The Safina Center
at Stony Brook University

And

Monterey Bay Aquarium
Seafood Watch®

Black Seabream

Spondyliosoma cantharus

France and UK: English Channel

Handline, Bottom Gillnet, Bottom Trawl, Midwater trawl

October 21, 2014

The Safina Center Seafood Analysts

About The Safina Center

The Safina Center (formerly Blue Ocean Institute) translates scientific information into language people can understand and serves as a unique voice of hope, guidance, and encouragement. The Safina Center (TSC) works through science, art, and literature to inspire solutions and a deeper connection with nature, especially the sea. Our mission is to inspire more people to actively engage as well-informed and highly motivated constituents for conservation.

Led by conservation pioneer and MacArthur fellow, Dr. Carl Safina, we show how nature, community, the economy and prospects for peace are all intertwined. Through Safina's books, essays, public speaking, PBS television series, our Fellows program and Sustainable Seafood program, we seek to inspire people to make better choices.

The Safina Center was founded in 2003 by Dr. Carl Safina and was built on three decades of research, writing and policy work by Dr. Safina.

The Safina Center's Sustainable Seafood Program
The Center's founders created the first seafood guide in 1998. Our online seafood guide now encompasses over 160-wild-caught species. All peer-reviewed seafood reports are transparent, authoritative, easy to understand and use. Seafood ratings and full reports are available on our website under Seafood Choices. TSC's Sustainable Seafood Program helps consumers, retailers, chefs and health professionals discover the connection between human health, a healthy ocean, fishing and sustainable seafood.

- Our online guide to sustainable seafood is based on scientific ratings for more than 160 wild-caught seafood species and provides simple guidelines. Through our expanded partnership with the Monterey Bay Aquarium, our guide now includes seafood ratings from both The Safina Center and the Seafood Watch® program.
- We partner with Whole Foods Market (WFM) to help educate their seafood suppliers and staff, and provide our scientific seafood ratings for WFM stores in the US and UK.
- Through our partnership with Chefs Collaborative, we created Green Chefs/Blue Ocean, a free, interactive, online sustainable seafood course for chefs and culinary professionals.
- Our website features tutorials, videos, blogs, links and discussions of the key issues such as mercury in seafood, bycatch, overfishing, etc.

Check out our Fellows Program, learn more about our Sustainable Seafood Program and Carl Safina's current work at www.safinacenter.org .

The Safina Center is a 501 (c) (3) nonprofit organization based in the School of Marine & Atmospheric Sciences at Stony Brook University, Long Island, NY. www.safinacenter.org admin@safinacenter.org | 631.632.3763

About Seafood Watch®

Monterey Bay Aquarium's Seafood Watch® program evaluates the ecological sustainability of wild-caught and farmed seafood commonly found in the United States marketplace. Seafood Watch® defines sustainable seafood as originating from sources, whether wild-caught or farmed, which can maintain or increase production in the long-term without jeopardizing the structure or function of affected ecosystems. Seafood Watch® makes its science-based recommendations available to the public in the form of regional pocket guides that can be downloaded from www.seafoodwatch.org. The program's goals are to raise awareness of important ocean conservation issues and empower seafood consumers and businesses to make choices for healthy oceans.

Each sustainability recommendation on the regional pocket guides is supported by a Seafood Report. Each report synthesizes and analyzes the most current ecological, fisheries and ecosystem science on a species, then evaluates this information against the program's conservation ethic to arrive at a recommendation of "Best Choices," "Good Alternatives" or "Avoid." The detailed evaluation methodology is available upon request. In producing the Seafood Reports, Seafood Watch® seeks out research published in academic, peer-reviewed journals whenever possible. Other sources of information include government technical publications, fishery management plans and supporting documents, and other scientific reviews of ecological sustainability. Seafood Watch® Research Analysts also communicate regularly with ecologists, fisheries and aquaculture scientists, and members of industry and conservation organizations when evaluating fisheries and aquaculture practices. Capture fisheries and aquaculture practices are highly dynamic; as the scientific information on each species changes, Seafood Watch®'s sustainability recommendations and the underlying Seafood Reports will be updated to reflect these changes.

Parties interested in capture fisheries, aquaculture practices and the sustainability of ocean ecosystems are welcome to use Seafood Reports in any way they find useful. For more information about Seafood Watch® and Seafood Reports, please contact the Seafood Watch® program at Monterey Bay Aquarium by calling 1-877-229-9990.

Guiding Principles

The Safina Center and Seafood Watch define sustainable seafood as originating from sources, whether fished[1] or farmed, that can maintain or increase production in the long-term without jeopardizing the structure or function of affected ecosystems.

Based on this principle, Seafood Watch and the Safina Center have developed four sustainability **criteria** for evaluating wild-catch fisheries for consumers and businesses. These criteria are:

- How does fishing affect the species under assessment?
- How does the fishing affect other, target and non-target species?
- How effective is the fishery's management?
- How does the fishing affect habitats and the stability of the ecosystem?

Each criterion includes:

- Factors to evaluate and score
- Guidelines for integrating these factors to produce a numerical score and **rating**

Once a rating has been assigned to each criterion, we develop an overall recommendation. Criteria ratings and the overall recommendation are color-coded to correspond to the categories on the Seafood Watch pocket guide and the Safina Center's online guide:

Best Choice/Green: Are well managed and caught in ways that cause little harm to habitats or other wildlife.

Good Alternative/Yellow: Buy, but be aware there are concerns with how they're caught.

Avoid/Red: Take a pass on these for now. These items are overfished or caught in ways that harm other marine life or the environment.

1 "Fish" is used throughout this document to refer to finfish, shellfish and other invertebrates.

Summary

This report provides analysis and recommendation for black seabream *(Spondyliosoma cantharus)* caught in the English Channel by the United Kingdom and France. In France, black seabream are caught in a targeted mid-water trawl fishery and as a minor catch in bottom trawl fisheries for various demersal species. In the UK, the black seabream fisheries are very small; they are primarily caught with bottom trawls, but also with handlines and bottom gillnets (includes gillnets, tangle nets, and trammel nets).

Black seabream are found in the northeast Atlantic from Norway south to the Mediterranean Sea and the Canary Islands. Black seabream are hermaphrodites, first maturing as a female at 2-3 years old**,** and later changing sex to male. Very little information is known about the abundance of black seabream in the English Channel, but there is no indication that the species is depleted.

In all fisheries, some species of concern are caught. In the mid-water trawl fishery, some European horse mackerel are caught, and overfishing is currently occurring on this species. As well, there is some potential for common dolphins to be caught. The French bottom trawl fishery and the UK fisheries catch Atlantic cod and European sea bass, which have low abundances and are experiencing high fishing.

The European Union, France, and United Kingdom, all have management strategies in place to protect fisheries in their waters. However, very few strategies have been implemented specifically for black seabream.

When black seabream are caught with mid-water trawls and handlines, there are no or minimal impacts on bottom ocean habitats. However, the gillnets that catch black seabream cause some damage to bottom ocean habitats, and the bottom trawls cause moderate-high damage.

Overall, black seabream caught in the mid-water trawl, handline, and gillnet fisheries are rated "yellow" or "good alternative" while black seabream caught with bottom trawls are rated "red" or "avoid".

Table of Conservation Concerns and Overall Recommendations

Species / Fishery	Criterion 1 Impacts on the Species Under Assessment	Criterion 2 Impacts on other Species	Criterion 3 Management Effectiveness	Criterion 4 Impacts on Habitat and Ecosystem	Overall Recommendation
Black seabream France English Channel - Trawl, Midwater	Yellow (2.64)	Red (1.73)	Yellow (2.45)	Green (3.87)	**Yellow/Good Alternative (2.567)**
Black seabream France English Channel - Trawl, Bottom	Yellow (2.64)	Red (1.06)	Yellow (3.00)	Yellow (2.60)	**Red/Avoid (2.162)**
Black seabream United Kingdom English Channel - Gillnet, Bottom	Yellow (2.64)	Red (1.27)	Yellow (2.45)	Yellow (3.12)	**Yellow/Good Alternative (2.252)**
Black seabream United Kingdom English Channel - Handline	Yellow (2.64)	Red (1.41)	Yellow (3.00)	Green (3.57)	**Yellow/Good Alternative (2.516)**
Black seabream United Kingdom English Channel - Trawl, Bottom	Yellow (2.64)	Red (1.06)	Yellow (2.45)	Yellow (2.60)	**Red/Avoid (2.055)**

Scoring Guide

Scores range from zero to five where zero indicates very poor performance and five indicates the fishing operations have no significant impact.

Final Score = geometric mean of the four Scores (Criterion 1, Criterion 2, Criterion 3, Criterion 4).

- **Best Choice/Green** = Final Score >3.2, **and** no Red Criteria, **and** no Critical scores
- **Good Alternative/Yellow** = Final score >2.2-3.2, **and** neither Harvest Strategy (Factor 3.1) nor Bycatch Management Strategy (Factor 3.2) are Very High Concern[2], **and** no more than one Red Criterion, **and** no Critical scores
- **Avoid/Red** = Final Score <=2.2, **or** either Harvest Strategy (Factor 3.1) or Bycatch Management Strategy (Factor 3.2) is Very High Concern[2], **or** two or more Red Criteria, **or** one or more Critical scores.

[2] Because effective management is an essential component of sustainable fisheries, Seafood Watch issues an Avoid recommendation for any fishery scored as a Very High Concern for either factor under Management (Criterion 3).

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Introduction

Scope of the analysis and ensuing recommendation

This report evaluates black seabream *(Spondylisosoma cantharus)* caught in the English Channel by the United Kingdom and France. Black seabream are caught with mid-water trawls, bottom trawls, bottom gillnets (includes gillnets, tangle nets, and trammel nets), and handline gears.

Overview of the species and management bodies

Black seabream are a member of the Sparidae family, which includes the seabreams or porgies. They are one of two Sparidae species commonly found in northern European seas (the other being the red seabream). Black seabream are found in the northeast Atlantic from Norway and the Orkney Islands south to the Mediterranean Sea and the Canary Islands. They are typically found in groups on rocky and sandy bottoms and seagrass beds at depths up to 300m (Pajuelo and Lorenzo 1999).

Black seabream can live up to 15 years and grow up to 60 cm in length. Black seabream display protogynous hermaphrodite behavior; they first mature as female and once they reach 30-40cm they change sex to male (Vause and Clark, 2011). Black seabream primarily feed on seaweed and invertebrates. Clawed crustaceans likely prey on black seabream eggs. Adult black seabream have few natural predators; they are sometimes eaten by marine birds and mammals (Vause and Clark 2011).

Commercial fisheries for black seabream are relatively small. There are some small targeted fisheries for black seabream, but they are also caught as a minor component in fisheries for various other demersal species. Both France and the United Kingdom (UK) are part of the European Union, which implements management strategies based on the Common Fisheries Policy (European Commission 2009). The French Ministry of Food, Agriculture and Fisheries is responsible for management of marine fisheries in France while the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) helps shape and implement policy in the UK (CEFAS 2013)(Peacock 2012). In addition, Inshore Fisheries and Conservation Authorities (IFCAs) are tasked with ensuring sustainable management of UK inshore sea fisheries resources at the local level (Southern IFCA 2013b). Few management measures are in place specific to black seabream.

Production Statistics

In 2011, 248 tonnes (t) of black seabream were caught by the UK and 3,330 t were caught by France (FAO 2013). The UK and France contributed about 43% to the worldwide landings of black seabream in 2011, which totaled 8,358 t. Other countries that are major producers of black seabream include Greece, Italy, Morocco, Portugal, Senegal, and Spain (FAO 2013).

