Molva dypterygia*	VU	No
Actinopterygii	Perciformes	Epinephelidae	*Mycteroperca fusca*	VU	No
Actinopterygii	Perciformes	Labridae	*Bodianus scrofa*	VU	No
Actinopterygii	Perciformes	Labridae	*Labrus viridis*	VU	No
Actinopterygii	Perciformes	Sciaenidae	*Umbrina cirrosa*	VU	No
Actinopterygii	Perciformes	Scombridae	*Orcynopsis unicolor*	VU	No
Actinopterygii	Perciformes	Sparidae	*Dentex dentex*	VU	No
Actinopterygii	Pleuronectiformes	Pleuronectidae	*Hippoglossus hippoglossus*	VU	No

Class	Order	Family	Species	European Red List status	Endemic to Europe?
Actinopterygii	Pleuronectiformes	Scophthalmidae	*Scophthalmus maximus*	VU	No
Actinopterygii	Salmoniformes	Salmonidae	*Salmo salar*	VU	No
Actinopterygii	Scorpaeniformes	Sebastidae	*Sebastes norvegicus*	VU	No
Chondrichthyes	Carcharhiniformes	Triakidae	*Galeorhinus galeus*	VU	No
Chondrichthyes	Carcharhiniformes	Triakidae	*Mustelus mustelus*	VU	No
Chondrichthyes	Carcharhiniformes	Triakidae	*Mustelus punctulatus*	VU	No
Chondrichthyes	Rajiformes	Dasyatidae	*Dasyatis centroura*	VU	No
Chondrichthyes	Rajiformes	Dasyatidae	*Dasyatis pastinaca*	VU	No
Chondrichthyes	Rajiformes	Myliobatidae	*Myliobatis aquila*	VU	No
Chondrichthyes	Rajiformes	Rajidae	*Leucoraja fullonica*	VU	Yes
Chondrichthyes	Rajiformes	Rajidae	*Raja maderensis*	VU	Yes
Chondrichthyes	Squaliformes	Centrophoridae	*Centrophorus uyato*	VU	No
Chondrichthyes	Squaliformes	Oxynotidae	*Oxynotus centrina*	VU	No

3.2 Status by taxonomic group

European marine fishes assessed as part of the European Red List of Marine Fishes belong to three classes divided into 38 orders, as described in section 1.2. Table 5 presents the status of these species by class and order.

Overall, the Chondrichthyes is the class showing the highest percentage of threatened species (40.4%), compared to the Actinopterygii, with 2.5% threatened, and the Myxini, where all three species are considered Least Concern (LC). In general, high rates of intrinsic extinction risk in marine species are related to large-bodied, slow maturing species (Reynolds *et al.* 2005). As a group, Chondrichthyes are inherently more sensitive to threats than other marine fishes due to their extreme life histories, low population growth rates and weak density-dependent compensation in juvenile survival (e.g., Dulvy and Forrest 2010, Dulvy *et al.* 2014).

It is worth noting that all 15 of the Critically Endangered marine fishes and 15 of the 22 Endangered species are chondrichthyans (Table 5). Within the Chondrichthyes, all the Squatiniformes are threatened with extinction and the Lamniformes, Squaliformes, and Rajiformes also show a high proportion of threatened species (87.5%, 55.6% and 36.2%, respectively). The Carcharhiniformes and the Squaliformes include many Data Deficient (DD) species (10 and 9, respectively).

The Actinopterygii, the class with the highest number of species, includes the Salmoniformes and the Beryciformes species, showing the higest percentage of threat (100% - as *Salmo salar* is assessed as Vulnerable, and 16.7%, respectively). The other threatened species are included in the following orders: Pleuronectiformes (6.1%), Scorpaeniformes (5.7%), Perciformes (3.4%) and Gadiformes (3.2%).

The Actinopterygii includes a large percentage of LC species (75.9%), especially in the Perciformes order. Likewise, this class also includes a great proportion of DD species (20.7%). All the Cetomimiformes are assessed as DD, and the Zeiformes and Saccopharyngiformes present a high proportion of DD species (80% and 60%, respectively). Species in these orders are typically found in the deep-sea, where limited surveys and research have resulted in major data gaps. It is worth highlighting that approximately half of the Tetraodontiformes, Syngnathiformes and Ophidiiformes are also classed as DD, often due to a small number of known specimens and taxonomic uncertainty.

Symphodus rostratus, Least Concern. © Robert A. Patzner.

Table 5. IUCN Red List status (at the European level) of marine fishes by class and order.

Class	Order	Total	CR	EN	VU	NT	LC	DD	% threatened*
Actinopterygii		**854**	**0**	**5**	**12**	**12**	**648**	**177**	**2.5 (2 - 22.7)**
	Anguilliformes	45	0	0	0	0	31	14	0 (0 - 31.3)
	Ateleopodiformes	1	0	0	0	0	1	0	0
	Atheriniformes	2	0	0	0	0	2	0	0
	Aulopiformes	27	0	0	0	0	24	3	0 (0 -11.1)
	Batrachoidiformes	1	0	0	0	0	1	0	0
	Beloniformes	14	0	0	0	0	14	0	0
	Beryciformes	6	0	0	1	2	3	0	16.7 (16.7 - 16.7)
	Cetomimiformes	3	0	0	0	0	0	3	0 (0 - 100)
	Clupeiformes	7	0	0	0	1	5	1	0 (0 - 14.3)
	Gadiformes	76	0	1	1	1	59	14	3.2 (2.6 - 21.1)
	Gasterosteiformes	1	0	0	0	0	1	0	0
	Gobiesociformes	11	0	0	0	0	9	2	0 (0 - 18.2)
	Lampriformes	6	0	0	0	0	6	0	0
	Lophiiformes	26	0	0	0	0	15	11	0 (0 - 42.3)
	Mugiliformes	1	0	0	0	0	1	0	0
	Myctophiformes	29	0	0	0	0	29	0	0
	Notacanthiformes	8	0	0	0	0	8	0	0
	Ophidiiformes	28	0	0	0	0	14	14	0 (0 - 50)
	Perciformes	297	0	3	6	6	247	35	3.4 (3 - 14.8)
	Pleuronectiformes	41	0	0	2	1	30	8	6.1 (4.9 - 24.4)
	Polymixiiformes	1	0	0	0	0	1	0	0
	Saccopharyngiformes	5	0	0	0	0	2	3	0
	Salmoniformes	1	0	0	1	0	0	0	100
	Scorpaeniformes	56	0	1	1	1	32	21	5.7 (3.6 - 41.1)
	Stephanoberyciformes	3	0	0	0	0	3	0	0
	Stomiiformes	62	0	0	0	0	57	5	0 (0 - 8.1)
	Syngnathiformes	17	0	0	0	0	8	9	0 (0 - 52.9)
	Tetraodontiformes	15	0	0	0	0	7	8	0 (0 - 53.3)
	Zeiformes	5	0	0	0	0	1	4	0 (0 - 80)
Chondrichthyes		**131**	**15**	**17**	**10**	**14**	**48**	**27**	**40.4 (32.1 - 52.7)**
	Carcharhiniformes	27	0	2	3	4	8	10	29.4 (18.5 - 55.6)
	Chimaeriformes	9	0	0	0	1	8	0	0
	Hexanchiformes	4	0	0	0	0	2	2	0 (0 – 50)
	Lamniformes	11	4	3	0	0	1	3	87.5 (63.6 - 90)
	Rajiformes	50	7	5	5	7	23	3	36.2 (34 - 40)
	Squaliformes	27	1	7	2	2	6	9	55.6 (37 - 70.4)
	Squatiniformes	3	3	0	0	0	0	0	100
Myxini		**3**	**0**	**0**	**0**	**0**	**3**	**0**	**0**
	Myxiniformes	3	0	0	0	0	3	0	0
Total		**988**	**15**	**22**	**22**	**26**	**699**	**204**	**7.5 (6 - 26.6)**

This table does not include species classed as Not Applicable (NA).

*The percentage of threatened species provides the mid point figure, as the best estimation of extinction risk; the lower and upper bounds are provided in brackets.

The status of Chondrichthyes in Europe

Nearly a decade has elapsed since the status of sharks, rays and chimaeras (chondrichthyans) was first assessed in European waters, and hence this new assessment provides an almost unique opportunity to measure conservation and management progress in Europe. A number of commercially important target and bycatch species occur within the European marine waters. Europe also includes some of the largest and most important fishing nations worldwide that are exploiting chondrichthyans, particularily Spain, France, the UK, and Portugal (Davidson *et al.* 2015).

There are 132 chondrichthyan species present in Europe. Overall, the best estimate is that 40.4% of these species are threatened, facing an elevated risk of extinction, according to the European Red List of Marine Fishes. However, the proportion of threatened chondrichtyans is uncertain as 27 species (20.6%) were assessed as Data Deficient (DD). Depending on the status of the DD species, the true percentage of threatened species could lie between 32.1% (if all DD species are not threatened) and 52.7% (if all DD species are threatened) (IUCN 2011b). Thus, the mid-point figure of 40.4% provides the best estimation of the proportion of threatened species (IUCN 2011b).

In Europe, 11.5% (15 species) of chondrichthyan species are Critically Endangered, 13% (17 species) are Endangered, and 7.6% (10 species) are Vulnerable (Figure 4). A further 10.7% (14 species) are considered Near Threatened. Furthermore, 39.7% (52 species) of chondrichthyan species have a declining population trend, 22.9% (30 species) are stable, 2.3% (3 species) are increasing, and the trends for 46 species (35.1%) are unknown (Figure 5).

Angelshark (*Squatina squatina*), Critically Endangered. © Tony Gilbert.

In the 2008 Northeast Atlantic assessment, the best estimate indicated that 35.3% of the species were threatened (30 out of 116 species; Gibson *et al.* 2008), and in the 2007 Mediterranean assessment, 56.6% of the species were threatened (30 out of 71 species; Cavanagh and Gibson 2007). This European assessment reveals that the percentage of threatened chondrichthyan species in the region remains very high. This increased extinction risk is driven primarily by high levels of unregulated overfishing in the Mediterranean Sea.

It is important to note the hard won progress made by the General Fisheries Commission for the Mediterranean in developing stock assessments and scientific capacity; moreover, Croatia and Israel have provided considerable conservation leadership. Notwithstanding these promising steps, there has been little effective fisheries management progress for chondrichthyans, and other exploited fishes, in the Mediterranean Sea (Vasilakopoulos *et al.* 2014, Smith and Garcia 2014). The status of Mediterranean chondrichthyans has worsened in the past decade.

Figure 4. IUCN Red List status of chondrichthyan species in Europe.

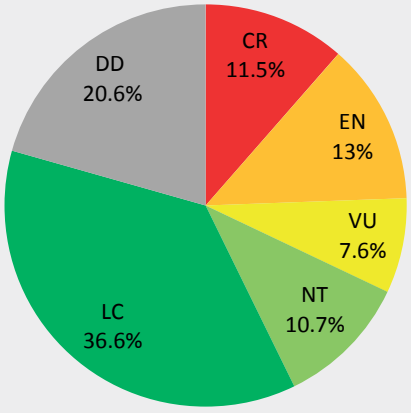
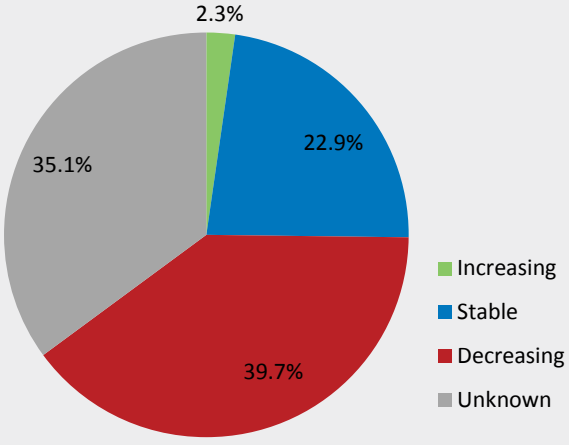


Figure 5. Population trends of chondrichthyan species in Europe.



Thornback Skate (*Raja clavata*), Near Threatened. © Peter Verhoog/Dutch Shark Society.

Several species are, at least in some areas, now close to regional or global extinction and there are many other "lost sharks and rays" that have not been sighted in decades. Of greatest concern is the status of all three angel sharks (*Squatina* spp.). In particular, the Critically Endangered Angelshark *(Squatina squatina)* was formerly found throughout European waters, and now it is inferred that almost all of the remaining population is found around the Canary Islands.

Nevertheless, the solution is at hand - effective fisheries management of chondrichthyans is possible. There is significant contrast between the near-absence of effective management in the waters of Italy in the western Adriatic Sea compared to the adjacent waters in the eastern Adriatic Sea. The waters of the western Adriatic Sea are more intensively fished resulting in low chondrichthyan abundance and diversity. By stark contrast, the eastern Adriatic countries have stricter protection and management and hence have greater biomass and diversity of chondrichthyans (Soldo 2012, Ferretti et al. 2013).

In northern European waters, vastly improved fisheries assessment, regulation and enforcement has been seen over the past decades (Clarke 2009). For example, preventing landings (by setting a zero Total Allowable Catch) has been implemented since 2011 for Spurdog (*Squalus acanthias,* EN*)* and since 2010 for three deepwater sharks, including Kitefin Shark *(Dalatias licha,* EN*), Portuguese Dogfish (Centroscymnus coelolepis*, EN), and Leafscale Gulper Shark (*Centrophorus squamosus,* EN*).*

In this assessment, two additional issues have emerged. First, one of the most exploited sharks in European waters, and the world, is the Blue Shark *(Prionace glauca)*, which is often taken as a bycatch in pelagic fisheries targeting tuna and billfish (Davidson *et al*. 2015). This species is also a major component of the global trade in shark fins and meat, and Spain is by far the world's biggest exporter of shark fins and meat (Davidson *et al.* 2015). Despite the rising catch, demand and trade, there has been little progress on management of this species, which is assessed as Near Threatened in the European Red List.

Second, there has been an unregulated rapid rise in reported landings of catches of smaller sharks, particularly smoothhounds (*Mustelus* spp.). A key challenge is that there are three species of smoothhound in European waters, and recent revision to their taxonomy means that a detailed assessment is needed of where specific species are caught, and in what numbers.

Blue Shark (*Prionace glauca*), Near Threatened. © Nuno Vasco Rodrigues.

The Atlantic Salmon *(Salmo salar)* in Europe

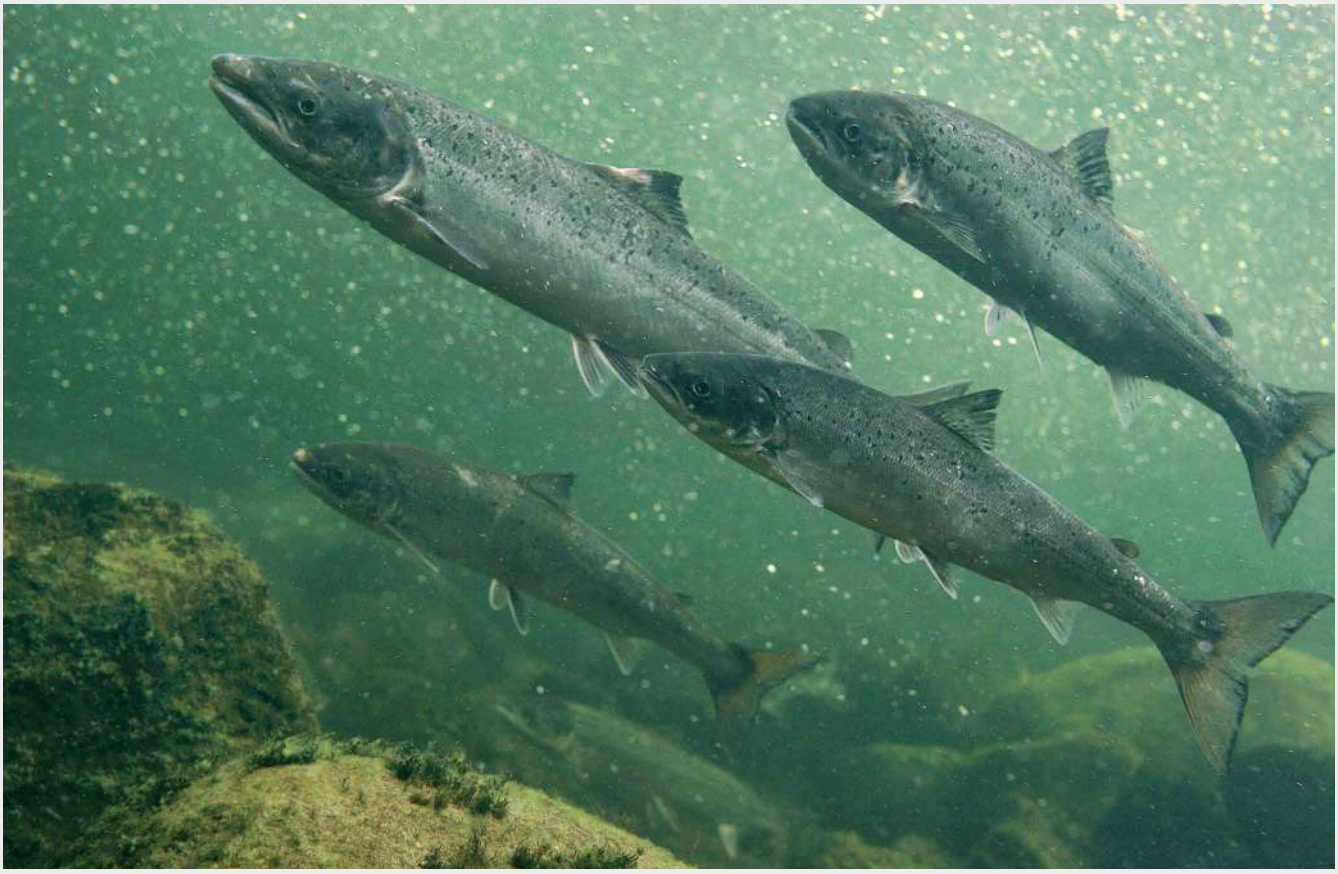
The Atlantic Salmon **(***Salmo salar)* is an iconic species in both historical and contemporary culture, and is widely depicted in art, literature, jewellery and architecture. The species is a focus for social activities (e.g., fishing clubs), and often the driver of general river basin restoration activities. Salmon runs draw visitors throughout Europe to well-known waterfalls where people have congregated to watch them leaping since the middle ages. Salmon are central to many cultures and have been fished in Europe for at least 40,000 years (Consuegra *et al.* 2002, Turrero *et al.* 2014). The species is important for food and sport fishing throughout its European range, where it is highly valued. It has been estimated that the cultural value of the species may exceed the value of commercial landings in northern Europe (Kulmala *et al.* 2013).

Atlantic Salmon is an anadromous fish, meaning they hatch in freshwater, migrate to the sea, and then return to rivers, where they spawn, although some populations complete their entire life cycle in freshwater. This fish is widely distributed through much of Europe's marine and freshwater habitats, from Severny Island in northern Russia south to the Iberian Peninsula. The main foraging areas of salmon of European origin are along the west coast of southern Greenland and north of the Faroe Islands.

The Atlantic Salmon has undergone historical declines and localised extinctions within its European range. It has been lost from a number of countries, including: Belgium, Czech Republic, Germany (now reintroduced), Netherlands, Poland, Slovakia, and Switzerland. Populations from the Duero and Tagus Rivers in the Iberian Peninsula (based on historical records) have been lost, and populations have been lost or threatened from numerous rivers in Norway, Denmark, Sweden, Ireland, France, United Kingdom (England, Wales and Scotland), and Russia (NASCO 2013). The fish was thought to be extinct in Belarus since the mid-20th Century as a result of dams built on the western Dvina and Neman rivers, however very small numbers of the fish have been found to migrate upstream in the Neris/Vilia rivers to the upper part of the Neman River basin to spawn in the Vilia River tributaries (Polutskaya 2005).

Primary causes of decline have been over-fishing (both at sea and in rivers), water pollution and sedimentation (especially in spawning habitats), and damming.

Atlantic Salmon (*Salmo salar)*, Vulnerable. © Michel Roggo / roggo.ch.



Overfishing at sea, in particular with drift nets, is a major threat to the species, although fisheries controls have been implemented throughout Europe. The species is also impacted as bycatch in the mackerel fishery in areas such as the north Norwegian Sea. Many populations have traditionally been stocked, especially in western and central Europe, but results have often been disappointing (Young *et al.* 2014) and stocking is beginning to be phased out (for example in Wales, BBC 2015). In recent years, fishery pressure on wild stocks has decreased but other problems have increased; the natural mortality of juvenile salmon in the marine phase has increased, salmon prey species have been depleted by commercial fisheries, and extensive salmon farming has affected wild populations through hybridisation between escaped farm and wild salmon, and the introduction of diseases and parasites. Sea Lice (*Lepeophtheirus salmonis)* occur in large numbers on farmed salmon and seriously infect wild salmon as they migrate past salmon farms in estuaries. WWF (2001) reported that diseases and parasites transferred from caged salmon to wild salmon are a severe hazard to juveniles in countries where salmon farming is common.

The direct and indirect impacts of climate change on the species and its habitats are not well understood and require further research. Impacts on the salmon's marine habitat could lead to temporal and spatial shifts in both salmon prey and predators, and changes to the timing of migration represent an important potential new threat to the fish.

Salmon catches at sea have undergone a continuing decline since 1987, with reported catches declining from more than 8,000 tonnes (fresh weight) in 1987 to less than 2,000 tonnes by 2012. The above well-documented threats have led to an inferred population decline in wild self-sustaining populations of more than 30% over the last three generation lengths (c. 18 years). As a result, Atlantic Salmon was assessed as Vulnerable (VU A2ace) based on levels of exploitation, declining habitat quality, reduced extent of occurrence, and the impacts of pollution, climate change, and introduced taxa.

It is important to note however that there are clear differences in the status of individual stocks (sub-populations from individual river basins), where some are in serious decline or extinct, whilst others are doing much better, either not yet impacted or benefitting from successful river basin-wide conservation interventions.

The IUCN SSC Salmon Specialist Group has recommended that each stock be assessed independently in order to better reflect this intraspecific variation, and to inform river basin population management and restoration actions.

3.3 Spatial distribution of species

3.3.1. Species richness

The geographic distribution of marine fish species richness in Europe is shown in Figure 6 and is based on all 988 native marine fish species, excluding those with a marginal occurrence in Europe (i.e., the NA species).

The coast of Portugal and the Macaronesian islands in the Northeast Atlantic, and the western Mediterranean Sea, clearly stand out as areas of high species richness. The waters west of France and the British Isles, southern Iceland and the eastern Mediterranean also exhibit great diversity. There is a general tendency in marine fishes for biodiversity to decrease from the tropics to the poles (Tittensor *et al.* 2010).

3.3.2. Endemic species richness

In Figure 7, the richness of endemic marine fish species in Europe is shown based on the 184 endemic species present. Marine fishes show high levels of endemism in the Mediterranean Sea, in particular along the European coast, including the Balearic, Ligurian, Tyrrhenian, Adriatic and Aegean Seas.

The Mediterranean is known as a hotspot for endemism; approximately 14%, 74 out of the 519 species present in the Mediterreanean Sea, are considered to be endemic (Abdul Malak *et al.* 2011). This high level of endemism is likely a result of the relative isolation of the Mediterranean basin. Other areas in the Northeast Atlantic, including from the North Sea, around the British Isles, and south to the Iberian Peninsula, also harbour an important concentration of endemic species.

Figure 6. Species richness of European marine fishes.

