German Market Analysis and IUU Assessment

WWF Germany

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Phase 1 Report

Final

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Submitted by

MRAG

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Abbreviations

AIS	Automatic identification system
BLE	Bundesanstalt für Landwirtschaft und Ernährung
CCAMLR	Commission for the Conservation of Atlantic Marine Living Resources
CDS	Catch Documentation Scheme
CN8	Customs Nomenclature (8 digit code)
CoC	Chain of Custody
EC	European Commission
EEZ	Exclusive economic zone
EJF	Environmental Justice Foundation
EUMOFA	EU Market Observatory for Fisheries and Aquaculture products
FAO	Food and Agriculture Organisation (United Nations)
FIP	Fisheries Improvement Project
FOC	Flag of Convenience
FONC	Flag of non-Compliance
GI	Global Initiative
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	The International Council for the Exploration of the Sea
IOTC	Indian Ocean Tuna Commission
IPOA	International Plan of Action
ISCAAP	International Standard Statistical Classification of Aquatic Animals and Plants
ISSF	International Sustainable Seafood Foundation
ITF	International Transport Workers' Federation
IUU	Illegal, Unregulated and Unreported (Fishing)
LOA	Length (overall)
MCS	Monitoring, control and surveillance
MSC	Marine Stewardship Council
NEAFC	Northeast Atlantic Fisheries Commission
NGO	Non-Government Organisation
NMFS	National Marine Fisheries Service (US)
NPOA	National Plan of Action
OPRT	Organisation for the Promotion of Responsible Tuna Fisheries
PNG	Papua New Guinea
PONC	Ports of non-Compliance
PSMA	Port State Measures Agreement
RFMO	Regional Fisheries Management Organisation
TAC	Total Allowable Catch
TACC	Total Allowable Commercial Catch
ToR	Terms of Reference
UK	United Kingdom
USA	United States of America
VMS	Vessel monitoring system
WCPFC	Western and Central Pacific Fisheries Commission
WWF	Worldwide Fund for Nature

1 Introduction

It is estimated that 50% of Atlantic and 80% of Mediterranean marine resources are overfished in European waters and yet Europe's seafood demand continues to rise (EC, 2012; Cardinale *et al.*, 2012 and ICES, 2012). Germany consumed 1.216 million tonnes of seafood in 2012 (Lüdemann and Jessel, 2014), 89% of which are imported. This large consumption and demand combined with a large reliance on imports puts the German market at risk of importing illegal, unregulated or unreported (IUU) fish.

WWF engaged the services of MRAG Ltd to complete a number of tasks relating to a preliminary assessment of the risk of IUU fish being present in the German seafood market. Annex 1 provides the Terms of References (ToR) under which MRAG conducted this study. The objective of this study was to qualitatively identify IUU hotspots of interest to the German retail market through a desk based study and by drawing upon MRAG's professional experience and knowledge on risk species, countries and supply chains. This study is the foundation for a further quantitative analysis. This report provides the outputs of the tasks presented in the ToR (Annex 1):

- Review of the German market study (Lüdemann and Jessel, 2014) and provide feedback regarding the type and level of information provided;
- Selection of species to be included in both the market study and those selected by WWF Germany for IUU assessment;
- A preliminary (qualitative) assessment of IUU risk associated with selected species and the countries from which Germany import these species;
- Identification of species, countries and supply chains which require further quantitative analysis; and
- Guidance for key suppliers to evaluate specific supply chains and conduct IUU risk assessments.

2 Review of German Market Study

The latest version of the market analysis study (Lüdemann and Jessel, 2014), has been reviewed in relation to the coverage of species and sources of fish and for the data provided.

2.1 Recommendations for additional information.

The market level information provided in the market analysis document follows the format we would recommend to allow a quantitative IUU analysis to be conducted for those species examined.

The market analysis has considered a consistent timeframe (2012-2013) throughout and the imports and exports are clearly detailed in their composition (by customs code (CN8)). In some cases (especially whitefish) we would recommend an additional secondary level of detailed analysis be conducted where large imports have been recorded from processing or fishing countries to identify where the fish have originally been sourced from to ensure the correct risks are applied. Taking cod as an example, the market analysis shows over 10,000t of cod has been imported into Germany from China in both 2012 and 2013, but China is not a major cod fishing nation. These imports are recording fish that have been sent to China for processing and then re-exported to Germany. Similarly, though on a smaller scale, Denmark exports over 2,000t of cod to Germany. Denmark is a major cod fishing country but also imports and processes cod from other sources which should be identified. An

analysis is possible without this information but a higher level of risk would need to be applied due to the unknown origin.

The number of countries highlighted in the market analysis, will in all cases allow us to reach the 70% cut-off that we recommend in section 3.2.1 as a minimum level of coverage and the number of species covered when herring is included will be sufficient to cover over 80% of landings and imports to the German market overall.

Table 3-3 in the market study provides German landings data for whitefish. It would be useful to provide this information for the other species in the market study. For some species this would not be applicable e.g. for tuna fisheries, as direct tuna landings will be negligible. This information can be retrieved directly from the EU Market Observatory for Fisheries and Aquaculture products (EUMOFA)[1].

3 Methodology

3.1 Choice of Methodology

The methodology presented has been developed to identify potential IUU hotspots and countries / fisheries of origin with a high risk of IUU fishing. The justification has been based on MRAGs global experience in fishery supply chains, risk assessment and the EU's 19 criteria for listing third countries (Annex 4) as to why certain supply chains may be at risk of IUU fishing. Examples have been provided with brief case studies related to IUU fishing for each of the species listed where available (as per Terms of Reference – See Annex 1).

This study uses trade data, catch statistics, market values, supply chain information and expert knowledge of the trade for particular species and countries to determine a generic level of risk. Of the EU criteria (listed in Annex 4), some are only applicable when an EU "yellow" or "red" card has been issued (e.g. Philippines or Papua New Guinea) and a detailed assessment has been carried out. Other criteria are more general, e.g. "IUU lists adopted by regional fisheries management organisations" and can be applied in this qualitative analysis.

There are nine standard methods that have typically been used to estimate the level of IUU for fisheries which are listed below (see Annex 3 and MRAG (2012) for more details).

- Discrepancies in catch, product flow and trade quantities identified through comparisons;
- Extrapolation of detected offences;
- Extrapolation from observer / inspector data;
- Economic modelling / Forensic accounting;
- Interviews / Surveys;
- Mathematical analysis and modelling of factors relating to IUU;
- Expert Judgment - based on available literature and other studies utilising base point and influence methods;
- Capture-Recapture (i.e. tracing marked products through a market chain); and
- Indicators that provide an indirect estimation of IUU fishing.

[1] http://ec.europa.eu/fisheries/market-observatory

Many of these methods have particular data or sampling requirements to feed into models to determine the level of IUU. Given the scale and scope of the current study, i.e. summary for a national market, only two of the methods are directly and consistently applicable "Interviews / Surveys" and "Expert Judgement".

Where information is available as scientific papers, reports or books the references are supplied in Annex 6. Information on illegal fishing is often more widely reported as online documentation, press reports etc. and these are highlighted as footnotes in the text.