Since 2000, catches of black seabream by France have ranged from 2784-4314 t, with around 1,500-3,000 t caught in the English Channel. Around 50-60% of the French English Channel black seabream catch was taken with pelagic or mid-water trawls from 2009-2011, while 25-30% was taken with bottom trawls. Catches by the UK have varied from 183-388 t, with the majority of the catch (99%) taken in the English Channel (STECF 2013). In the UK, small amounts of black seabream are caught by bottom

gillnets (<5% of total catch) and handline gear (<1% of catch) when they are in shallow water to feed before breeding (STECF 2013)(Sussex IFCA 2013a). However, the primary gears used to catch black seabream are bottom pair trawls and otter trawls when the fish move on to their breeding grounds (Sussex IFCA 2013a).

Importance to the US/North American market

The National Marine Fisheries Service (NMFS) does not report any imports of black seabream into the U.S. from the UK or France (NMFS 2013).

Common and market names

Common names include black bream, seabream, and porgy. French names for this species are Dorade grise and griset (Carpentier et al. 2005).

Primary product forms

Black seabream is usually baked, steamed or pan-fried whole. It is a popular and prized species used in Mediterranean cuisine.

Assessment

This section assesses the sustainability of the fishery(s) relative to the Seafood Watch Criteria for Fisheries, available at http://www.seafoodwatch.org.

Criterion 1: Impacts on the species under assessment

This criterion evaluates the impact of fishing mortality on the species, given its current abundance. The inherent vulnerability to fishing rating influences how abundance is scored, when abundance is unknown.

The final Criterion 1 score is determined by taking the geometric mean of the abundance and fishing mortality scores. The Criterion 1 rating is determined as follows:

- *Score >3.2=Green or Low Concern*
- *Score >2.2 and <=3.2=Yellow or Moderate Concern*
- *Score <=2.2=Red or High Concern*

Rating is Critical if Factor 1.3 (Fishing Mortality) is Critical.

Criterion 1 Summary

BLACK SEABREAM				
Region / Method	**Factor 1.1 Inherent Vulnerability**	**Factor 1.2 Abundance**	**Factor 1.3 Fishing Mortality**	**Criterion 1 Score**
France English Channel Trawl, Bottom	Medium	3.00:Moderate Concern	2.33:Moderate Concern	**Yellow (2.644)**
France English Channel Trawl, Midwater	Medium	3.00:Moderate Concern	2.33:Moderate Concern	**Yellow (2.644)**
United Kingdom English Channel Gillnet, Bottom	Medium	3.00:Moderate Concern	2.33:Moderate Concern	**Yellow (2.644)**
United Kingdom English Channel Handline	Medium	3.00:Moderate Concern	2.33:Moderate Concern	**Yellow (2.644)**
United Kingdom English Channel Trawl, Bottom	Medium	3.00:Moderate Concern	2.33:Moderate Concern	**Yellow (2.644)**

Criterion 1 Assessment

BLACK SEABREAM

Factor 1.1 - Inherent Vulnerability

Scoring Guidelines

- *Low— FishBase vulnerability score for species 0-35 OR species exhibits life history characteristics that make it resilient to fishing, e.g., early maturing (<5 years), short lived (< 10 years), small maximum size, and low on food chain.*
- *Medium— FishBase vulnerability score for species 36-55 OR life history characteristics that make it neither particularly vulnerable or resilient to fishing, e.g. moderate age at sexual maturity (5-15 years), moderate maximum age (10-25 years), moderate maximum size, and middle of food chain.*
- *High— FishBase vulnerability score for species 56-100 OR life history characteristics that make is particularly vulnerable to fishing, e.g. long-lived (>25 years), late maturing (>15 years), low reproduction rate, large body size, and top-predator.*

France English Channel, Trawl, Bottom
France English Channel, Trawl, Midwater
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Medium

The FishBase vulnerability score for black seabream is 52 out of 100, which indicates black seabream have a medium inherent vulnerability to fishing (Froese and Pauly 2011). The life history characteristics of black seabream also suggest a medium inherent vulnerability to fishing. Black seabream can reach 60 cm in length and live up to 15 years. Black seabream are protogynous hermaphrodites, meaning they first mature as females and later on change sex to males. They sexually mature as females at 2-3 years old and at a length of approximately 20 cm (Sussex IFCA 2013a). At around 30-40 cm, they change to males (Sussex IFCA 2013a). Depending on their size, females can lay between 31,000 and 554,000 eggs. The eggs are laid in nests, dug by the males, on the bottom of the seafloor (Vause and Clark 2011).

Factor 1.2 - Abundance

Scoring Guidelines

- *5 (Very Low Concern)—Strong evidence exists that the population is above target abundance level (e.g., biomass at maximum sustainable yield, BMSY) or near virgin biomass.*

- *4 (Low Concern)—Population may be below target abundance level, but it is considered not overfished*
- *3 (Moderate Concern) —Abundance level is unknown and the species has a low or medium inherent vulnerability to fishing.*
- *2 (High Concern)—Population is overfished, depleted, or a species of concern, OR abundance is unknown and the species has a high inherent vulnerability to fishing.*
- *1 (Very High Concern)—Population is listed as threatened or endangered.*

France English Channel, Trawl, Bottom
France English Channel, Trawl, Midwater
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Moderate Concern

No formal population assessments have been completed for black seabream in the English Channel, and no target abundance reference points or conservation goals have been specified (Vause and Clark 2011)(Carleton et al. 2009). Black seabream only have a medium vulnerability to fishing, but they undergo a sex change from female to male, which may have important consequences for their sustainability. Between 1977 and 1979, the modal size of the black seabream decreased from 37-38cm to 28-30cm due to the expansion of the fishery and fishing practices that selectively target larger fish, which are predominately males. The selective removal of the larger males has the potential to affect the sex-ratio of the population and thus reproduction and repopulation (Sussex IFCA 2013a). Current information on the size structure and sex-ratio of the population is not available. Due to a lack of information, the abundance for black seabream in the English Channel is considered "unknown" and this factor is ranked "moderate concern".

Factor 1.3 - Fishing Mortality

Scoring Guidelines

- *5 (Very Low Concern)—Highly likely that fishing mortality is below a sustainable level (e.g., below fishing mortality at maximum sustainable yield, FMSY), OR fishery does not target species and its contribution to the mortality of species is negligible (≤ 5% of a sustainable level of fishing mortality).*
- *3.67 (Low Concern)—Probable (>50%) chance that fishing mortality is at or below a sustainable level, but some uncertainty exists, OR fishery does not target species and does not adversely affect species, but its contribution to mortality is not negligible, OR fishing mortality is unknown, but the population is healthy and the species has a low susceptibility to the fishery (low chance of being caught).*

- *2.33 (Moderate Concern)—Fishing mortality is fluctuating around sustainable levels, OR fishing mortality is unknown and species has a moderate-high susceptibility to the fishery and, if species is depleted, reasonable management is in place.*
- *1 (High Concern)—Overfishing is occurring, but management is in place to curtail overfishing, OR fishing mortality is unknown, species is depleted, and no management is in place.*
- *0 (Critical)—Overfishing is known to be occurring and no reasonable management is in place to curtail overfishing.*

France English Channel, Trawl, Bottom
France English Channel, Trawl, Midwater
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Moderate Concern

No fishing mortality reference points or targets have been established for black seabream in the English Channel. The fishery in the English Channel expanded in the late 1970s and early 1980s, causing a decrease in the size of black seabream (Pawson 1995). Currently, there is no evidence to suggest that black seabream are being overfished. Since 2000, catches of black seabream by France in the English Channel have fluctuated between 1,500 and 3,000 t and catches by the UK have ranged between 182 and 377 t, with no overall trend emerging (FAO 2013)(Carleton et al. 2009)(STECF 2013). Since fishing mortality on black seabream in the English Channel is unknown, this factor is ranked "moderate concern".

Criterion 2: Impacts on other species

All main retained and bycatch species in the fishery are evaluated in the same way as the species under assessment were evaluated in Criterion 1. Seafood Watch® defines bycatch as all fisheries-related mortality or injury to species other than the retained catch. Examples include discards, endangered or threatened species catch, and ghost fishing.

To determine the final Criterion 2 score, the score for the lowest scoring retained/bycatch species is multiplied by the discard rate score (ranges from 0-1), which evaluates the amount of non-retained catch (discards) and bait use relative to the retained catch. The Criterion 2 rating is determined as follows:

- *Score >3.2=Green or Low Concern*
- *Score >2.2 and <=3.2=Yellow or Moderate Concern*
- *Score <=2.2=Red or High Concern*

Rating is Critical if Factor 2.3 (Fishing Mortality) is Critical.

Criterion 2 Summary

Only the lowest scoring main species is/are listed in the table and text in this Criterion 2 section; a full list and assessment of the main species can be found in Appendix A.

Black seabream				
Region / Method	Factors 2.1-2.3		Factor 2.4 Discard Rate Modifying Score ((Discards+ Bait)/Retained Catch)	Criterion 2 Score
	Lowest Scoring of Other Species	Lowest Species Subscore		
France English Channel, Trawl, Bottom	Atlantic cod and European sea bass	1.414	0.75 (>100%)	Red (1.06)
France English Channel, Trawl, Midwater	Atlantic horse mackerel	1.732	1.00 (<20%)	Red (1.73)
United Kingdom English Channel, Gillnet, Bottom	Atlantic cod and European sea bass	1.414	0.90 (40-60%)	Red (1.27)
United Kingdom English Channel, Handline	Atlantic cod and European sea bass	1.414	1.00 (<20%)	Red (1.41)
United Kingdom English Channel, Trawl, Bottom	Atlantic cod and European sea bass	1.414	0.75 (>100%)	Red (1.06)

For the French fisheries that catch black seabream, information from at-sea observer programs, as well as expert input, was used to identify the main species in these fisheries. In the French mid-water trawl fishery, black seabream is the main target species. Limited at-sea observer data for this fishery in 1996 indicates that the main other species caught in this fishery is European horse mackerel (21% of catches) (Morizur et al. 1996). More recent at-sea observer data (2010-2012) for mid-water trawls that target either black seabream or European sea bass indicates that catches of others species are very low (<5% of total catch), but data specific to only the black seabream fishery is not available. The most commonly reported bycatch species were Atlantic mackerel. European horse mackerel, whiting, starry smoothound, John dorry, and red gurnard (Fauconnet et al. 2011)(Cornou et al. 2013)(Dube et al. 2012). For this criterion, we chose to evaluate European horse mackerel because there is a concern about current fishing levels on this species and it may be commonly captured in the black seabream mid-water trawl fishery. European sea bass was not evaluated because black seabream and European sea bass are not commonly caught together in mid-water trawls (they are separate fisheries) (Morizur et al. 1996)(Fauconnet et al. 2011)(Cornou et al. 2013)(Dube et al. 2012)(Cornou et al. 2013). In mid-water trawl fisheries in the English Channel, there is concern about incidental catches of the short-beaked common dolphin, so this species was also evaluated. However, catches of common dolphins seem to mostly be a concern in the fisheries that target European sea bass (ICES 2014d), and less of a concern in those for black seabream.

Identifying the main species caught in the French bottom trawl fisheries that catch black seabream was challenging because they are caught as a minor component (1-2% of total catch) in several different demersal fisheries, and at-sea observer coverage rates in these fisheries are low. They may be frequently caught in fisheries with whiting, cod, and European sea bass, and other species that may be caught include horse mackerel, Atlantic mackerel, Atlantic herring, dab, pouting, red mullet, gurnard, European plaice, dogfish, and some skates and rays (Cornou et al. 2013)(Dube et al. 2012). Within this criteria we chose to evaluate the major species that are likely caught with black seabream, as well as species of concern; these included: whiting, Atlantic cod, European sea bass, horse mackerel, and skates/rays. Species not evaluated were either in good condition in the English Channel, likely only caught with black seabream rarely, or had no data with which to evaluate their status.

Quantitative information on other retained and bycatch species caught in the UK black seabream fisheries in the English Channel is not available. The main species that are reported caught in the UK black seabream fisheries are Atlantic cod, European sea bass, wrasse, and skates and rays (gillnets and trawls only) (Carleton, et al. 2009). Most bycatch species are retained and landed; however, juveniles are typically discarded due to minimum landing sizes. The percentage of the catch that these species comprise in the black seabream fisheries is unknown.