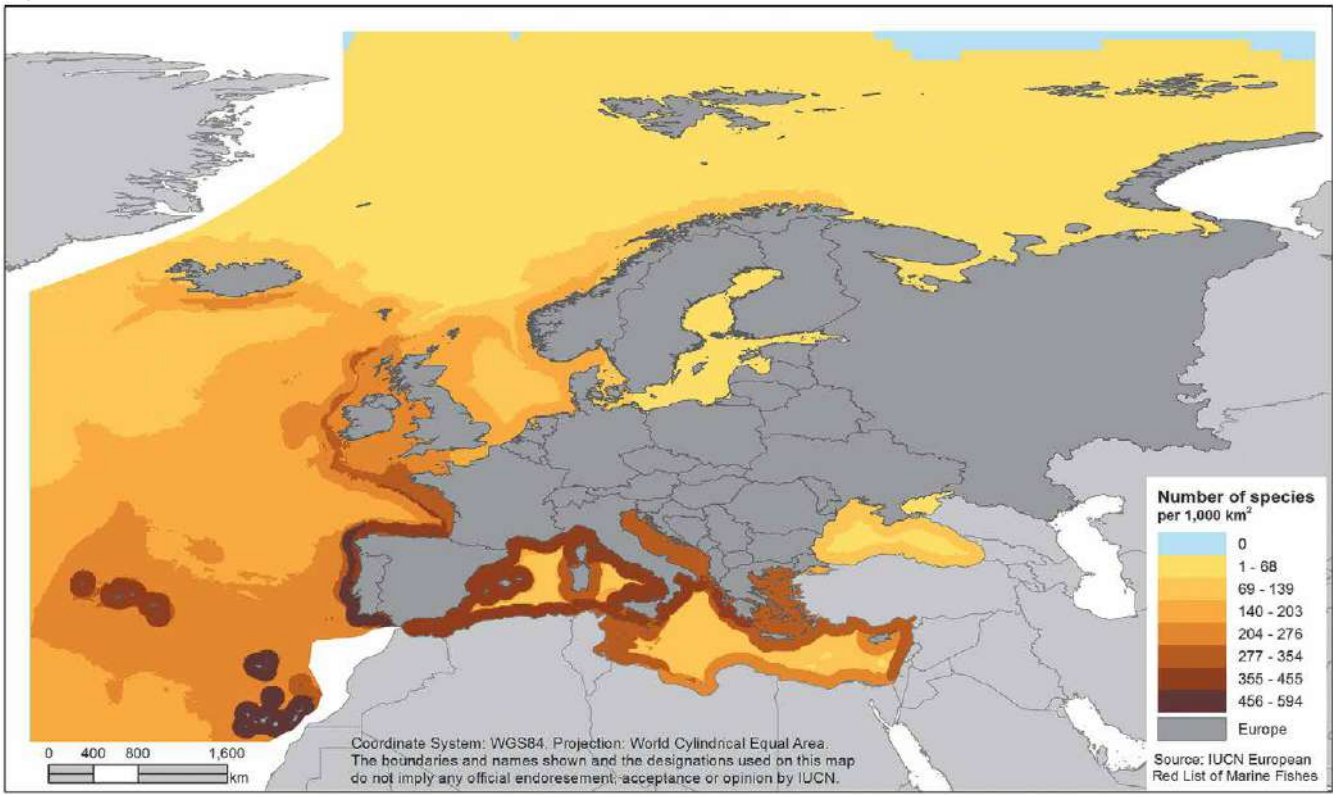
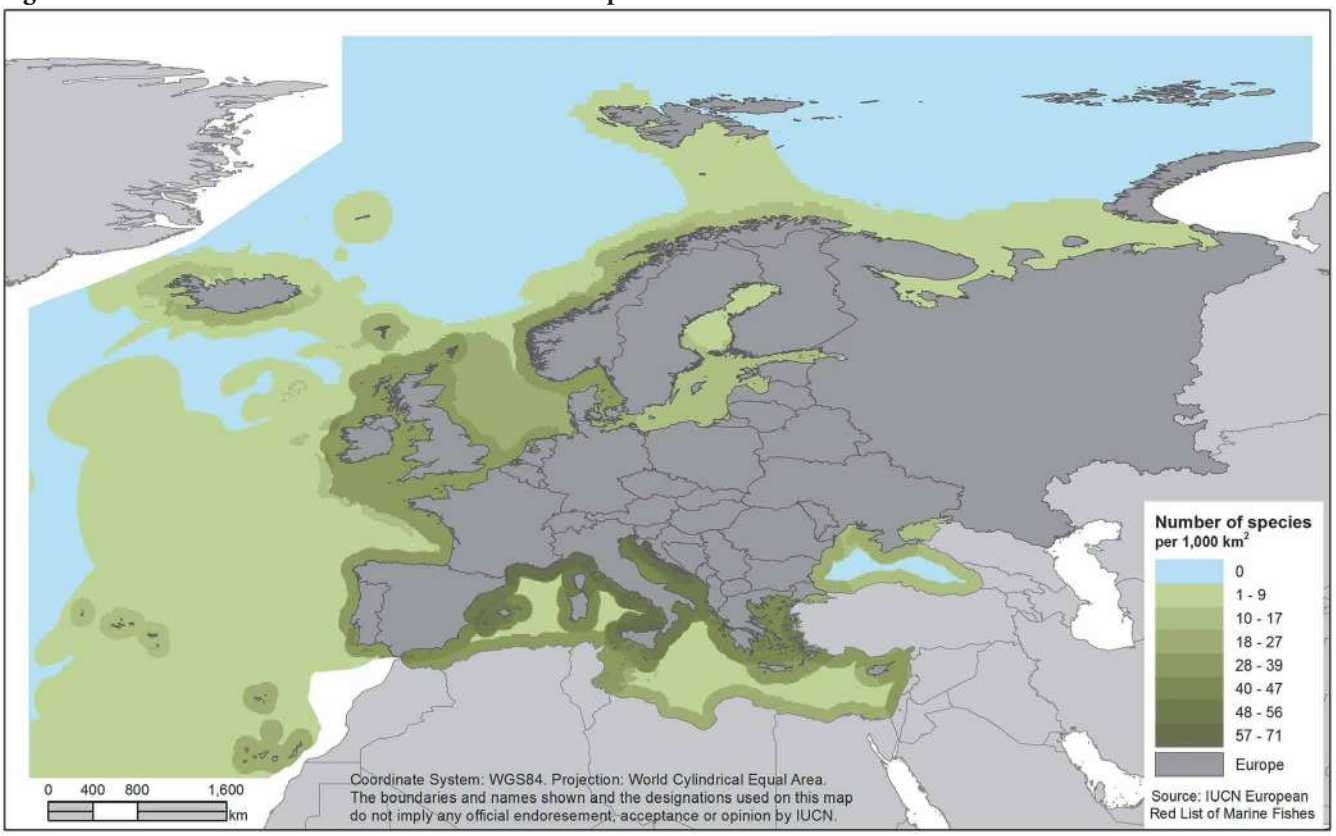


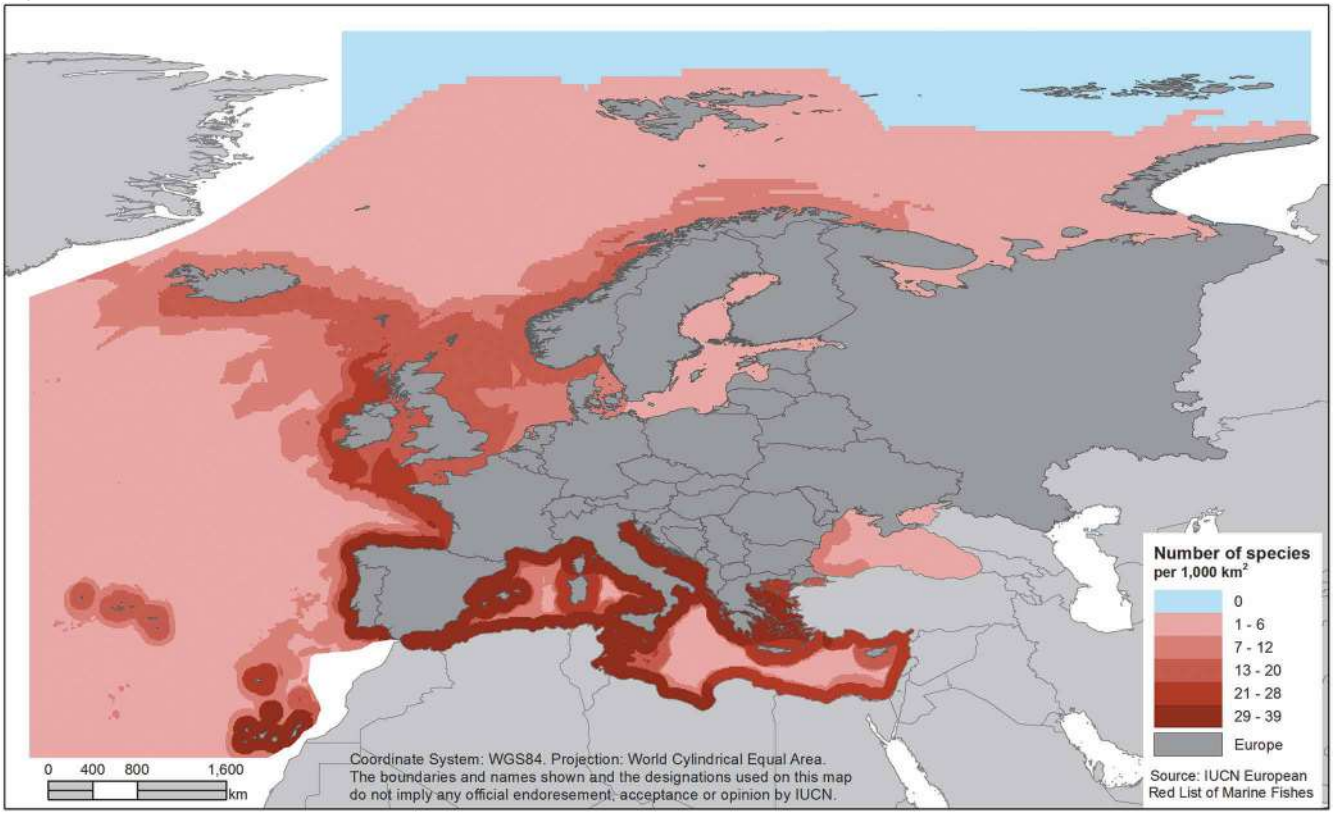
Figure 7. Distribution of endemic marine fishes in Europe.



3.3.3. Distribution of threatened species

In Figure 8, the richness pattern of threatened marine fish species in Europe, which considered 59 threatened species, is illustrated showing the greatest concentration in the Iberian Peninsula, the Mediterranean Sea and the Canary Islands. In the Northeast Atlantic the waters around Iceland, the British Isles and Norway as well as the Azores also emerge as hotspots of threatened marine fishes.

Figure 8. Distribution of threatened marine fishes in Europe.

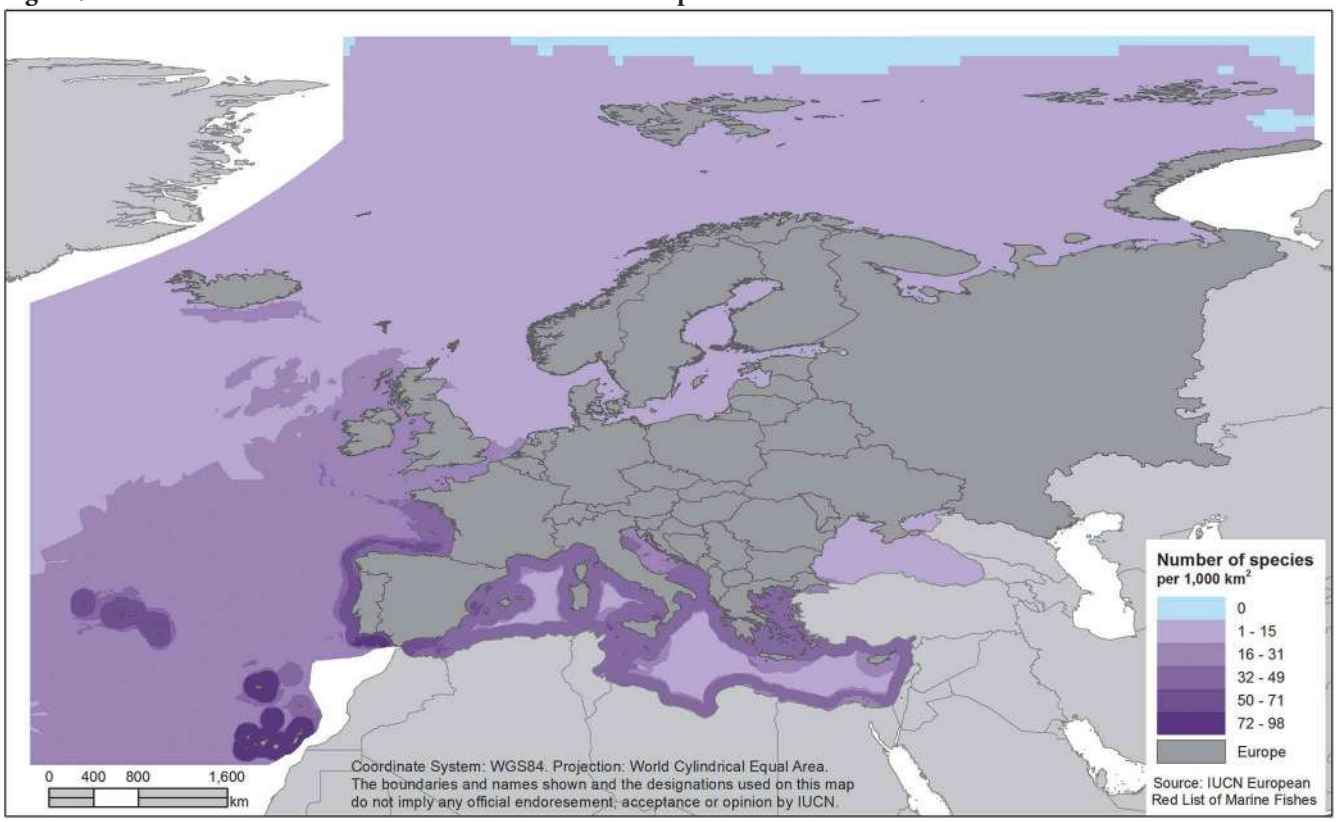


3.3.4. Distribution of Data Deficient species

In Figure 9, the richness of Data Deficient (DD) species is presented based on the total number of DD species (204 species) present.

The highest number of DD species is found around the Macaronesian islands, particularly the Madeiran and Canary archipelagos. Fishing and climate change are important potential threats in these areas, but they are relatively poorly studied and quantitative data on

Figure 9. Distribution of Data Deficient marine fishes in Europe.



population level impacts are lacking. Other areas with high numbers of DD species include the Iberian and Mediterranean coasts. This may be at least partially caused by high fishing pressure combined with limited quantitative data making accurate assignments of extinction risk difficult, thus resulting in a higher proportion of DD species.

3.4 Major threats to marine fishes in Europe

With 20.6% of the European marine fishes listed as Data Deficient (DD), a complete overview of the threats is not possible. However, conservation and management of marine fishes must move forward in spite of the substantial data gaps, particularly in relation to taxonomic uncertainty and lack of quantitative species-specific population trends.

According to the European Red List, 177 species had no threats identified; for another 288 species, threats remain unknown. All of the species recorded as having unknown or no threats are assessed as Least Concern (LC) or Data Deficient (DD). Threats identified for the remaining species (523) are presented below, and a summary of the relative importance of the different threatening processes is shown in Figure 10.

Fishing and harvesting

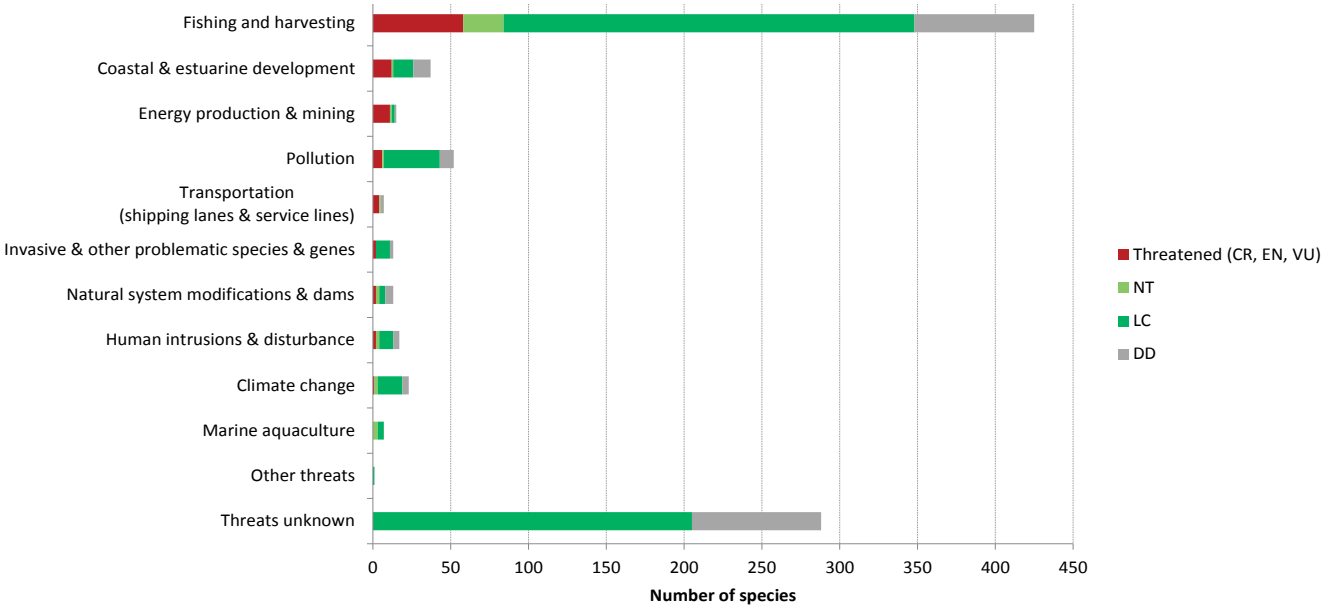
The greatest threat to marine species globally is exploitation (Roberts and Hawkins 1999, Dulvy *et al.* 2009, Harnik *et al.* 2012). This includes direct commercial exploitation; small-scale artisanal or subsistence fisheries; exploitation as non-target catch or bycatch; and indirect effects of exploitation on habitats (Figure 10).

According to the European Red List, 425 species are impacted by fishing activities, 58 of which are threatened. Many species are the direct target of commercial fisheries and/or small scale artisanal fisheries. Overexploitation in European waters has been curbed in recent years, as evidenced by a substantial improvement in the number of stocks fished at maximum sustainable yield (MSY), from two stocks in 2005 to 27 stocks in 2014 (EC 2014). However, it still remains a major problem for many marine fishes: for example, Atlantic Bluefin Tuna (*Thunnus thynnus*), assessed regionally as Near Threatened, and Atlantic Halibut (*Hippoglossus hippoglossus*), assessed regionally as Vulnerable, are both the direct targets of large-scale, directed fisheries.

In addition to targeted fisheries exploitation, non-target catch or bycatch can substantially impact marine fishes. This is a much harder issue to tackle, both in terms of assigning a Red List Category and in terms of managing the impacts. Non-target catch is often not recorded to the species level and species-specific estimates of discard rates and mortality are rarely available. For example, the Blue Shark *(Prionace glauca)*, assessed regionally as Near Threatened, is mostly taken as bycatch in pelagic fisheries (Davidson *et al.* 2015).

Whilst fishing and harvesting are the main threats affecting European marine fishes, a variety of other anthropogenic and environmental stressors may also exacerbate threats,

Figure 10. Major threats to marine fishes in Europe.



but the severity of such threats will depend on the degree of spatial and temporal overlap with the distribution of critically important fish habitats.

Coastal and estuarine development

In total, 37 species are directly affected by coastal and estuarine development, however 12 of these are considered threatened by the European Red List (20% of threatened marine fish species). Additionally, human intrusion and disturbance (work and recreational activities) impact 17 species, two of which are threatened. Together, these form the second most common threat, affecting 22% of threatened marine fishes in Europe. Coastal development has continued apace in the late 20th and early 21st centuries, with the expansion of cities, ports, tourist resorts and associated recreational areas. Global trade in goods grew 6.9% on average yearly between 1997 and 2006 and sea ports in northern Europe enacted major extension projects to accommodate the expansion (e.g., EUROMAX-Terminal in Rotterdam expanded in area by 1,000 ha) (EEA 2006). Mass tourism in coastal regions has increased both the size of the local population and number of hotels (e.g., Málaga; Costa del Sol, Spain, saw an increase in the number of hotels from 150 to 300 between 1983 and 2000 and a rise in population of 71.6% from 1950–2000) (Segreto *et al*. 2009). One estimate predicts that by 2020, 350 million tourists will visit the Mediterranean coastal region alone (Davenport and Davenport 2006).

In addition, in low lying coastal areas where flood risk from tidal surges is a potential threat to human life and livelihood, the strengthening of sea walls, and the creation of new defences (such as in the Dutch Delta area) have impacted coastal habitats, especially saltmarshes. Works aimed at stabilising the existing coastline also cause considerable losses of saltmarsh habitats (Cooper *et al.* 2001) with direct impact on specialised marine fishes.

Energy production and mining

The effects of mining and quarrying, oil and gas drilling impact a total of 15 species, of which 11 are threatened (19% of all threatened marine fish species). For certain species, such as *Reinhardtius hippoglossoides*, the depth of occurrence of oil exploitation overlaps with the habitats that the species inhabit. In the past, when species such as *Limanda limanda* were exposed to diesel-drilling mud (which was common around drilling platforms in the North Sea), this exposure triggered inhibitory and stimulatory immune responses (Tahir *et al.* 1993). In addition, drilling can have additional effects, ranging from attracting larger fish to the platforms, to the release of muds on the surrounding spoil grounds, impacting demersal species and especially those with vulnerable life history stages. Excessive noise production may also affect sensitive species (Chapman and Sand 1974). Mining could impact species such as *Raja microocellata* (e.g., in the Bristol Channel) and other demersal species, by impacting their spawning, nursery and feeding grounds in areas where aggregate extraction occurs.

Pollution

Pollution, in the form of sewage, run off, oil spills (e.g., the Prestige oil spill in 2002), nutrient loads, sedimentation, herbicides, pesticides, and noise pollution, affects 52

Common Dentex (*Dentex dentex*), Vulnerable. © Christophe Quintin.

species, five of which are threatened (10% of the threatened species). Rapid urban and industrial development, major causes of pollution, have degraded critical coastal habitats, such as fish nursery and spawning areas (Camhi *et al.* 1998, Stevens *et al.* 2005, UNEP/MAP/RAC/SPA 2003).

Pollution adds to the contamination of food sources, bioaccumulating in animals at the top of the food chain and potentially affecting their health and reproductive success (UNEP/MAP/ RAC/SPA 2003). Some Mediterranean cartilaginous fishes contain mercury concentrations that exceed levels considered safe for human consumption (e.g., Storelli *et al.* 2002), as well as trace metals and organochlorine residues in their eggs, muscles, livers and kidneys (UNEP/MAP/RAC/SPA 2002).

Transportation (shipping lanes and service lines)

Seven species are affected by shipping lanes and service lines, with four being threatened. Shipping affects the marine environment through operational, bilge and ballast water discharges from cruise ships, large tankers and bulk cargo carriers, which can lead to the introduction of non-indigenous organisms. Water pollution can also occur through the release of toxic chemicals used in anti-fouling paints and leaching of heavy metals, and oil and toxic substances from discharges (OSPAR Commission 2009). Additionally, shipping emissions have been found to contribute to the acidification of the oceans (Hassellöv *et al.* 2013). Ship strikes may also potentially affect *Carcharodon carcharias* and other surface swimming species such as *Mobula mobular* and *Cetorhinus maximus*.

Invasive and problematic species and genes

Globally, marine invasive species are a major threat to biodiversity, with high levels of invasive species documented in North America, Australia, and Europe (Molnar *et al.* 2008). These species can cause enormous economic and ecological impacts, including direct predation upon and competition with native species. For example, two Lessepsian migrants (*Siganus rivulatus* and *S. luridus*) have been implicated in the decline of the native sparid *Sarpa salpa* in Lebanon through competition (Kalogirou *et al.* 2012). In European waters, invasive species are impacting 13 species, two of which are threatened (3% of threatened species).

Dams and other natural system modifications

Natural system modifications, including the construction of dams, are affecting 13 species, two of which are threatened (3% of threatened species). There

Karanteen (*Sarpa salpa*), Least Concern. © Robert A. Patzner.

are few rivers in Europe that have not been impacted by dams for hydropower or irrigation purposes (Freyhof and Brooks 2011), and tidal barrages in estuaries, to aid navigation and/or to generate energy, have become more frequent. In most cases, dams block the migration routes of fishes, thereby increasing the pressures on species that rely on movement between freshwater and marine environments. Dams can also cause significant direct mortality as individuals are passing through hydraulic turbines or over spillways (Larinier 2001). Other natural system modifications, including land reclamation projects, construction of riprap along shorelines, and beach construction are also impacting some species.

Climate change

Impacts of climate change are being seen in a number of marine fish assemblages. For example, the North Sea has seen distribution shifts in marine fishes towards deeper waters (Dulvy *et al.* 2008) and towards more northerly latitudes (Perry *et al.* 2005). Climate change is expected to have major impacts on Mediterranean species, as warming temperatures force individuals northwards into cul-de-sacs, and trapping them in increasingly warming seas, such as the Adriatic Sea and Gulf of Lions (Ben Rais Lasram *et al.* 2010). According to the European Red List, climate change is impacting 23 species, of which one is threatened.