3.2 Selection of species and fishery coverage

The choice of species to be assessed is critical and must be relevant to the current situation with regard to the German market. For this assessment we have considered species highlighted in the current market study (Lüdemann and Jessel, 2014) and a list of additional species suggested by WWF Germany as potential candidates for analysis (see Annex 2). This list has been discussed with WWF Germany to highlight potential data deficient species and to highlight the particular risks indicated in this report.

There are three critical factors that determine the choice of species to be investigated:

- The amount of fish landed or imported for a species ,
- Species known to be at risk of IUU fishing that enter the German market; and
- Species that are already highlighted as being of specific interest to the German market.

3.2.1 Volume or value of fish landed / imported

The simplest indicator of species selection is the relative importance of that species to the market in terms of their relative volume (kg) or value (€). The most important species in terms of landings and imports may generate a larger volume or value of fish at risk of IUU entering the market at relatively low rates of IUU risk than a higher risk species with relatively low imports. It is therefore important to understand both the value and volume or fish landed and imported.

In an analysis for the entire German market, we would recommend that at least 70% of the landings / imports should be covered by the species selected. In raising estimates to the overall market this would allow the remaining undefined species to be considered at an average rate for the analysed portion of the market.

Analysing every single fish species to cover 100% of the market tend to show a diminishing return from the amount of work required. Data deficiencies also tend to occur more frequently over the recommended 70-80% level and estimates based on evidence are more difficult to justify.

3.2.2 Species at a known high level of IUU risk

When identifying high risk species before a full risk analysis has been conducted we are looking for those species that are generally known to be at risk i.e. those high risk species such as abalone and sea cucumbers that are known to have a high risk of poaching would be prioritised. We would also suggest a prioritisation for those species that are predominantly imported from countries with a known high level of IUU risk, both from fishing by illegal vessels or in the processing sector where legal and illegal fish are known to be mixed thereby allowing IUU fish to enter the market or substitutions to be made. This would,

for instance, suggest that species imported from countries that have been subjected to an EU yellow cards would be prioritised (e.g. Papua New Guinea and the Philippines). These high risk species would be required for a quantitative analysis.

A summary of the global averages by International Standard Statistical Classification of Aquatic Animals and Plants (ISCAAP) fish group from Agnew *et al.* (1999) is presented in Figure 1, which gives an indication of the species or species groups that are more likely to be subject to IUU fishing e.g. Misc. demersal fish, salmon, trout etc.

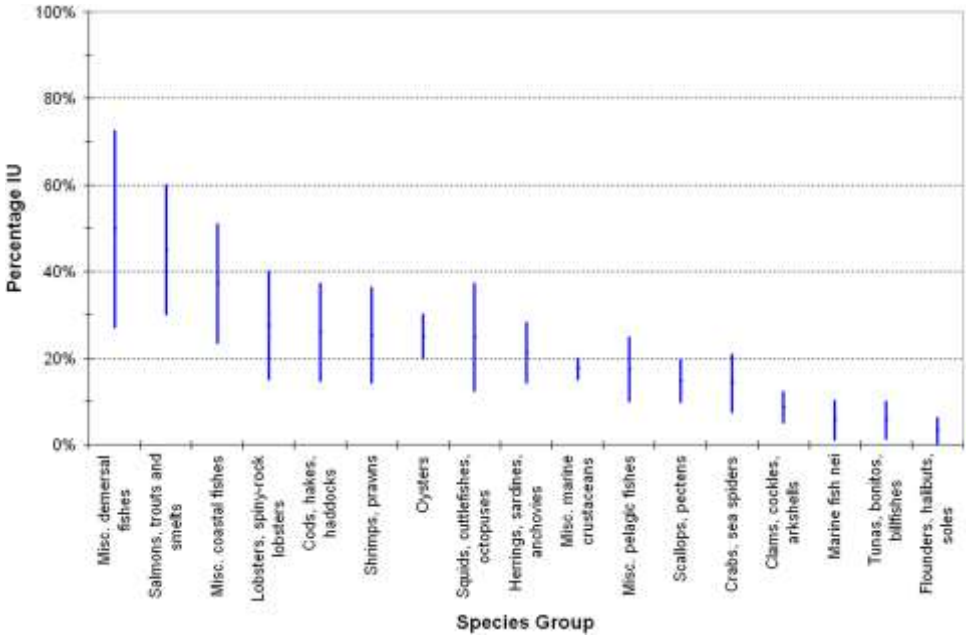

Figure 1 Illegal and unreported catch, expressed as percentage of reported catch, by species group 2000 -2003 (From Agnew *et al.,* (1999)).

3.2.3 High profile species

We would also suggest that any species that is high-profile within Germany and has a higher than normal media coverage than its landings would suggest should be prioritised. For instance in the UK, cod has always been regarded as an iconic species with a higher profile than the closely related haddock and other whitefish species even though the relative values of the species may be similar, the landings may be similar but cod imports are always relatively higher due to the prevalence of cod in UK whitefish sales.

Whitefish and tuna species have already been identified as key footprint impacted species in the WWF Global Initiatives (GIs) of 'Smart Fishing' and 'Market Transformation' and would therefore be regarded as high profile within WWF.

3.2.4 Species selected for assessment

Using the criteria described above and the guided by the lists of species provided by WWF Germany (Annex 2) a range of species has been selected for qualitative assessment. These are presented in

Table 3.1.

Table 3.1 List of candidate species proposed by WWF Germany.

Group	Species	Scientific name	Reasons for Selection		
			Volume / Value	High IUU risk	Priority
Tuna and tuna-like	Skipjack tuna	*Katsuwonus pelamis*	X		X
	Yellowfin tuna	*Thunnus albacares*	X		X
	Albacore	*Thunnus alalunga*	X		
	Bigeye tuna	*Thunnus obesus*	X	X	X
	Bluefin tuna	*T. maccoyii, (Southern)* *T. orientalis ,(Pacific)* *T. thynuus (Altantic)*	X	X	X
	Swordfish	*Xiphias gladius*	X		
	Blue marlin	*Makaira nigricans, (Atlantic),* *Makaira mazara, (Indo-Pacific)*	X		
Whitefish	Alaska pollock	*Theragra chalcogramma*	X	X	X
	Atlantic cod	*Gadus morhua*	X		X
	Atlantic redfish	*Sebastes spp.*	X		X
	Haddock	*Melanogrammus aeglefinus*	X		X
	Hake	*Merluccius spp.*	X		
	Toothfish	*DIssostichus spp.*	X	X	X
	Pangasius	*Pangasius spp.*		X	
Shrimp	Tropical shrimp	*Penaeus spp., Parapaneus longirostris*	X	X	X
	Cold-water shrimp	*Crangon spp., Pandalidae*	X	X	X
Other species	Herring	*Clupea harengus*	X		
	Orange roughy	*Hoplostethus spp.*	X		X
	Horse mackerel	*Trachurus spp.*			
	Anglerfish	*Lophius spp.*	X		
	Zander	*Sander lucioperca*		X	
	Grendaier	*Macrouridae*			
	Soles	*Soleidae, Achiridae, Cynoglossidae*		X	
	Halibut	*Reinhardtius hippoglossoides*	X	X	
	Dorade	*Various*			
	Snapper	*Various*	X		
	Conger eel	*Conger conger*			
	Hoki	*Macruronus spp.*	X		
	Octopus	*Various*	X	X	
	Salmon (wild-caught)	*Salmo salar, Oncorhynchus spp.*	X		
	Crayfish (Roter / Louisiana Flusskrebs)	*Procambarus clarkii*	X		

3.3 Estimating an unknown - "IUU"

3.3.1 Limitations

Throughout the species assessments a number of issues related to the estimation of IUU occur. These all stem essentially from the problem of estimating an unknown in this case the level of IUU for each species in the German market.