The lowest scoring species in the French mid-water trawl fishery was European horse mackerel, because overfishing on horse mackerel is occurring. The lowest scoring species in the French bottom trawl fishery and the UK fisheries were Atlantic cod and European sea bass because these species are at low abundances and fishing levels on these species are too high. Discards (amount of fish thrown back to

sea) are high in the bottom trawl fisheries, moderate for the gillnet fisheries, and low for the mid-water trawl and handline fisheries.

Criterion 2 Assessment

ATLANTIC COD

Factor 2.1 - Inherent Vulnerability

Scoring Guidelines (same as Factor 1.1 above)

France English Channel, Trawl, Bottom
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

High

The FishBase vulnerability score of Atlantic cod is 71 out of 100, which indicates that this species has a high inherent vulnerability to fishing (Froese and Pauly 2011). Atlantic cod can live up to 25 years and grow to a length of 150cm. They reach sexual maturity at 4-5 years of age and at a length of 68-78cm. Cod broadcast spawn in the eastern English Channel from January through April. A female can produce 3 million to 6 million planktonic eggs during each spawning (Vause and Clark 2011). Atlantic cod are high-level predators within the food chain.

Factor 2.2 - Abundance

Scoring Guidelines (same as Factor 1.2 above)

France English Channel, Trawl, Bottom
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

High Concern

The abundance of Atlantic cod for the North Sea and Eastern English Channel population reached a historic low in 2006. Since then, the population of Atlantic cod has gradually improved, though recruitment of Atlantic cod (amount of new fish entering the population) has been low since 1998 (ICES 2013a). From 1998 to 2012, the abundance of cod remained below the limit abundance reference point of 70,000 t, established by the International Council for the Exploration of the Sea (ICES). In 2013, the abundance of Atlantic cod reached the limit reference point but is still below the precautionary abundance reference point (150,000 t) (ICES 2013a). No estimate of the abundance/biomass at maximum sustainable yield (BMSY) is available, but the precautionary abundance reference point set by ICES is generally less conservative than BMSY. Therefore, although abundance is at the limit abundance reference point established by ICES, abundance is likely still well below BMSY (i.e., < 50% of BMSY) and thus Atlantic cod is considered overfished or depleted by Seafood Watch standards. For the Celtic Sea

Atlantic cod population, which includes the Western English Channel, abundance of cod has increased since a low in the early-mid 2000's and now is above both the limit and precautionary abundance reference points. However, the population has started to decline again in recent years due to poor recruitment and fishing mortality on this population continues to remain above a sustainable level (ICES 2014a). Since Atlantic cod are considered depleted in the Eastern Channel, this factor is rated "high concern".

Factor 2.3 - Fishing Mortality

Scoring Guidelines (same as Factor 1.3 above)

France English Channel, Trawl, Bottom
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

High Concern

There have been strict total allowable catch limit (TAC) regulations in recent years for Atlantic cod, which has limited catches of this species. Since 2000, due to the reduced catch limits, the fishing mortality of Atlantic cod has declined, but still remains above a sustainable level. The most recent population assessment for Atlantic cod in the North Sea and Eastern English Channel indicated that fishing mortality is around 0.4, which is above the fishing mortality at maximum sustainable yield (FMSY) proxy of 0.19 (ICES 2013a). Fishing levels also remain above FMSY on the Celtic Sea cod population, which includes the Western English Channel (ICES 2014a). Since overfishing is occurring, but management measures are in place, this factor is rated "high concern".

EUROPEAN HORSE MACKEREL

Factor 2.1 - Inherent Vulnerability

Scoring Guidelines (same as Factor 1.1 above)

France English Channel, Trawl, Midwater

Medium

The Fishbase vulnerability score for European horse mackerel is 53 out of 100, indicating this species has a medium vulnerability to fishing (Froese and Pauly 2011). They may grow up to 70 cm in length and reach sexual maturity at an early age (3-4 years) (Froese and Pauly 2011). Horse mackerel recruitment (amount of new fish entering the population) is characterized by infrequent large year classes (ICES 2014f)(ICES 2014g).

Factor 2.2 - Abundance

Scoring Guidelines (same as Factor 1.2 above)

France English Channel, Trawl, Midwater

Moderate Concern

The 2014 assessment of the North Sea horse mackerel population, which includes the eastern English Channel, indicates that abundance is at a low but stable level. Scientists believe abundance is likely below the target level, but no formal abundance targets or reference points have been defined (ICES 2014f). For the western horse mackerel population, which includes the western English Channel, horse mackerel abundance declined from 1988 to 2001, reaching a low. Abundance then increased some, but has declined again in recent years. The 2013 abundance is near the 2001 low abundance level, and is expected to decline further in 2014. Formal abundance targets/reference points have not been defined for this population either (ICES 2014g). We have awarded a moderate concern score for both populations because it is uncertain if they are overfished/depleted and horse mackerel have only a medium vulnerability to fishing.

Factor 2.3 - Fishing Mortality

Scoring Guidelines (same as Factor 1.3 above)

France English Channel, Trawl, Midwater

High Concern

For the North Sea horse mackerel population, which includes the eastern English Channel, fishing mortality targets have not been defined but exploratory assessments suggest current fishing levels are likely well above target levels (3-6 times higher). The majority of the horse mackerel catches on this population occur in the eastern English Channel (ICES 2014f). Scientists have advised that a significant reduction in catch of greater than 20% is needed for 2015. Total allowable catch limits are set for the North Sea horse mackerel population, but a management plan is not in place (ICES 2014f). For the Western horse mackerel population (includes Western English Channel), fishing levels were sustainable during most of the 2000's. However, in recent years fishing levels have increased to above the fishing mortality at maximum sustainable yield (FMSY), indicating overfishing is currently occurring (ICES 2014g). Catch limits are in place for this horse mackerel population and a management plan is in development (ICES 2014g). Limited at-sea observer information specific to the black seabream mid-water trawl fishery in 1996, indicated that European horse mackerel made up 21% of the total catch, with most being retained (Morizur et al. 1996). More recent observer data for mid-water trawl fisheries targeting either black seabream or European sea bass, indicates they make up <5% of the total catch, but the proportion of the catch they make up on trips targeting only black seabream is not reported (Fauconnet et al. 2011)(Cornou et al. 2013)(Dube et al. 2012). We have awarded a high concern score since fishing levels on horse mackerel are high and mid-water trawls account for most of this mortality.

EUROPEAN SEA BASS

Factor 2.1 - Inherent Vulnerability

Scoring Guidelines (same as Factor 1.1 above)

France English Channel, Trawl, Bottom

United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

High

The FishBase vulnerability score for European sea bass is 57 out of 100 which indicates they have a high inherent vulnerability to fishing (Froese and Pauly 2011). European sea bass can grow up to 1m in length and live up to 25 years old. Males reach sexual maturity between 4-7 years of age and at a length of 31-35cm. Females reach sexual maturity between 4-8 years and at a length of 40-45cm. Bass spawn in the English Channel from February to June and a female can lay up to 2 million planktonic eggs (Vause and Clark 2011). European sea bass form spawning aggregations and also exhibit high site fidelity, which increases their vulnerability to overfishing. They are high-level predators within the food chain.

Factor 2.2 - Abundance

Scoring Guidelines (same as Factor 1.2 above)

France English Channel, Trawl, Bottom
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

High Concern

Despite having biological sampling information on European sea bass since 1985, target abundance reference points/goals have not been determined (Carleton et al. 2009)(ICES 2014e). The recent 2014 assessment of the Irish Sea, Celtic Sea, English Channel, and southern North Sea European sea bass population, indicates that abundance increased from 1990 to the mid-late 2000's, but that abundance has rapidly declined in recent years and is now near the lowest observed abundance (ICES 2013b)(ICES 2014e). Recruitment (amount of new fish entering the population) has been declining since the mid-2000's and has been very low since 2008 (ICES 2014e). Because European sea bass have a high vulnerability to fishing and abundance relative to abundance reference points is unknown but abundance is rapidly declining, this factor is rated "high concern."

Factor 2.3 - Fishing Mortality

Scoring Guidelines (same as Factor 1.3 above)

France English Channel, Trawl, Bottom
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

High Concern

Prior to 2014 fishing mortality targets/reference points were undefined for the Irish Sea, Celtic Sea, English Channel, and southern North Sea European sea bass population, though there were indications

that fishing levels were above sustainable levels (ICES 2013b). The recent 2014 assessment defined a fishing mortality at maximum sustainable yield (FMSY) target, and determined that fishing levels on European sea bass have been above this target level for the entire evaluated time series, 1985-2013, indicating overfishing is occurring. Fishing levels have been increasing and current fishing levels are 2.5 times the FMSY level (ICES 2014e). Scientists have advised that a management plan is urgently needed to develop strategies to substantially reduce fishing on this species, and that landings (retained catches) should be reduced to around 1/4 of their current level (ICES 2014e). In the UK and France, pelagic trawls account for 37% of retained European sea bass catches, bottom trawls 21%, gillnets 13%, and lines 12% (ICES 2014e). There is a European wide minimum landing size of 36 inches for this species and additional national restrictions are also in place. In France and the UK, there is a 5 t per week bass limit for trawling vessel between January 1-April 30, and in the UK there are 37 key sea bass nursery areas that are closed to sea bass fishing (Carleton et al. 2009)(Seafish 2013) (MMO 2013c). However, total allowable catch (TAC) limits have not been established for European sea bass. Because overfishing on European sea bass is occurring, this factor is rated "high concern".

ALL SPECIES

Factor 2.4 – Modifying Factor: Discards and Bait Use

Scoring Guidelines

The discard rate is the sum of all dead discards (i.e. non-retained catch) plus bait use divided by the total retained catch.

Ratio of bait + discards/landings	Factor 2.4 score
<20%	1
20-40%	0.95
40-60%	0.9
60-80%	0.85
80-100%	0.8
>100%	0.75

France English Channel, Trawl, Bottom

> 100%

Some information on discards (fish thrown back to sea) in the French fisheries is available from at-sea observer programs, though observer coverage rates are low (0.5-1.5% of total days at sea). Discard rates (discards/retained catch) range from 57% to 167% for demersal trawl fisheries in the English Channel (Cornou et al. 2013)(Dube et al. 2012). Because discard rates for several demersal trawl fisheries were estimated to be greater than 100%, we have awarded the lowest score.

France English Channel, Trawl, Midwater

< 20%

Some information on discards (fish thrown back to sea) is available from at-sea observer programs, though observer coverage rates are low (1.5% of the total fishing days at sea). Discards rates (discards/retained catch) for mid-water trawls fisheries targeting either black seabream or European sea bass have been reported to range from 1-17% in 2010-2012. The most commonly discarded species were whiting, Atlantic mackerel, horse mackerel, Atlantic herring, and starry smoothhound (Fauconnet et al. 2011)(Cornou et al. 2013)(Dube et al. 2012).

United Kingdom English Channel, Gillnet, Bottom

40-60%

Discarded and retained catch information available from the English and Welsh fisheries in ICES sub-area VII, which includes the English Channel as well as the Celtic and Irish Seas, was used to provide an estimate of the discard to retained catch ratio for this fishery. According to the mean annual estimates of fish numbers discarded and retained in ICES sub-area VII by English and Welsh fishing vessels from 2002-2005, the discard to retained catch ratio for netting gears, including trammel, tangle, and unspecified gillnets, was 57 percent (Enever et al. 2007).

United Kingdom English Channel, Handline

< 20%

Data on discards (fish thrown back to sea) and bait use was unavailable for the handline fishery. The most common fish baits used to catch black seabream are mackerel, herring, squid strip, and sandeel (British Sea Fishing 2013). According to a 2005 global review study, the average discard/retained catch ratio for handlines is 2% (Kelleher 2005). Given that handline fisheries tend to be fairly selective and that fish can often be returned back to sea unharmed, a discard rate of less than 20% is assumed.