Marine aquaculture

With marine fisheries' yield plateauing over the past two decades, and global demand for fish and products continuing to increase, the marine aquaculture sector has grown to meet demand (Frid and Paramor 2012). Recent estimates suggest that almost 50% of all fish biomass consumed by humans is produced by

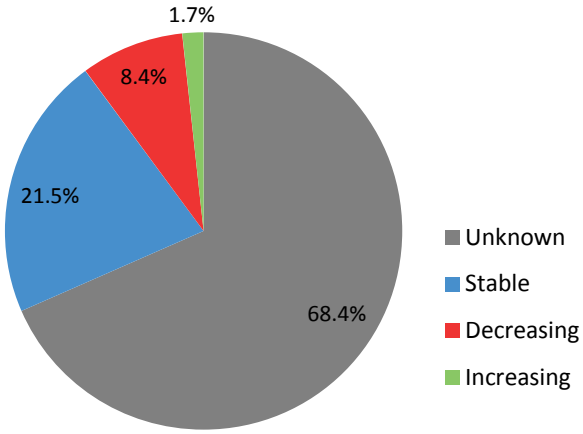
aquaculture (FAO 2014). Among other environmental impacts, including the dependence on capture fisheries (primarily of forage fish such as menhaden and anchovy) to provide fishmeal, aquaculture facilities can negatively impact other fish species. Specifically, survival of wild populations can be reduced through the movement of diseases and parasites from farmed to wild individuals, competition with escaped farmed individuals, and hybridisation (e.g., salmonids; Ford and Myers 2008). Marine aquaculture was identified as affecting seven species, none of which are currently assessed as threatened.

3.5 Population trends

Documenting a species' population trend provides key information when assessing its Red List status. As part of this process, the species' overall populations were assessed as declining, stable, increasing or unknown.

8.4% (83 species) of Europe's marine fish species are thought to be in decline, including 88.1% of threatened species (52 species). Overall, 21.5% species are considered stable (212 species), including 3.4% of threatened species (two species), and 1.7% (17 species, including one species currently assessed as threatened) are increasing (Figure 11). However, as very little population trend data exists from the European region, 68.4% of species (676 species) have unknown population trends.

Figure 11. Population trends of European marine fishes.



3.6 Gaps in knowledge

Overall the marine fish fauna of the European region is relatively well known. Europe has a long tradition of scientific enquiry, a high human population density, and a long history of commercial fisheries. Notwithstanding the relatively high scientific capacity within Europe, very serious gaps still remain in our understanding of the distribution, population size, population trajectory and biology of many marine fishes, including many commercially important species.

These knowledge gaps can be discussed in relation to each of the main topics that are considered in the individual species accounts, including taxonomy, distribution,

Greater Weever (*Trachinus draco*), Least Concern. © Robert A. Patzner.

populations, habitats and ecology, threats, conservation measures, other general information, and references to previous work.

Regarding taxonomy, the European marine fish fauna are relatively well studied by world standards, as this is the geographical area where taxonomic science originated. However there are still some species for which taxonomic questions remain. The use of modern molecular systematics tools and techniques may help to solve some of these remaining taxonomic problems. For example, further taxonomic work is required to determine the number of valid *Nansenia* spp., as there may be hidden synonymies within this genus. *Dysommina proboscideus* is another interesting example; originally described on the basis of a *Leptocephalus* larva, the correct generic designation of this eel is unclear and it may actually represent a complex of closely related species (Smith 1989). Taxonomic issues also affect the chondrichthyans, as highlighted by the recent discovery that the world's largest skate, the Critically Endangered Common Skate (*Dipturus batis* complex), is actually a complex of two species (Iglésias *et al.* 2010, Dulvy and Reynolds 2009).

With regard to their geographic ranges, there are many published checklists of marine fishes of different European countries, such as the HELCOM Checklist of Baltic Sea Macro-species (HELCOM 2012), although for many countries and subregions in the European marine area, recently published and accurate checklists are unfortunately not available (e.g., south Mediterranean, countries at the Black Sea, etc.) or are only available in the national languages. There are relatively few checklists available for broader areas within the European region; and for some of these the information is patchier than for others.

Many marine fish species found more commonly to the south of this region are now increasingly being found further north and in deeper waters, and therefore there has been a reduction in the areal extend of coldwater areas within the European region seas (Perry *et al.* 2005, Dulvy *et al.* 2008, Rutterford *et al.* 2015). This has mainly been due to the increasing water temperatures caused by climate change. For instance, some Macaronesian and Lusitanian species are reported with increasing regularity in the Bay of Biscay. A good example for this trend is the Sailfin Dory (*Zenopsis conchifer)* (Quéro 1998).

Likewise, it has been observed that some typically southern species are expanding their ranges within Europe, adding complexity to the assessment of their European status.

Information on population fluctuations and trends, including population declines and recoveries, is to some extent available for those species that are commonly fished within this region, in the form of commercial fisheries catch landings data. However, such catch landings figures may often reflect patterns of fisheries selectivity and may only be an indirect or biased estimate of abundance (Pauly *et al.* 2013). There is usually little information available in the form of fisheries-independent catch per unit effort (CPUE) data. Whilst some fisheries-independent population information is available, such as that from scientific surveys, these data are only available to interpret the abundance trends of a comparatively small proportion of all Europe's marine fish species. Although a synoptic MEDITS survey exists for the Mediterranean Sea, these data have yet to be compiled and systematically analysed to provide regionwide population trends (e.g., Baino *et al.* 2001).

For those species that are not fished commercially, population size and trend information is mostly not available, making it difficult to determine population trajectories. Similarly, little information is available on small-scale artisanal fish catches in some areas (particularly in the Mediterranean), and little or no information on recreational fishing catches even where these catches may be significant (e.g., Pita and Friere 2014).

Regarding the habitat preferences and species ecology and biology, there is at least some information available for most species present in this region on their basic habitat preferences and depth ranges, and also on such basic biological parameters as their maximum sizes. Aspects of their movements and feeding and breeding biology are also known sometimes. For many species it is unclear how the various habitat types in which they are found may contribute at their different life-history stages, and how loss or degradation of these habitats would translate into population declines.

Reliable information on their sizes and ages at maturity, and their longevity, are also often lacking, making the calculation of generation lengths, and thus the rates of population declines per generation, difficult to determine. This information is essential in the calculation and use of population decline as a major predictor of a species' conservation status. While the biology of many or most

species that are common in shallower, inshore habitats in this region is relatively well understood, for many other species present in offshore mid and deep water habitats, even commoner ones, hardly anything is known. The precise habitat requirements and details of the biology of the more cryptic species present are also often less well-known. For example, the Alepocephalidae (slickheads), a deepwater dwelling family that includes both highly abundant, e.g., *Alepocephalus bairdii*, and rare species, encompasses 8.5% of the marine bony fishes categorized as Data Deficient (DD). Also, more information on fish habitats and biology is available for some areas within the broader European region (e.g., northern Europe) than in others (e.g., the Black Sea, Macaronesia). The two Gobiesociformes (clingfishes) species assessed as DD are mostly known from the Macaronesian islands in European waters, with *Diplecogaster ctenocrypta* being found in relatively deep waters and *Apletodon pellegrini* in shallow waters.

While major threats due to fishing activities, including those to bycatch species, are often known or can be estimated, other threats can be difficult to determine, such as the population effects of habitat degradation and destruction, invasive alien species, or pollution. For example, organic pollutants and heavy metals are measured in marine fish from the coast to the deep sea and some pathological effects are suspected, but the consequences on population dynamics are yet unknown (Stentiford and Feist 2006, Feist *et al*. 2015).

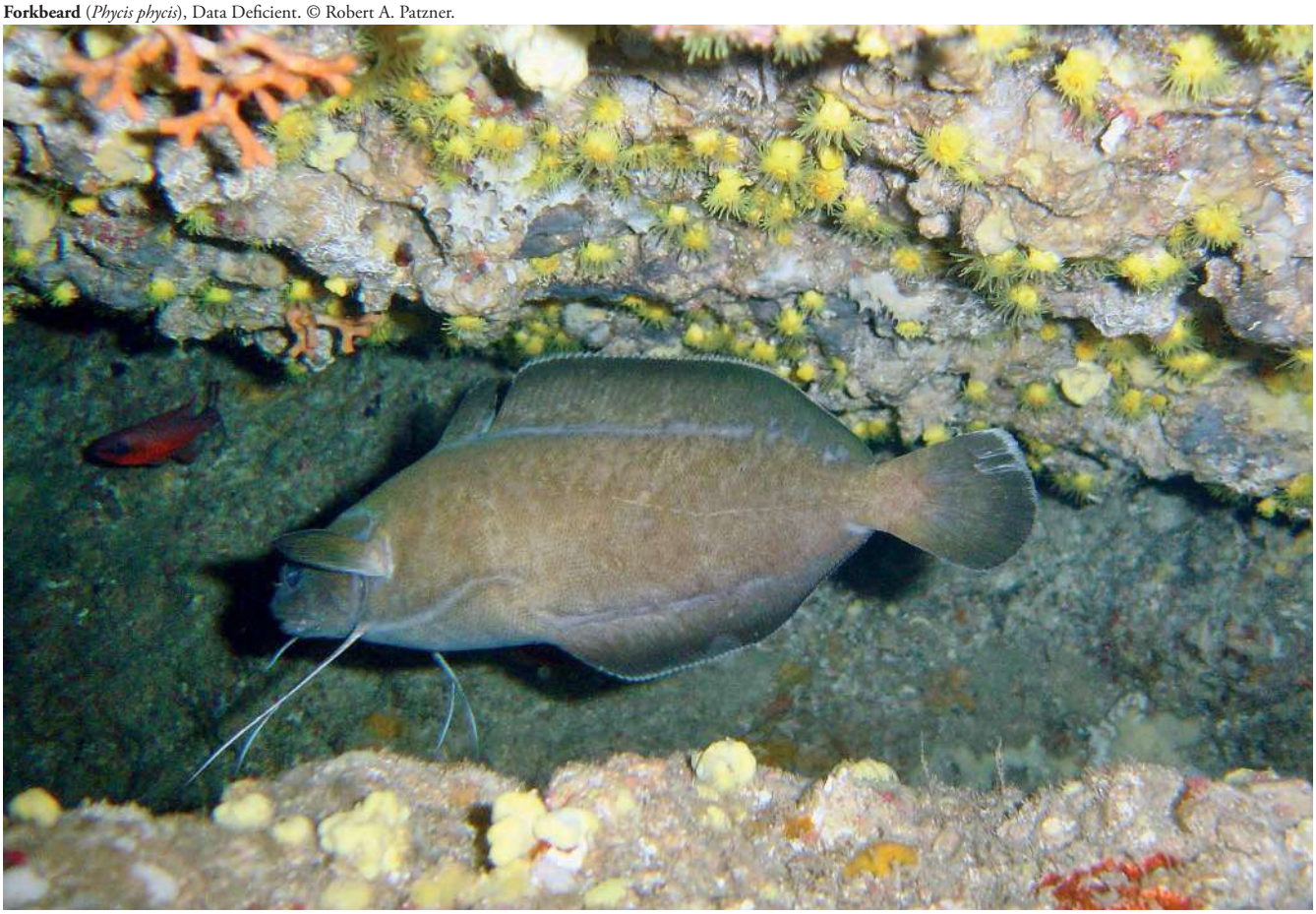
The lack of direct evidence for a link between a potential threat and substantial population trends (>30% decline over three generation lengths) means that some potentially impacted species are categorised as Data Deficient or Least Concern.

With regard to the effectiveness of existing conservation measures, various fisheries management regimes, including the application of a wide variety of input and output controls, can be effective in maintaining the populations of some fished species in European waters. For example, strict management actions have led to recent improvements in the European populations of Atlantic Cod (*Gadus morhua*) and Atlantic Bluefin Tuna (*Thunnus thynnus*) (Fernandes and Cook 2013). However, management for other fished species, including Atlantic Halibut (*Hippoglossus hippoglossus)*, appears so far to be less effective. In addition, it is unclear if the non fished species are being adequately protected, particularly

Long-snouted Seahorse (*Hippocampus guttulatus*), Data Deficient. © Robert A. Patzner.

in existing Marine Protected Areas within their ranges. Both the effectiveness of existing conservation measures and the need for additional conservation methods therefore need to be addressed. For example, Tortonese's Goby *(Pomatoschistus tortonesei)* was assessed as Endangered due to its restricted range and reliance on Zostera seagrass habitat; however, it is unclear if the protected areas in Marsala Lagoon and Faro Lake (Sicily, Italy) are effectively protecting this species and its seagrass habitat.

Forkbeard (*Phycis phycis*), Data Deficient. © Robert A. Patzner.



4. Conservation measures

4.1 Conservation of marine fish species in Europe

Important efforts have recently been made to improve the conservation status of marine fishes in Europe and at the international level. At the global level, the main legal instrument governing the oceans and seas is the UN Convention on the Law of the Sea (UNCLOS), which provides a framework for marine environmental protection and the management of fish stocks. Other important global conventions exist, including the Convention on Biological Diversity (CBD) and those aiming to protect species such as the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

European countries and EU Member States are also signatories to regional conventions, such as the Bern Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), or conventions addressing specific environmental problems relevant to the Northeast Atlantic, the Baltic Sea and the Mediterranean Sea. These include the Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention), the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) and the Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM).

The Marine Strategy Framework Directive (MSFD) and the Common Fisheries Policy (CFP) provide the main EU policy framework related to the conservation and management of marine fauna, and have been made fully consistent, with the latter defining overarching goals and the former being the more technical instrument. The MSFD aims to achieve Good Environmental Status (GES) of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. This objective is also reinforced in the EU 2020 Biodiversity Strategy.

The CFP is the principal instrument for managing European fishing fleets, together with the national policy of each country, organising who can fish where, how, how much, and when, and also for conserving fish stocks.

Atlantic Bluefin Tuna (*Thunnus thynnus*), Near Threatened. © OCEANA/Keith Ellenbogen.

The CFP was established in 1982 and updated over the years; the latest reform took effect in January 2014. One of the major management tools in the CFP is the Total Allowable Catch (TAC), which can be set to zero for the more depleted populations. Since 2007, Europe's annual fisheries regulations that set quota limits for commercial stocks have also included a list of "prohibited species" that cannot be fished or landed. With the 2014 reform, the CFP aims to move from landings TACs to catch TACs. The regulation implies the TACs are set at suitable levels to achieve Maximum Sustainable Yield (MSY).

Fisheries in the European region are also influenced by a number of management and advisory bodies, all of which play an important role in providing technical advice and developing management measures. In the Northeast Atlantic the most relevant are the Northeast Atlantic Fisheries Commission (NEAFC) and the International Commission for the Conservation of Atlantic Tunas (ICCAT), while the main body governing Mediterranean fisheries is the General Fisheries Council for the Mediterranean (GFCM). The International Council for the Exploration of the Seas (ICES) is providing advice on the status of an increasing number of fish stocks in European Atlantic waters. While ICES is strictly a scientific advisory body, NEAFC and ICCAT bear also responsibility for management.

In relation to shark finning, two prohibitions apply in Europe. In 2003, the EU adopted a finning ban through the Regulation 1185/2003 (CEC 2003). However, it should be noted that there remained a loophole allowing for the continued finning of sharks under a Special Fishing Permit. This loophole was only finally closed in June 2013, and now all EU fishing vessels worldwide are required to land sharks with their 'Fins Naturally Attached'. In 2004, ICCAT adopted a finning ban (ICCAT 2005), requiring that fins should not total more than 5% of the weight of the sharks onboard – though it remains unspecified whether this pertains to the whole or dressed carcass weight.

The marine Natura 2000 sites designated under the Birds and Habitats Directives are another important marine conservation tool and provide the basis for a network of Marine Protected Areas across the EU. Currently the marine Natura 2000 network of protected areas comprises 4% of the total EU marine area. While this represents great progress towards marine conservation, further efforts are needed to ensure that the Natura 2000 sites have adequate management and deliver the required protection; at the moment, fisheries are not sufficiently regulated in many Natura 2000 areas (Fock 2011, Tsiafouli *et al.* 2013).

4.2 Red List versus priority for conservation action

Assessing the extinction risk and setting conservation priorities are related but distinct processes. The purpose of the IUCN Red List assessment is to produce a relative estimate of the likelihood of extinction of a taxon. Setting conservation priorities, on the other hand, also takes into account other factors such as ecological, phylogenetic, historical, economical, or cultural preferences for some taxa over others, as well as the probability of success of conservation actions, availability of funds or personnel, cost-effectiveness, and legal frameworks for the conservation of threatened taxa. In the context of regional risk assessments, a number of additional pieces of information are valuable for setting conservation priorities. For example, it is important to consider not only conditions within the region, but also the status of the taxon from a global perspective and the proportion of the global population that occurs within the region. The decision on how these three variables, as well as the other factors, are used for establishing conservation priorities is a matter for the regional authorities to determine, taking into account the assessment status of the species of concern.

5. Recommendations

5.1 Recommended actions

Currently, 7.5% of marine fishes are considered threatened at the European regional level. Primarily these are chondrichthyan fishes and heavily exploited bony fishes as well as a small number of species with restricted ranges (Table 4). The most important threat to marine fishes in Europe is the over-exploitation of both targeted and non-targeted species. Hence, improving the conservation status of marine fishes and preventing future declines in Europe will require increasing efforts and commitments from both European and neighbouring countries. Below, a series of recommendations are proposed to strengthen the long-term survival of European marine fishes:

- Use the European and national Red Lists of marine fishes to inform revisions and implementation of relevant European legislation (including the Marine Strategy Framework Directive and the Maritime Spatial Planning Directive) to improve the status of threatened marine species, and to improve the knowledge of Data Deficient species.
- Continue, and where necessary, expand multi-national fisheries conservation initiatives and management of commercially shared stocks of exploited species, particularly in the Mediterranean and Black Seas.
- Take immediate measures to (i) reduce target and incidental catches of species assessed as threatened (i.e., Critically Endangered, Endangered and Vulnerable), (ii) enact measures to ensure sustainable management of species threatened by exploitation, and (iii) set and enforce science-based fishing opportunities and multi-annual management plans for all commercial species, especially those fisheries that target or affect species assessed as threatened and Near Threatened based on exploitation.
- Ensure compliance with the requirements under the Common Fisheries Policy (CFP) to apply the precautionary approach by harvesting species at levels to ensure Maximum Sustainable Yield (MSY) for all EU fisheries, especially those for highly migratory species.
- Ensure compliance with the requirements, under the Common Fisheries Policy (CFP) to apply the ecosystem-based management of fisheries.
- Improve collection of fisheries-dependent data of commercial fisheries, in particular data on catch composition, by-catch, landings, discards, and catch per unit effort, and where not already in place, establish monitoring schemes for small scale artisanal and recreational (line and spear) fisheries.
- Require fully documented fisheries and proper mapping of fisheries and fishing effort deployed though control technologies such as Vessel Monitoring System (VMS), Vessel Detection System (VDS) and/or Automatic Identification System (AIS).
- Expand fisheries-independent data collection monitoring, especially for Data Deficient species, and monitoring of threatened species that are not currently sampled effectively, and ensure that such data are exchanged with relevant scientific bodies and Regional Fisheries Management Organisations (RFMO) (e.g., ICES, GFCM, NEAFC, ICCAT).
- Improve EU and RFMO requirements for species-specific reporting of catches and landings of all species, especially chondrichthyans, and for quality assurance of these data so that improved analyses of long-term trends can be undertaken.
- Carry out analyses of species trends in both the Northeast Atlantic and the Mediterranean Sea. In particular in the Mediterranean Sea, although there is the ongoing MEDITS survey, there is an urgent need for the development of region-wide time-series analyses of these data.
- For those taxa with threatened species and taxonomic problems, improved species identification is required in all data collection exercises (including both commercial landings as well as scientific surveys). For that purpose, trainings of species identification to fishers should be provided, in particular for sharks, skates and rays species, with a view to ensuring that these species are not confused and that juveniles in particular can be distinguished.
- Ensure that all designated Marine Protected Areas (MPAs) and areas restricted to fisheries, at the national, regional (Regional Seas Conventions) and European levels (Natura 2000 network) provide adequate protection to threatened marine fishes and particularly protect critical habitats for key life cycle stages (e.g., spawning, pupping, nursery and feeding grounds).
- Fully adopt and enforce fisheries management measures for designated MPAs with the view to

alleviate pressure on marine fish species and on the habitats that are necessary for their conservation.

- Expand area-based conservation measures to meet and exceed the globally agreed-upon Aichi Target 11 of 10% coverage of each marine region, by identifying and establishing Fish Stock Recovery areas, as per the Common Fisheries Policy provisions, to protect spawning grounds and concentration of juvenile fish for those commercial fish species assessed as Critically Endangered, Endangered, Vulnerable and Near Threatened.
- Revise the list of threatened European marine fishes regularly, and whenever new data becomes available.
- Conduct basic biological research for deep-sea and Data Deficient species, especially those that are or have been commercially exploited (e.g., Orange Roughy, *Hoplostethus atlanticus*, and the wolf-fishes, *Anarhichas* spp.).

5.2 Application of project outputs

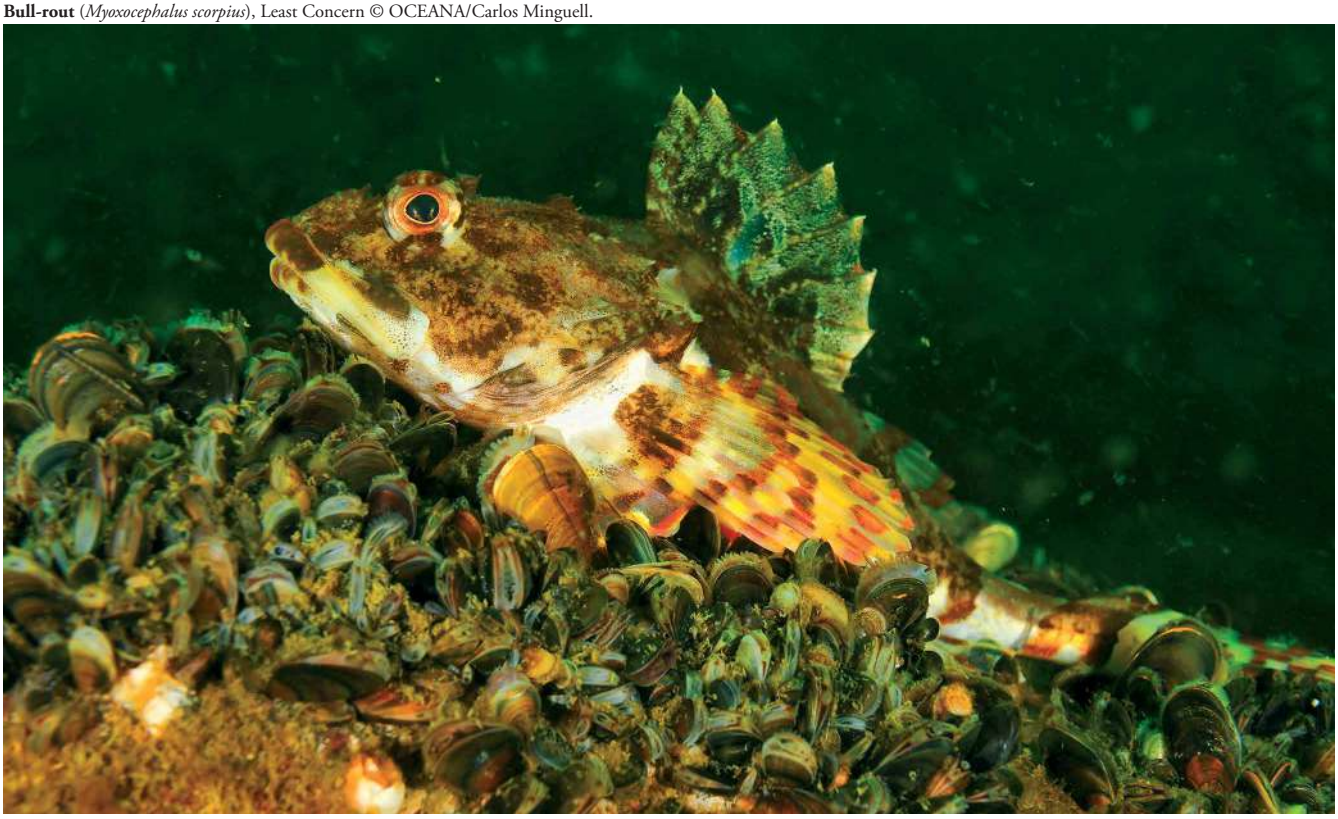
The European Red List of marine fishes is part of a wider initiative aimed at assessing the status of all European species. It provides key resources for decision-makers, policymakers, resources managers, environmental planners, NGOs and the concerned public by compiling large amounts of data on the population, ecology, habitats, threats and recommended conservation measures for each marine fish species. These data are freely available on the IUCN Red List website (www.iucnredlist.org/initiatives/europe), on the European Commission's website (http://ec.europa.eu/environment/nature/conservation/species/redlist) and through paper publications (see the list of European Red Lists published at the end of this report).

This European Red List of marine fishes includes many highly exploited species that support large commercial, recreational, and artisanal fisheries.

Red Lists are a dynamic tool that will evolve with time as species are re-assessed according to new information or situations. They are aimed at stimulating and supporting research, monitoring and conservation action at local, regional and international levels, especially for threatened, Near Threatened and Data Deficient species.