3.3.1.1 Data on fish entering the German market

The first problem is clearly identifying the volume of fish entering the German market and the origins of these fish. A standard data source is required to allow consistent data recording

and for this type of data the EuroStat International Trade Database allows the imports and exports of fish to be determined based on harmonised customs codes. Some species analysed in the market study have landings data included but for some fish species that have been landed direct into Germany these will need to be included and can be found using the EUMOFA database (European Fisheries Observatory). However, there are still some problems:

Not all species recorded in trade (customs) statistics – a number of species do not have designated trade codes so it is not possible to identify amounts imported or the country from which imports occurred.

Merging of species – Some species are reported together (e.g. skipjack and yellowfin tuna) which obscures potential issues and makes assessment difficult as these species are often caught by different fisheries and fleets.

Confusion over species names – When data are not available from the official data sources (e.g. EUROSTAT, EUMOFA), they can be recorded in other sources of documentation but they may use non-scientific or trade names that obscure any problems with traceability (e.g. dorade and snapper). The use of standardised species codes for international trade in fish has been recommended in WWF's traceability guidelines.

3.3.2 Assessing the supply chains of fish into the German market

International fish trade is not a simple linear system at any level of the supply chain. Fish are caught, landed in a number of ports and States and traded internationally. They can be shipped half-way around the world, processed, only to be shipped back, traded again and finally sold via a wide variety of suppliers from governments, large supermarket chains to individual fishmongers.

The exporting country listed in trade statistics is not often where the fish have been caught or landed but may be one of many intermediaries. Tuna imported from Spain for example may have been caught by a French purse seiner in the Indian Ocean, landed in Seychelles, transhipped to Mauritius where they have been processed (canned) and exported to Spain. At each stage in this chain, fish are effectively pooled in trade statistics and it is difficult to identify, without access to the full set of traceability documents, where exactly fish have come from. So x% of the fish exported from a country are IUU and that 20% of that catch is exported to another market State such as Germany, it is not possible from trade statistics alone to determine the percentage that is IUU after export. The minimum would be 0% but the maximum would be x% or 20% whichever is lower. In this case it is only possible to estimate the level of IUU based on a wide variety of information and expert judgement and it is best produced as a range of risk (as in Agnew *et al*., (2009) for the global estimate, MRAG (2013) for the UK market and Pramod *et al*., (2014) for the US market). In this study we estimate an approximate qualitative level of IUU to determine if the risk of importing IUU fish is high enough to require a quantitative assessment.

3.3.3 Assessing the sources of fish from a country

Within the catches of a species (or species group) reported by a country the catches are often from a variety of gears, fleets and locations. For example do French yellowfin tuna all come from purse seine gear or are there longline catches in there also? Norwegian cod could be trawl, longline or handline caught and without further traceability information and a mass balance conducted to verify that no extraneous inputs to the system have occurred it is difficult to say what specific fleet, gear or fishery were involved. Fish caught simply enter a pool and an estimate of the level of IUU can be made for that pool of fish. At the level of this study where we are primarily using qualitative data it is not possible to guarantee that fish

from a particular fishery goes to a particular market but this may be possible with more detailed supply chain data.

3.3.4 Qualitative Assessment

It should be noted that this document provides a simple qualitative assessment of which species will be likely to exhibit a high degree of IUU risk, and should therefore be subject to further analysis on a quantitative level based on the actual levels of imports, exports and landings into the German market.

4 Species Case Studies

4.1 Tuna and tuna-like species

The majority of tuna imported (zero or negligible tuna are landed directly) into Germany come from a small number of countries, the top ten in descending order of import tonnage are Ecuador, Philippines, Papua New Guinea, Vietnam, Netherlands, Thailand, Spain, Indonesia, Ivory Coast and Italy (Eurostat International Trade Database[2]). Of these, Netherlands, Spain and Italy are unlikely to land tropical tunas directly and therefore will be importing fish from other sources and then re-exporting to Germany, which opens up additional possible supply routes from Mauritius, Seychelles, Ivory Coast and Ghana that may require consideration.

It should be noted that tuna on the German market is found in two predominant forms. Skipjack tuna are sold as canned ambient tuna only. Yellowfin tuna are generally as fresh product from loins, only about 10t of yellowfin tuna per year has been imported for canning (Lüdemann and Jessel (2014)). In addition, smaller quantities of bigeye tuna, albacore and bluefin tuna are found on the German market.

There are widely recognised levels of IUU fishing in all four tropical tuna fisheries (Atlantic, Indian, Eastern and Western Pacific Oceans). IUU lists of illegal vessels are shared between the tuna RFMOs. The four RFMO IUU lists have a number of vessels listed but the majority are without flag, having been de-flagged by their flag State due to their activities. Of the remaining vessels IATTC lists vessels[3] from Fiji and Georgia, IOTC lists[4] no recognised flag vessels currently, ICCAT lists[5] vessels from Georgia, Chinese Taipei and Indonesia and WCPFC[6] from Georgia and Chinese Taipei. It is the unreported portion of IUU fishing that is the largest component however. Under-reporting is a particular problem in the Indian Ocean where the large "artisanal"[7] fisheries, defined by IOTC as vessels <24m in length, often suffer from lack of effective catch recording. In this respect catches made by Indonesia and Sri Lanka have been highlighted as suffering from a high degree of unreported catch (e.g. Indonesian IUU estimated for tuna at between 20 and 35% by Pramod *et al*. (2014).

The unregulated portion of the tuna fleet is difficult to monitor as the fishing occurs on the high seas. Tuna fishing vessels often operate at sea for long periods of time without coming into port, being supplied and transhipping their catches at sea. The regional transhipment observer programmes implemented by ICCAT, IOTC and IATTC have reduced this and non-

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2 http://epp.eurostat.ec.europa.eu/portal/page/portal/about_eurostat/introduction

3 https://www.iattc.org/VesselRegister/IUU.aspx?Lang=en

4 http://www.iotc.org/sites/default/files/documents/compliance/vessel_lists/IUU%20lists/IUU%20LIST%202013%20%28E%29.docx

5 http://www.iccat.int/en/IUU.asp

6 http://www.wcpfc.int/system/files/WCPFC%20IUU%20LIST%202014_Att%20I%20WCPFC%2010%20FINAL%20RECORD.pdf

7 Defined as fishing by vessels <24m LOA.

registered reefers are being forced to use ports without adequate control e.g. Singapore which is not a member of ICCAT or IOTC, has a large port with limited enforcement capacity but is a focal point for transhipment vessels from the Indian and Atlantic Oceans. Other ports in countries with low governance scores (particularly for "Government Effectiveness" and "Regulatory Quality" have been highlighted as being at risk of having low levels of enforcement that would allow unreported transhipment or mixing to occur (e.g. Cote d'Ivoire, PNG, Ecuador). Any fish landed through these ports may be at higher risk.