United Kingdom English Channel, Trawl, Bottom

> 100%

Discarded and retained catch information from the English and Welsh fisheries in ICES sub-area VII, which includes the English Channel as well as the Celtic and Irish Seas, was used to provide an estimate of the discard to retained catch ratio for this fishery. Black bream are caught with both pair trawls and otter trawls. According to the mean annual estimates of fish numbers discarded and retained in ICES sub-area VII by English and Welsh fishing vessels from 2002-2005, the discard to retained catch ratio for bottom pair trawl, mid-water trawl and mid-water pair trawl, was 75 percent (Enever et al. 2007). However, for otter trawl gear, the discard to retained catch ratio was 182% (Enever et al. 2007). Therefore, we have rated the discard rate as >100%.

Criterion 3: Management effectiveness

Management is separated into management of retained species (harvest strategy) and management of non-retained species (bycatch strategy).

The final score for this criterion is the geometric mean of the two scores. The Criterion 3 rating is determined as follows:

- *Score >3.2=Green or Low Concern*
- *Score >2.2 and <=3.2=Yellow or Moderate Concern*
- *Score <=2.2 or either the Harvest Strategy (Factor 3.1) or Bycatch Management Strategy (Factor 3.2) is Very High Concern = Red or High Concern*

Rating is Critical if either or both of Harvest Strategy (Factor 3.1) and Bycatch Management Strategy (Factor 3.2) ratings are Critical.

Criterion 3 Summary

Region / Method	Factor 3.1 Harvest Strategy	Factor 3.2 Bycatch Management Strategy	Criterion 3 Score
France English Channel Trawl, Bottom	3.00: Moderate Concern	3.00: Moderate Concern	Yellow(3.000)
France English Channel Trawl, Midwater	2.00: High Concern	3.00: Moderate Concern	Yellow(2.449)
United Kingdom English Channel Gillnet, Bottom	3.00: Moderate Concern	2.00: High Concern	Yellow(2.449)
United Kingdom English Channel Handline	3.00: Moderate Concern	All Species Retained	Yellow(3.000)
United Kingdom English Channel Trawl, Bottom	3.00: Moderate Concern	2.00: High Concern	Yellow(2.449)

There are minimal management measures in place specific to black seabream. The only European Union regulation in place for this species is a restriction on the mesh size of trawls with a catch of 70% black seabream or greater. However, a few additional regulations have been implemented in the UK. No catch limits or management plans have been established for black seabream, and limited research on black seabream is conducted. Because of this, the Harvest Strategy for the French mid-water trawl fishery that only targets black seabream is rated as "high concern". For the other fisheries, the Harvest Strategy is "moderate" because these fisheries catch smaller amount of black seabream and they target/catch other species that are assessed and managed.

Bycatch in the UK gillnet and trawls fisheries is rated "high concern" because although some bycatch measures are in place, there is no or minimal collection of bycatch data. For the UK handline fishery, all

species are considered to be retained, so bycatch management was not rated. Bycatch management in the French fisheries scores "moderate" because some bycatch measures are in place and some bycatch data is collected.

Factor 3.1: Harvest Strategy

Scoring Guidelines

Seven subfactors are evaluated: Management Strategy, Recovery of Species of Concern, Scientific Research/Monitoring, Following of Scientific Advice, Enforcement of Regulations, Management Track Record, and Inclusion of Stakeholders. Each is rated as 'ineffective,' 'moderately effective,' or 'highly effective.'

- *5 (Very Low Concern)—Rated as 'highly effective' for all seven subfactors considered.*
- *4 (Low Concern)—Management Strategy and Recovery of Species of Concern rated 'highly effective' and all other subfactors rated at least 'moderately effective.'*
- *3 (Moderate Concern)—All subfactors rated at least 'moderately effective.'*
- *2 (High Concern)—At minimum, meets standards for 'moderately effective' for Management Strategy and Recovery of Species of Concern, but at least one other subfactor rated 'ineffective.'*
- *1 (Very High Concern)—Management exists, but Management Strategy and/or Recovery of Species of Concern rated 'ineffective.'*
- *0 (Critical)—No management exists when there is a clear need for management (i.e., fishery catches threatened, endangered, or high concern species), OR there is a high level of Illegal, unregulated, and unreported fishing occurring.*

Factor 3.1 Summary

Factor 3.1: Harvest Strategy								
Region/Method	**Management Strategy and Impl.**	**Recovery of Species of Concern**	**Scientific Research & Monitoring**	**Record of Following Scientific Advice**	**Enforcement of Regs.**	**Track Record**	**Stakeholder Inclusion**	**Factor 3.1 Score**
France English Channel Trawl, Bottom	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	3:00 Moderate Concern
France English Channel Trawl, Midwater	Moderately Effective	N/A	Ineffective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	2:00 High Concern
United Kingdom English Channel Gillnet, Bottom	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	3:00 Moderate Concern

United Kingdom English Channel Handline	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	3:00 Moderate Concern
United Kingdom English Channel Trawl, Bottom	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	3:00 Moderate Concern

Factor 3.1 Assessment

Subfactor 3.1.1 – Management Strategy and Implementation

Considerations: What type of management measures are in place? Are there appropriate management goals, and is there evidence that management goals are being met? To achieve a highly effective rating, there must be appropriate management goals, and evidence that the measures in place have been successful at maintaining/rebuilding species.

France English Channel, Trawl, Bottom

Moderately Effective

All the countries that are a member of the European Union (EU) implement the Common Fisheries Policy (CFP) in community waters. The CFP has been in place since 1983 and functions as the forum to define a common baseline for sustainable fishing. It also prevents and resolves disputes on how EU members will share marine resources (European Commission 2009). Recently the Common Fisheries Policy was reformed (European Commission 2014b). The French Ministry of Food, Agriculture and Fisheries is responsible for marine fisheries in France.

There are minimal management measures in place specific to black seabream. The only European Union regulation in place for this species is a restriction on the mesh size of trawls with a catch of 70% black seabream or greater (Peacock 2012). No catch limits or management plans have been established for black seabream, even though the Common Fisheries Policy provides a solid framework for the potential management of all European fisheries (Peacock 2012). There is very limited information collected on black seabream, so the status of this species is uncertain.

In the French bottom trawl fisheries, however, black seabream are primarily caught as a minor bycatch species in fisheries targeting other demersal species, such as whiting and cod. Therefore management measures for these species and other demersal species are mainly influencing catches of black seabream. Catch limits are in place for Atlantic cod, and a long-term management plan that includes fishing effort controls is in place for the North Sea/eastern English Channel population to rebuild this species (ICES 2013a)(ICES 2014a). Catch limits and a management plan that has been considered precautionary are in place for the North Sea/eastern English Channel whiting population (ICES 2014b). A management plan is not in place for the Celtic Sea/western English Channel whiting population, but catch limits are in place (ICES 2014c). Another important species that is also caught in the French bottom trawl fisheries is European sea bass. While some regulations are in place for European sea bass, a recent assessment of European sea bass indicates that overfishing has been occurring on this species

since the 1980's and that the population is rapidly declining in recent years. No catch limits are currently in place for European sea bass (ICES 2014e).

Because a variety of species are caught in the French bottom trawl fisheries and management effectiveness is mixed, we have awarded a "moderately effective" score.

France English Channel, Trawl, Midwater

Moderately Effective

All the countries that are a member of the European Union (EU) implement the Common Fisheries Policy (CFP) in community waters. The CFP has been in place since 1983 and functions as the forum to define a common baseline for sustainable fishing. It also prevents and resolves disputes on how EU members will share marine resources (European Commission 2009). Recently the Common Fisheries Policy was reformed (European Commission 2014b). The French Ministry of Food, Agriculture and Fisheries is responsible for marine fisheries in France.

There are few management measures in place specific to black seabream. The only European Union regulation for this species is a restriction on the mesh size of trawls with a catch of 70% black seabream or greater (Peacock 2012). No catch limits or management plans have been established for black seabream, even though the Common Fisheries Policy provides a solid framework for the potential management of all European fisheries (Peacock 2012). There is very limited information collected on black seabream, so the status of this species is uncertain.

Although limited management for black seabream is in place, because there is no indication this species is being depleted, we have rated this factor "moderately effective".

United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Moderately Effective

All the countries that are a member of the European Union (EU) implement the Common Fisheries Policy (CFP) in community waters. The CFP has been in place since 1983 and functions as the forum to define a common baseline for sustainable fishing. It also prevents and resolves disputes on how EU members will share marine resources (European Commission 2009). Recently the Common Fisheries Policy was reformed (European Commission 2014b). The Centre for Environment, Fisheries and Aquaculture Science (CEFAS) helps shape and implement policy in the UK (CEFAS 2013)(Peacock 2012). In addition, Inshore Fisheries and Conservation Authorities (IFCAs) are tasked with ensuring sustainable management of UK inshore sea fisheries resources at the local level, within 6 nautical miles of the shore (Southern IFCA 2013b).

Few management measures specific to black seabream are in place. The only European Union regulation for this species is a restriction on the mesh size of trawls with a catch of 70% black seabream or greater

(Peacock 2012). No catch limits or management plans have been established for black seabream, even though the Common Fisheries Policy provides a solid framework for the potential management of all European fisheries (Peacock 2012). The UK Inshore Fisheries Conservation Authorities (IFCA) have established some additional regulations beyond those of the EU such as gear restrictions and seasonal closures in the Sussex district (Sussex IFCA 2013d)(Sussex IFCA 2013c) and a minimum landing size of 23 cm for black seabream in the Southern and Cornwall districts (Southern IFCA 2013a)(Cornwall IFCA 2014). However, while this minimum size limit protects juvenile females, which sexually mature around 20 cm, it does not protect juvenile males, because this species is hermaphroditic and does not change sex from female to male until they reach 30-40 cm in length. Additionally, without a maximum size limit, this could result in the predominant targeting of males (Sussex IFCA 2013a). There is very limited information collected on black seabream, so the status of this species is uncertain.

An important species that is often caught along with black seabream is European sea bass. The official minimum landing size for European sea bass is 36 cm (EC regulation 850/98). In addition, a variety of national restrictions on commercial and/or recreational sea bass fishing are also in place, including licensing (specific sea bass licensing introduced in France from 2012), individual landings limitations, larger minimum landing size (MLS), seasonal/area closures, and weekly limits on individual vessel landings (ICES 2014e). However, there is no management plan in place for this species and no catch limits. A recent assessment of European sea bass indicates that overfishing has been occurring on the species since the 1980's and that population is rapidly declining in recent years. Scientists have recommended that a management plan and strategies to reduce fishing be developed immediately (ICES 2014e). Other species that may be caught with black seabream are Atlantic cod, wrasse, and skates and rays. Catch limits are in place for Atlantic cod, and a long-term management plan that includes fishing effort controls is in place for the North Sea/eastern English Channel population to rebuild this species (ICES 2013a)(ICES 2014a). Catch limits are also in place for skates and rays (ICES 2012a).

Although limited management for black seabream is in place, because there is no indication this species is being depleted, and management of other species caught along with black seabream is mixed, we have awarded a "moderately effective" score.

Subfactor 3.1.2 – Recovery of Species of Concern

Considerations: When needed, are recovery strategies/management measures in place to rebuild overfished/threatened/ endangered species or to limit fishery's impact on these species and what is their likelihood of success? To achieve a rating of Highly Effective, rebuilding strategies that have a high likelihood of success in an appropriate timeframe must be in place when needed, as well as measures to minimize mortality for any overfished/threatened/ endangered species.

France English Channel, Trawl, Bottom
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline

United Kingdom English Channel, Trawl, Bottom

Moderately Effective

Some species of concern are retained in the English Channel bottom trawl, gillnet, and handline fisheries that catch black seabream. The North Sea/Eastern English Channel Atlantic cod population has been considered "overfished", though in 2013 the abundance of Atlantic cod had increased to the established limit reference point and the population could be considered "in recovery" (ICES 2013a). Catch limits and a long-term management plan that includes fishing effort controls are in place for this population. Fishing mortality of Atlantic cod has been declining since 2000, but fishing levels still remain about target levels (ICES 2013a).