Each species assessment lists the major threats affecting the specific marine fish species as well as conservation measures in place or needed. This will be useful to inform the application of conservation measures for each species. The outputs of this project can be applied to inform policy, and to identify priority sites for biodiversity and priority species to include in research and monitoring programmes.

Bull-rout (*Myoxocephalus scorpius*), Least Concern © OCEANA/Carlos Minguell.



5.3 Future work

This project has mobilised a network of international, European and national marine fish experts, and has made extensive use of their knowledge and experience. It has benefitted greatly from the work and information held by relevant organisations and stakeholders, such as international marine conventions (OSPAR, HELCOM, Barcelona and Black Sea Conventions), ICES, Regional Fisheries Management Organisations and NGOs.

Through the process of compiling data for the European Red List, a number of knowledge gaps have been identified. Across Europe there are significant geographic, geopolitical and taxonomic biases in the quality of data available on the distribution and status of species.

There is a clear need for drawing together information from all data compilation initiatives under way or planned, and for a wider European marine fish conservation action plan to be explored, developed, and progressed. It is hoped that by presenting this assessment, local, national, regional and international research will be stimulated to provide new data and to improve on the quality of that already given.

Key challenges for the future are to improve monitoring and data quality, and to further develop data openness and dissemination so that the information and analyses presented here can be updated and improved, and so conservation actions can be given as solid a scientific basis as possible. The further dissemination of this information to concerned European citizens will also lead to progressive policies at various jurisdictional levels that promote marine and fisheries conservation.

If the marine fish assessments are periodically updated, they will enable the changing status of these species to be tracked through time via the production of a Red List Index (Butchart *et al. 2*004, 2005, 2006, 2007). To date, this indicator has been produced for birds, mammals, amphibians and reptiles at the European regional level and has been adopted as one of the headline biodiversity indicators to monitor progress towards halting biodiversity loss in Europe by 2020 (EEA 2007). For marine fishes, this Red List indicator has been developed for the North Sea (Dulvy *et al.* 2006); the same methodology could be applied more widely to European marine fishes if the assessments are regularly repeated. The development of such an index will be important to evaluate progress towards meeting Target 4 of the EU Biodiversity Strategy (e.g., achieving Maximum Sustainable Yield by 2020), and Aichi Target 6 of the CBD, whereby, *inter alia*, all fish stocks are managed and harvested sustainably.

Conger Eel (*Conger conger*), Least Concern. © Robert A. Patzner.

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Appendix 1. Red List status of European marine fishes

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Anguilliformes	Chlopsidae	*Chlopsis bicolor*	LC		No
Actinopterygii	Anguilliformes	Congridae	*Ariosoma balearicum*	LC		No
Actinopterygii	Anguilliformes	Congridae	*Conger conger*	LC		No
Actinopterygii	Anguilliformes	Congridae	*Gnathophis codoniphorus*	DD		Yes
Actinopterygii	Anguilliformes	Congridae	*Gnathophis mystax*	LC		No
Actinopterygii	Anguilliformes	Congridae	*Heteroconger longissimus*	LC		No
Actinopterygii	Anguilliformes	Congridae	*Paraconger macrops*	DD		Yes
Actinopterygii	Anguilliformes	Congridae	*Pseudophichthys splendens*	DD		No
Actinopterygii	Anguilliformes	Derichthyidae	*Derichthys serpentinus*	LC		No
Actinopterygii	Anguilliformes	Derichthyidae	*Nessorhamphus ingolfianus*	LC		No
Actinopterygii	Anguilliformes	Heterenchelyidae	*Panturichthys fowleri*	DD		Yes
Actinopterygii	Anguilliformes	Muraenesocidae	*Cynoponticus ferox*	DD		No
Actinopterygii	Anguilliformes	Muraenidae	*Anarchias longicauda*	DD		No
Actinopterygii	Anguilliformes	Muraenidae	*Enchelycore anatina*	LC		No
Actinopterygii	Anguilliformes	Muraenidae	*Gymnothorax bacalladoi*	DD		No
Actinopterygii	Anguilliformes	Muraenidae	*Gymnothorax maderensis*	LC		No
Actinopterygii	Anguilliformes	Muraenidae	*Gymnothorax polygonius*	DD		No
Actinopterygii	Anguilliformes	Muraenidae	*Gymnothorax unicolor*	LC		No
Actinopterygii	Anguilliformes	Muraenidae	*Gymnothorax vicinus*	DD		No
Actinopterygii	Anguilliformes	Muraenidae	*Muraena augusti*	LC		No
Actinopterygii	Anguilliformes	Muraenidae	*Muraena helena*	LC		No
Actinopterygii	Anguilliformes	Nemichthyidae	*Avocettina infans*	NA		No
Actinopterygii	Anguilliformes	Nemichthyidae	*Nemichthys curvirostris*	NA		No
Actinopterygii	Anguilliformes	Nemichthyidae	*Nemichthys scolopaceus*	LC		No
Actinopterygii	Anguilliformes	Nettastomatidae	*Facciolella oxyrhyncha*	DD		No
Actinopterygii	Anguilliformes	Nettastomatidae	*Nettastoma melanurum*	LC		No
Actinopterygii	Anguilliformes	Nettastomatidae	*Saurenchelys cancrivora*	DD		No
Actinopterygii	Anguilliformes	Nettastomatidae	*Venefica proboscidea*	LC		No
Actinopterygii	Anguilliformes	Ophichthidae	*Apterichtus anguiformis*	LC		No
Actinopterygii	Anguilliformes	Ophichthidae	*Apterichtus caecus*	LC		No
Actinopterygii	Anguilliformes	Ophichthidae	*Dalophis imberbis*	LC		No
Actinopterygii	Anguilliformes	Ophichthidae	*Echelus myrus*	LC		No
Actinopterygii	Anguilliformes	Ophichthidae	*Myrichthys pardalis*	LC		No
Actinopterygii	Anguilliformes	Ophichthidae	*Ophichthus maculatus*	DD		Yes
Actinopterygii	Anguilliformes	Ophichthidae	*Ophichthus rufus*	LC		Yes
Actinopterygii	Anguilliformes	Ophichthidae	*Ophisurus serpens*	LC		No
Actinopterygii	Anguilliformes	Ophichthidae	*Pisodonophis semicinctus*	LC		No
Actinopterygii	Anguilliformes	Serrivomeridae	*Serrivomer beanii*	LC		No
Actinopterygii	Anguilliformes	Serrivomeridae	*Serrivomer lanceolatoides*	LC		No
Actinopterygii	Anguilliformes	Synaphobranchidae	*Dysomma brevirostre*	LC		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Anguilliformes	Synaphobranchidae	*Dysommina proboscideus*	DD		No
Actinopterygii	Anguilliformes	Synaphobranchidae	*Histiobranchus bathybius*	LC		No
Actinopterygii	Anguilliformes	Synaphobranchidae	*Ilyophis arx*	DD		No
Actinopterygii	Anguilliformes	Synaphobranchidae	*Ilyophis blachei*	LC		No
Actinopterygii	Anguilliformes	Synaphobranchidae	*Ilyophis brunneus*	LC		No
Actinopterygii	Anguilliformes	Synaphobranchidae	*Simenchelys parasitica*	LC		No
Actinopterygii	Anguilliformes	Synaphobranchidae	*Synaphobranchus affinis*	NA		No
Actinopterygii	Anguilliformes	Synaphobranchidae	*Synaphobranchus brevidorsalis*	NA		No
Actinopterygii	Anguilliformes	Synaphobranchidae	*Synaphobranchus dolichorhynchus*	NA		No
Actinopterygii	Anguilliformes	Synaphobranchidae	*Synaphobranchus kaupii*	LC		No
Actinopterygii	Ateleopodiformes	Ateleopodidae	*Guentherus altivela*	LC		No
Actinopterygii	Atheriniformes	Atherinidae	*Atherina hepsetus*	LC		No
Actinopterygii	Atheriniformes	Atherinidae	*Atherina presbyter*	LC		No
Actinopterygii	Aulopiformes	Alepisauridae	*Alepisaurus brevirostris*	NA		No
Actinopterygii	Aulopiformes	Alepisauridae	*Alepisaurus ferox*	LC		No
Actinopterygii	Aulopiformes	Anotopteridae	*Anotopterus pharao*	LC		No
Actinopterygii	Aulopiformes	Aulopidae	*Aulopus filamentosus*	LC		No
Actinopterygii	Aulopiformes	Bathysauridae	*Bathysaurus ferox*	LC		No
Actinopterygii	Aulopiformes	Bathysauridae	*Bathysaurus mollis*	LC		No
Actinopterygii	Aulopiformes	Chlorophthalmidae	*Chlorophthalmus agassizi*	LC		No
Actinopterygii	Aulopiformes	Evermannellidae	*Coccorella atlantica*	NA		No
Actinopterygii	Aulopiformes	Evermannellidae	*Evermannella balbo*	LC		No
Actinopterygii	Aulopiformes	Evermannellidae	*Evermannella melanoderma*	LC		No
Actinopterygii	Aulopiformes	Ipnopidae	*Bathymicrops multispinis*	NA		No
Actinopterygii	Aulopiformes	Ipnopidae	*Bathymicrops regis*	NA		No
Actinopterygii	Aulopiformes	Ipnopidae	*Bathypterois dubius*	LC		No
Actinopterygii	Aulopiformes	Ipnopidae	*Bathypterois grallator*	LC		No
Actinopterygii	Aulopiformes	Ipnopidae	*Bathypterois longipes*	LC		No
Actinopterygii	Aulopiformes	Ipnopidae	*Bathypterois phenax*	LC		No
Actinopterygii	Aulopiformes	Ipnopidae	*Bathytyphlops sewelli*	NA		No
Actinopterygii	Aulopiformes	Notosudidae	*Ahliesaurus berryi*	LC		No
Actinopterygii	Aulopiformes	Notosudidae	*Scopelosaurus argenteus*	LC		No
Actinopterygii	Aulopiformes	Notosudidae	*Scopelosaurus lepidus*	LC		No
Actinopterygii	Aulopiformes	Notosudidae	*Scopelosaurus smithii*	NA		No
Actinopterygii	Aulopiformes	Omosudidae	*Omosudis lowii*	LC		No
Actinopterygii	Aulopiformes	Paralepididae	*Arctozenus risso*	LC		No
Actinopterygii	Aulopiformes	Paralepididae	*Lestidiops affinis*	NA		No
Actinopterygii	Aulopiformes	Paralepididae	*Lestidiops jayakari*	LC		No
Actinopterygii	Aulopiformes	Paralepididae	*Lestidiops sphyrenoides*	LC		No
Actinopterygii	Aulopiformes	Paralepididae	*Macroparalepis affinis*	NA		No
Actinopterygii	Aulopiformes	Paralepididae	*Macroparalepis brevis*	NA		No
Actinopterygii	Aulopiformes	Paralepididae	*Magnisudis atlantica*	LC		No
Actinopterygii	Aulopiformes	Paralepididae	*Paralepis brevirostris*	NA		No
Actinopterygii	Aulopiformes	Paralepididae	*Paralepis coregonoides*	LC		No
Actinopterygii	Aulopiformes	Paralepididae	*Paralepis speciosa*	LC		Yes

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Aulopiformes	Paralepididae	*Sudis hyalina*	DD		No
Actinopterygii	Aulopiformes	Paralepididae	*Uncisudis longirostra*	DD		No
Actinopterygii	Aulopiformes	Paralepididae	*Uncisudis quadrimaculata*	DD		No
Actinopterygii	Aulopiformes	Scopelarchidae	*Benthalbella infans*	NA		No
Actinopterygii	Aulopiformes	Scopelarchidae	*Rosenblattichthys hubbsi*	NA		No
Actinopterygii	Aulopiformes	Scopelarchidae	*Scopelarchus analis*	NA		No
Actinopterygii	Aulopiformes	Scopelarchidae	*Scopelarchus guentheri*	NA		No
Actinopterygii	Aulopiformes	Scopelarchidae	*Scopelarchus michaelsarsi*	NA		No
Actinopterygii	Aulopiformes	Synodontidae	*Synodus foetens*	NA		No
Actinopterygii	Aulopiformes	Synodontidae	*Synodus saurus*	LC		No
Actinopterygii	Aulopiformes	Synodontidae	*Synodus synodus*	LC		No
Actinopterygii	Aulopiformes	Synodontidae	*Trachinocephalus myops*	NA		No
Actinopterygii	Batrachoidiformes	Batrachoididae	*Halobatrachus didactylus*	LC		No
Actinopterygii	Beloniformes	Belonidae	*Belone belone*	LC		No
Actinopterygii	Beloniformes	Belonidae	*Belone svetovidovi*	LC		No
Actinopterygii	Beloniformes	Belonidae	*Platybelone argalus*	NA		No
Actinopterygii	Beloniformes	Belonidae	*Tylosurus acus*	LC		No
Actinopterygii	Beloniformes	Exocoetidae	*Cheilopogon cyanopterus*	NA		No
Actinopterygii	Beloniformes	Exocoetidae	*Cheilopogon exsiliens*	LC		No
Actinopterygii	Beloniformes	Exocoetidae	*Cheilopogon furcatus*	LC		No
Actinopterygii	Beloniformes	Exocoetidae	*Cheilopogon heterurus*	LC		No
Actinopterygii	Beloniformes	Exocoetidae	*Cheilopogon pinnatibarbatus*	LC		No
Actinopterygii	Beloniformes	Exocoetidae	*Exocoetus obtusirostris*	LC		No
Actinopterygii	Beloniformes	Exocoetidae	*Exocoetus volitans*	LC		No
Actinopterygii	Beloniformes	Exocoetidae	*Hirundichthys rondeletii*	LC		No
Actinopterygii	Beloniformes	Exocoetidae	*Hirundichthys speculiger*	LC		No
Actinopterygii	Beloniformes	Hemiramphidae	*Hemiramphus balao*	NA		No
Actinopterygii	Beloniformes	Hemiramphidae	*Hyporhamphus picarti*	LC		No
Actinopterygii	Beloniformes	Scomberesocidae	*Scomberesox saurus*	LC		No
Actinopterygii	Beloniformes	Scomberesocidae	*Scomberesox simulans*	LC		No
Actinopterygii	Beryciformes	Anoplogastridae	*Anoplogaster cornuta*	LC		No
Actinopterygii	Beryciformes	Berycidae	*Beryx decadactylus*	NT		No
Actinopterygii	Beryciformes	Berycidae	*Beryx splendens*	NT		No
Actinopterygii	Beryciformes	Diretmidae	*Diretmichthys parini*	NA		No
Actinopterygii	Beryciformes	Diretmidae	*Diretmus argenteus*	LC		No
Actinopterygii	Beryciformes	Holocentridae	*Sargocentron hastatum*	NA		No
Actinopterygii	Beryciformes	Trachichthyidae	*Gephyroberyx darwinii*	NA		No
Actinopterygii	Beryciformes	Trachichthyidae	*Hoplostethus atlanticus*	VU	A1bd	No
Actinopterygii	Beryciformes	Trachichthyidae	*Hoplostethus cadenati*	NA		No
Actinopterygii	Beryciformes	Trachichthyidae	*Hoplostethus mediterraneus*	LC		No
Actinopterygii	Cetomimiformes	Cetomimidae	*Cetichthys indagator*	NA		No
Actinopterygii	Cetomimiformes	Cetomimidae	*Cetomimus hempeli*	DD		No
Actinopterygii	Cetomimiformes	Cetomimidae	*Cetostoma regani*	NA		No
Actinopterygii	Cetomimiformes	Cetomimidae	*Gyrinomimus myersi*	NA		No
Actinopterygii	Cetomimiformes	Cetomimidae	*Mirapinna esau*	DD		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Cetomimiformes	Mirapinnidae	*Parataeniophorus gulosus*	DD		No
Actinopterygii	Cetomimiformes	Rondeletiidae	*Rondeletia loricata*	NA		No
Actinopterygii	Clupeiformes	Clupeidae	*Clupea harengus*	LC		No
Actinopterygii	Clupeiformes	Clupeidae	*Sardina pilchardus*	NT		No
Actinopterygii	Clupeiformes	Clupeidae	*Sardinella aurita*	LC		No
Actinopterygii	Clupeiformes	Clupeidae	*Sardinella maderensis*	LC		No
Actinopterygii	Clupeiformes	Clupeidae	*Sprattus sprattus*	LC		No
Actinopterygii	Clupeiformes	Engraulidae	*Engraulis albidus*	DD		Yes
Actinopterygii	Clupeiformes	Engraulidae	*Engraulis encrasicolus*	LC		No
Actinopterygii	Gadiformes	Bregmacerotidae	*Bregmaceros atlanticus*	LC		No
Actinopterygii	Gadiformes	Gadidae	*Boreogadus saida*	LC		No
Actinopterygii	Gadiformes	Gadidae	*Gadiculus argenteus*	LC		No
Actinopterygii	Gadiformes	Gadidae	*Gadus chalcogrammus*	NT		No
Actinopterygii	Gadiformes	Gadidae	*Gadus morhua*	LC		No
Actinopterygii	Gadiformes	Gadidae	*Melanogrammus aeglefinus*	LC		No
Actinopterygii	Gadiformes	Gadidae	*Merlangius merlangus*	LC		Yes
Actinopterygii	Gadiformes	Gadidae	*Micromesistius poutassou*	LC		No
Actinopterygii	Gadiformes	Gadidae	*Pollachius pollachius*	LC		Yes
Actinopterygii	Gadiformes	Gadidae	*Pollachius virens*	LC		No
Actinopterygii	Gadiformes	Gadidae	*Raniceps raninus*	LC		Yes
Actinopterygii	Gadiformes	Gadidae	*Trisopterus capelanus*	LC		Yes
Actinopterygii	Gadiformes	Gadidae	*Trisopterus esmarkii*	LC		Yes
Actinopterygii	Gadiformes	Gadidae	*Trisopterus luscus*	LC		No
Actinopterygii	Gadiformes	Gadidae	*Trisopterus minutus*	LC		No
Actinopterygii	Gadiformes	Lotidae	*Brosme brosme*	LC		No
Actinopterygii	Gadiformes	Lotidae	*Ciliata mustela*	LC		Yes
Actinopterygii	Gadiformes	Lotidae	*Ciliata septentrionalis*	LC		Yes
Actinopterygii	Gadiformes	Lotidae	*Enchelyopus cimbrius*	LC		No
Actinopterygii	Gadiformes	Lotidae	*Gaidropsarus argentatus*	LC		No
Actinopterygii	Gadiformes	Lotidae	*Gaidropsarus biscayensis*	LC		No
Actinopterygii	Gadiformes	Lotidae	*Gaidropsarus granti*	DD		Yes
Actinopterygii	Gadiformes	Lotidae	*Gaidropsarus guttatus*	DD		Yes
Actinopterygii	Gadiformes	Lotidae	*Gaidropsarus macrophthalmus*	LC		Yes
Actinopterygii	Gadiformes	Lotidae	*Gaidropsarus mediterraneus*	LC		No
Actinopterygii	Gadiformes	Lotidae	*Gaidropsarus vulgaris*	LC		Yes
Actinopterygii	Gadiformes	Lotidae	*Molva dypterygia*	VU	A1bd	No
Actinopterygii	Gadiformes	Lotidae	*Molva macrophthalma*	LC		Yes
Actinopterygii	Gadiformes	Lotidae	*Molva molva*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Asthenomacrurus victoris*	NA		No
Actinopterygii	Gadiformes	Macrouridae	*Bathygadus melanobranchus*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Coelorinchus caelorhincus*	DD		No
Actinopterygii	Gadiformes	Macrouridae	*Coelorinchus labiatus*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Coelorinchus mediterraneus*	LC		Yes
Actinopterygii	Gadiformes	Macrouridae	*Coryphaenoides armatus*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Coryphaenoides brevibarbis*	LC		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Gadiformes	Macrouridae	*Coryphaenoides carapinus*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Coryphaenoides guentheri*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Coryphaenoides leptolepis*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Coryphaenoides mediterraneus*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Coryphaenoides profundicolus*	LC		Yes
Actinopterygii	Gadiformes	Macrouridae	*Coryphaenoides rupestris*	EN	A1bd	No
Actinopterygii	Gadiformes	Macrouridae	*Coryphaenoides thelestomus*	DD		Yes
Actinopterygii	Gadiformes	Macrouridae	*Coryphaenoides zaniophorus*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Echinomacrurus mollis*	DD		No
Actinopterygii	Gadiformes	Macrouridae	*Gadomus arcuatus*	DD		No
Actinopterygii	Gadiformes	Macrouridae	*Gadomus dispar*	DD		No
Actinopterygii	Gadiformes	Macrouridae	*Gadomus longifilis*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Hymenocephalus italicus*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Hymenogadus gracilis*	NA		No
Actinopterygii	Gadiformes	Macrouridae	*Kumba dentoni*	DD		Yes
Actinopterygii	Gadiformes	Macrouridae	*Macrourus berglax*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Malacocephalus laevis*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Nezumia aequalis*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Nezumia longebarbata*	DD		No
Actinopterygii	Gadiformes	Macrouridae	*Nezumia sclerorhynchus*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Odontomacrurus murrayi*	NA		No
Actinopterygii	Gadiformes	Macrouridae	*Paracetonurus flagellicauda*	DD		No
Actinopterygii	Gadiformes	Macrouridae	*Sphagemacrurus hirundo*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Squalogadus modificatus*	NA		No
Actinopterygii	Gadiformes	Macrouridae	*Trachonurus sulcatus*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Trachonurus villosus*	NA		No
Actinopterygii	Gadiformes	Macrouridae	*Trachyrincus murrayi*	LC		No
Actinopterygii	Gadiformes	Macrouridae	*Trachyrincus scabrus*	LC		No
Actinopterygii	Gadiformes	Melanonidae	*Melanonus zugmayeri*	LC		No
Actinopterygii	Gadiformes	Merlucciidae	*Lyconus brachycolus*	DD		No
Actinopterygii	Gadiformes	Merlucciidae	*Merluccius merluccius*	LC		No
Actinopterygii	Gadiformes	Moridae	*Antimora rostrata*	LC		No
Actinopterygii	Gadiformes	Moridae	*Eretmophorus kleinenbergi*	LC		Yes
Actinopterygii	Gadiformes	Moridae	*Gadella maraldi*	LC		No
Actinopterygii	Gadiformes	Moridae	*Guttigadus latifrons*	LC		No
Actinopterygii	Gadiformes	Moridae	*Halargyreus johnsonii*	LC		No
Actinopterygii	Gadiformes	Moridae	*Laemonema robustum*	NA		No
Actinopterygii	Gadiformes	Moridae	*Laemonema yarrellii*	LC		No
Actinopterygii	Gadiformes	Moridae	*Lepidion eques*	LC		No
Actinopterygii	Gadiformes	Moridae	*Lepidion guentheri*	LC		Yes
Actinopterygii	Gadiformes	Moridae	*Lepidion lepidion*	LC		Yes
Actinopterygii	Gadiformes	Moridae	*Lepidion schmidti*	NA		No
Actinopterygii	Gadiformes	Moridae	*Mora moro*	LC		No
Actinopterygii	Gadiformes	Moridae	*Physiculus dalwigki*	LC		No
Actinopterygii	Gadiformes	Moridae	*Rhynchogadus hepaticus*	DD		Yes