4.1.1 Skipjack tuna (*Katsuwonus pelamis*)

Key countries exporting skipjack tuna to Germany include the two largest canning producers, Thailand and Ecuador. Both these countries have well reported problems as flag States with control of their own fleets with numerous cases of IUU in domestic and distant water fisheries (NMFS, 2013). These have included failing to adhere to IATTC closure periods, vessels fishing but not being on authorised vessel lists and vessels fishing without notification of changes to capacity. Thailand have been increasing their national MCS system to address IUU in recent years, though it remains a substantial problem in their national waters with several hundred cases being reported each year[8]. Also as a major hub for the skipjack tuna processing industry there have been allegations that certain plants will accept fish from any source as long as it is economic and legality and sustainability are not the primary driving factors (Pers. Comm. Anon., 2014). Other major exporting countries such as PNG and the Philippines have recently (10/06/2014) been issued with a "yellow card" by the EU highlighting the problems with IUU in those countries. In Commission Decision (2014/C 185/02) [9] it was reported that "The Commission considers, on the basis of an assessment of all the information at its disposal, that PNG cannot ensure that fishery products entering PNG or PNG-based processing plants do not stem from IUU fishing" and that "no controls on landings are performed, neither by fisheries nor customs authorities. Raw material caught by Third Country flagged vessels entering processing plants does neither undergo an import procedure with payment of duties nor is it placed under customs supervision until export. Traceability of such products is not possible and access to the PNG market would easily be possible without being noticed" and "PNG cannot ensure that fishery products entering PNG or PNG-based processing plants do not stem from IUU fishing". The Philippines were also issued with a similar judgement in Commission Decision (2014/C 185/03) [10] which stated "The Commission considers, on the basis of an assessment of all the information at its disposal that the Philippines cannot ensure that fishery products entering the Philippines or Philippines-based processing plants do not stem from IUU fishing. This is due to systemic problems undermining the possibility of the Philippines authorities to trace catches because of the lack of available official information about fish landed, imported and/or processed". This would put into severe doubt the legitimacy of any imports from PNG or the Philippines. Indonesia has been reported to have high level of unreported tuna catches which is being addressed through data collection programmes with IOTC, though

[8] http://www.itlos.org/fileadmin/itlos/documents/cases/case_no.21/written_statements_round2/21_II-5_Thailand.pdf

[9] http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1403274982625&uri=CELEX:32014D0617(01)

[10] http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1403274982625&uri=CELEX:32014D0617(02)

they themselves are victims of IUU fishing by China, Malaysia, the Philippines, Taiwan, Thailand and Vietnam[11].

Control systems in many of these countries are not well developed with the possibility of corruption and a low level regulatory framework enabling IUU fishing to occur. The four indicators most closely related to higher incidences of IUU (Regulatory Quality, Rule of Law, Government Effectiveness and Control of Corruption) are low for many of the non-European source countries. [12] Coastal State control measures are weak to moderate in many of the coastal States where tuna are caught and of the non-EU States only Ghana, Indonesia and Seychelles have signed or acceded to the FAO Port State Measures Agreement. It is on the basis of their level of port State control that many of the countries may struggle to restrict the incoming flow of illegal product into their own markets and once it leaves it can be mixed with legal catch and would appear to be legitimate. The competent authorities in charge of monitoring, control and surveillance of fishing activities in the respective EEZs and ports are often not in possession of the means / resources to conduct effective operations and inspections at sea or on land. Many have no dedicated fisheries patrol vessels, observer schemes and ineffective remote systems (e.g. VMS, AIS and radar). An example of this is the Ivory Coast which after fighting a civil war, the Government has found it difficult to implement strong legal structures and strategies on fisheries, resources management and surveillance. This has been improving recently with NGO assistance and increased regional cooperation but the offshore tuna fisheries still remain at risk of illegal fishing.

In summary, there is an acknowledged risk of IUU skipjack tuna being able to enter the German market from a number of sources. Due to the high levels of imports and risk we would recommend further quantitative analysis of imports from Ecuador, Philippines, PNG, Vietnam, Netherlands, Thailand, Spain, Indonesia, Cote d'Ivoire and Italy, with secondary analysis of the sources of the imports from Netherlands, Spain and Italy. This selection of countries will cover over 90% of imports into Germany. The provision of MSC certified skipjack is not known at this time, catch from the PNA Western and Central Pacific skipjack tuna fishery may enter the chain through PNG but this cannot be determined from the trade statistics alone.

4.1.2 Yellowfin tuna (*Thunnus albacares*)

The generic risks for yellowfin tuna are very similar to those described above for skipjack as many of the same source countries and fisheries supply the fish although in a much different composition of the origin of the fish. Lüdemann and Jessel (2014) showed that over 60% of the tuna loins (processed and prepared) imported into Germany came from France with only Vietnam being a significant exporter of yellowfin tuna loins to Germany from outside the European Union. However, looking further into the origin of the yellowfin tuna France re-exports tuna from Ghana, Ecuador, Spain, Thailand and Taiwan, and Spain in turn re-exports from Ecuador, PNG, Guatemala, El Salvador China Mauritius, Thailand and Indonesia giving a much wider possible source of fish.

Similarly for frozen loins, which make up only 1.2% of the tuna market, yellowfin tuna appear to come from the Netherlands, Spain, Vietnam, Ecuador and Indonesia. The exports from

[11] http://www.thejakartapost.com/news/2014/04/05/indonesia-and-problem-illegal-fishing.html

[12] http://info.worldbank.org/governance/wgi/index.aspx#home

the Netherlands and Spain in turn are from a diverse set of countries including France, Panama, Curaçao, Guatemala, Mexico, Indonesia, Philippines, Seychelles and Senegal.

Although smaller in volume than the skipjack tuna imports the yellowfin are higher value and due to the fisheries may exhibit higher rates of IUU due to the fishing methods employed, i.e. longline vessels sourcing tuna for loins can land in much smaller ports with less control than the larger purse seiners that dominate the skipjack catch used for canning.

Vietnam is highlighted as a source of yellowfin tuna. In the section below on swordfish (see section 4.1.6) a significant problem was identified with the under-reporting of swordfish in Vietnam where landings were reported within the quota established but were below the level of catch exported solely to Spain, which exceeded the quota and hence IUU and caught outside of regulation and not reported. This highlights a major problem in the control system in Vietnam where catches are not being recorded systematically and a risk of IUU fish entering the supply chain is highly probable.

In summary, there is risk of IUU yellowfin tuna being able to enter the German market from a number of sources, including Vietnam, Ecuador and Papua New Guinea.