There is also concern about the status of European sea bass, because abundance has been rapidly declining in recent years and fishing levels are well above sustainable levels. This species is not officially considered depleted/overfished but managers have recommended that fishing levels be substantially reduced and a management plan implemented (ICES 2014e).

Some vulnerable and endangered species of skates and rays are also caught (some may be retained while others are discarded). Total allowable catch (TAC) restrictions have been implemented in most European waters to protect skates and rays, however there are concerns that the TAC regulations are not adequate to control fishing mortality; additional management regulations are being considered (Seafish 2011)(ICES 2013c).

This factor is deemed "moderately effective".

France English Channel, Trawl, Midwater

N/A

In the French mid-water trawl fishery, black seabream is the main target species. The status of black seabream is uncertain, but there is no evidence that black seabream is depleted. We have therefore rated this factor N/A.

Subfactor 3.1.3 – Scientific Research and Monitoring

Considerations: How much and what types of data are collected to evaluate the health of the population and the fishery's impact on the species? To achieve a Highly Effective rating, population assessments must be conducted regularly and they must be robust enough to reliably determine the population status.

France English Channel, Trawl, Bottom
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Moderately Effective

There is very limited evidence of any research into black seabream populations in the English Channel.

Black seabream are caught in French abundance surveys in the English Channel, but this data is not analyzed. The International Council for the exploration of the Seas (ICES) does not assess or issue advice on black seabream, and no population assessment has been conducted (Carleton et al. 2009)(Peacock 2012). Catch data is the only information collected for black seabream. The European Union only requires vessels over 10 meters to report their catches, fishing effort, and estimated discards in logbooks but France requires vessels less than 10m to comply with this regulation as well (Ifremer 2013b). For the UK vessels under 10 m, landings are reported where the fish are sold or data has been provided voluntarily (MMO 2014).

Research is conducted for other species caught in the bottom trawl, gillnet, and handline fisheries that catch black seabream. The International Council for the Exploration of the Sea assesses and provides advice for European sea bass, Atlantic cod, whiting, and skates and rays. High amounts of data are collected for some species, like Atlantic cod, while for other species, like European sea bass and skates and rays, more research is needed (ICES 2012a)(ICES 2013a)(ICES 2014a)(ICES 2014b)(ICES 2014c)(ICES 2014e).

Although limited information is collected for black seabream, because catches of black seabream by these fisheries are small and research is conducted on the other species caught in these fisheries, we have awarded a score of "moderately effective".

France English Channel, Trawl, Midwater

Ineffective

There is very limited evidence of any research into black seabream populations in the English Channel. Black seabream are caught in French abundance surveys in the English Channel, but this data is not analyzed. The International Council for the exploration of the Seas (ICES) does not assess or issue advice on black seabream, and no population assessment has been conducted (Carleton et al. 2009)(Peacock 2012). Catch data is the only information collected for black seabream. The European Union only requires vessels over 10 meters to report their catches, fishing effort, and estimated discards in logbooks, but France requires vessels less than 10m to comply with this regulation as well (Ifremer 2013b). Because black seabream is the only main target species in the France mid-water trawl fishery and very minimal data on the abundance and health of the black seabream population is collected, we have rated this factor "ineffective".

Subfactor 3.1.4 – Management Record of Following Scientific Advice

Considerations: How often (always, sometimes, rarely) do managers of the fishery follow scientific recommendations/advice (e.g. do they set catch limits at recommended levels)? A Highly Effective rating is given if managers nearly always follow scientific advice.

France English Channel, Trawl, Bottom
France English Channel, Trawl, Midwater
United Kingdom English Channel, Gillnet, Bottom

United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Moderately Effective

There has been little scientific advice provided for black seabream, so it is difficult to score this factor. However, the International Council on Exploration of the Seas (ICES) provides advice to the European Union for some of the other species caught with black seabream, including Atlantic cod, European sea bass, whiting, horse mackerel, and skates and rays. Overall, managers appear to sometimes, but not always, follow scientific advice. For example, the European Union 2009 plan for Atlantic cod is in accordance with the precautionary approach and follows ICES advice (ICES 2013a). However, for European sea bass ICES has advised that fishing levels should be reduced, but managers have yet to implement catch restrictions for this species (ICES 2013b). Additionally, it has been noted that for many species caught in the European Union, many of the total allowable catches (TACs) set into place by the Common Fisheries Policy (CFP) continue to be set above the levels which scientists advise are sustainable (European Commission 2009). Since management only sometimes follows scientific advice, this factor is ranked "moderately effective".

Subfactor 3.1.5 – Enforcement of Management Regulations

Considerations: Do fishermen comply with regulations, and how is this monitored? To achieve a Highly Effective rating, there must be regular enforcement of regulations and verification of compliance.

France English Channel, Trawl, Bottom
France English Channel, Trawl, Midwater

Moderately Effective

In 2010, the European Union Common Fisheries Policy (CFP) set up control regulations to ensure that the Common Fisheries Policy rules are being properly and uniformly enforced in all European countries. The enforcement of French fisheries is carried out by the French navy, maritime affairs, customs, and other French government agencies. Fishing and seafood are subject to checks conducted from vessels and aircraft as well as on land. The seafood is monitored at different stages of the industry, from the fishing net to the consumer's plate, in order to deter illegal fishing and ensure compliance with the Common Fisheries Policy standards (The Ministry of Ecology, Sustainable Development, and Energy 2013). Vessels >12 meters fishing under the French flag must be able to transmit their position, course, and speed through a vessel monitoring system (VMS) (European Union 2009). However, there are a number of small vessels (<12 m) that fish in the English Channel, for which vessel monitoring systems are not required. This factor is deemed "moderately effective".

United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Moderately Effective

In 2010, the European Union Common Fisheries Policy (CFP) set up control regulations to ensure that the Common Fisheries Policy rules are being properly and uniformly enforced in all European countries. The Marine Management Organization (MMO) coordinates an enforcement program for fishing that takes place in British fishery limits and for English vessels operating in other waters. The program includes the inspection of fishing vessels at sea and in port, inspections of fishing industry premises, fish markets and other locations around the coast by marine enforcement officers. Inspections at sea are carried out by the Royal Navy's Fishery Protection Squadron operating under an agreement with MMO. Aerial surveillance is conducted under contract by Directflight Ltd. The Marine Management Organization also operates a satellite-based vessel monitoring system (VMS). The Vessel Monitoring System is used to track the positions of fishing vessels exceeding 12 meters in length (MMO 2013a). However, there are a number of small vessels (<12 m) that fish in the English Channel, for which vessel monitoring systems are not required. Some enforcement measures area also applied at the local level by the Inshore Fisheries and Conservation Authorities (IFCAs). For instance, Sussex IFCA tries to maximize voluntary compliance through education, involvement of stakeholders, and providing incentives to comply with the rules. Monitoring and surveillance is done by IFCAs through land and sea based patrols and offenders may face financial penalties (Sussex IFCA 2013b). This factor is ranked "moderately effective".

Subfactor 3.1.6 – Management Track Record

Considerations: Does management have a history of successfully maintaining populations at sustainable levels or a history of failing to maintain populations at sustainable levels? A Highly Effective rating is given if measures enacted by management have been shown to result in the long-term maintenance of species overtime.

France English Channel, Trawl, Bottom
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Moderately Effective

There are very limited management measures in place to maintain the abundance of black seabream in the English Channel. There is no evidence suggesting black seabream is in decline or in need of recovery, but limited information is collected on this species so their status remains uncertain. Management effectiveness for other species that are caught along with black seabream in the bottom trawl, gillnet, and handline fisheries has been mixed. For example, management measures for Atlantic cod have resulted in an increase in their abundance and a decrease in fishing mortality in recent years (ICES 2013a). However, for European sea bass, a recent assessment indicates that fishing levels on European sea bass have been above sustainable levels since the 1980's, and the population has been rapidly declining in recent years. There is currently no management plan in place for European sea bass, but scientists have recommended that this be immediately developed (ICES 2013b)(ICES 2014e). We have rated this factor "moderately effective".

France English Channel, Trawl, Midwater

Moderately Effective

There are very limited management measures in place to maintain the abundance of black seabream in the English Channel. There is no evidence suggesting that the species is in decline or in need of recovery, but limited information is collected on this species so their status remains uncertain. We have therefore rated management track record as "moderately effective".

Subfactor 3.1.7 – Stakeholder Inclusion

Considerations: Are stakeholders involved/included in the decision-making process? Stakeholders are individuals/groups/organizations that have an interest in the fishery or that may be affected by the management of the fishery (e.g., fishermen, conservation groups, etc.). A Highly Effective rating is given if the management process is transparent and includes stakeholder input.

France English Channel, Trawl, Bottom
France English Channel, Trawl, Midwater
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Highly Effective

Prior to 2002, there was a major lack of trust between stakeholders and regulators in the European Union (EU). The 2002 reform of EU's Common Fisheries Policy (CFP) addressed this issue by promoting greater involvement of stakeholders in all aspects of policy development. Ensuring that the stakeholders voices are heard is now an integral part of the management framework of the Common Fisheries Policy (European Commission 2009). The Advisory Committee on Fisheries and Aquaculture (ACFA) was set up to provide industry advice to the Commission on fisheries issues and promote an ongoing dialogue. Today, the committee's 21 members come from the production sector, the processing industry and trade in fishery and aquaculture, and the interests of consumers, the environment and development. As well, stakeholder-led organizations, called Regional Advisory Councils (RACs), were created to advise the Commission on strategic policy decisions, drawing from the practical experiences of their members. These councils act as a forum in which fishers can start to work more closely with scientists, and overcome the barriers of mistrust which exist between them. They also provide a real opportunity for stakeholders from different sectors and different countries to meet regularly to discuss their common interests as well as their differences. (European Commission 2009). Stakeholder involvement at a more local level can also be seen in the UK Inshore Fisheries Conservation Authorities (IFCAs). IFCAs are made up of representatives from local authorities, commercial and recreational fishermen, environmental groups, and marine researchers. It is encouraged for stakeholders to be involved in the development of fisheries management which allows for a greater understanding, acceptance and compliance with the rules. IFCAs also help local authorities, local communities, local businesses and individual citizens to play a bigger part in protecting their marine environment (Southern IFCA 2013b)(Sussex IFCA 2013b). For these reasons, the stakeholder inclusion factor is ranked "highly effective".

Factor 3.2: Bycatch Management Strategy

Scoring Guidelines

Four subfactors are evaluated: Management Strategy and Implementation, Scientific Research and Monitoring, Record of Following Scientific Advice, and Enforcement of Regulations. Each is rated as 'ineffective,' 'moderately effective,' or 'highly effective.' Unless reason exists to rate Scientific Research and Monitoring, Record of Following Scientific Advice, and Enforcement of Regulations differently, these ratings are the same as in 3.1.

- *5 (Very Low Concern) —Rated as 'highly effective' for all four subfactors considered.*
- *4 (Low Concern) —Management Strategy rated 'highly effective' and all other subfactors rated at least 'moderately effective.'*
- *3 (Moderate Concern) — All subfactors rates at least 'moderately effective.'*
- *2 (High Concern) — At minimum, meets standards for 'moderately effective' for Management Strategy but some other factors rated 'ineffective.'*
- *1 (Very High Concern) —Management exists, but Management Strategy rated 'ineffective.'*
- *0 (Critical)— No bycatch management even when overfished, depleted, endangered or threatened species are known to be regular components of bycatch and are substantially impacted by the fishery.*

Factor 3.2 Summary

Region / Method	Management Strategy and Impl.	Scientific Research & Monitoring	Record of Following Scientific Advice	Enforcement of Regs.	Factor 3.2 Score
France English Channel Trawl, Bottom	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	3:00 Moderate Concern
France English Channel Trawl, Midwater	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	3:00 Moderate Concern
United Kingdom English Channel Gillnet, Bottom	Moderately Effective	Ineffective	Moderately Effective	Moderately Effective	2:00: High Concern
United Kingdom English Channel Handline	N/A	N/A	N/A	N/A	N/A
United Kingdom English Channel Trawl, Bottom	Moderately Effective	Ineffective	Moderately Effective	Moderately Effective	2:00: High Concern

Factor 3.2 Assessment

Subfactor 3.2.1 – Management Strategy and Implementation

Considerations: What type of management strategy/measures are in place to reduce the impacts of the fishery on bycatch species and how successful are these management measures? To achieve a Highly Effective rating, the primary bycatch species must be known and there must be clear goals and measures in place to minimize the impacts on bycatch species (e.g., catch limits, use of proven mitigation measures, etc.).