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Gadiformes	Phycidae	*Phycis blennoides*	DD		No
Actinopterygii	Gadiformes	Phycidae	*Phycis phycis*	DD		No
Actinopterygii	Gasterosteiformes	Gasterosteidae	*Spinachia spinachia*	LC		Yes
Actinopterygii	Gobiesociformes	Gobiesocidae	*Apletodon bacescui*	LC		Yes
Actinopterygii	Gobiesociformes	Gobiesocidae	*Apletodon dentatus*	LC		No
Actinopterygii	Gobiesociformes	Gobiesocidae	*Apletodon incognitus*	LC		Yes
Actinopterygii	Gobiesociformes	Gobiesocidae	*Apletodon pellegrini*	DD		No
Actinopterygii	Gobiesociformes	Gobiesocidae	*Diplecogaster bimaculata*	LC		Yes
Actinopterygii	Gobiesociformes	Gobiesocidae	*Diplecogaster ctenocrypta*	DD		No
Actinopterygii	Gobiesociformes	Gobiesocidae	*Gouania willdenowi*	LC		Yes
Actinopterygii	Gobiesociformes	Gobiesocidae	*Lepadogaster candolii*	LC		No
Actinopterygii	Gobiesociformes	Gobiesocidae	*Lepadogaster lepadogaster*	LC		No
Actinopterygii	Gobiesociformes	Gobiesocidae	*Lepadogaster purpurea*	LC		No
Actinopterygii	Gobiesociformes	Gobiesocidae	*Opeatogenys gracilis*	LC		Yes
Actinopterygii	Lampriformes	Lampridae	*Lampris guttatus*	LC		No
Actinopterygii	Lampriformes	Lophotidae	*Lophotus lacepede*	LC		No
Actinopterygii	Lampriformes	Radiicephalidae	*Radiicephalus elongatus*	NA		No
Actinopterygii	Lampriformes	Regalecidae	*Regalecus glesne*	LC		No
Actinopterygii	Lampriformes	Stylephoridae	*Stylephorus chordatus*	NA		No
Actinopterygii	Lampriformes	Trachipteridae	*Trachipterus arcticus*	LC		No
Actinopterygii	Lampriformes	Trachipteridae	*Trachipterus trachypterus*	LC		No
Actinopterygii	Lampriformes	Trachipteridae	*Zu cristatus*	LC		No
Actinopterygii	Lophiiformes	Antennariidae	*Antennatus nummifer*	NA		No
Actinopterygii	Lophiiformes	Antennariidae	*Fowlerichthys senegalensis*	NA		No
Actinopterygii	Lophiiformes	Antennariidae	*Histrio histrio*	LC		No
Actinopterygii	Lophiiformes	Caulophrynidae	*Caulophryne jordani*	NA		No
Actinopterygii	Lophiiformes	Caulophrynidae	*Caulophryne polynema*	NA		No
Actinopterygii	Lophiiformes	Ceratiidae	*Ceratias holboelli*	LC		No
Actinopterygii	Lophiiformes	Ceratiidae	*Cryptopsaras couesii*	LC		No
Actinopterygii	Lophiiformes	Chaunacidae	*Chaunax pictus*	LC		No
Actinopterygii	Lophiiformes	Chaunacidae	*Chaunax suttkusi*	LC		No
Actinopterygii	Lophiiformes	Diceratiidae	*Bufoceratias wedli*	DD		No
Actinopterygii	Lophiiformes	Gigantactinidae	*Gigantactis ios*	LC		No
Actinopterygii	Lophiiformes	Gigantactinidae	*Gigantactis vanhoeffeni*	NA		No
Actinopterygii	Lophiiformes	Himantolophidae	*Himantolophus albinares*	NA		No
Actinopterygii	Lophiiformes	Himantolophidae	*Himantolophus brevirostris*	NA		No
Actinopterygii	Lophiiformes	Himantolophidae	*Himantolophus compressus*	DD		Yes
Actinopterygii	Lophiiformes	Himantolophidae	*Himantolophus groenlandicus*	DD		No
Actinopterygii	Lophiiformes	Himantolophidae	*Himantolophus mauli*	LC		No
Actinopterygii	Lophiiformes	Linophrynidae	*Haplophryne mollis*	NA		No
Actinopterygii	Lophiiformes	Linophrynidae	*Linophryne arcturi*	NA		No
Actinopterygii	Lophiiformes	Linophrynidae	*Linophryne brevibarbata*	LC		No
Actinopterygii	Lophiiformes	Linophrynidae	*Linophryne lucifer*	LC		No
Actinopterygii	Lophiiformes	Linophrynidae	*Linophryne maderensis*	DD		Yes
Actinopterygii	Lophiiformes	Linophrynidae	*Linophryne polypogon*	DD		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Lophiiformes	Linophrynidae	*Linophryne racemifera*	DD		No
Actinopterygii	Lophiiformes	Linophrynidae	*Linophryne sexfilis*	DD		Yes
Actinopterygii	Lophiiformes	Linophrynidae	*Photocorynus spiniceps*	NA		No
Actinopterygii	Lophiiformes	Lophiidae	*Lophius budegassa*	LC		No
Actinopterygii	Lophiiformes	Lophiidae	*Lophius piscatorius*	LC		No
Actinopterygii	Lophiiformes	Melanocetidae	*Melanocetus johnsonii*	LC		No
Actinopterygii	Lophiiformes	Melanocetidae	*Melanocetus murrayi*	NA		No
Actinopterygii	Lophiiformes	Neoceratiidae	*Neoceratias spinifer*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Chaenophryne draco*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Chaenophryne longiceps*	LC		No
Actinopterygii	Lophiiformes	Oneirodidae	*Chaenophryne ramifera*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Ctenochirichthys longimanus*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Dolopichthys allector*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Dolopichthys danae*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Dolopichthys jubatus*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Dolopichthys longicornis*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Dolopichthys pullatus*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Leptacanthichthys gracilispinis*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Lophodolos acanthognathus*	LC		No
Actinopterygii	Lophiiformes	Oneirodidae	*Microlophichthys microlophus*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Oneirodes anisacanthus*	DD		Yes
Actinopterygii	Lophiiformes	Oneirodidae	*Oneirodes carlsbergi*	DD		No
Actinopterygii	Lophiiformes	Oneirodidae	*Oneirodes clarkei*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Oneirodes eschrichtii*	LC		No
Actinopterygii	Lophiiformes	Oneirodidae	*Oneirodes macronema*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Oneirodes macrosteus*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Oneirodes myrionemus*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Oneirodes posti*	DD		Yes
Actinopterygii	Lophiiformes	Oneirodidae	*Pentherichthys atratus*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Phyllorhinichthys micractis*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Puck pinnata*	NA		No
Actinopterygii	Lophiiformes	Oneirodidae	*Spiniphryne gladisfenae*	NA		No
Actinopterygii	Lophiiformes	Thaumatichthyidae	*Lasiognathus amphirhamphus*	DD		Yes
Actinopterygii	Lophiiformes	Thaumatichthyidae	*Lasiognathus beebei*	NA		No
Actinopterygii	Lophiiformes	Thaumatichthyidae	*Lasiognathus saccostoma*	NA		No
Actinopterygii	Mugiliformes	Mugilidae	*Oedalechilus labeo*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Benthosema glaciale*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Benthosema suborbitale*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Bolinichthys indicus*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Bolinichthys photothorax*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Bolinichthys supralateralis*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Centrobranchus nigroocellatus*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Ceratoscopelus maderensis*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Ceratoscopelus warmingii*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Diaphus adenomus*	NA		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Myctophiformes	Myctophidae	*Diaphus bertelseni*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Diaphus dumerilii*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Diaphus effulgens*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Diaphus holti*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Diaphus lucidus*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Diaphus metopoclampus*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Diaphus mollis*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Diaphus perspicillatus*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Diaphus rafinesquii*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Diaphus splendidus*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Diaphus subtilis*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Diaphus termophilus*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Diogenichthys atlanticus*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Electrona risso*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Gonichthys cocco*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Hygophum benoiti*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Hygophum hygomii*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Hygophum macrochir*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Hygophum reinhardtii*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Hygophum taaningi*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Lampadena anomala*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Lampadena atlantica*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Lampadena chavesi*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Lampadena luminosa*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Lampadena speculigera*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Lampanyctus alatus*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Lampanyctus crocodilus*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Lampanyctus festivus*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Lampanyctus intricarius*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Lampanyctus macdonaldi*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Lampanyctus photonotus*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Lampanyctus pusillus*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Lepidophanes gaussi*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Lepidophanes guentheri*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Lobianchia dofleini*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Lobianchia gemellarii*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Loweina interrupta*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Loweina rara*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Myctophum affine*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Myctophum nitidulum*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Myctophum punctatum*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Nannobrachium atrum*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Nannobrachium cuprarium*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Nannobrachium lineatum*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Notolychnus valdiviae*	LC		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Myctophiformes	Myctophidae	*Notoscopelus bolini*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Notoscopelus caudispinosus*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Notoscopelus elongatus*	LC		Yes
Actinopterygii	Myctophiformes	Myctophidae	*Notoscopelus resplendens*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Protomyctophum arcticum*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Symbolophorus rufinus*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Symbolophorus veranyi*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Taaningichthys bathyphilus*	LC		No
Actinopterygii	Myctophiformes	Myctophidae	*Taaningichthys minimus*	NA		No
Actinopterygii	Myctophiformes	Myctophidae	*Taaningichthys paurolychnus*	NA		No
Actinopterygii	Myctophiformes	Neoscopelidae	*Neoscopelus macrolepidotus*	NA		No
Actinopterygii	Myctophiformes	Neoscopelidae	*Neoscopelus microchir*	LC		No
Actinopterygii	Myctophiformes	Neoscopelidae	*Scopelengys tristis*	NA		No
Actinopterygii	Notacanthiformes	Halosauridae	*Aldrovandia affinis*	NA		No
Actinopterygii	Notacanthiformes	Halosauridae	*Aldrovandia phalacra*	LC		No
Actinopterygii	Notacanthiformes	Halosauridae	*Aldrovandia rostrata*	NA		No
Actinopterygii	Notacanthiformes	Halosauridae	*Halosauropsis macrochir*	LC		No
Actinopterygii	Notacanthiformes	Halosauridae	*Halosaurus johnsonianus*	LC		No
Actinopterygii	Notacanthiformes	Halosauridae	*Halosaurus ovenii*	LC		No
Actinopterygii	Notacanthiformes	Notacanthidae	*Notacanthus bonaparte*	LC		No
Actinopterygii	Notacanthiformes	Notacanthidae	*Notacanthus chemnitzii*	LC		No
Actinopterygii	Notacanthiformes	Notacanthidae	*Polyacanthonotus challengeri*	LC		No
Actinopterygii	Notacanthiformes	Notacanthidae	*Polyacanthonotus rissoanus*	LC		No
Actinopterygii	Ophidiiformes	Aphyonidae	*Aphyonus gelatinosus*	LC		No
Actinopterygii	Ophidiiformes	Aphyonidae	*Meteoria erythrops*	DD		No
Actinopterygii	Ophidiiformes	Aphyonidae	*Nybelinella erikssoni*	DD		No
Actinopterygii	Ophidiiformes	Aphyonidae	*Sciadonus cryptophthalmus*	DD		Yes
Actinopterygii	Ophidiiformes	Aphyonidae	*Sciadonus galatheae*	DD		No
Actinopterygii	Ophidiiformes	Aphyonidae	*Sciadonus pedicellaris*	NA		No
Actinopterygii	Ophidiiformes	Bythitidae	*Bellottia apoda*	LC		No
Actinopterygii	Ophidiiformes	Bythitidae	*Bythites islandicus*	DD		Yes
Actinopterygii	Ophidiiformes	Bythitidae	*Cataetyx alleni*	LC		No
Actinopterygii	Ophidiiformes	Bythitidae	*Cataetyx laticeps*	LC		No
Actinopterygii	Ophidiiformes	Bythitidae	*Grammonus ater*	LC		Yes
Actinopterygii	Ophidiiformes	Bythitidae	*Melodichthys hadrocephalus*	DD		Yes
Actinopterygii	Ophidiiformes	Carapidae	*Carapus acus*	LC		No
Actinopterygii	Ophidiiformes	Carapidae	*Echiodon dentatus*	LC		No
Actinopterygii	Ophidiiformes	Carapidae	*Echiodon drummondii*	LC		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Acanthonus armatus*	NA		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Barathrites iris*	DD		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Bassozetus compressus*	NA		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Bassozetus levistomatus*	NA		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Bassozetus taenia*	DD		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Bathyonus laticeps*	LC		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Benthocometes robustus*	LC		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Ophidiiformes	Ophidiidae	*Brotulotaenia brevicauda*	NA		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Brotulotaenia crassa*	DD		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Brotulotaenia nigra*	NA		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Holcomycteronus squamosus*	DD		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Lamprogrammus niger*	NA		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Monomitopus metriostoma*	LC		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Ophidion barbatum*	LC		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Ophidion rochei*	DD		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Parophidion vassali*	DD		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Penopus microphthalmus*	NA		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Porogadus miles*	NA		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Spectrunculus crassus*	LC		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Spectrunculus grandis*	LC		No
Actinopterygii	Ophidiiformes	Ophidiidae	*Thalassobathia pelagica*	DD		No
Actinopterygii	Ophidiiformes	Parabrotulidae	*Leucobrotula adipata*	DD		Yes
Actinopterygii	Ophidiiformes	Parabrotulidae	*Parabrotula plagiophthalma*	NA		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Alepocephalus agassizii*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Alepocephalus australis*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Alepocephalus bairdii*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Alepocephalus productus*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Alepocephalus rostratus*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Asquamiceps velaris*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Bajacalifornia calcarata*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Bajacalifornia megalops*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Bathylaco nigricans*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Bathyprion danae*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Bathytroctes macrolepis*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Bathytroctes michaelsarsi*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Bathytroctes microlepis*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Conocara fiolenti*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Conocara macropterum*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Conocara microlepis*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Conocara murrayi*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Conocara salmoneum*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Einara edentula*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Einara macrolepis*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Herwigia kreffti*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Leptoderma macrophthalmum*	DD		Yes
Actinopterygii	Osmeriformes	Alepocephalidae	*Leptoderma macrops*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Mirognathus normani*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Narcetes erimelas*	NA		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Narcetes stomias*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Photostylus pycnopterus*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Rinoctes nasutus*	LC		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Rouleina attrita*	LC		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Osmeriformes	Alepocephalidae	*Rouleina maderensis*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Talismania mekistonema*	DD		No
Actinopterygii	Osmeriformes	Alepocephalidae	*Xenodermichthys copei*	LC		No
Actinopterygii	Osmeriformes	Argentinidae	*Argentina silus*	LC		No
Actinopterygii	Osmeriformes	Argentinidae	*Argentina sphyraena*	LC		No
Actinopterygii	Osmeriformes	Argentinidae	*Glossanodon leioglossus*	LC		No
Actinopterygii	Osmeriformes	Bathylagidae	*Bathylagichthys greyae*	LC		No
Actinopterygii	Osmeriformes	Bathylagidae	*Bathylagus euryops*	LC		No
Actinopterygii	Osmeriformes	Bathylagidae	*Dolicholagus longirostris*	LC		No
Actinopterygii	Osmeriformes	Bathylagidae	*Melanolagus bericoides*	LC		No
Actinopterygii	Osmeriformes	Leptochilichthyidae	*Leptochilichthys agassizii*	LC		No
Actinopterygii	Osmeriformes	Microstomatidae	*Microstoma microstoma*	LC		No
Actinopterygii	Osmeriformes	Microstomatidae	*Nansenia atlantica*	DD		No
Actinopterygii	Osmeriformes	Microstomatidae	*Nansenia groenlandica*	DD		No
Actinopterygii	Osmeriformes	Microstomatidae	*Nansenia iberica*	DD		Yes
Actinopterygii	Osmeriformes	Microstomatidae	*Nansenia longicauda*	NA		No
Actinopterygii	Osmeriformes	Microstomatidae	*Nansenia oblita*	DD		No
Actinopterygii	Osmeriformes	Microstomatidae	*Nansenia tenera*	DD		No
Actinopterygii	Osmeriformes	Opisthoproctidae	*Bathylychnops brachyrhynchus*	NA		No
Actinopterygii	Osmeriformes	Opisthoproctidae	*Bathylychnops exilis*	NA		No
Actinopterygii	Osmeriformes	Opisthoproctidae	*Dolichopteryx longipes*	LC		No
Actinopterygii	Osmeriformes	Opisthoproctidae	*Dolichopteryx rostrata*	DD		No
Actinopterygii	Osmeriformes	Opisthoproctidae	*Opisthoproctus grimaldii*	LC		No
Actinopterygii	Osmeriformes	Opisthoproctidae	*Opisthoproctus soleatus*	LC		No
Actinopterygii	Osmeriformes	Osmeridae	*Mallotus villosus*	LC		No
Actinopterygii	Osmeriformes	Platytroctidae	*Barbantus curvifrons*	LC		No
Actinopterygii	Osmeriformes	Platytroctidae	*Holtbyrnia anomala*	LC		No
Actinopterygii	Osmeriformes	Platytroctidae	*Holtbyrnia macrops*	LC		No
Actinopterygii	Osmeriformes	Platytroctidae	*Maulisia argipalla*	DD		No
Actinopterygii	Osmeriformes	Platytroctidae	*Maulisia mauli*	LC		No
Actinopterygii	Osmeriformes	Platytroctidae	*Maulisia microlepis*	NA		No
Actinopterygii	Osmeriformes	Platytroctidae	*Normichthys operosus*	LC		No
Actinopterygii	Osmeriformes	Platytroctidae	*Platytroctes apus*	LC		No
Actinopterygii	Osmeriformes	Platytroctidae	*Sagamichthys schnakenbecki*	LC		No
Actinopterygii	Osmeriformes	Platytroctidae	*Searsia koefoedi*	LC		No
Actinopterygii	Perciformes	Acanthuridae	*Acanthurus monroviae*	NA		No
Actinopterygii	Perciformes	Ammodytidae	*Ammodytes marinus*	LC		No
Actinopterygii	Perciformes	Ammodytidae	*Ammodytes tobianus*	DD		Yes
Actinopterygii	Perciformes	Ammodytidae	*Gymnammodytes cicerelus*	DD		No
Actinopterygii	Perciformes	Ammodytidae	*Gymnammodytes semisquamatus*	LC		Yes
Actinopterygii	Perciformes	Ammodytidae	*Hyperoplus immaculatus*	DD		No
Actinopterygii	Perciformes	Ammodytidae	*Hyperoplus lanceolatus*	LC		Yes
Actinopterygii	Perciformes	Anarhichadidae	*Anarhichas denticulatus*	EN	A2b	No
Actinopterygii	Perciformes	Anarhichadidae	*Anarhichas lupus*	DD		No
Actinopterygii	Perciformes	Anarhichadidae	*Anarhichas minor*	NT		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Perciformes	Apogonidae	*Apogon imberbis*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Aidablennius sphynx*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Blennius ocellaris*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Coryphoblennius galerita*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Hypleurochilus bananensis*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Lipophrys pholis*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Lipophrys trigloides*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Microlipophrys adriaticus*	LC		Yes
Actinopterygii	Perciformes	Blenniidae	*Microlipophrys canevae*	LC		Yes
Actinopterygii	Perciformes	Blenniidae	*Microlipophrys dalmatinus*	LC		Yes
Actinopterygii	Perciformes	Blenniidae	*Microlipophrys nigriceps*	LC		Yes
Actinopterygii	Perciformes	Blenniidae	*Ophioblennius atlanticus*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Parablennius gattorugine*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Parablennius incognitus*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Parablennius parvicornis*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Parablennius pilicornis*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Parablennius rouxi*	LC		Yes
Actinopterygii	Perciformes	Blenniidae	*Parablennius ruber*	LC		Yes
Actinopterygii	Perciformes	Blenniidae	*Parablennius sanguinolentus*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Parablennius tentacularis*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Parablennius zvonimiri*	LC		Yes
Actinopterygii	Perciformes	Blenniidae	*Salaria basilisca*	LC		Yes
Actinopterygii	Perciformes	Blenniidae	*Salaria pavo*	LC		No
Actinopterygii	Perciformes	Blenniidae	*Scartella cristata*	LC		No
Actinopterygii	Perciformes	Bramidae	*Brama brama*	LC		No
Actinopterygii	Perciformes	Bramidae	*Pterycombus brama*	LC		No
Actinopterygii	Perciformes	Bramidae	*Taractes asper*	NA		No
Actinopterygii	Perciformes	Bramidae	*Taractichthys longipinnis*	LC		No
Actinopterygii	Perciformes	Callanthiidae	*Callanthias ruber*	LC		No
Actinopterygii	Perciformes	Callionymidae	*Callionymus fasciatus*	LC		Yes
Actinopterygii	Perciformes	Callionymidae	*Callionymus lyra*	LC		No
Actinopterygii	Perciformes	Callionymidae	*Callionymus maculatus*	LC		No
Actinopterygii	Perciformes	Callionymidae	*Callionymus pusillus*	LC		Yes
Actinopterygii	Perciformes	Callionymidae	*Callionymus reticulatus*	LC		Yes
Actinopterygii	Perciformes	Callionymidae	*Callionymus risso*	LC		Yes
Actinopterygii	Perciformes	Callionymidae	*Protogrammus sousai*	DD		Yes
Actinopterygii	Perciformes	Callionymidae	*Synchiropus phaeton*	LC		No
Actinopterygii	Perciformes	Caproidae	*Antigonia capros*	LC		No
Actinopterygii	Perciformes	Caproidae	*Capros aper*	LC		No
Actinopterygii	Perciformes	Carangidae	*Alectis alexandrina*	LC		No
Actinopterygii	Perciformes	Carangidae	*Campogramma glaycos*	LC		No
Actinopterygii	Perciformes	Carangidae	*Caranx crysos*	LC		No
Actinopterygii	Perciformes	Carangidae	*Caranx fischeri*	DD		No
Actinopterygii	Perciformes	Carangidae	*Caranx latus*	NA		No
Actinopterygii	Perciformes	Carangidae	*Caranx lugubris*	NA		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Perciformes	Carangidae	*Caranx rhonchus*	DD		No
Actinopterygii	Perciformes	Carangidae	*Decapterus macarellus*	NA		No
Actinopterygii	Perciformes	Carangidae	*Decapterus punctatus*	DD		No
Actinopterygii	Perciformes	Carangidae	*Elagatis bipinnulata*	NA		No
Actinopterygii	Perciformes	Carangidae	*Lichia amia*	LC		No
Actinopterygii	Perciformes	Carangidae	*Naucrates ductor*	LC		No
Actinopterygii	Perciformes	Carangidae	*Pseudocaranx dentex*	LC		No
Actinopterygii	Perciformes	Carangidae	*Selene dorsalis*	NA		No
Actinopterygii	Perciformes	Carangidae	*Seriola carpenteri*	LC		No
Actinopterygii	Perciformes	Carangidae	*Seriola dumerili*	LC		No
Actinopterygii	Perciformes	Carangidae	*Seriola fasciata*	LC		No
Actinopterygii	Perciformes	Carangidae	*Seriola rivoliana*	LC		No
Actinopterygii	Perciformes	Carangidae	*Trachinotus ovatus*	LC		No
Actinopterygii	Perciformes	Carangidae	*Trachurus mediterraneus*	LC		No
Actinopterygii	Perciformes	Carangidae	*Trachurus picturatus*	LC		No
Actinopterygii	Perciformes	Carangidae	*Trachurus trachurus*	LC		No
Actinopterygii	Perciformes	Caristiidae	*Platyberyx opalescens*	DD		No
Actinopterygii	Perciformes	Centracanthidae	*Centracanthus cirrus*	LC		No
Actinopterygii	Perciformes	Centracanthidae	*Spicara maena*	LC		No
Actinopterygii	Perciformes	Centracanthidae	*Spicara smaris*	LC		No
Actinopterygii	Perciformes	Centrolophidae	*Centrolophus niger*	LC		No
Actinopterygii	Perciformes	Centrolophidae	*Hyperoglyphe perciformis*	DD		No
Actinopterygii	Perciformes	Centrolophidae	*Schedophilus maculatus*	NA		No
Actinopterygii	Perciformes	Centrolophidae	*Schedophilus medusophagus*	LC		No
Actinopterygii	Perciformes	Centrolophidae	*Schedophilus ovalis*	LC		No
Actinopterygii	Perciformes	Cepolidae	*Cepola macrophthalma*	LC		No
Actinopterygii	Perciformes	Chiasmodontidae	*Chiasmodon niger*	LC		No
Actinopterygii	Perciformes	Chiasmodontidae	*Kali indica*	NA		No
Actinopterygii	Perciformes	Chiasmodontidae	*Kali kerberti*	NA		No
Actinopterygii	Perciformes	Chiasmodontidae	*Kali macrodon*	NA		No
Actinopterygii	Perciformes	Chiasmodontidae	*Kali macrura*	NA		No
Actinopterygii	Perciformes	Chiasmodontidae	*Pseudoscopelus altipinnis*	NA		No
Actinopterygii	Perciformes	Chiasmodontidae	*Pseudoscopelus obtusifrons*	NA		No
Actinopterygii	Perciformes	Chiasmodontidae	*Pseudoscopelus scutatus*	NA		No
Actinopterygii	Perciformes	Clinidae	*Clinitrachus argentatus*	LC		No
Actinopterygii	Perciformes	Coryphaenidae	*Coryphaena equiselis*	LC		No
Actinopterygii	Perciformes	Coryphaenidae	*Coryphaena hippurus*	LC		No
Actinopterygii	Perciformes	Draconettidae	*Centrodraco acanthopoma*	LC		No
Actinopterygii	Perciformes	Echeneidae	*Phtheirichthys lineatus*	NA		No
Actinopterygii	Perciformes	Echeneidae	*Remora albescens*	NA		No
Actinopterygii	Perciformes	Echeneidae	*Remora australis*	NA		No
Actinopterygii	Perciformes	Echeneidae	*Remora brachyptera*	NA		No
Actinopterygii	Perciformes	Echeneidae	*Remora osteochir*	LC		No
Actinopterygii	Perciformes	Echeneidae	*Remora remora*	LC		No
Actinopterygii	Perciformes	Epigonidae	*Epigonus constanciae*	LC		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Perciformes	Epigonidae	*Epigonus denticulatus*	LC		No
Actinopterygii	Perciformes	Epigonidae	*Epigonus telescopus*	DD		No
Actinopterygii	Perciformes	Epigonidae	*Microichthys coccoi*	LC		Yes
Actinopterygii	Perciformes	Epigonidae	*Microichthys sanzoi*	DD		Yes
Actinopterygii	Perciformes	Epinephelidae	*Epinephelus aeneus*	DD		No
Actinopterygii	Perciformes	Epinephelidae	*Epinephelus caninus*	LC		No
Actinopterygii	Perciformes	Epinephelidae	*Epinephelus costae*	DD		No
Actinopterygii	Perciformes	Epinephelidae	*Epinephelus marginatus*	EN	A2d	No
Actinopterygii	Perciformes	Epinephelidae	*Hyporthodus haifensis*	DD		No
Actinopterygii	Perciformes	Epinephelidae	*Mycteroperca fusca*	VU	B2ab(v)	No
Actinopterygii	Perciformes	Epinephelidae	*Mycteroperca rubra*	LC		No
Actinopterygii	Perciformes	Gempylidae	*Diplospinus multistriatus*	NA		No
Actinopterygii	Perciformes	Gempylidae	*Gempylus serpens*	NA		No
Actinopterygii	Perciformes	Gempylidae	*Lepidocybium flavobrunneum*	DD		No
Actinopterygii	Perciformes	Gempylidae	*Nealotus tripes*	NA		No
Actinopterygii	Perciformes	Gempylidae	*Nesiarchus nasutus*	LC		No
Actinopterygii	Perciformes	Gempylidae	*Promethichthys prometheus*	LC		No
Actinopterygii	Perciformes	Gempylidae	*Ruvettus pretiosus*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Aphia minuta*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Buenia affinis*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Buenia jeffreysii*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Chromogobius britoi*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Chromogobius quadrivittatus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Chromogobius zebratus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Corcyrogobius liechtensteini*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Crystallogobius linearis*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Deltentosteus collonianus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Deltentosteus quadrimaculatus*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Didogobius bentuvii*	DD		Yes
Actinopterygii	Perciformes	Gobiidae	*Didogobius kochi*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Didogobius schlieweni*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Didogobius splechtnai*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Gammogobius steinitzi*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Gnatholepis thompsoni*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Gobius ater*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Gobius auratus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Gobius bucchichi*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Gobius cobitis*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Gobius couchi*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Gobius cruentatus*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Gobius fallax*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Gobius gasteveni*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Gobius geniporus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Gobius kolombatovici*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Gobius niger*	LC		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Perciformes	Gobiidae	*Gobius paganellus*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Gobius roulei*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Gobius vittatus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Gobius xanthocephalus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Gobiusculus flavescens*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Lebetus guilleti*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Lebetus scorpioides*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Lesueurigobius friesii*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Lesueurigobius heterofasciatus*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Lesueurigobius sanzi*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Lesueurigobius suerii*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Mauligobius maderensis*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Millerigobius macrocephalus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Odondebuenia balearica*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Pomatoschistus bathi*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Pomatoschistus knerii*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Pomatoschistus lozanoi*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Pomatoschistus marmoratus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Pomatoschistus minutus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Pomatoschistus norvegicus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Pomatoschistus pictus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Pomatoschistus quagga*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Pomatoschistus tortonesei*	EN	B2ab(ii,iii)	Yes
Actinopterygii	Perciformes	Gobiidae	*Ponticola cephalargoides*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Ponticola platyrostris*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Ponticola ratan*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Proterorhinus marmoratus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Pseudaphya ferreri*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Speleogobius trigloides*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Thorogobius ephippiatus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Thorogobius macrolepis*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Vanneaugobius canariensis*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Vanneaugobius dollfusi*	LC		No
Actinopterygii	Perciformes	Gobiidae	*Vanneaugobius pruvoti*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Zebrus zebrus*	LC		Yes
Actinopterygii	Perciformes	Gobiidae	*Zosterisessor ophiocephalus*	LC		Yes
Actinopterygii	Perciformes	Haemulidae	*Parapristipoma humile*	LC		No
Actinopterygii	Perciformes	Haemulidae	*Parapristipoma octolineatum*	LC		No
Actinopterygii	Perciformes	Haemulidae	*Plectorhinchus mediterraneus*	LC		No
Actinopterygii	Perciformes	Haemulidae	*Pomadasys incisus*	LC		No
Actinopterygii	Perciformes	Howellidae	*Bathysphyraenops simplex*	NA		No
Actinopterygii	Perciformes	Howellidae	*Howella atlantica*	LC		No
Actinopterygii	Perciformes	Istiophoridae	*Tetrapturus belone*	LC		Yes
Actinopterygii	Perciformes	Istiophoridae	*Tetrapturus georgii*	DD		No
Actinopterygii	Perciformes	Kyphosidae	*Kyphosus bigibbus*	DD		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Perciformes	Kyphosidae	*Kyphosus sectatrix*	DD		No
Actinopterygii	Perciformes	Kyphosidae	*Kyphosus vaigiensis*	DD		No
Actinopterygii	Perciformes	Labridae	*Acantholabrus palloni*	LC		No
Actinopterygii	Perciformes	Labridae	*Bodianus scrofa*	VU	B2ab(iv,v)	No
Actinopterygii	Perciformes	Labridae	*Centrolabrus exoletus*	LC		Yes
Actinopterygii	Perciformes	Labridae	*Coris julis*	LC		No
Actinopterygii	Perciformes	Labridae	*Ctenolabrus rupestris*	LC		No
Actinopterygii	Perciformes	Labridae	*Labrus bergylta*	LC		No
Actinopterygii	Perciformes	Labridae	*Labrus merula*	LC		No
Actinopterygii	Perciformes	Labridae	*Labrus mixtus*	LC		No
Actinopterygii	Perciformes	Labridae	*Labrus viridis*	VU	A4ad	No
Actinopterygii	Perciformes	Labridae	*Lappanella fasciata*	LC		Yes
Actinopterygii	Perciformes	Labridae	*Sparisoma cretense*	LC		No
Actinopterygii	Perciformes	Labridae	*Symphodus bailloni*	LC		No
Actinopterygii	Perciformes	Labridae	*Symphodus caeruleus*	LC		Yes
Actinopterygii	Perciformes	Labridae	*Symphodus cinereus*	LC		Yes
Actinopterygii	Perciformes	Labridae	*Symphodus doderleini*	LC		Yes
Actinopterygii	Perciformes	Labridae	*Symphodus mediterraneus*	LC		No
Actinopterygii	Perciformes	Labridae	*Symphodus melanocercus*	LC		Yes
Actinopterygii	Perciformes	Labridae	*Symphodus melops*	LC		No
Actinopterygii	Perciformes	Labridae	*Symphodus ocellatus*	LC		Yes
Actinopterygii	Perciformes	Labridae	*Symphodus roissali*	LC		No
Actinopterygii	Perciformes	Labridae	*Symphodus rostratus*	LC		Yes
Actinopterygii	Perciformes	Labridae	*Symphodus tinca*	LC		No
Actinopterygii	Perciformes	Labridae	*Symphodus trutta*	LC		Yes
Actinopterygii	Perciformes	Labridae	*Thalassoma pavo*	LC		No
Actinopterygii	Perciformes	Labridae	*Xyrichtys novacula*	LC		No
Actinopterygii	Perciformes	Lobotidae	*Lobotes surinamensis*	LC		No
Actinopterygii	Perciformes	Luvaridae	*Luvarus imperialis*	LC		No
Actinopterygii	Perciformes	Moronidae	*Dicentrarchus punctatus*	LC		No
Actinopterygii	Perciformes	Mullidae	*Mullus barbatus*	LC		No
Actinopterygii	Perciformes	Mullidae	*Mullus surmuletus*	DD		No
Actinopterygii	Perciformes	Nomeidae	*Cubiceps capensis*	LC		No
Actinopterygii	Perciformes	Nomeidae	*Cubiceps gracilis*	LC		No
Actinopterygii	Perciformes	Nomeidae	*Nomeus gronovii*	NA		No
Actinopterygii	Perciformes	Nomeidae	*Psenes maculatus*	NA		No
Actinopterygii	Perciformes	Pholidae	*Pholis gunnellus*	LC		No
Actinopterygii	Perciformes	Polyprionidae	*Polyprion americanus*	NT		No
Actinopterygii	Perciformes	Pomacentridae	*Abudefduf luridus*	LC		No
Actinopterygii	Perciformes	Pomacentridae	*Chromis chromis*	LC		No
Actinopterygii	Perciformes	Pomacentridae	*Chromis limbata*	LC		No
Actinopterygii	Perciformes	Pomatomidae	*Pomatomus saltatrix*	NT		No
Actinopterygii	Perciformes	Priacanthidae	*Cookeolus japonicus*	NA		No
Actinopterygii	Perciformes	Priacanthidae	*Heteropriacanthus cruentatus*	NA		No
Actinopterygii	Perciformes	Priacanthidae	*Priacanthus arenatus*	LC		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Perciformes	Sciaenidae	*Argyrosomus regius*	LC		No
Actinopterygii	Perciformes	Sciaenidae	*Sciaena umbra*	NT		No
Actinopterygii	Perciformes	Sciaenidae	*Umbrina canariensis*	LC		No
Actinopterygii	Perciformes	Sciaenidae	*Umbrina cirrosa*	VU	A2bc	No
Actinopterygii	Perciformes	Sciaenidae	*Umbrina ronchus*	LC		No
Actinopterygii	Perciformes	Scombridae	*Acanthocybium solandri*	LC		No
Actinopterygii	Perciformes	Scombridae	*Auxis rochei*	LC		No
Actinopterygii	Perciformes	Scombridae	*Euthynnus alletteratus*	LC		No
Actinopterygii	Perciformes	Scombridae	*Katsuwonus pelamis*	LC		No
Actinopterygii	Perciformes	Scombridae	*Orcynopsis unicolor*	VU	A2bde	No
Actinopterygii	Perciformes	Scombridae	*Sarda sarda*	LC		No
Actinopterygii	Perciformes	Scombridae	*Scomber colias*	LC		No
Actinopterygii	Perciformes	Scombridae	*Scomber scombrus*	LC		No
Actinopterygii	Perciformes	Scombridae	*Scomberomorus tritor*	LC		No
Actinopterygii	Perciformes	Scombridae	*Thunnus alalunga*	LC		No
Actinopterygii	Perciformes	Scombridae	*Thunnus thynnus*	NT		No
Actinopterygii	Perciformes	Scombrolabracidae	*Scombrolabrax heterolepis*	NA		No
Actinopterygii	Perciformes	Serranidae	*Anthias anthias*	LC		No
Actinopterygii	Perciformes	Serranidae	*Serranus atricauda*	DD		No
Actinopterygii	Perciformes	Serranidae	*Serranus cabrilla*	LC		No
Actinopterygii	Perciformes	Serranidae	*Serranus hepatus*	LC		No
Actinopterygii	Perciformes	Serranidae	*Serranus scriba*	LC		No
Actinopterygii	Perciformes	Sparidae	*Boops boops*	LC		No
Actinopterygii	Perciformes	Sparidae	*Dentex dentex*	VU	A2bd	No
Actinopterygii	Perciformes	Sparidae	*Dentex gibbosus*	LC		No
Actinopterygii	Perciformes	Sparidae	*Dentex macrophthalmus*	LC		No
Actinopterygii	Perciformes	Sparidae	*Dentex maroccanus*	LC		No
Actinopterygii	Perciformes	Sparidae	*Diplodus annularis*	LC		No
Actinopterygii	Perciformes	Sparidae	*Diplodus bellottii*	LC		No
Actinopterygii	Perciformes	Sparidae	*Diplodus cervinus*	LC		No
Actinopterygii	Perciformes	Sparidae	*Diplodus puntazzo*	LC		No
Actinopterygii	Perciformes	Sparidae	*Diplodus sargus*	LC		No
Actinopterygii	Perciformes	Sparidae	*Diplodus vulgaris*	LC		No
Actinopterygii	Perciformes	Sparidae	*Lithognathus mormyrus*	LC		No
Actinopterygii	Perciformes	Sparidae	*Oblada melanura*	LC		No
Actinopterygii	Perciformes	Sparidae	*Pagellus acarne*	LC		No
Actinopterygii	Perciformes	Sparidae	*Pagellus bellottii*	LC		No
Actinopterygii	Perciformes	Sparidae	*Pagellus bogaraveo*	NT		No
Actinopterygii	Perciformes	Sparidae	*Pagellus erythrinus*	LC		No
Actinopterygii	Perciformes	Sparidae	*Pagrus auriga*	LC		No
Actinopterygii	Perciformes	Sparidae	*Pagrus caeruleostictus*	LC		No
Actinopterygii	Perciformes	Sparidae	*Pagrus pagrus*	LC		No
Actinopterygii	Perciformes	Sparidae	*Sarpa salpa*	LC		No
Actinopterygii	Perciformes	Sparidae	*Sparus aurata*	LC		No
Actinopterygii	Perciformes	Sparidae	*Spondyliosoma cantharus*	LC		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Perciformes	Sphyraenidae	*Sphyraena barracuda*	NA		No
Actinopterygii	Perciformes	Sphyraenidae	*Sphyraena intermedia*	DD		Yes
Actinopterygii	Perciformes	Sphyraenidae	*Sphyraena sphyraena*	DD		No
Actinopterygii	Perciformes	Sphyraenidae	*Sphyraena viridensis*	DD		No
Actinopterygii	Perciformes	Stichaeidae	*Anisarchus medius*	LC		No
Actinopterygii	Perciformes	Stichaeidae	*Chirolophis ascanii*	LC		No
Actinopterygii	Perciformes	Stichaeidae	*Leptoclinus maculatus*	LC		No
Actinopterygii	Perciformes	Stichaeidae	*Lumpenus lampretaeformis*	LC		No
Actinopterygii	Perciformes	Stromateidae	*Stromateus fiatola*	LC		No
Actinopterygii	Perciformes	Tetragonuridae	*Tetragonurus atlanticus*	NA		No
Actinopterygii	Perciformes	Tetragonuridae	*Tetragonurus cuvieri*	LC		No
Actinopterygii	Perciformes	Trachinidae	*Echiichthys vipera*	LC		No
Actinopterygii	Perciformes	Trachinidae	*Trachinus araneus*	LC		No
Actinopterygii	Perciformes	Trachinidae	*Trachinus draco*	LC		No
Actinopterygii	Perciformes	Trachinidae	*Trachinus pellegrini*	DD		No
Actinopterygii	Perciformes	Trachinidae	*Trachinus radiatus*	LC		No
Actinopterygii	Perciformes	Trichiuridae	*Aphanopus carbo*	LC		No
Actinopterygii	Perciformes	Trichiuridae	*Aphanopus intermedius*	LC		No
Actinopterygii	Perciformes	Trichiuridae	*Benthodesmus simonyi*	LC		No
Actinopterygii	Perciformes	Trichiuridae	*Lepidopus caudatus*	LC		No
Actinopterygii	Perciformes	Trichiuridae	*Trichiurus lepturus*	DD		No
Actinopterygii	Perciformes	Tripterygiidae	*Tripterygion delaisi*	LC		No
Actinopterygii	Perciformes	Tripterygiidae	*Tripterygion melanurum*	LC		Yes
Actinopterygii	Perciformes	Tripterygiidae	*Tripterygion tartessicum*	LC		No
Actinopterygii	Perciformes	Tripterygiidae	*Tripterygion tripteronotum*	LC		Yes
Actinopterygii	Perciformes	Uranoscopidae	*Uranoscopus scaber*	LC		No
Actinopterygii	Perciformes	Xiphiidae	*Xiphias gladius*	LC		No
Actinopterygii	Perciformes	Zoarcidae	*Lycenchelys alba*	DD		No
Actinopterygii	Perciformes	Zoarcidae	*Lycenchelys muraena*	DD		No
Actinopterygii	Perciformes	Zoarcidae	*Lycenchelys platyrhina*	DD		Yes
Actinopterygii	Perciformes	Zoarcidae	*Lycenchelys sarsii*	LC		No
Actinopterygii	Perciformes	Zoarcidae	*Lycodes esmarkii*	LC		No
Actinopterygii	Perciformes	Zoarcidae	*Lycodes eudipleurostictus*	LC		No
Actinopterygii	Perciformes	Zoarcidae	*Lycodes frigidus*	DD		No
Actinopterygii	Perciformes	Zoarcidae	*Lycodes gracilis*	LC		No
Actinopterygii	Perciformes	Zoarcidae	*Lycodes paamiuti*	LC		No
Actinopterygii	Perciformes	Zoarcidae	*Lycodes pallidus*	LC		No
Actinopterygii	Perciformes	Zoarcidae	*Lycodes reticulatus*	LC		No
Actinopterygii	Perciformes	Zoarcidae	*Lycodes rossi*	LC		No
Actinopterygii	Perciformes	Zoarcidae	*Lycodes seminudus*	LC		No
Actinopterygii	Perciformes	Zoarcidae	*Lycodes squamiventer*	LC		No
Actinopterygii	Perciformes	Zoarcidae	*Lycodes terraenovae*	DD		No
Actinopterygii	Perciformes	Zoarcidae	*Lycodonus flagellicauda*	LC		No
Actinopterygii	Perciformes	Zoarcidae	*Melanostigma atlanticum*	LC		No
Actinopterygii	Perciformes	Zoarcidae	*Pachycara bulbiceps*	DD		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Perciformes	Zoarcidae	*Pachycara crassiceps*	DD		No
Actinopterygii	Perciformes	Zoarcidae	*Zoarces viviparus*	LC		No
Actinopterygii	Pleuronectiformes	Bothidae	*Arnoglossus grohmanni*	DD		Yes
Actinopterygii	Pleuronectiformes	Bothidae	*Arnoglossus imperialis*	LC		No
Actinopterygii	Pleuronectiformes	Bothidae	*Arnoglossus kessleri*	DD		Yes
Actinopterygii	Pleuronectiformes	Bothidae	*Arnoglossus laterna*	LC		No
Actinopterygii	Pleuronectiformes	Bothidae	*Arnoglossus rueppelii*	DD		No
Actinopterygii	Pleuronectiformes	Bothidae	*Arnoglossus thori*	LC		No
Actinopterygii	Pleuronectiformes	Bothidae	*Bothus podas*	LC		No
Actinopterygii	Pleuronectiformes	Citharidae	*Citharus linguatula*	LC		No
Actinopterygii	Pleuronectiformes	Cynoglossidae	*Symphurus insularis*	LC		No
Actinopterygii	Pleuronectiformes	Cynoglossidae	*Symphurus ligulatus*	LC		No
Actinopterygii	Pleuronectiformes	Cynoglossidae	*Symphurus nigrescens*	LC		No
Actinopterygii	Pleuronectiformes	Pleuronectidae	*Glyptocephalus cynoglossus*	LC		No
Actinopterygii	Pleuronectiformes	Pleuronectidae	*Hippoglossoides platessoides*	LC		No
Actinopterygii	Pleuronectiformes	Pleuronectidae	*Hippoglossus hippoglossus*	VU	A2ce	No
Actinopterygii	Pleuronectiformes	Pleuronectidae	*Limanda limanda*	LC		Yes
Actinopterygii	Pleuronectiformes	Pleuronectidae	*Liopsetta glacialis*	LC		No
Actinopterygii	Pleuronectiformes	Pleuronectidae	*Microstomus kitt*	LC		No
Actinopterygii	Pleuronectiformes	Pleuronectidae	*Reinhardtius hippoglossoides*	NT		No
Actinopterygii	Pleuronectiformes	Scophthalmidae	*Lepidorhombus boscii*	LC		No
Actinopterygii	Pleuronectiformes	Scophthalmidae	*Lepidorhombus whiffiagonis*	LC		No
Actinopterygii	Pleuronectiformes	Scophthalmidae	*Phrynorhombus norvegicus*	LC		Yes
Actinopterygii	Pleuronectiformes	Scophthalmidae	*Scophthalmus maximus*	VU	A2bd	No
Actinopterygii	Pleuronectiformes	Scophthalmidae	*Scophthalmus rhombus*	LC		No
Actinopterygii	Pleuronectiformes	Scophthalmidae	*Zeugopterus punctatus*	LC		No
Actinopterygii	Pleuronectiformes	Scophthalmidae	*Zeugopterus regius*	LC		No
Actinopterygii	Pleuronectiformes	Soleidae	*Bathysolea profundicola*	LC		No
Actinopterygii	Pleuronectiformes	Soleidae	*Buglossidium luteum*	LC		No
Actinopterygii	Pleuronectiformes	Soleidae	*Dagetichthys lusitanica*	DD		No
Actinopterygii	Pleuronectiformes	Soleidae	*Dicologlossa cuneata*	LC		No
Actinopterygii	Pleuronectiformes	Soleidae	*Microchirus azevia*	LC		No
Actinopterygii	Pleuronectiformes	Soleidae	*Microchirus boscanion*	LC		No
Actinopterygii	Pleuronectiformes	Soleidae	*Microchirus ocellatus*	DD		No
Actinopterygii	Pleuronectiformes	Soleidae	*Microchirus variegatus*	LC		No
Actinopterygii	Pleuronectiformes	Soleidae	*Microchirus wittei*	NA		No
Actinopterygii	Pleuronectiformes	Soleidae	*Monochirus atlanticus*	LC		No
Actinopterygii	Pleuronectiformes	Soleidae	*Monochirus hispidus*	LC		Yes
Actinopterygii	Pleuronectiformes	Soleidae	*Pegusa impar*	DD		No
Actinopterygii	Pleuronectiformes	Soleidae	*Pegusa lascaris*	LC		No
Actinopterygii	Pleuronectiformes	Soleidae	*Solea aegyptiaca*	LC		Yes
Actinopterygii	Pleuronectiformes	Soleidae	*Solea senegalensis*	DD		No
Actinopterygii	Pleuronectiformes	Soleidae	*Solea solea*	DD		No
Actinopterygii	Pleuronectiformes	Soleidae	*Synapturichthys kleinii*	LC		No
Actinopterygii	Polymixiiformes	Polymixiidae	*Polymixia nobilis*	LC		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Saccopharyngiformes	Cyematidae	*Cyema atrum*	LC		No
Actinopterygii	Saccopharyngiformes	Eurypharyngidae	*Eurypharynx pelecanoides*	LC		No
Actinopterygii	Saccopharyngiformes	Monognathidae	*Monognathus boehlkei*	DD		No
Actinopterygii	Saccopharyngiformes	Monognathidae	*Monognathus herringi*	DD		Yes
Actinopterygii	Saccopharyngiformes	Monognathidae	*Monognathus nigeli*	NA		No
Actinopterygii	Saccopharyngiformes	Saccopharyngidae	*Saccopharynx ampullaceus*	DD		No
Actinopterygii	Salmoniformes	Salmonidae	*Salmo salar*	VU	A2ace	No
Actinopterygii	Scorpaeniformes	Agonidae	*Agonus cataphractus*	LC		Yes
Actinopterygii	Scorpaeniformes	Agonidae	*Leptagonus decagonus*	LC		No
Actinopterygii	Scorpaeniformes	Cottidae	*Artediellus atlanticus*	LC		No
Actinopterygii	Scorpaeniformes	Cottidae	*Gymnocanthus tricuspis*	LC		No
Actinopterygii	Scorpaeniformes	Cottidae	*Icelus bicornis*	LC		No
Actinopterygii	Scorpaeniformes	Cottidae	*Micrenophrys lilljeborgii*	LC		Yes
Actinopterygii	Scorpaeniformes	Cottidae	*Myoxocephalus scorpius*	LC		No
Actinopterygii	Scorpaeniformes	Cottidae	*Taurulus bubalis*	LC		Yes
Actinopterygii	Scorpaeniformes	Cottidae	*Triglops murrayi*	LC		No
Actinopterygii	Scorpaeniformes	Cottidae	*Triglops pingelii*	LC		No
Actinopterygii	Scorpaeniformes	Cyclopteridae	*Cyclopteropsis mcalpini*	DD		No
Actinopterygii	Scorpaeniformes	Cyclopteridae	*Cyclopterus lumpus*	NT		No
Actinopterygii	Scorpaeniformes	Cyclopteridae	*Eumicrotremus spinosus*	DD		No
Actinopterygii	Scorpaeniformes	Dactylopteridae	*Dactylopterus volitans*	LC		No
Actinopterygii	Scorpaeniformes	Liparidae	*Careproctus aciculipunctatus*	DD		Yes
Actinopterygii	Scorpaeniformes	Liparidae	*Careproctus merretti*	DD		Yes
Actinopterygii	Scorpaeniformes	Liparidae	*Careproctus reinhardti*	LC		No
Actinopterygii	Scorpaeniformes	Liparidae	*Eutelichthys leptochirus*	DD		Yes
Actinopterygii	Scorpaeniformes	Liparidae	*Liparis liparis*	LC		Yes
Actinopterygii	Scorpaeniformes	Liparidae	*Liparis montagui*	LC		Yes
Actinopterygii	Scorpaeniformes	Liparidae	*Paraliparis abyssorum*	DD		Yes
Actinopterygii	Scorpaeniformes	Liparidae	*Paraliparis bathybius*	LC		No
Actinopterygii	Scorpaeniformes	Liparidae	*Paraliparis bipolaris*	DD		Yes
Actinopterygii	Scorpaeniformes	Liparidae	*Paraliparis copei*	NA		No
Actinopterygii	Scorpaeniformes	Liparidae	*Paraliparis hystrix*	DD		Yes
Actinopterygii	Scorpaeniformes	Liparidae	*Paraliparis murieli*	DD		Yes
Actinopterygii	Scorpaeniformes	Liparidae	*Paraliparis nigellus*	DD		Yes
Actinopterygii	Scorpaeniformes	Liparidae	*Psednos spirohira*	DD		Yes
Actinopterygii	Scorpaeniformes	Liparidae	*Rhodichthys regina*	DD		No
Actinopterygii	Scorpaeniformes	Peristediidae	*Peristedion cataphractum*	DD		No
Actinopterygii	Scorpaeniformes	Psychrolutidae	*Cottunculus konstantinovi*	DD		Yes
Actinopterygii	Scorpaeniformes	Psychrolutidae	*Cottunculus microps*	DD		No
Actinopterygii	Scorpaeniformes	Psychrolutidae	*Cottunculus thomsonii*	LC		No
Actinopterygii	Scorpaeniformes	Scorpaenidae	*Pontinus kuhlii*	LC		No
Actinopterygii	Scorpaeniformes	Scorpaenidae	*Scorpaena azorica*	DD		Yes
Actinopterygii	Scorpaeniformes	Scorpaenidae	*Scorpaena canariensis*	DD		Yes
Actinopterygii	Scorpaeniformes	Scorpaenidae	*Scorpaena elongata*	LC		No
Actinopterygii	Scorpaeniformes	Scorpaenidae	*Scorpaena laevis*	DD		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Scorpaeniformes	Scorpaenidae	*Scorpaena loppei*	LC		No
Actinopterygii	Scorpaeniformes	Scorpaenidae	*Scorpaena maderensis*	LC		No
Actinopterygii	Scorpaeniformes	Scorpaenidae	*Scorpaena notata*	LC		No
Actinopterygii	Scorpaeniformes	Scorpaenidae	*Scorpaena porcus*	LC		No
Actinopterygii	Scorpaeniformes	Scorpaenidae	*Scorpaena scrofa*	LC		No
Actinopterygii	Scorpaeniformes	Scorpaenidae	*Scorpaenodes arenai*	DD		Yes
Actinopterygii	Scorpaeniformes	Sebastidae	*Helicolenus dactylopterus*	LC		No
Actinopterygii	Scorpaeniformes	Sebastidae	*Sebastes mentella*	EN	A2bd	No
Actinopterygii	Scorpaeniformes	Sebastidae	*Sebastes norvegicus*	VU	A2bd	No
Actinopterygii	Scorpaeniformes	Sebastidae	*Sebastes viviparus*	LC		No
Actinopterygii	Scorpaeniformes	Sebastidae	*Trachyscorpia cristulata*	LC		No
Actinopterygii	Scorpaeniformes	Setarchidae	*Setarches guentheri*	NA		No
Actinopterygii	Scorpaeniformes	Triglidae	*Chelidonichthys cuculus*	LC		No
Actinopterygii	Scorpaeniformes	Triglidae	*Chelidonichthys lucerna*	LC		No
Actinopterygii	Scorpaeniformes	Triglidae	*Chelidonichthys obscurus*	LC		No
Actinopterygii	Scorpaeniformes	Triglidae	*Eutrigla gurnardus*	LC		No
Actinopterygii	Scorpaeniformes	Triglidae	*Lepidotrigla cavillone*	LC		No
Actinopterygii	Scorpaeniformes	Triglidae	*Lepidotrigla dieuzeidei*	LC		No
Actinopterygii	Scorpaeniformes	Triglidae	*Trigla lyra*	DD		No
Actinopterygii	Scorpaeniformes	Triglidae	*Trigloporus lastoviza*	DD		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Melamphaes falsidicus*	NA		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Melamphaes longivelis*	NA		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Melamphaes polylepis*	NA		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Melamphaes pumilus*	NA		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Melamphaes simus*	NA		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Melamphaes suborbitalis*	NA		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Melamphaes typhlops*	NA		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Poromitra capito*	NA		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Poromitra crassiceps*	LC		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Poromitra megalops*	NA		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Poromitra nigriceps*	LC		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Scopeloberyx opisthopterus*	NA		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Scopeloberyx robustus*	NA		No
Actinopterygii	Stephanoberyciformes	Melamphaidae	*Scopelogadus beanii*	LC		No
Actinopterygii	Stephanoberyciformes	Stephanoberycidae	*Acanthochaenus luetkenii*	NA		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Bonapartia pedaliota*	LC		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Cyclothone acclinidens*	LC		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Cyclothone alba*	LC		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Cyclothone braueri*	LC		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Cyclothone livida*	LC		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Cyclothone microdon*	LC		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Cyclothone obscura*	NA		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Cyclothone pallida*	LC		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Cyclothone parapallida*	NA		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Cyclothone pseudopallida*	LC		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Stomiiformes	Gonostomatidae	*Cyclothone pygmaea*	LC		Yes
Actinopterygii	Stomiiformes	Gonostomatidae	*Diplophos taenia*	LC		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Gonostoma atlanticum*	NA		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Gonostoma denudatum*	LC		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Gonostoma elongatum*	LC		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Manducus maderensis*	NA		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Margrethia obtusirostra*	LC		No
Actinopterygii	Stomiiformes	Gonostomatidae	*Sigmops bathyphilus*	LC		No
Actinopterygii	Stomiiformes	Phosichthyidae	*Ichthyococcus ovatus*	LC		No
Actinopterygii	Stomiiformes	Phosichthyidae	*Polymetme corythaeola*	LC		No
Actinopterygii	Stomiiformes	Phosichthyidae	*Polymetme thaeocoryla*	LC		No
Actinopterygii	Stomiiformes	Phosichthyidae	*Vinciguerria attenuata*	LC		No
Actinopterygii	Stomiiformes	Phosichthyidae	*Vinciguerria nimbaria*	LC		No
Actinopterygii	Stomiiformes	Phosichthyidae	*Vinciguerria poweriae*	LC		No
Actinopterygii	Stomiiformes	Sternoptychidae	*Argyripnus atlanticus*	NA		No
Actinopterygii	Stomiiformes	Sternoptychidae	*Argyropelecus aculeatus*	LC		No
Actinopterygii	Stomiiformes	Sternoptychidae	*Argyropelecus affinis*	NA		No
Actinopterygii	Stomiiformes	Sternoptychidae	*Argyropelecus gigas*	LC		No
Actinopterygii	Stomiiformes	Sternoptychidae	*Argyropelecus hemigymnus*	LC		No
Actinopterygii	Stomiiformes	Sternoptychidae	*Argyropelecus olfersii*	LC		No
Actinopterygii	Stomiiformes	Sternoptychidae	*Argyropelecus sladeni*	NA		No
Actinopterygii	Stomiiformes	Sternoptychidae	*Maurolicus amethystinopunctatus*	LC		No
Actinopterygii	Stomiiformes	Sternoptychidae	*Maurolicus muelleri*	LC		No
Actinopterygii	Stomiiformes	Sternoptychidae	*Sternoptyx diaphana*	LC		No
Actinopterygii	Stomiiformes	Sternoptychidae	*Sternoptyx pseudobscura*	LC		No
Actinopterygii	Stomiiformes	Sternoptychidae	*Valenciennellus tripunctulatus*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Aristostomias grimaldii*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Aristostomias lunifer*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Aristostomias tittmanni*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Aristostomias xenostoma*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Astronesthes atlanticus*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Astronesthes gemmifer*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Astronesthes indicus*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Astronesthes leucopogon*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Astronesthes macropogon*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Astronesthes micropogon*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Astronesthes neopogon*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Astronesthes niger*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Astronesthes zharovi*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Bathophilus brevis*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Bathophilus digitatus*	DD		No
Actinopterygii	Stomiiformes	Stomiidae	*Bathophilus longipinnis*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Bathophilus nigerrimus*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Bathophilus pawneei*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Bathophilus proximus*	DD		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Stomiiformes	Stomiidae	*Bathophilus vaillanti*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Borostomias abyssorum*	DD		Yes
Actinopterygii	Stomiiformes	Stomiidae	*Borostomias antarcticus*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Borostomias elucens*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Borostomias mononema*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Chauliodus danae*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Chauliodus sloani*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Chirostomias pliopterus*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Echiostoma barbatum*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias braueri*	DD		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias contiguus*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias dubius*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias enbarbatus*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias filifer*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias fissibarbis*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias lipochirus*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias longibarba*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias macronema*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias macrurus*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias monodactylus*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias obscurus*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias parri*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias radicifilis*	DD		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias satterleei*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias schmidti*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias simplex*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Eustomias tetranema*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Flagellostomias boureei*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Grammatostomias circularis*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Grammatostomias dentatus*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Grammatostomias flagellibarba*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Idiacanthus fasciola*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Leptostomias gladiator*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Leptostomias haplocaulus*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Leptostomias longibarba*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Malacosteus niger*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Melanostomias bartonbeani*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Melanostomias biseriatus*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Melanostomias macrophotus*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Melanostomias tentaculatus*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Melanostomias valdiviae*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Neonesthes capensis*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Pachystomias microdon*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Photonectes braueri*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Photonectes dinema*	NA		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Stomiiformes	Stomiidae	*Photonectes margarita*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Photonectes mirabilis*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Photonectes parvimanus*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Photostomias goodyeari*	NA		No
Actinopterygii	Stomiiformes	Stomiidae	*Photostomias guernei*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Rhadinesthes decimus*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Stomias boa*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Stomias brevibarbatus*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Stomias longibarbatus*	LC		No
Actinopterygii	Stomiiformes	Stomiidae	*Trigonolampa miriceps*	LC		No
Actinopterygii	Syngnathiformes	Aulostomidae	*Aulostomus strigosus*	LC		No
Actinopterygii	Syngnathiformes	Centriscidae	*Macroramphosus scolopax*	LC		No
Actinopterygii	Syngnathiformes	Fistulariidae	*Fistularia petimba*	NA		No
Actinopterygii	Syngnathiformes	Syngnathidae	*Entelurus aequoreus*	LC		Yes
Actinopterygii	Syngnathiformes	Syngnathidae	*Hippocampus erectus*	NA		No
Actinopterygii	Syngnathiformes	Syngnathidae	*Hippocampus guttulatus*	DD		No
Actinopterygii	Syngnathiformes	Syngnathidae	*Hippocampus hippocampus*	DD		No
Actinopterygii	Syngnathiformes	Syngnathidae	*Minyichthys sentus*	DD		Yes
Actinopterygii	Syngnathiformes	Syngnathidae	*Nerophis lumbriciformis*	LC		Yes
Actinopterygii	Syngnathiformes	Syngnathidae	*Nerophis maculatus*	DD		Yes
Actinopterygii	Syngnathiformes	Syngnathidae	*Nerophis ophidion*	LC		Yes
Actinopterygii	Syngnathiformes	Syngnathidae	*Syngnathus acus*	LC		No
Actinopterygii	Syngnathiformes	Syngnathidae	*Syngnathus phlegon*	DD		Yes
Actinopterygii	Syngnathiformes	Syngnathidae	*Syngnathus rostellatus*	LC		Yes
Actinopterygii	Syngnathiformes	Syngnathidae	*Syngnathus schmidti*	DD		Yes
Actinopterygii	Syngnathiformes	Syngnathidae	*Syngnathus taenionotus*	DD		Yes
Actinopterygii	Syngnathiformes	Syngnathidae	*Syngnathus tenuirostris*	DD		Yes
Actinopterygii	Syngnathiformes	Syngnathidae	*Syngnathus typhle*	LC		Yes
Actinopterygii	Syngnathiformes	Syngnathidae	*Syngnathus variegatus*	DD		Yes
Actinopterygii	Tetraodontiformes	Balistidae	*Balistes capriscus*	DD		No
Actinopterygii	Tetraodontiformes	Balistidae	*Balistes vetula*	DD		No
Actinopterygii	Tetraodontiformes	Balistidae	*Canthidermis maculata*	LC		No
Actinopterygii	Tetraodontiformes	Balistidae	*Canthidermis sufflamen*	NA		No
Actinopterygii	Tetraodontiformes	Diodontidae	*Chilomycterus reticulatus*	LC		No
Actinopterygii	Tetraodontiformes	Diodontidae	*Chilomycterus spinosus*	NA		No
Actinopterygii	Tetraodontiformes	Diodontidae	*Diodon eydouxii*	NA		No
Actinopterygii	Tetraodontiformes	Diodontidae	*Diodon hystrix*	DD		No
Actinopterygii	Tetraodontiformes	Molidae	*Masturus lanceolatus*	NA		No
Actinopterygii	Tetraodontiformes	Molidae	*Mola mola*	DD		No
Actinopterygii	Tetraodontiformes	Molidae	*Ranzania laevis*	DD		No
Actinopterygii	Tetraodontiformes	Monacanthidae	*Aluterus monoceros*	DD		No
Actinopterygii	Tetraodontiformes	Monacanthidae	*Aluterus scriptus*	DD		No
Actinopterygii	Tetraodontiformes	Monacanthidae	*Stephanolepis hispidus*	LC		No
Actinopterygii	Tetraodontiformes	Ostraciidae	*Acanthostracion notacanthus*	NA		No
Actinopterygii	Tetraodontiformes	Tetraodontidae	*Canthigaster capistrata*	LC		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Actinopterygii	Tetraodontiformes	Tetraodontidae	*Ephippion guttifer*	DD		No
Actinopterygii	Tetraodontiformes	Tetraodontidae	*Lagocephalus lagocephalus*	LC		No
Actinopterygii	Tetraodontiformes	Tetraodontidae	*Sphoeroides marmoratus*	LC		No
Actinopterygii	Tetraodontiformes	Tetraodontidae	*Sphoeroides pachygaster*	LC		No
Actinopterygii	Zeiformes	Grammicolepididae	*Grammicolepis brachiusculus*	DD		No
Actinopterygii	Zeiformes	Oreosomatidae	*Neocyttus helgae*	LC		No
Actinopterygii	Zeiformes	Parazenidae	*Cyttopsis rosea*	DD		No
Actinopterygii	Zeiformes	Zeidae	*Zenopsis conchifer*	DD		No
Actinopterygii	Zeiformes	Zeidae	*Zeus faber*	DD		No
Actinopterygii	Zeiformes	Zenionidae	*Zenion hololepis*	NA		No
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus altimus*	DD		No
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus brachyurus*	DD		No
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus falciformis*	DD		No
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus limbatus*	DD		No
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus longimanus*	EN	A2b	No
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus obscurus*	DD		No
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus plumbeus*	EN	A4d	No
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Galeocerdo cuvier*	DD		No
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Prionace glauca*	NT		No
Chondrichthyes	Carcharhiniformes	Pseudotriakidae	*Pseudotriakis microdon*	DD		No
Chondrichthyes	Carcharhiniformes	Scyliorhinidae	*Apristurus aphyodes*	LC		Yes
Chondrichthyes	Carcharhiniformes	Scyliorhinidae	*Apristurus laurussonii*	LC		No
Chondrichthyes	Carcharhiniformes	Scyliorhinidae	*Apristurus manis*	LC		No
Chondrichthyes	Carcharhiniformes	Scyliorhinidae	*Apristurus melanoasper*	LC		No
Chondrichthyes	Carcharhiniformes	Scyliorhinidae	*Apristurus microps*	LC		No
Chondrichthyes	Carcharhiniformes	Scyliorhinidae	*Galeus atlanticus*	NT		No
Chondrichthyes	Carcharhiniformes	Scyliorhinidae	*Galeus melastomus*	LC		No
Chondrichthyes	Carcharhiniformes	Scyliorhinidae	*Galeus murinus*	LC		Yes
Chondrichthyes	Carcharhiniformes	Scyliorhinidae	*Scyliorhinus canicula*	LC		No
Chondrichthyes	Carcharhiniformes	Scyliorhinidae	*Scyliorhinus stellaris*	NT		No
Chondrichthyes	Carcharhiniformes	Sphyrnidae	*Sphyrna lewini*	DD		No
Chondrichthyes	Carcharhiniformes	Sphyrnidae	*Sphyrna mokarran*	DD		No
Chondrichthyes	Carcharhiniformes	Sphyrnidae	*Sphyrna zygaena*	DD		No
Chondrichthyes	Carcharhiniformes	Triakidae	*Galeorhinus galeus*	VU	A2bd	No
Chondrichthyes	Carcharhiniformes	Triakidae	*Mustelus asterias*	NT		No
Chondrichthyes	Carcharhiniformes	Triakidae	*Mustelus mustelus*	VU	A2bd	No
Chondrichthyes	Carcharhiniformes	Triakidae	*Mustelus punctulatus*	VU	A4d	No
Chondrichthyes	Chimaeriformes	Chimaeridae	*Chimaera monstrosa*	NT		No
Chondrichthyes	Chimaeriformes	Chimaeridae	*Chimaera opalescens*	LC		No
Chondrichthyes	Chimaeriformes	Chimaeridae	*Hydrolagus affinis*	LC		No
Chondrichthyes	Chimaeriformes	Chimaeridae	*Hydrolagus lusitanicus*	LC		Yes
Chondrichthyes	Chimaeriformes	Chimaeridae	*Hydrolagus mirabilis*	LC		No
Chondrichthyes	Chimaeriformes	Chimaeridae	*Hydrolagus pallidus*	LC		No
Chondrichthyes	Chimaeriformes	Rhinochimaeridae	*Harriotta haeckeli*	LC		No
Chondrichthyes	Chimaeriformes	Rhinochimaeridae	*Harriotta raleighana*	LC		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Chondrichthyes	Chimaeriformes	Rhinochimaeridae	*Rhinochimaera atlantica*	LC		No
Chondrichthyes	Hexanchiformes	Chlamydoselachidae	*Chlamydoselachus anguineus*	LC		No
Chondrichthyes	Hexanchiformes	Hexanchidae	*Heptranchias perlo*	DD		No
Chondrichthyes	Hexanchiformes	Hexanchidae	*Hexanchus griseus*	LC		No
Chondrichthyes	Hexanchiformes	Hexanchidae	*Hexanchus nakamurai*	DD		No
Chondrichthyes	Lamniformes	Alopiidae	*Alopias superciliosus*	EN	A2bd	No
Chondrichthyes	Lamniformes	Alopiidae	*Alopias vulpinus*	EN	A2bd	No
Chondrichthyes	Lamniformes	Cetorhinidae	*Cetorhinus maximus*	EN	A2abd	No
Chondrichthyes	Lamniformes	Lamnidae	*Carcharodon carcharias*	CR	C2a(ii)	No
Chondrichthyes	Lamniformes	Lamnidae	*Isurus oxyrinchus*	DD		No
Chondrichthyes	Lamniformes	Lamnidae	*Isurus paucus*	DD		No
Chondrichthyes	Lamniformes	Lamnidae	*Lamna nasus*	CR	A2bd	No
Chondrichthyes	Lamniformes	Mitsukurinidae	*Mitsukurina owstoni*	LC		No
Chondrichthyes	Lamniformes	Odontaspididae	*Carcharias taurus*	CR	C2a(ii)	No
Chondrichthyes	Lamniformes	Odontaspididae	*Odontaspis ferox*	CR	A2bcd	No
Chondrichthyes	Lamniformes	Odontaspididae	*Odontaspis noronhai*	DD		No
Chondrichthyes	Rajiformes	Arhynchobatidae	*Bathyraja pallida*	LC		No
Chondrichthyes	Rajiformes	Arhynchobatidae	*Bathyraja richardsoni*	LC		No
Chondrichthyes	Rajiformes	Arhynchobatidae	*Bathyraja spinicauda*	LC		No
Chondrichthyes	Rajiformes	Dasyatidae	*Dasyatis centroura*	VU	A2d	No
Chondrichthyes	Rajiformes	Dasyatidae	*Dasyatis marmorata*	DD		No
Chondrichthyes	Rajiformes	Dasyatidae	*Dasyatis pastinaca*	VU	A2d	No
Chondrichthyes	Rajiformes	Dasyatidae	*Pteroplatytrygon violacea*	LC		No
Chondrichthyes	Rajiformes	Dasyatidae	*Taeniurops grabata*	DD		No
Chondrichthyes	Rajiformes	Gymnuridae	*Gymnura altavela*	CR	A2bd	No
Chondrichthyes	Rajiformes	Mobulidae	*Mobula mobular*	EN	A2d	Yes
Chondrichthyes	Rajiformes	Myliobatidae	*Myliobatis aquila*	VU	A2b	No
Chondrichthyes	Rajiformes	Myliobatidae	*Pteromylaeus bovinus*	CR	A2c	No
Chondrichthyes	Rajiformes	Pristidae	*Pristis pectinata*	CR	A2b; D	No
Chondrichthyes	Rajiformes	Pristidae	*Pristis pristis*	CR	A2b; D	No
Chondrichthyes	Rajiformes	Rajidae	*Amblyraja hyperborea*	LC		No
Chondrichthyes	Rajiformes	Rajidae	*Amblyraja jenseni*	LC		No
Chondrichthyes	Rajiformes	Rajidae	*Amblyraja radiata*	LC		No
Chondrichthyes	Rajiformes	Rajidae	*Dipturus batis*	CR	A2bcd+4bcd	No
Chondrichthyes	Rajiformes	Rajidae	*Dipturus nidarosiensis*	NT		Yes
Chondrichthyes	Rajiformes	Rajidae	*Dipturus oxyrinchus*	NT		Yes
Chondrichthyes	Rajiformes	Rajidae	*Leucoraja circularis*	EN	A2bcd	Yes
Chondrichthyes	Rajiformes	Rajidae	*Leucoraja fullonica*	VU	A2bd	Yes
Chondrichthyes	Rajiformes	Rajidae	*Leucoraja melitensis*	CR	A2bcd+3bcd	Yes
Chondrichthyes	Rajiformes	Rajidae	*Leucoraja naevus*	LC		Yes
Chondrichthyes	Rajiformes	Rajidae	*Malacoraja kreffti*	LC		Yes
Chondrichthyes	Rajiformes	Rajidae	*Malacoraja spinacidermis*	LC		No
Chondrichthyes	Rajiformes	Rajidae	*Neoraja caerulea*	LC		Yes
Chondrichthyes	Rajiformes	Rajidae	*Neoraja iberica*	LC		Yes
Chondrichthyes	Rajiformes	Rajidae	*Raja asterias*	NT		Yes