4.1.3 Albacore (*Thunnus alalunga*)

Albacore is an important species in many commercial fisheries throughout the temperate, sub-tropical and tropical regions around the world, albacore being a highly migratory oceanic species, abundant in temperate to sub-tropical waters throughout the world's oceans, undertaking significant migrations. Worldwide, the species is caught by longlining, pole and line, purse seining, pelagic trawling and trolling (MBA, 2010; Sustainable Fisheries Partnership, 2014).

There are a number of known problems with many albacore fisheries. The major sources of supply (from Lüdemann and Jessel (2014)) to the European market are Japan, Taiwan, China, the US, Spain Indonesia, Fiji and Vanuatu. No specific origins have been determined for the German market, however, the total imports of albacore in 2012 only amounted to 287t. In the South and North Pacific fisheries many island States (e.g. Fiji and Vanuatu) have reported illegal fishing for albacore taking place but with the limited resources available they have not been able to effectively reduce the fishing [13 and 14]. Also the North Pacific has a known historical problem with illegal driftnet fishing from Asian countries with the catches being fully illegal, unregulated and unreported. (WCPFC10-2013-OP05). Problems in the Indian Ocean also occur with misreporting in the southern fisheries off South Africa (Pers. Comm. Heineken, C) and Indonesia (Rochman, 2014) though attempts are being made to correct both these through programmes of port sampling. The risks to suppliers in obtaining sustainable and IUU free fish may vary greatly between fisheries.

In summary, there is an acknowledged but minor risk of IUU albacore being able to enter the German market from a number of sources, but due to the levels of imports of albacore we would recommend that further quantitative analysis of imports would not be required. It is

[13] http://www.americanalbacore.com/cook-islands-feels-overrun-by-iuu-albacore-vessels-from-epo

[14] http://www.undercurrentnews.com/2013/07/12/vanuatu-working-with-eu-to-fight-iuu-fishing/

unlikely that albacore would replace lower value skipjack tuna in cans and due to the different “white” colour and taste would be easily spotted.

4.1.4 Bigeye tuna (*Thunnus obesus*)

As for skipjack and yellowfin tunas there are known IUU problems for bigeye tuna in all four tropical tuna fisheries (Atlantic, Indian, Eastern and Western Pacific Oceans). Unreported fishing again is likely to be the largest component. Under-reporting is a again a particular problem in the Indian Ocean where the “artisanal”[15] fisheries have ineffective catch recording, although the problem will be smaller for bigeye tuna than for skipjack and yellowfin tuna as bigeye tuna are not caught in as great a proportion by the artisanal fleets. Progress has been made in recent years on the under-reporting problem through increased data recording and MCS procedures e.g. in Indonesia where a port based monitoring program on the catch of all tuna species landed and the number of landings has been put in place in response to criticism of poor monitoring (Davis *et al.*, 2003, Proctor *et al.*, 2006)

The unregulated portion of the bigeye tuna will be important as the longline vessels that target bigeye tuna operate at sea for long periods of time (often >200 days) without coming into port, being supplied and transhipping their catches at sea. The regional transhipment observer programmes implemented by ICCAT, IOTC and IATTC have reduced this and non-registered reefers are being forced to use ports without adequate control. It is possible though that unregulated bigeye may enter the international market. Any fish landed through these ports may be at higher risk. For example, information from the publicly available database maintained by Lloyd’s Intelligence Unit[16] showed 23 port visits by seven IUU-listed vessels to three Ecuadorean ports (Manta, Puerto Bolivar and Guayaquil) and five visits by to two Philippine ports (Daveo and Cebu). A more detailed summary would be provided in a full risk assessment.

The RFMOs however have introduced a variety of catch documentation schemes including the IATTC, ICCAT and IOTC “Bigeye Tuna Statistical Document Programmes” [17] [18] [19] These programmes allow the reporting of bigeye catch and movement.

The majority of fish imported (zero or negligible tuna are landed directly) into Germany come from a small number of countries (as reported by Eurostat International Trade Database) a quantitative analysis would be possible.

Bigeye tuna are consumed typically as sashimi and sushi, from frozen or fresh products. The majority of tuna loins are imported from France, which in turn imports them from Spain and from significant non-EU sources (Ghana, Ecuador, and Thailand) that have known IUU problems and may present a higher level of risk. Lüdemann and Jessel (2014) noted that a high proportion of the fresh tuna loins from Vietnam are imported into Germany (though this

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[15] Defined as fishing by vessels <24m LOA.

[16] http://www.lloydslistintelligence.com/

[17] https://www.iattc.org/PDFFiles2/Resolutions/C-03-01%20BET%20Statistical%20Doc%20Program.pdf

[18] http://www.iccat.int/Documents%5CRecs%5Ccompendiopdf-e%5C2001-21-e.pdf

[19] http://www.iotc.org/cmm/resolution-0106-concerning-iotc-bigeye-tuna-statistical-document-programme

may have included both yellowfin and bigeye tuna). It has been noted for other species (e.g. swordfish in section 4.1.6) that Vietnam has a large problem with underreporting of tuna and billfish[20]. Vietnam as a tuna processor and exporter imports much of its raw material for processing from 3rd party countries. Pramod *et al.* (2014), for example, report that an estimated 30-31% of the tuna caught by Vietnamese vessels originates from the Indonesian EEZ and had been caught illegally with no fishing agreement or as unregulated catch from disputed waters (Spratly Islands). There is also significant under-reporting of tuna in domestic small-scale fisheries within the Vietnamese EEZ (WCPFC, 2012). This would increase the risk of IUU bigeye tuna entering the German market. Other sources of bigeye would include catches from a variety of sources. These are likely to not be the same as the canning grade source countries and a separation of the species is required.

Bigeye tuna is a high value species and has a market value in Europe of up to approximately EUR 50 per kg for frozen loins (Globefish, 2014).

In summary, there is a known risk of IUU bigeye tuna being able to enter the German market from a number of sources and an IUU risk assessment may be carried out as high risk sources may be including in the sources of fish on the German market. These are likely to be indirect imports via other EU Member States.

4.1.5 Bluefin tuna (*Thunnus thynuus, T. orientalis* and *T. maccoyi*)

Bluefin tuna, from any of the three species are one of the highest value fish on the market, with the market value reaching EUR 40 per kg for fresh products (InfoFish, 2014) and reports of individual fish fetching over €500,000 on occasion. This makes them an obvious target for IUU fishing in all forms. There were substantial IUU catches of southern bluefin tuna for at least 15 years throughout the 1990's and 2000's by Japan which undermined the southern bluefin tuna stock assessment and management. Significant IUU catches have been seized in Europe in 2013, with over 130t in Italy alone and reports of over quota catches in North Africa. Catches in the Mediterranean and Eastern Atlantic have also been estimated as being widely underreported (Gagern, van den Bergh and Sumaila, 2013).