France English Channel, Trawl, Bottom
United Kingdom English Channel, Trawl, Bottom

Moderately Effective

Some management strategies are in place to reduce bycatch in the English Channel. The newly reformed Common Fisheries Policy (CFP) consists of various strategies to reduce bycatch such as, incentives to improve fishing gear selectivity, closures of high bycatch locations, levying charges on bycatch, and preferential access to fisheries granted on the basis of bycatch track records (Europa 2011). In addition, the new Common Fisheries Policy introduces a landing obligation, which will eventually eliminate the wasteful practice of discarding. To allow fishermen to adapt to the change, the landing obligation will be introduced gradually, between 2015 and 2019 for all commercial fisheries (species under catch limits, or under minimum size restrictions) in European waters. Under the landing obligation, all catches have to be kept on board, landed and counted against the catch limits. Undersized fish cannot be marketed for human consumption purposes (European Commission 2014a).

Gear modifications have been specified by the European Commission to minimize cod catches in trawls (Europa 2011). In the UK, the Sussex Inshore Fisheries Conservation Authority has a byelaw that prohibits trawling within 1⁄4 of a nautical mile of the shore between May 1st and October 30th; the purpose of the byelaw is to protect juvenile fish in this area (Sussex IFCA 2013c).

It is unclear how effective these management strategies are since there is limited information on bycatch. Therefore, this factor was deemed "moderately effective".

France English Channel, Trawl, Midwater

Moderately Effective

Bycatch or discards in this fishery are low, but there is concern about the incidental catches of the common dolphin in mid-water trawls in the English Channel. However, the main potential for dolphin bycatch is thought to occur in the mid-water trawls fisheries that target European sea bass. Bycatch in the mid-water trawls fisheries for black seabream is thought to be less of a concern (Morizur et al. 1996)(ICES 2014d)(IUCN 2013). A European Commission regulation (812/2004) has been established which specifies monitoring and mitigation requirements for fisheries where marine mammal bycatch is a concern. Based on this regulation, France is required to carry out at-sea monitoring in their mid-water trawl fisheries in the English Channel (ICES 2014d). France has established an at-sea observer

program for the mid-water trawl fisheries that target sea bass or black seabream in the English Channel, but coverage is low, particularly for the black seabream portion of the fishery (Cornou et al. 2013)(Dube et al. 2012). Further monitoring/better coverage is likely needed. No mitigation measures in the mid-water trawl fisheries are currently required, but some trials on the use of pingers and other deterrents have been tested (ICES 2014d). Because it is unclear if the black seabream fishery has an impact on the common dolphin and hence unclear if additional bycatch measures are needed, we have awarded a moderately effective score.

United Kingdom English Channel, Gillnet, Bottom

Moderately Effective

Some management strategies are in place to reduce bycatch in the English Channel. The newly reformed Common Fisheries Policy (CFP) consists of various strategies to reduce bycatch such as, incentives to improve fishing gear selectivity, closures of high bycatch locations, levying charges on bycatch, and preferential access to fisheries granted on the basis of bycatch track records (Europa 2011). In addition, the new Common Fisheries Policy introduces a landing obligation, which will eventually eliminate the wasteful practice of discarding. To allow fishermen to adapt to the change, the landing obligation will be introduced gradually, between 2015 and 2019 for all commercial fisheries (species under catch limits, or under minimum size restrictions) in European waters. Under the landing obligation, all catches have to be kept on board, landed and counted against the catch limits. Undersized fish cannot be marketed for human consumption purposes (European Commission 2014a).

In the UK fisheries, management strategies to limit bycatch include utilizing gear characteristics, fishing seasons, and fishing locations that help maximize catches of target species. As well, the Sussex Sea Fisheries District Committee byelaw states that from May 1st - September 30th gillnets must have a headline of at least 1.5m below the surface of the water at any state of the tide in order to reduce interaction with migratory and Endangered, Threatened, or Protected species (Carleton et al. 2009). A European regulation requiring certain vessels (over 12m) to use pingers (acoustic deterrent devices) to minimize the bycatch of harbor porpoises is also in place, however, the UK has so far only partially complied with this regulation (ICES 2014d). The effectiveness of current bycatch management strategies is uncertain. This factor is deemed "moderately effective".

Subfactor 3.2.2 – Scientific Research and Monitoring

Considerations: Is bycatch in the fishery recorded/documented and is there adequate monitoring of bycatch to measure fishery's impact on bycatch species? To achieve a Highly Effective rating, assessments must be conducted to determine the impact of the fishery on species of concern, and an adequate bycatch data collection program must be in place to ensure bycatch management goals are being met.

France English Channel, Trawl, Bottom

Moderately Effective

The European Union only requires vessels over 10 meters to report their catches, fishing effort, and

estimated discards in logbooks; however, France requires vessels less than 10 m to comply with this regulation as well (Ifremer 2013b). Some information on bycatch/discard rates in the French fisheries is available from at-sea observer programs, but coverage rates are low (0.5-1.5% of total days at sea)(Cornou et al. 2013)(Dube et al. 2012). Additionally, fisheries that target different species but use the same gear type are often combined in these at-sea observer reports, making it difficult to determine the species composition for the different fisheries. Discard rates in these fisheries are high, so further monitoring is likely needed. This factor is rated "moderately effective".

France English Channel, Trawl, Midwater

Moderately Effective

Incidental capture of common dolphins in European Atlantic fisheries has been well studied in recent years, and as a result of recent European Union legislation, at-sea observer programs are being carried out in most of the fisheries considered to have a potentially significant bycatch of common dolphins (Hammond et al. 2008)(Mannocci et al. 2012). This legislation requires France to have an at-sea observer program for their mid-water trawls fisheries in the English Channel (ICES 2014d). France has developed an at-sea observer program that covers the mid-water trawl fisheries for European sea bass and black seabream, but coverage is only 1.5% of the total days at sea, and is particularly low for the black seabream portion of the fishery (ICES 2014d)(Cornou et al. 2013)(Dube et al. 2012). Data for these two fisheries is combined, so the catch composition specific to the black seabream portion of the fishery remains unclear.

The European Union only requires vessels over 10 meters to report their catches, fishing effort, and estimated discards in logbooks; however, France requires vessels less than 10 m to comply with this regulation as well (Ifremer 2013b). This factor is rated "moderately effective".

United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Trawl, Bottom

Ineffective

Data collection in English Channel fisheries may occur through vessel monitoring systems (VMS), logbooks, and at-sea observer programs (European Union 2009), but the amount of data collection that occurs in the black seabream fisheries is uncertain. The European Union only requires vessels over 10 meters to report their catches, fishing effort, and estimated discards in logbooks. For the UK vessels under 10 m, data is only available when provided voluntarily (MMO 2014). At-sea observer coverage in the English Channel is typically low (Carleton et al. 2009). The Center for Environment, Fisheries, and Aquaculture Science (CEFAS) asked vessels under 10 m to volunteer in a self-sampling trial from July 2012-June 2014 in order to monitor discard patterns and to develop new strategies to reduce discards (Sussex IFCA 2012). It is unclear if any vessels from the black seabream fishery are participating in this self-sampling trial. Qualitative information on bycatch for the UK black seabream fisheries was not available. Since there is very minimal collection on bycatch in the UK fisheries that catch black seabream, we have rated this factor ineffective.

Subfactor 3.2.3 – Management Record of Following Scientific Advice

Considerations: How often (always, sometimes, rarely) do managers of the fishery follow scientific recommendations/advice (e.g., do they set catch limits at recommended levels)? A Highly Effective rating is given if managers nearly always follow scientific advice.

France English Channel, Trawl, Bottom
France English Channel, Trawl, Midwater
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Trawl, Bottom

Moderately Effective

Following of scientific advice for bycatch species is scored the same as following of scientific advice for retained species (factor 3.1.4). See the Harvest Strategy section for further details.

Subfactor 3.2.4 – Enforcement of Management Regulations

Considerations: Is there a monitoring/enforcement system in place to ensure fishermen follow management regulations and what is the level of fishermen's compliance with regulations? To achieve a Highly Effective rating, there must be consistent enforcement of regulations and verification of compliance.

France English Channel, Trawl, Bottom
France English Channel, Trawl, Midwater
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Trawl, Bottom

Moderately Effective

Enforcement of management regulations for the France and UK fisheries is considered moderately effective. See the Harvest Strategy section (factor 3.1.5) for further details.

Criterion 4: Impacts on the habitat and ecosystem

This Criterion assesses the impact of the fishery on seafloor habitats, and increases that base score if there are measures in place to mitigate any impacts. The fishery's overall impact on the ecosystem and food web and the use of ecosystem-based fisheries management (EBFM) principles is also evaluated. Ecosystem Based Fisheries Management aims to consider the interconnections among species and all natural and human stressors on the environment.

The final score is the geometric mean of the impact of fishing gear on habitat score (plus the mitigation of gear impacts score) and the Ecosystem Based Fishery Management score. The Criterion 2 rating is determined as follows:

- *Score >3.2=Green or Low Concern*
- *Score >2.2 and <=3.2=Yellow or Moderate Concern*
- *Score <=2.2=Red or High Concern*

Rating cannot be Critical for Criterion 4.

Criterion 4 Summary

Region / Method	Factor 4.1 Impact of Gear on Habitat Score	Factor 4.2 Mitigation of Gear Impacts Modifier	Factor 4.3 Ecosystem Based Fisheries Management Score	Criterion 4 Score
France English Channel Trawl, Bottom	2.00:Moderate Concern	0.25:Minimal Mitigation	3.00:Moderate Concern	**Yellow (2.598)**
France English Channel Trawl, Midwater	5.00:None	0.00:Not Applicable	3.00:Moderate Concern	**Green (3.873)**
United Kingdom English Channel Gillnet, Bottom	3.00:Low Concern	0.25:Minimal Mitigation	3.00:Moderate Concern	**Yellow (3.123)**
United Kingdom English Channel Handline	4.00:Very Low Concern	0.25:Minimal Mitigation	3.00:Moderate Concern	**Green (3.571)**
United Kingdom English Channel Trawl, Bottom	2.00:Moderate Concern	0.25:Minimal Mitigation	3.00:Moderate Concern	**Yellow (2.598)**

Criterion 4 Assessment

Factor 4.1 – Impact of Fishing Gear on the Habitat/Substrate

Scoring Guidelines

- *5 (None)—Fishing gear does not contact the bottom*
- *4 (Very Low)—Vertical line gear*

- *3 (Low)—Gears that contacts the bottom, but is not dragged along the bottom (e.g. gillnet, bottom longline, trap) and is not fished on sensitive habitats. Bottom seine on resilient mud/sand habitats. Midwater trawl that is known to contact bottom occasionally (*
- *2 (Moderate)—Bottom dragging gears (dredge, trawl) fished on resilient mud/sand habitats. Gillnet, trap, or bottom longline fished on sensitive boulder or coral reef habitat. Bottom seine except on mud/sand*
- *1 (High)—Hydraulic clam dredge. Dredge or trawl gear fished on moderately sensitive habitats (e.g., cobble or boulder)*
- *0 (Very High)—Dredge or trawl fished on biogenic habitat, (e.g., deep-sea corals, eelgrass and maerl)*

Note: When multiple habitat types are commonly encountered, and/or the habitat classification is uncertain, the score will be based on the most sensitive, plausible habitat type.