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Chondrichthyes	Rajiformes	Rajidae	*Raja brachyura*	NT		No
Chondrichthyes	Rajiformes	Rajidae	*Raja clavata*	NT		No
Chondrichthyes	Rajiformes	Rajidae	*Raja maderensis*	VU	D2	Yes
Chondrichthyes	Rajiformes	Rajidae	*Raja microocellata*	NT		No
Chondrichthyes	Rajiformes	Rajidae	*Raja miraletus*	LC		No
Chondrichthyes	Rajiformes	Rajidae	*Raja montagui*	LC		No
Chondrichthyes	Rajiformes	Rajidae	*Raja polystigma*	LC		Yes
Chondrichthyes	Rajiformes	Rajidae	*Raja radula*	EN	A4b	Yes
Chondrichthyes	Rajiformes	Rajidae	*Raja undulata*	NT		No
Chondrichthyes	Rajiformes	Rajidae	*Rajella bathyphila*	LC		No
Chondrichthyes	Rajiformes	Rajidae	*Rajella bigelowi*	LC		No
Chondrichthyes	Rajiformes	Rajidae	*Rajella fyllae*	LC		No
Chondrichthyes	Rajiformes	Rajidae	*Rajella kukujevi*	LC		Yes
Chondrichthyes	Rajiformes	Rajidae	*Rajella lintea*	LC		No
Chondrichthyes	Rajiformes	Rajidae	*Rostroraja alba*	CR	A2bd	No
Chondrichthyes	Rajiformes	Rhinobatidae	*Glaucostegus cemiculus*	EN	A3bd	No
Chondrichthyes	Rajiformes	Rhinobatidae	*Rhinobatos rhinobatos*	EN	A2b	No
Chondrichthyes	Rajiformes	Rhinopteridae	*Rhinoptera marginata*	DD		No
Chondrichthyes	Rajiformes	Torpedinidae	*Torpedo marmorata*	LC		No
Chondrichthyes	Rajiformes	Torpedinidae	*Torpedo nobiliana*	LC		No
Chondrichthyes	Rajiformes	Torpedinidae	*Torpedo torpedo*	LC		No
Chondrichthyes	Squaliformes	Centrophoridae	*Centrophorus granulosus*	CR	A4b	No
Chondrichthyes	Squaliformes	Centrophoridae	*Centrophorus lusitanicus*	EN	A4b	No
Chondrichthyes	Squaliformes	Centrophoridae	*Centrophorus squamosus*	EN	A4b	No
Chondrichthyes	Squaliformes	Centrophoridae	*Centrophorus uyato*	VU	A2b	No
Chondrichthyes	Squaliformes	Centrophoridae	*Deania calcea*	EN	A4d	No
Chondrichthyes	Squaliformes	Centrophoridae	*Deania hystricosa*	DD		No
Chondrichthyes	Squaliformes	Centrophoridae	*Deania profundorum*	DD		No
Chondrichthyes	Squaliformes	Dalatiidae	*Dalatias licha*	EN	A3d+4d	No
Chondrichthyes	Squaliformes	Dalatiidae	*Isistius brasiliensis*	NA		No
Chondrichthyes	Squaliformes	Dalatiidae	*Isistius plutodus*	LC		No
Chondrichthyes	Squaliformes	Dalatiidae	*Squaliolus laticaudus*	LC		No
Chondrichthyes	Squaliformes	Echinorhinidae	*Echinorhinus brucus*	EN	A2bcd	No
Chondrichthyes	Squaliformes	Etmopteridae	*Centroscyllium fabricii*	LC		No
Chondrichthyes	Squaliformes	Etmopteridae	*Etmopterus princeps*	LC		No
Chondrichthyes	Squaliformes	Etmopteridae	*Etmopterus pusillus*	DD		No
Chondrichthyes	Squaliformes	Etmopteridae	*Etmopterus spinax*	NT		No
Chondrichthyes	Squaliformes	Oxynotidae	*Oxynotus centrina*	VU	A2bd	No
Chondrichthyes	Squaliformes	Oxynotidae	*Oxynotus paradoxus*	DD		No
Chondrichthyes	Squaliformes	Somniosidae	*Centroscymnus coelolepis*	EN	A2bd	No
Chondrichthyes	Squaliformes	Somniosidae	*Centroselachus crepidater*	LC		No
Chondrichthyes	Squaliformes	Somniosidae	*Scymnodalatias garricki*	DD		Yes
Chondrichthyes	Squaliformes	Somniosidae	*Scymnodon ringens*	LC		No
Chondrichthyes	Squaliformes	Somniosidae	*Somniosus microcephalus*	NT		No
Chondrichthyes	Squaliformes	Somniosidae	*Somniosus rostratus*	DD		No