Now bluefin tuna must be accompanied by a bluefin catch document from catch to their final destination. Where bluefin tuna are a rare commodity on the market and where responsible actions in relation to their tracking are completed there should be very little risk of IUU catch entering the market, although as there are bluefin catches both legal and illegal landed into the EU direct there would be no import checks on Atlantic bluefin tuna found on the German market and we would rely on the catch documentation scheme. There are some identified weaknesses though with the paper catch documentation schemes relating to the doubling up of catch. There is potential for catches to be sent to two different places accompanied by the same document where efficient checks by buyers and national authorities are not completed satisfactorily. This system is being replaced by an electronic bluefin tuna catch documentation scheme (eBCDS) which will in essence be a full mass balance system ensuring what goes into the system comes out, with no missing fish or additional fish entering the system. This system will be more effective and immediate, allowing buyers to check their incoming bluefin as they arrive.

[20] http://www.undercurrentnews.com/2014/06/30/spain-seeks-eu-wide-suspension-of-vietnamese-swordfish-imports/

In the situation of Germany, the potential for IUU bluefin tuna entering the market should be low where documentation that should accompany the tuna providing the necessary checks. The risk is minimal and it is recommended that no further quantitative assessment should be required.

4.1.6 Swordfish (*Xiphias gladius*)

The global swordfish catch was 114,000 tonnes in 2012. Countries which account for the largest capture production of swordfish are Spain (22%), Taiwan (13%) Japan (9%) and Indonesia (7%) (Lüdemann, 2015).

Swordfish is a relatively high value species with a market value of approximately EUR 5 per kg (Globefish, 2014), thereby increasing its risk to IUU.

Europe imported almost 52,000 tonnes of swordfish in 2011, with Germany accounting for less than 1% of these imports at 453 tonnes (Lüdemann, 2015). The main importing (intra and extra) countries are Italy, Spain and France and the main top exporters (intra and extra) are Spain, Portugal and Belgium.

Germany`s swordfish imports have fluctuated between 400-800 tonnes in the period 2006-2013. In 2013, Germany imported swordfish products from Sri Lanka (26%), Poland (18%), the Netherlands (10%), India (9%) and Italy (8%) (Lüdemann, 2015). Poland and the Netherlands are not associated with swordfish fisheries, therefore imports from these countries are likely to be re-exports. Poland imports primarily from Portugal (92%), whereas the Netherlands imports from Germany (33%), Vietnam (33%), France (9%) and Spain (7%), although there appear to be discrepancies in the trade data between Germany and the Netherlands.

The countries of interest to the review of IUU risk associated with swordfish products entering the German market are identified as: Sri Lanka, India, Italy, Portugal (although low risk and not direct imports it dominates the secondary imports through Poland) and Vietnam.

Sri Lanka received formal warnings – 'yellow cards' - under the IUU Regulation in 2012 (IP/12/1215) and has since been issued with a 'red card'[21] where the Commission identified Sri Lanka as a third country that it "considers as a non-cooperating third country in fighting IUU fishing". At this time 13 Sri Lankan vessels were listed in the draft IUU vessel list of IOTC as they had been caught fishing in breach of the Indian Ocean Tuna Commission (IOTC) conservation and management measures (para 36) and Sri Lanka had not prohibited its vessels from fishing illegally on the high seas nor adopted legislation putting in place a licensing system for high seas fishing. Significant weaknesses had also been identified in the MCS system including the level of VMS and observer coverage and reporting issues related to the actions taken against previously identified IUU vessels (e.g. paras 44-52).

Sri Lanka have since cooperated with the European Commission and had made limited progress in their fisheries management systems which address IUU fishing but not to the level required by the EU. New legislation had been developed and improvements have been made on their monitoring, control and inspection systems[22] but this was not deemed

[21] Commission Décision (2014/715/EU) http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014D0715

[22] http://europa.eu/rapid/press-release_MEMO-14-408_en.htm

sufficient by the Commission. Therefore any swordfish previously originating from Sri Lanka has a high risk of IUU, but currently there should be no Sri Lankan swordfish on the EU market.

The underreporting of swordfish has become a high profile issue in the EU, and Spain in particular, in recent years where the Spanish government decided to suspend the importation of Vietnamese swordfish[23] over concerns that in 2012, a higher volume of fish were imported to Spain alone than were declared as catches to the Western and Central Pacific Fisheries Commission (WCPFC) (502t vs. 372 mt)[24]. A similar situation has been reported for 2013. This only related to Spain and it is not hard to believe that catches were not exported to other countries. It is reported[25], that operators are now attempting to import the Vietnamese swordfish into Spain through other EU nations where checks may not be made, and that once in the EU it can still reach the Spanish market. Although the amount imported from Vietnam is very little, Germany imports from other EU member states who also imports from Vietnam (Italy and Portugal) (EuroStat, 2014). India has been noted as having a highly complex system of fisheries and that catch estimates are based on visual estimates of numbers rather than weight. A project to establish estimates based on weights in India was proposed by IOTC in 2013 but it is unclear how successful this has been.[26]

Extensive IUU fishing of swordfish has been reported in Moroccan waters in 2014[27] with the fish entering the European market via Spain and Italy. There have also been reports of illegal catching, landing and selling of swordfish in the EU (in particular Italy)[28], illegal driftnet fishing and associated swordfish catch in Italy[29].

In summary, swordfish products entering the German market are identified as those imported from Sri Lanka, India, Italy, Portugal and Vietnam will be of higher IUU risk. These countries have limited regulations in place, which increases the risk of IUU products entering Germany.

4.1.7 Blue marlin (*Makaira nigricans*)

Blue marlin was not covered by the market study (Lüdemann and Jessel, 2014). Blue marlin is not recorded in EU trade statistics nor FAO trade statistic, therefore we cannot discern the countries from which Germany imports blue marlin. The main catching nations are Taiwan, Japan, China and the Philippines (FAO FishStat, 2014). Blue marlin, like swordfish and other billfish species, are relatively high value and may similarly be caught by unregulated longline and purse seine vessels on the high seas and in EEZs of coastal States.

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[23] http://houseofocean.org/2014/09/29/catch-certificates-and-swordfish-imports-into-the-eu/

[24] http://iuufishing.ideasoneurope.eu/2014/08/04/illegal-fishing-implementation-measures-europe-needs-common-software/

[25] http://www.undercurrentnews.com/2014/06/30/spain-seeks-eu-wide-suspension-of-vietnamese-swordfish-imports/

[26] http://www.iotc.org/documents/pilot-project-improve-data-collection-tuna-sharks-and-billfish-artisanal-fisheries-indian

[27] http://www.worldfishing.net/news101/industry-news/illegal-driftnet-fishing-returns-to-morocco

[28] http://www.thefishsite.com/fishnews/24421/european-commission-documents-prove-illegal-fishing-of-swordfish/

[29] http://eu.oceana.org/en/press-center/press-releases/oceana-exposes-illegal-driftnet-fisheries-while-italy-denies-it

In order to ascertain the level of risk associated with blue marlin available on the German market information regarding the total imports of blue marlin and the countries from which they are imported is needed. In order to obtain this information, further analysis would be required.

4.2 Whitefish

4.2.1 Alaska pollock (*Theragra chalcogramma*)

The market study (Lüdemann and Jessel, 2014) identified that China is the country from which Germany imports the majority of Alaska pollock, followed by the USA, Russia, and Poland with lesser volumes coming from the Czech Republic and Denmark (Lüdemann and Jessel, 2014). Alaska pollock has a market value of approximately EUR 4 per kg (GlobeFish, 2014).