France English Channel, Trawl, Bottom
United Kingdom English Channel, Trawl, Bottom

Moderate Concern

Bottom trawls can have a significant impact on the bottom habitat including disturbances to benthic communities that can lead to changes in species diversity, community structure, trophic structure, and productivity. Bottom trawls can flatten bioturbation mounds and other irregular features and destroy structural organisms that provide a habitat for other species (CEFAS 2008). Black seabream are commonly targeted by trawls (including pair trawls and otter trawls) when they move to their breeding grounds. Black seabream prefer to make their nests in habitats with a thin layer of mobile gravel over a hard surface (Carleton et al. 2009)(Sussex IFCA 2013a). For these reasons, this factor is rated "moderate concern".

France English Channel, Trawl, Midwater

None

This gear does not come in contact with the bottom ocean habitats.

United Kingdom English Channel, Gillnet, Bottom

Low Concern

Black seabream are not picky about the seabeds they live over and can be caught across sandy, mixed and fairly rough ground. However, they are known to be attracted to features such as wrecks, shellfish beds and weed beds. Black seabream are typically targeted with bottom gillnets (gillnets, tangle nets, and trammel nets) when they inhabit shallow, inshore hard ground areas to feed before breeding (Sussex IFCA 2013a). The nets are fixed to the ground with anchors or weights, and there is the potential for small amounts of habitat damage (Carleton et al. 2009). Therefore, this factor is deemed "low concern".

United Kingdom English Channel, Handline

Very Low Concern

Fishing for black seabream with handlines (or rod and reel) usually occurs when the fish are in shallow, inshore hard ground areas. There is the potential for the small lead weight at the end of the line to come in contact with the seabed (Carleton et al. 2009). However, vertical handline gears are considered to have minimal impacts on bottom habitats.

Factor 4.2 – Mitigation of Gear Impacts

Scoring Guidelines

- *+1 (Strong Mitigation)—Examples include large proportion of habitat protected from fishing (>50%) with gear, fishing intensity low/limited, gear specifically modified to reduce damage to seafloor and modifications shown to be effective at reducing damage, or an effective combination of 'moderate' mitigation measures.*
- *+0.5 (Moderate Mitigation)—20% of habitat protected from fishing with gear or other measures in place to limit fishing effort, fishing intensity, and spatial footprint of damage caused from fishing.*
- *+0.25 (Low Mitigation)—A few measures are in place (e.g., vulnerable habitats protected but other habitats not protected); there are some limits on fishing effort/intensity, but not actively being reduced.*
- *0 (No Mitigation)—No effective measures are in place to limit gear impacts on habitats.*

France English Channel, Trawl, Bottom
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Minimal Mitigation

Under the European Union Habitats Directive, established in 1992, European countries, including France and the UK, are required to create a network of marine protected areas known as European Marine Sites (EMS). The directive protects over 200 "habitat types" which are of European importance. Natura 2000, an EU wide network of nature protection areas established under the Habitats Directive, will help stop the loss of biodiversity in the EU and broaden marine conservation and sustainable use objectives (European Commission 2013).

Currently, almost a quarter of of English inshore waters are designated as European Marine Sites (DEFRA 2013). In the UK, 108 special areas of conservation (SACs) to protect marine habitats and species have been developed (DEFRA 2013). On a local level, the Sussex district (eastern English Channel) is developing proposals for its Sensitive Area Management Plan, which will lay out strategies for protecting benthic habitats. Some benthic areas have already been proposed as non-statutory marine wildlife

reserves (“Marine Sites of Nature Conservation Importance”). However, bottom trawling effort is shown to occur across a number of these reserves (Carleton et al. 2009). The UK is currently revising their approach to protecting European Marine Sites in order to address these issues (MMO 2013b). The revised approach will assess the potential impact of commercial fishing activities in these sites and introduce local management measures where appropriate.

Various types of marine protected areas, with different levels of protection, have also been established by France in the English Channel (e.g. National Marine Parks, Nature Reserves). In April 2013, the total French marine protected areas covered about 3.81% of French waters (Agency for Marine Protected Areas 2014).

While there are some measures and policies in place designed to protect vulnerable habitats, there is little protection of other habitats. Therefore, this factor was given a score of "minimal mitigation".

France English Channel, Trawl, Midwater

Not Applicable

Factor 4.3 – Ecosystem-Based Fisheries Management

Scoring Guidelines

- *5 (Very Low Concern)—Substantial efforts have been made to protect species’ ecological roles and ensure fishing practices do not have negative ecological effects (e.g., large proportion of fishery area is protected with marine reserves, and abundance is maintained at sufficient levels to provide food to predators).*
- *4 (Low Concern)—Studies are underway to assess the ecological role of species and measures are in place to protect the ecological role of any species that plays an exceptionally large role in the ecosystem. Measures are in place to minimize potentially negative ecological effect if hatchery supplementation or fish aggregating devices (FADs) are used.*
- *3 (Moderate Concern)—Fishery does not catch species that play an exceptionally large role in the ecosystem, or if it does, studies are underway to determine how to protect the ecological role of these species, OR negative ecological effects from hatchery supplementation or FADs are possible and management is not place to mitigate these impacts.*
- *2 (High Concern)—Fishery catches species that play an exceptionally large role in the ecosystem and no efforts are being made to incorporate their ecological role into management.*
- *1 (Very High Concern)—Use of hatchery supplementation or fish aggregating devices (FADs) in the fishery is having serious negative ecological or genetic consequences, OR fishery has resulted in trophic cascades or other detrimental impacts to the food web.*

France English Channel, Trawl, Bottom
France English Channel, Trawl, Midwater
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Moderate Concern

The European Union's Common Fisheries Policy is committed to an 'ecosystem-based approach'. Recently, the Common Fisheries Policy has been reformed and includes several policies that would help address ecosystem concerns, such as ban on discarding and setting sustainable fishing limits based on the most vulnerable species in the fishery (Europa 2012)(European Commission 2014b). The European Union's Integrated Maritime Policy (IMP), developed in 2007, aims to use an ecosystem-based approach to managing not just fisheries, but all human activities which impact the health of our marine resources, by facilitating cooperation among stakeholders (Europa 2013). As well, under the European Union Habitats Directive established in 1992, European countries, including France and UK, are required to create a network of marine protected areas known as European Marine Sites (EMS) (European Commission 2013). However, there is currently little research or management for black seabream, and there are no explicit efforts to address ecosystem concerns in the black seabream fisheries. Species of 'exceptional ecological importance' are not caught in the black seabream fisheries, so this factor is rated "moderate concern".

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Appendix A: Main Species Considered in the Assessment

Summary of all main species considered in the assessment

Black seabream: France English Channel, Trawl, Bottom				
Species	**Inherent Vulnerability**	**Abundance**	**Fishing Mortality**	**Subscore**
ATLANTIC COD	High	2.00: High Concern	1.00: High Concern	**1.414**
EUROPEAN SEA BASS	High	2.00: High Concern	1.00: High Concern	**1.414**
SKATE (UNSPECIFIED)	High	1.00: Very High Concern	2.33: Moderate Concern	**1.526**
BLACK SEABREAM	Medium	3.00: Moderate Concern	2.33: Moderate Concern	**2.644**
EUROPEAN HORSE MACKEREL	Medium	3.00: Moderate Concern	2.33: Moderate Concern	**2.644**
EUROPEAN WHITING	Medium	3.00: Moderate Concern	2.33: Moderate Concern	**2.644**

Black seabream: France English Channel, Trawl, Midwater				
Species	**Inherent Vulnerability**	**Abundance**	**Fishing Mortality**	**Subscore**
EUROPEAN HORSE MACKEREL	Medium	3.00: Moderate Concern	1.00: High Concern	**1.732**
BLACK SEABREAM	Medium	3.00: Moderate Concern	2.33: Moderate Concern	**2.644**
SHORT-BEAKED COMMON DOLPHIN	High	3.00: Moderate Concern	2.33: Moderate Concern	**2.644**

Black seabream: United Kingdom English Channel, Gillnet, Bottom				
Species	**Inherent Vulnerability**	**Abundance**	**Fishing Mortality**	**Subscore**
ATLANTIC COD	High	2.00: High Concern	1.00: High Concern	**1.414**
EUROPEAN SEA BASS	High	2.00: High Concern	1.00: High Concern	**1.414**
SKATE (UNSPECIFIED)	High	1.00: Very	2.33:	**1.526**

		High Concern	Moderate Concern	
BLACK SEABREAM	Medium	3.00: Moderate Concern	2.33: Moderate Concern	**2.644**
WRASSE (UNSPECIFIED)	Medium	3.00: Moderate Concern	2.33: Moderate Concern	**2.644**

Black seabream: United Kingdom English Channel, Handline				
Species	**Inherent Vulnerability**	**Abundance**	**Fishing Mortality**	**Subscore**
ATLANTIC COD	High	2.00: High Concern	1.00: High Concern	**1.414**
EUROPEAN SEA BASS	High	2.00: High Concern	1.00: High Concern	**1.414**
BLACK SEABREAM	Medium	3.00: Moderate Concern	2.33: Moderate Concern	**2.644**
WRASSE (UNSPECIFIED)	Medium	3.00: Moderate Concern	2.33: Moderate Concern	**2.644**

Black seabream: United Kingdom English Channel, Trawl, Bottom				
Species	**Inherent Vulnerability**	**Abundance**	**Fishing Mortality**	**Subscore**
ATLANTIC COD	High	2.00: High Concern	1.00: High Concern	**1.414**
EUROPEAN SEA BASS	High	2.00: High Concern	1.00: High Concern	**1.414**
SKATE (UNSPECIFIED)	High	1.00: Very High Concern	2.33: Moderate Concern	**1.526**
BLACK SEABREAM	Medium	3.00: Moderate Concern	2.33: Moderate Concern	**2.644**
WRASSE (UNSPECIFIED)	Medium	3.00: Moderate Concern	2.33: Moderate Concern	**2.644**

Assessment of main species not included in body of report

EUROPEAN HORSE MACKEREL

Factor 2.1 - Inherent Vulnerability

Scoring Guidelines (same as Factor 1.1 above)

France English Channel, Trawl, Bottom

Medium

The Fishbase vulnerability score for European horse mackerel is 53 out of 100, indicating this species has a medium vulnerability to fishing (Froese and Pauly 2011). They may grow up to 70 cm in length and reach sexual maturity at an early age (3-4 years) (Froese and Pauly 2011). Horse mackerel recruitment (amount of new fish entering the population) is characterized by infrequent large year classes (ICES 2014f)(ICES 2014g).

Factor 2.2 - Abundance

Scoring Guidelines (same as Factor 1.2 above)

France English Channel, Trawl, Bottom

Moderate Concern

The 2014 assessment of the North Sea horse mackerel population, which includes the eastern English Channel, indicates that abundance is at a low but stable level. Scientists believe abundance is likely below the target level, but no formal abundance targets or reference points have been defined (ICES 2014f). For the western horse mackerel population, which includes the western English Channel, horse mackerel abundance declined from 1988 to 2001, reaching a low. Abundance then increased some, but has declined again in recent years. The 2013 abundance is near the 2001 low abundance level, and is expected to decline further in 2014. Formal abundance targets/reference points have not been defined for this population either (ICES 2014g). We have awarded a moderate concern score for both populations because it is uncertain if they are overfished/depleted and horse mackerel have only a medium vulnerability to fishing.