Class	Order	Family	Species	IUCN Red List Category	IUCN Red List Criteria	Endemic to Europe
Chondrichthyes	Squaliformes	Somniosidae	*Zameus squamulosus*	DD		No
Chondrichthyes	Squaliformes	Squalidae	*Squalus acanthias*	EN	A2bd	No
Chondrichthyes	Squaliformes	Squalidae	*Squalus blainville*	DD		No
Chondrichthyes	Squaliformes	Squalidae	*Squalus megalops*	DD		No
Chondrichthyes	Squatiniformes	Squatinidae	*Squatina aculeata*	CR	A2bcd	No
Chondrichthyes	Squatiniformes	Squatinidae	*Squatina oculata*	CR	A2bcd+3cd	No
Chondrichthyes	Squatiniformes	Squatinidae	*Squatina squatina*	CR	A2bcd+3d	Yes
Myxini	Myxiniformes	Myxinidae	*Myxine glutinosa*	LC		No
Myxini	Myxiniformes	Myxinidae	*Myxine ios*	LC		No
Myxini	Myxiniformes	Myxinidae	*Myxine jespersenae*	LC		No

Appendix 2. Example of species summary and distribution map

The species summary gives all the information collated (for each species) during this assessment, including a distribution map. You can search for and download all the summaries and distribution maps from the European Red List website and data portal available online at http://ec.europa.eu/environment/nature/conservation/species/redlist/ and http://www.iucnredlist.org/initiatives/europe.