Alaska pollock has one of the highest levels of potential IUU in the German market compared to other whitefish species. There are two major contributing factors to this, the source fisheries of Alaska pollock are less well regulated than the majority of the other whitefish fisheries (e.g. cod, haddock and hake) and the longer often more complex supply chains. Although a high percentage of Alaskan pollock is MSC certified (two fisheries in the USA and one in Russia, with two in assessment), there are still concerns over the level of IUU in the fishery with unreported catches reportedly being made into and laundered through China. China's dominant role in the global trade of cod, haddock and Alaska pollock (MRAG, 2014) complicates the clear and transparent understanding of their supply chains due to a lack of widely available data on origin of imports to China. In addition, research suggests that relabelling and statistical errors within China could constrain modelling of global trade flow (Clarke 2009, Clarke and Hosch (2013)). A requirement for additional documentation to increase transparency and traceability agreed between Russia and China should reduce the risk of IUU but some Chinese processing plants are having difficult implementing the new procedures.[30] Catches made in the US are less liable to IUU risks, but the majority of Alaska pollock is processed in China (over 1 million tonnes per annum) and is imported through China and Russia, where the risk of mixing of IUU and duplication of catches (i.e. passing off illegal fish as legal fish in duplicate transactions) are much more possible (Clarke and Hosch (2013)). Fish are typically frozen, shipped to China where they are thawed, processed and refrozen before re-export. Although these fish will be at risk of being IUU it will be difficult to refuse them entry to the EU market without good reason and evidence to refuse the import as they will often have documentation from the flag State (i.e. Russia or the USA) to show they are legal.

Recent estimates put about 40% of the Pollock entering the USA as IUU (Pramod *et al.,* 2014). Pramod *et al.* (2014) estimated that average IUU rate for China was between 29 and 44% and higher than that specifically for Alaska pollock at 30-46%. Estimates of IUU product trying to enter the EU would likely be of a similar rate.

One highlighted additional risk area was the significant imports to the EU (identified when analysing the UK market) was of imports made through the Czech Republic from Russia

[30] http://www.undercurrentnews.com/2014/10/24/sudden-shift-in-export-rules-could-affect-russian-far-east-sellerschinese-plants/

(MRAG, 2013). These imports only started in 2012 and the risk is increased as there is no explanation why the Czech Republic, which does not have a long history of marine fish processing, no coastline or marine fleet is used as the first point of entry. This may be a legitimate operation taking advantage of cheaper labour or may be suppliers using the unfamiliarity of the Czech authorities to fisheries imports to avoid investigation or detection. The origin and final destination of these fish is unknown. The only recorded evidence of its existence is in the import statistics. Once inside the EU the movement of fish would be simpler and not subject to the same degree of verification as at the first point of entry so in theory the fish could have ended up anywhere inside the EU. Therefore, we recommend that further quantitative analysis of imports should be conducted.

MSC certified pollock would have a much reduced level of IUU risk due to the detailed certification process that would only certify pollock fisheries with a very low level or no risk of IUU and a "one-up-one-down" chain of custody in place to ensure fish are from the certified fishery. In summary, if all Alaska pollock on the German market are MSC certified a risk assessment may not be required, but if other sources still occur than a risk assessment would be recommended.

4.2.2 Atlantic cod (*Gadus morhua*)

Germany imports Atlantic cod from primarily Norway, China and Poland, followed by Iceland, Denmark, USA, Vietnam, the Netherlands, Russia and the UK (Lüdemann and Jessel, 2014).

Cod sourced from the fisheries of the EU (Poland, Denmark, Netherlands and UK), Iceland, Norway, Russia and the USA have a low level of IUU risk due to a high level of compliance in their cod fisheries following long periods of high IUU (particularly high levels of under-reporting). This is particularly true in the Baltic and Barents Seas in recent years where the compliance and management of the fisheries has also shown in the improved stock status of these fisheries. However, trade statistics do not indicate the source fishery, they only provide information on where products are imported from and too.

A high level of port state controls implemented by the States party to the Northeast Atlantic Fisheries Commission and in EU States (e.g. 100% monitoring of all cod landings >100kg in Poland) ensure that IUU is minimal. This is a key example of where effective flag State and port State control has been implemented with the resulting reduction in IUU though it still relies on the continued implementation of the regulatory framework.

Risks that still exist for cod are those of substitution, where cod is replaced with lower value whitefish (e.g. saithe or *Pangasius* sp.). Oceana (2012), reports cod in the US has been substituted with other cod species, hake, rockfish, slickhead, pangasius and tilapia. A similar situation has been anecdotally in the UK and is likely within Europe.

The enforcement of fisheries regulations in the Barents Sea, a main fishery for cod for Norway and Russia has suffered due to the level of IUU (illegal, unregulated and unreported fishing) fisheries targeting cod up to 2007. In 2000, the TAC was only 390 000 tonnes, ICES estimated that the illegal fisheries of cod has been reduced from 166 000 tonnes in 2005, to 40 000 tonnes in 2007.[31] Since then the level of IUU in the fishery has decreased further,

[31] http://www.fisheries.no/resource_management/control_monitoring_surveillance/Extent_and_consequences_of_IUU_fishing/#.VCA45vldVqI

with 2009 being the first year in which no IUU fishing was detected.[32] Since then quotas have been able to increase and quotas for have been able to be set at their highest level ever at 1 million tonnes. It now appears that the overall level of IUU has now been reduced to negligible levels with the enhanced MCS and an increase in the political will enabling sustainable fishing of the resource. With the sustainability of the stock with high catches possible, the current fleet size is appropriate for the available TAC, hence over capacity, a key driver of IUU has been removed.

Some limited IUU risk still exists for those non-MSC sources of cod or fish processed in higher risk locations such as China (Clarke (2009) and Clarke and Hosch (2013)) where robust traceability systems have yet to be fully developed. MSC certified fish should be IUU free, though doubts have been raised about the chain of custody of some of the processors (Pers. Comm. 2014) for whitefish in China. The major sources of risk for the cod imported direct into Germany are through China (25% of imports), Vietnam (3.7%) or Russia (2.7%), or as secondary imports through Poland (15%).

In these cases there is a risk of illegal fish that have been exported to China or Vietnam from a variety of sources being able to be mixed with legal fish and thereby legitimised. Both China and Vietnam are highlighted as high risk countries by Pramod *et al.* (2014). MRAG (2005) identifies Vietnam as one of 37 countries at that time known to be involved in IUU fishing, and a number of statements that suggest that illegal fishing was widespread at the time and still occurs. Vietnam has been noted for poor practices in the supply chain with middlemen supply raw material without regard for quality, quantity and traceability (UNEP, 2009) and has had a long-term problem as reported by van Zwieten *et al.* (2002) where major issues with fisheries statistics are identified in Vietnam, with low categorical resolution and the non-transparent aggregation of data. Poland is a much improved situation compared to twenty years ago. In Poland, the import / export controls and checking of imported fish (particularly from Russia and China) have been identified as a potential weakness compared to the highly effective landings controls. Port based inspection and control were increased to a 100% inspection rate for all cod landings (MARD, 2006) after criticism of illegal cod landings in the 1990s and early 2000s (HSTF (2006) and MRAG (2005)). The latest ICES Baltic Working Group report (ICES, 2014) indicated that misreporting of cod (Eastern Baltic Sea stock) during the period 1993 – 2007 was in the order of 35-40%, though since the increased control throughout the region "unallocated" catches have been reduced to zero.