Factor 2.3 - Fishing Mortality

Scoring Guidelines (same as Factor 1.3 above)

France English Channel, Trawl, Bottom

Moderate Concern

For the North Sea horse mackerel population, which includes the eastern English Channel, fishing mortality targets have not been defined but exploratory assessments suggest current fishing levels are likely well above target levels (3-6 times higher). Scientists have advised that a significant reduction in catch of greater than 20% is needed for 2015. The majority of the horse mackerel catches on this

population occur in the eastern English Channel, but most horse mackerel are caught with mid-water trawls (ICES 2014f). In 2012, at-sea observer data indicates that European horse mackerel made up around 11% of the total catch in French bottom trawl vessels >18 m in the eastern English Channel/North Sea (Cornou et al. 2013). In 2011, they were also reported to make up a significant proportion of the total catch (29%) in French bottom trawl vessels <18 m in the eastern English Channel/North Sea (Dube et al. 2012). The majority of horse mackerel caught in these fisheries were discarded back to sea. Total allowable catch limits are set for the North Sea horse mackerel population, but a management plan is not in place (ICES 2014f). For the Western horse mackerel population (includes Western English Channel), fishing levels were sustainable during most of the 2000's. However, in recent years fishing levels have increased to above the fishing mortality at maximum sustainable yield (FMSY), indicating overfishing is currently occurring. France only contributes to a small proportion of the Western horse mackerel catches (ICES 2014g). We have awarded a moderate concern since fishing levels on horse mackerel are high, but since mid-water trawls, not bottom trawls, likely account for most of the mortality on this species.

EUROPEAN WHITING

Factor 2.1 - Inherent Vulnerability

Scoring Guidelines (same as Factor 1.1 above)

France English Channel, Trawl, Bottom

Medium

Fishbase assigned a medium inherent vulnerability to fishing score of 37 out of 100 for European whiting (Froese and Pauly 2013). This species reaches sexual maturity at around 30 cm in length and 1-4 years of age. They are broadcast spawners. The maximum length and age are 70 cm and 20 years respectively. Within the food web, they are high-level predators (Froese and Pauly 2011).

Factor 2.2 - Abundance

Scoring Guidelines (same as Factor 1.2 above)

France English Channel, Trawl, Bottom

Moderate Concern

For the North Sea and Eastern English Channel European whiting population, abundance is unknown with regard to sustainable abundance targets/reference points. Abundance has declined in recent year and is at one of the lowest levels observed since 1990 (ICES 2014b). For the Celtic Sea population, which includes the Western English Channel, the population has been above established abundance reference points (limit and precautionary) since 2009. Abundance increased from 2008 to 2011, and has since declined some, but still remains well above the established reference points (ICES 2014c). However, these reference points are considered less conservative than the biomass at maximum sustainable yield (BMSY). Because the abundance of European whiting in uncertain in the Eastern Channel and this species has a medium vulnerability to fishing, we have awarded a moderate concern score.

Factor 2.3 - Fishing Mortality

Scoring Guidelines (same as Factor 1.3 above)

France English Channel, Trawl, Bottom

Moderate Concern

Fishing mortality rates with regard to target/sustainable reference points are undefined for the North Sea and Eastern English Channel whiting population, but fishing mortality has been stable since 2003 (ICES 2014b). Fishing mortality rates have recently fallen to below sustainable levels on the Celtic Sea whiting population, which includes the Western English Channel. From 2011-2013, fishing mortality has below the fishing mortality at maximum sustainable yield (FMSY) proxy (ICES 2014c). We have awarded a moderate concern score due to the unknown fishing levels in the Eastern Engish Channel. .

SHORT-BEAKED COMMON DOLPHIN

Factor 2.1 - Inherent Vulnerability

Scoring Guidelines (same as Factor 1.1 above)

France English Channel, Trawl, Midwater

High

All marine mammals are considered to have a high inherent vulnerability to fishing because they are long-lived and produce few offspring.

Factor 2.2 - Abundance

Scoring Guidelines (same as Factor 1.2 above)

France English Channel, Trawl, Midwater

Moderate Concern

The short-beaked common dolphin (Delphinus delphis) is considered a species of "Least Concern" by the International Union for Conservation of Nature and Natural Resources (Hammond et al. 2013). This species is considered abundant throughout most of its range. Abundance in European continental shelf waters was estimated at just over 56,000 individuals in 2005 ((Hammond et al. 2013). However, a recent study on the impacts of fisheries bycatch on this species, suggested the population is in decline (Mannocci et al. 2012). We have therefore awarded a moderate concern score.

Factor 2.3 - Fishing Mortality

Scoring Guidelines (same as Factor 1.3 above)

France English Channel, Trawl, Midwater

Moderate Concern

The common dolphin is one of the most prominent bycatch species of pelagic or mid-water purse-seine, driftnet and trawl fisheries. Incidental capture of common dolphins in European Atlantic fisheries has been well studied in recent years, and as a result of recent European Union legislation, at-sea observer

programs are being carried out in most of the fisheries considered to have a potentially significant bycatch of common dolphins. Bycatch of common dolphins is known to be a particular concern in mid-water trawls fisheries targeting European sea bass. Bycatch of common dolphins have been estimated at around 800 animals per year in UK and French mid-water trawl fisheries for sea bass, although annual catch rates in the UK sector of this fishery have been falling in recent years due to reduced fishing effort and mitigation measures (Hammond et al. 2008)(SMRU 2009). The bycatch of common dolphins in the French English Channel mid-water trawl fishery for sea bass in 2012 was estimated at 124-170 dolphins (ICES 2014d). Catches of common dolphins have not been reported in mid-water trawl fisheries aimed at black seabream; however at-sea observer coverage on trips targeting black seabream has been limited (Morizur et al. 1996). Since bycatch of the common dolphin is a general concern in pelagic/mid-water trawl fisheries in this region, it seems likely that interactions are possible. Estimates of bycatch in at-sea observer programs in the Northeast Atlantic from 2003-2009 indicate that total bycatch of this species is a minimum of 1,000 individuals annually (Mannocci et al. 2012). A recent study suggests that bycatch levels on this species in coastal waters are unsustainable if common dolphins in coastal waters represent a separate population from those in offshore waters, as suggested by ecological studies. However, if there is only a single population in European Atlantic waters, as suggested by genetic studies, the risk that bycatch levels were unsustainable was lower (Mannocci et al. 2012). We have awarded a moderate concern score since it is uncertain whether the black seabream mid-water trawl fishery has an impact on the common dolphin.

SKATE

Factor 2.1 - Inherent Vulnerability

Scoring Guidelines (same as Factor 1.1 above)

France English Channel, Trawl, Bottom
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Trawl, Bottom

High

The FishBase vulnerability scores and the life history characteristics of skates and rays in the English Channel both indicate that these species have a high inherent vulnerability to fishing (Froese and Pauly 2011). Skates and rays typically mature between 60-100 cm and between 5 and 10 years of age (Seafish 2011). They can live up to 18 years old and reach a maximum size of 70-120 cm. Skates and rays typically produce few young compared to most bony fish, with females laying fewer than 100 eggs per year (Seafish 2011).

Factor 2.2 - Abundance

Scoring Guidelines (same as Factor 1.2 above)

France English Channel, Trawl, Bottom
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Trawl, Bottom

Very High Concern

In 2010, the International Council for Exploration of the Seas (ICES) provided an overview of the relative status of skates and rays (Seafish 2011). Also, in October of 2012, ICES published advice for skates and rays in the North Sea ecoregion, which includes the English Channel. Due to limited data, no target abundance reference points were established, but qualitative evaluations of their abundance were determined (ICES 2012a). The abundance of the thornback ray, cuckoo ray, and spotted ray in the English Channel was described as stable or increasing, and the abundance of the blonde ray, small-eyed ray, and undulate ray was considered unknown. The abundance of the starry ray was declining and the common skate was considered depleted (ICES 2012a)(ICES 2012b). According to the International Union for the Conservation of Nature (IUCN), the status of cuckoo ray and spotted ray are designated 'Least Concern', the smalleyed ray, thornback ray, and blonde ray are designated as 'Near Threatened', the starry ray is designated as 'Vulnerable', the undulate ray is considered 'Endangered', and the common skate is considered 'Critically Endangered' (IUCN 2013). Due to the 'Endangered' and 'Critically Endangered' status of the undulate ray and common skate, this factor was deemed "very high concern".

Factor 2.3 - Fishing Mortality

Scoring Guidelines (same as Factor 1.3 above)

France English Channel, Trawl, Bottom
United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Trawl, Bottom

Moderate Concern

Skates and rays are targeted and caught as bycatch in bottom trawl, gillnet, and longline fisheries. Catches of skates and rays in the North Sea region, including the eastern English Channel, have declined since a peak in 1982. In 2011, 954 t of skates and rays were caught by France and 141 t by the UK in the eastern English Channel (ICES 2012a). Catches of skates and rays in the western English Channel plus the Celtic Sea, were 3,193 t by France and 771 t by the UK (ICES 2012b). The undulate ray, thornback ray, and smooth skate have been reported in at-sea observer data for the French bottom trawl fisheries. They appear to be caught in low amounts in the fisheries that catch black seabream (<5% of catch) (Cornou et al. 2013)(Dube et al. 2012). There are no fishing mortality reference points/targets established for skates and rays (ICES 2012a). There is a prohibition on landing undulate ray because of its vulnerable status (ICES 2013c). Total allowable catches (TAC) limit for skates and rays have been implemented in most European waters (Seafish 2011). However, total allowable catch limits only regulate the landings (retained catches), and since skates and rays are a low-value bycatch species, a low catch limit may just encourage more discards (ICES 2012a). The European Union is currently working with the International Council for the Exploration of the Sea (ICES) on exploring management measures other than catch limits (ICES 2013c). The overall fishing mortality on skates and rays and the contribution to mortality by the fisheries that catch black seabream is considered "unknown". Since management is in place for skates and rays, this factor is deemed "moderate concern".

WRASSE

Factor 2.1 - Inherent Vulnerability

Scoring Guidelines (same as Factor 1.1 above)

United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Medium

Two common wrasse species caught in the English Channel are the ballan wrasse and the cuckoo wrasse. The FishBase vulnerability score for both species was 67 out of 100, which would put them in the high inherent vulnerability category (Froese and Pauly 2011). However, the life history method for assessing vulnerability indicates that these species only have a medium vulnerability to fishing. Wrasse can live up to 29 years old and grow to a length of 66 cm (Froese and Pauly 2011). They can reach sexual maturity at a length of 16 cm. Both wrasse species are protogynous hermaphrodites; they are born female, and they change to male when they are between 4 and 14 years old (Froese and Pauly 2011)(Pollard 2010). Females lay approximately 1,000 eggs in a nest of algae and the male guards the nest until the eggs hatch. Within the food chain, they are intermediate species. The International Union for the Conservation of Nature (IUCN) has classified the ballan wrasse and cuckoo wrasse as species of "Least Concern", which also suggests these species are not particularly vulnerable to fishing pressure (Pollard 2010)(Pollard and Afonso 2010). We have therefore rated their vulnerability to fishing as "medium", based on the life history method.

Factor 2.2 - Abundance

Scoring Guidelines (same as Factor 1.2 above)

United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Moderate Concern

Information on the abundance of wrasse species in the English Channel is limited. No target abundance reference points/goals for ballan and cuckoo wrasse have been established. The International Union for Conservation of Nature (IUCN) has designated both the ballan wrasse and the cuckoo wrasse as 'Least Concern' (Pollard 2010)(Pollard and Afonso 2010). Since there are no estimates of abundance in relation to target reference points, we have awarded a score of "moderate concern".

Factor 2.3 - Fishing Mortality

Scoring Guidelines (same as Factor 1.3 above)

United Kingdom English Channel, Gillnet, Bottom
United Kingdom English Channel, Handline
United Kingdom English Channel, Trawl, Bottom

Moderate Concern

Very little information is known about the current fishing mortality on wrasse species in the English Channel. No formal assessments have been completed and no fishing mortality targets/reference points for wrasse species have been established (Pollard 2010)(Pollard and Afonso 2010). Since fishing mortality is unknown and there is no evidence to suggest wrasse populations are depleted, this factor is deemed "moderate concern".