Reinhardtius hippoglossoides - (Walbaum, 1792)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PLEURONECTIFORMES - PLEURONECTIDAE - Reinhardtius - hippoglossoides

Common Names: Greenland Halibut (English), Black Halibut (English), Blue Halibut (English), Fletán Negro (Spanish; Castilian), Flétan Noir (French), Flétan du Groenland (French), Greenland Turbot (English), Hipogloso Negro (Spanish; Castilian), Lesser Halibut (English), Mock Halibut (English), Newfoundland Turbot (English), Platija Negra (Spanish; Castilian), Platija de Groenlandia (Spanish; Castilian), Turbot (English)

Synonyms: Pleuronectes hippoglossoides Walbaum, 1792

Red List Status
NT, (IUCN version 3.1)

Red List Assessment

Assessment Information

Date of Assessment: 2013-10-18

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2014-09-05	Passed	-	-

Assessor(s): Munroe, T., Costa, M., Nielsen, J., Herrera, J. & de Sola, L.
Reviewer(s): Ralph, G.
Facilitators/Compilers: Nieto, A.
Regions: Europe
Regional Expert Questions: No change,-1,3,3

Assessment Rationale

European Regional Assessment: Near Threatened (NT)

Reinhardtius hippoglossoides is distributed from Greenland, to Novaya Zemlya, along the Norwegian coast to England to depths of 2,000 m. *Reinhardtius hippoglossoides* is can be locally abundant, but it is commercially important and has been heavily exploited throughout parts of its range. Generation length was estimated at about 13 years. Population trends in *R. hippoglossoides* were evaluated over a period of 3 generation lengths in order to apply Criteria A. To account for variability in life history, population trends were examined over a 30 to 40 year time window. Historically low stock abundances were documented in the 1980s and 1990s, along with major declines in total biomass, spawning stock biomass, and a reduction in average fish size. As a long-lived and slow growing species, *R. hippoglossoides* may be inherently vulnerable to overexploitation. Based on historical estimates of biomass in the Barents and Norwegian seas, there has been approximately 25% increase in estimated biomass over the past 45 to 50 years (three generation lengths). However, there has been an approximately 75% decline in relative biomass from the mid-1970s and 1980s to present in the Iceland and east Greenland stock. Based on average landings in both stocks during the time period, it is estimated that the Barents Sea and Norwegian Sea stock accounts

for roughly 40% of landings, while the Iceland and east Greenland stock accounts for roughly 60% of landings. The declines in the Iceland and Greenland stock are given slightly more weight in estimating the magnitude of population decline. It is estimated that there has been a 20 to 30% decline in the regional population over the past 30 to 40 years (3 generation lengths). Therefore, *R. hippoglossoides* is assessed as Near Threatened under Criterion A2bd.

Distribution

Geographic Range

Reinhardtius hippoglossoides is distributed from Newfoundland (Canada) to both sides of Greenland, and in the northern Pacific Ocean from Sagami Bay, Sea of Japan, the Okhotsk Sea, the Bering Sea, and the Pacific coast of North America to northern Mexico (FAO 2013). In the northeastern Atlantic, *R. hippoglossoides* occurs from south of Ireland and northward to the Faroe Islands, Iceland, and along the continental slope of Norway eastwards to Franz Joseph Land, also including Bear Island and along the submarine ridge to Spitsbergen.

The species occurs at depths of 200 m to 2,000 m (Milinsky 1944, Andriyashev 1954, Godø and Haug 1989, FAO 2013). This species is usually found only to depths of 1,400 m on the continental slope off Norway to 62°N to northern Spitzbergen (Gundersen *et al.* 1999).

Elevation / Depth / Depth Zones

Depth Lower Limit (in metres below sea level): 2000
Depth Upper Limit (in metres below sea level): 200
Depth Zone: Deep Photic (51-200m), Bathyl (201-4,000m)

Map Status

Map Status	Data Sensitive?	Justification	Geographic range this applies to:	Date restriction imposed:
Done	-	-	-	-

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Faroe Islands	Extant	Native	-	Resident
Iceland	Extant	Native	-	Resident
Ireland	Extant	Native	-	Resident
Norway	Extant	Native	-	Resident
Russian Federation	Extant	Native	-	Resident
Russian Federation -> European Russia	Extant	Native	-	Resident
Svalbard and Jan Mayen	Extant	Native	-	Resident
United Kingdom	Extant	Native	-	Resident
United Kingdom -> Great Britain	Extant	Native	-	Resident
United Kingdom -> Northern Ireland	Extant	Native	-	Resident

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
27. Atlantic - northeast	Extant	Native	-	Resident

Population

Reinhardtius hippoglossoides was one of the most abundant groundfish species inhabiting the continental slope and shelf areas west, north, and east of Iceland (Solmundsson 2007). Stocks in the northeast Atlantic have been at historically low levels since the 1990s due to periods of high fishing pressure and reduced recruitment (Anonymous 1998, Bowering and Nedreaas 2001). Results from Albert *et al.* (2001) suggest that the recruitment failure reported from previous assessments may be due to the decreasing proportion of the year classes at younger ages being present in the survey area (ICES 1998). Catches from the northern North Sea (Division IVa) increased from ~200 t in 2011 to ~1,000 t in 2012.

Barents Sea and Norwegian Sea

Landings from the Barents and Norwegian Sea stock ranged from 12,996 to 21,461 tonnes from 2013 to 2014. Biomass estimates have shown a stable or increasing trend since 1992 (ICES 2013). Based on historical estimates of relative biomass in the Barents and Norwegian seas, averaging of endpoints from 1965-1969, and 2009-2012, there has been approximately 25% increase in estimated biomass (ICES 2013) over the last 30 to 40 years.

Iceland

Landings from fluctuated between 20,000 and 30,000 t. Relative total biomass estimates are available from 1960 to 2013. This stock reached a record low in 2005. There has been an approximately 75% decline in relative biomass (ICES Advice 2013) from the mid-1970s and 1980s to present.

Therefore, it is estimated that there has been a 20 to 30% decline in the regional population over the past 30 to 40 years (3 generations).

Population Information

Current Population Trend: Unknown

Habitats and Ecology

Reinhardtius hippoglossoides ranges from depths of 200 to 2,000 m, but is more commonly found between 500 and 1,000 m. *Reinhardtius hippoglossoides* typically feeds on prawns, squids, and fishes including cod, eelpouts, capelin, and redfish. In Spitzbergen waters, juveniles feed primarily on polar cod and prawns (Haug and Gulliksen 1982). Feeding activity of *R. hippoglossoides* peaks in October between depths of 1,100 to 1,500 m (Huse *et al.* 1999). Spawning takes place in the spring/summer from April to July, which peaks in May/June, at 700 to 1,500 m depth. *Reinhardtius hippoglossoides* from the Northeast Arctic region spawn primarily from November to mid-January with the peak of season occurring in December (Albert *et al.* 1998). It is unknown whether *R. hippoglossoides* is a serial spawner or if all of the eggs are released in a single batch (Stene *et al.* 1999). There is evidence that indicates *R. hippoglossoides* as being both a spring and winter spawner (Hogsnestad 1969, Albert *et al.* 1998) as well as suggestions that this species spawns throughout the year (Fedorov 1971). Eggs, larvae, and post larvae remain pelagic for several months and metamorphosis is completed when 6 cm to 8.5 cm length is attained (Knutsen *et al.* 2007, FAO 2013). The maximum length and weight for this species is 120 cm and 45 kg, respectively but is more commonly found between 80 and 100 cm and 11 to 25 kg (FAO 2013).

Reinhardtius hippoglossoides is adapted to a variety of environmental conditions and can be found in water temperature from -1°C to 10.0°C. *Reinhardtius hippoglossoides* is most abundant at temperatures ranging from -0.5°C to 3.0°C (Templeman 1973). Proportions of small fish are higher north of 76° and larger fish are more abundant in deeper water (Godø and Haug 1989). Only a small proportion of *R. hippoglossoides* over 65 cm are males (Huse *et al.* 1999). The coastal northern areas west and north of Spitsbergen are used as nursery grounds for *R. hippoglossoides* and the mature stock is distributed more south along the continental slope where spawning takes place (Godø and Huag 1989). The Denmark Strait serves as the main spawning ground in Icelandic waters for this species with peak spawning taking place from January to April (Solmundsson 2007). Fecundity can range from ~7,000 eggs to ~140,000 eggs which is primarily correlated to length and age, a lesser extent to the latter. The eggs are 3.8 to 4.3 mm in diameter and yolk-sac larvae range from 10 to 15 mm. Fecundity was determined for females from the Barents Sea which ranged from 6,800 eggs to 70,500 eggs per female between 48 and 80 cm in length (Gundersen *et al.* 1999). Spawning grounds for *R. hippoglossoides* in the Barents and Norwegian seas are at 600 and 900 m depth between 70°N and 75°N along the continental slope (Godø and Huag 1989, Hognestad 1969).

The growth rate of individuals from the Barents Sea were faster than those from Iceland but slower than those from Newfoundland (Godø and Haug 1989).*Reinhardtius hippoglossoides* grows on average ~6 to 8 cm a year. Individuals from the northeast Atlantic tend to be larger at age, up to about eight years, than those from the northwest Atlantic; however, the growth

patterns seem to be more similar in recent years which suggests the convergence to a similar pattern between northeast and northwest *R. hippoglossoides* (Bowering and Nedreaas 2001).

Reinhardtius hippoglossoides migrates from the east coast of Iceland to Norway (Sigurðsson 1981). After spawning, most individuals will begin a feeding migration to the north and northeast of Iceland. This migration ends in September and from then until December, the fish will migrate back to western Iceland for spawning (ICES 1997). Migration patterns of this species are influenced by size and growth characteristics. Males and females leave the nursery grounds at 40 cm length and females appear in spawning condition around 60 cm (Albert 2003).

Off Iceland, individuals of this species <60 cm in length tend to be pelagic or semi-pelagic feeders while individuals >80 cm feed mainly on the or close to the bottom (Solmundsson 2007).

In the northeast Atlantic females can reach 16 years of age and males can reach 11 years of age (Bowering and Nedreaas 2001). The growth rate of females is slightly faster than that of males after five years of age and males reach sexual maturity before females (Godø and Haug 1989). Age at 50% ranges from 9.5 years to 15.0 years for females and 8.2 years and 11.6 years for males (Morgan and Bowering 1997). Other suggested ages for 50% maturity are 9-10 years of age and 7-8 years of age (sexes combined) (Anonymous 1996, ICES 1997). Additional data are included from the 1970's and the 1980's suggest that 50% of males were mature at about five years of age and females between nine and ten years of age; however, data from Russian surveys suggest that individuals from the Barents Sea reach maturity at about six years of age (sexes combined) (ICES 1997).

Generation length was calculated using the formula (A_{max}+A_m/2), where A_m = age at first maturity (10 years for females), A_{max} = longevity (16 years). This gives a generation length of 13 years.

IUCN Habitats Classification Scheme

Habitat	Season	Suitability	Major Importance?
11.1.1. Marine Deep Benthic -> Marine Deep Benthic - Continental Slope/ Bathyl Zone (200-4,000m) -> Hard Substrate	-	Suitable	-
11.1.2. Marine Deep Benthic -> Marine Deep Benthic - Continental Slope/ Bathyl Zone (200-4,000m) -> Soft Substrate	-	Suitable	-

Life History

Generation Length	Justification	Data Quality
13	GL = (Amax+Am/2), where Am = age at first maturity (10 years for females), Amax = longevity (16 years)	unknown

Longevity
16 (Not specified)

Maximum Size (in cms)
120

Average Annual Fecundity or Litter Size
7000-140000

Breeding Strategy

Does the species lay eggs?
No

Does the species give birth to live young
No

Does the species exhibit parthenogenesis
No

Does the species have a free-living larval stage?
No

Does the species require water for breeding?
No

Movement Patterns

Movement Patterns: Full Migrant
Congregatory: Congregatory (and dispersive)

Systems

System: Marine

Use and Trade

General Use and Trade Information

The increased use of bottom trawls in the 1960's and 1970's led to the substantial reduction of *R. hippoglossides* in the eastern Norwegian and Barents Sea (Anonymous 1978 from Godø and Haug 1989). Landing trends for *R. hippoglossoides* of the Northeastern Atlantic show regular fluctuations in the last decade with a notable decrease from 50,008 tonnes in 2004 to 36,001 tonnes in 2008 (FAO 2011 FishStatJ Accessed 2013 September).

Barents Sea and Norwegian Sea

Biomass estimates indicate a stable or increase in trend since 1992 (ICES 2013). The total catch for this area in 2012 was 20,079 tonnes (ICES 2013).

Iceland and East Greenland

The stock has been below BMSY since the early 1990's and is presently at 56% of BMSY. Fishing mortality is estimated to be 1.5 times the F_{msy} and the stock is currently at 56% B_{msy} (ICES 2013). Since the record-low biomass observed in 2004 the stock has been stable with a low increase. The total catch for 2012 from this region was 29,309 t, and discarding is considered to be less than 1% by weight (ICES 2013). The total biomass for this species has declined by 75% over the past 50 years (1960-2012).

Subsistence:	Rationale:	Local Commercial:	Further detail including information on economic value if available:
No	-	Unknown	-

National Commercial Value: Yes
International Commercial Value: Yes
Is there harvest from captive/cultivated sources of this species? No

Threats

Reinhardtius hippoglossoides has experienced major declines due to exploitation. During the 1970's, the total stock and the spawning stock decreased but have increased slightly since the 1980's. The trawl fishery expanded rapidly in 1969 which contributed to the decline as well. A trawl fishery that operates on the nursery grounds had led to a decrease in the average size of fish in the catch (Godø and Haug 1989). This species also experienced recruitment failure which was indicated by the abundance of juveniles and young fish which contributed to a sharp decrease in catches (Godø and Haug 1987).

During the late 1980's the northeast Arctic stock experienced a drop in year-class indices, derived from regular 0-group and juvenile surveys and a historic low spawning stock biomass was also observed (Hylen and Nedreaas 1995, Smirnov 1995). The importance of this species as a commercial fish increased during this time and a decrease in the commercial catch per unit efforts was observed. This series of events led to strict regulation including a fishing ban north of 71°30'N from 1992 (Gundersen *et al.* 1999).

Females of this species tend to live longer, reach sexual maturity at an older age, and reach a larger size than males. These traits may make females more susceptible to exploitation.

In some areas of the species distribution the depth of occurrence of oil exploitation overlaps with the species habitats.

Threats Classification Scheme

Threat	Timing	Scope	Severity	Impact Score
5.4.1. Biological resource use -> Fishing & harvesting aquatic resources -> Intentional use: (subsistence/small scale) [harvest]	Ongoing	-	-	Low Impact: 3
5.4.2. Biological resource use -> Fishing & harvesting aquatic resources -> Intentional use: (large scale) [harvest]	Ongoing	-	-	Low Impact: 3
5.4.3. Biological resource use -> Fishing & harvesting aquatic resources -> Unintentional effects: (subsistence/small scale) [harvest]	Ongoing	-	-	Low Impact: 3
5.4.4. Biological resource use -> Fishing & harvesting aquatic resources -> Unintentional effects: (large scale) [harvest]	Ongoing	-	-	Low Impact: 3

Conservation

The ban against a targeted fishery for *R. hippoglossoides* was lifted by Joint Russian–Norwegian Fisheries Commission (JRNFC) in 2010 which resulted in a directed fishery and capture as bycatch in fisheries for other demersal species. The 38th JRNFC session in 2009 cancelled the ban on the *R. hippoglossoides* fishery and implemented a TAC which was raised to 19,000 t for 2013. In the Barents Sea, Norwegian Sea, Spitzbergen, and Bear Island, all targeted fishing by gillnet and long-line vessels longer than 28 m has been banned (Huse *et al.* 1999).

The fishery in the North Sea does not have Total Allowable Catch (TAC) restrictions but does have catch limits for non-EU countries (ICES 2013). ICES advises that catches should not exceed 15,000 t in 2014 in the Barents and Norwegian seas, and not exceed 20,000 t in 2014 for Iceland and East Greenland (ICES 2013).

Coastal states recently began work on a common management plan for *R. hippoglossoides* in the area. This plan will include a gradual lowering of total catches until biological reference points have been evaluated by ICES and the implementation of a harvest control rule and continuous monitoring (ICES 2013). *Reinhardtius hippoglossoides* was assessed as Least Concern in Norway (including the Barents Sea) using a generation length of 50 years.

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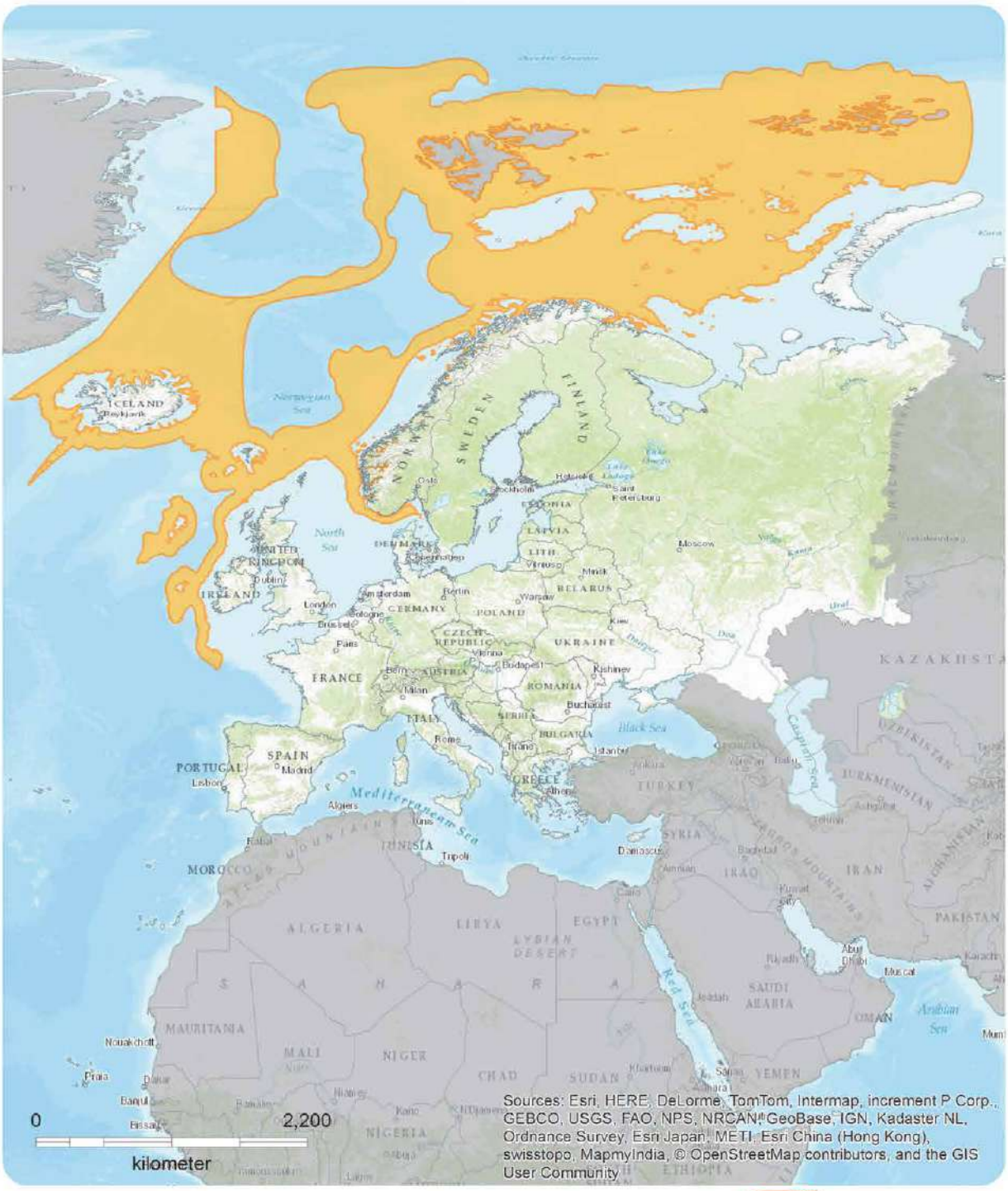
European Regional Assessment



Reinhardtius hippoglossoides

NE | DD | LC | **NT** NEAR THREATENED | VU | EN | CR | EW | EX

Range

Extant (resident)

Compiled by:
International Union for Conservation of Nature

Map created 05/21/2015

The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.

RED LIST
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European Commission

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The IUCN Global Species Programme supports the activities of the IUCN Species Survival Commission and individual Specialist Groups, as well as implementing global species conservation initiatives. It is an integral part of the IUCN Secretariat and is managed from IUCNs international headquarters in Gland, Switzerland. The Global Species Programme includes a number of technical units covering Species Trade and Use, The IUCN Red List, Freshwater Biodiversity Unit and Climate Change Unit (all located in Cambridge, UK), the Biodiversity Assessment Unit (located in Washington DC, USA), and the Marine Biodiversity Unit (hosted by Old Dominion University Norfolk VA, USA).

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The European Red List is a review of the conservation status of European species according to IUCN regional Red Listing guidelines. It identifies those species that are threatened with extinction at the regional level – in order that appropriate conservation action can be taken to improve their status.

This publication summarises results for all Europe's native species of marine fishes (1,220 species). 7.5% of species are threatened with extinction at the European level due to mainly overfishing, coastal development, energy production and mining, and pollution.

The European Red List was compiled by IUCN's Global Species Programme and the European Regional Office with support from the IUCN Species Survival Commission and it is the product of a service contract with the European Commission.
It is available online at
http://ec.europa.eu/environment/nature/conservation/species/redlist
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