It should be noted that Germany exports almost as much cod as it imports and a full analysis of the product imports, exports and landings should be carried out to ensure an accurate estimate of the cod consumed by the German market is made.

Due to the importance of cod as a key whitefish species with a high volume and high value Atlantic cod has a market value reaching up to EUR 7 per kg for fresh fillets (GlobeFish, 2014) to the German market we would recommend including it for quantitative assessment.

4.2.3 Atlantic redfish (*Sebastes spp.*)

Of the three redfish species in the North Atlantic, two of them are considered to be of commercial importance. These are *Sebastes marinus* and *Sebastes mentella*. Redfish is a

[32] http://www.fisheries.no/resource_management/control_monitoring_surveillance/No_IUU_fishing_of_cod_in_the_Barents_Sea/#.VCA4AvldVqI

straddling stock that occurs inside the Icelandic Exclusive Economic Zone (EEZ) and in the international waters of the North Atlantic high seas on the Reykjanes Ridge immediately adjacent to the Icelandic Exclusive Economic Zone where the ridge extends south of the EEZ. Through a regional agreement establishing the North East Atlantic Fisheries Commission (NEAFC), fishing and coastal states jointly regulate fisheries in this area.

EU trade codes differentiate between *S. marinus* and 'redfish others'. Germany imports Golden redfish (*Sebastes marinus*) from Iceland (80%), Norway (6%) and the Netherlands (4%) (Lüdemann and Jessel, 2014). Other redfish species are imported from China (41%), Iceland (28%), Turkey (7%) and Norway (5%) (Lüdemann and Jessel, 2014).

During the early 2000's there were high profile NGO campaigns against IUU fishing[33] for redfish of the North Atlantic. At this time there were eight were IUU vessels on the NEAFC blacklist active in the fishery and very little control effort was targeted by NEAFC Member States on this area. It was at the time estimated that IUU fish of a value of US$30 million during was taken from this fishery in 2002 and 2003 (OECD, 2004)[34]

NEAFC in response developed one of the first IUU lists and a detailed set of port State measures to restrict the ability of the IUU vessels landing their catch in or using the port facilities of any member State (or responsible port State). This was very successful and has forced the IUU vessels out of the fishery. This port State measures scheme is often now used as a template for port state control systems.

IUU now considered to be low with only limited underreporting of over quota fish contributing to the overall level of IUU.

Of particular interest for further assessment is the high proportion of "redfish others" (i.e. not *S. mariunus* but possibly *S. fasticatus*, or *S norvegicus*) being imported from China and Turkey. Given the link between Russian fisheries and China's role in the processing of whitefish, and that Russia is one of the main catching nations of redfish it is recommended that redfish could be considered for a further risk assessment although the main sources of fisheries are relatively free of IUU.

4.2.4 Haddock (*Melanogrammus aeglefinus*)

The main countries from which Germany imports haddock are Poland, China, Norway Denmark and Iceland. Haddock is of lower importance to the German market in terms of volume and value (approximately EUR 2 per kg (GlobeFish, 2014)) compared to the other species of whitefish covered in this study. It has similar low levels of risk to cod with most of the sources being from well-managed, well controlled Scandinavian or EU sources (Poland, Iceland, Norway, Netherlands, UK and Denmark) which have a relative low risk. As for cod though, the higher risk haddock entering the German market has come in through a route via secondary processing States (e.g. China and to some extent Poland) which import large amounts of cod, process it and re-export it. Without adequate traceability in place this provides an opportunity for substitution, duplication or laundering of IUU fish.

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[33] www.greenpeace.de

[34] OECD (2004). IUU fishing in NEAFC: How big is the problem and what have we done? AGR/FI/IUU/RD/(2004)5. 8pp

It should be noted that Germany also acts as an intermediary or processor of haddock for other European MS markets with nearly 40% of the amount of imported haddock being exported. It is important when re-exporting a high proportion of the fish (in this example of haddock about 40-50% based on the import and export figures of 2012 / 2013 (Lüdemann and Jessel, 2014)) to ensure that German markets are not acting as an intermediary for the supply of IUU sourced fish to other EU States or even outside the EU.

In the case of haddock, even though most of the sources would have a low-level of IUU risk, the amount of fish processed and imported via China (approx. 1500t per year (Lüdemann and Jessel, 2014)) represents a high level of risk that should be quantified.

4.2.5 Hake (*Merluccius spp.)*

The species considered for this assessment were *Merluccius hubbsi* (Argentine hake), *M. capensis* and *M. paradoxus* (Cape hake) and other *Merluccius spp.* EU trade statistics differentiate between *M. capensis* and *M. paradoxus; M. australis; M. hubbsi*; hake of the genus *Urophycis;* and other hake (of the genus *Merluccius)* (Lüdemann and Jessel, 2014).

German hake imports come from a wide variety of sources from a number of species. From the import data in Lüdemann and Jessel (2014) the main imports appear to consist of *Merluccius hubbsi* (from USA, Peru, Argentina and Chile) and *M. capensis* and *M. paradoxus* (Namibia and South Africa). Additional imports (10-20%) come from other sources or via other EU States.

With regards to total imports of all classifications of hake the USA, Namibia, Peru, South Africa and Argentina were the main countries from which Germany imported (Lüdemann and Jessel, 2014). It is likely that hake imported from the US has been re-exported from Chile and Peru. Due to the checks put in place by the US authorities these will have a low-medium risk of IUU but all hake from South America are at risk due to high levels of overfishing. The director of the Chilean National Fisheries and Aquaculture Service (SERNAPESCA) expressed in August 2014 “a strong rejection of illegal hake fishing” stating that the hake resource was overfished and that ban would soon be enforced. It was estimated that IUU fishing of hake in Chile could have totalled 19,000 metric tons so far in 2014, i.e. 83.3% of the total allowable catch and that the sustainability of hake in Chile is at risk due to IUU fishing. The situation is similar though possibly at a lower level in Peru and Argentina.

Previously the risk of IUU hake from Namibia and South Africa was high as Spanish vessels were taking hake without licences and the fish were being exported to EU markets (mainly Spain). These were then processed and the products re-exported, mainly frozen but also refrigerated, throughout EU markets. Increases in the MCS and regulatory compliance in both Namibia and South Africa have reduced the level of IUU to negligible levels. The Namibian fishery is recognised as well managed, though some level of IUU is still suggested. South Africa’s hake trawl has achieved MSC certification[35] showing the good management and high level of MCS that has eliminated IUU from the fishery.

[35] http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/south-atlantic-indian-ocean/south-africa-hake-trawl-fishery/south-african-hake-trawl-fishery

The high volumes of higher risk South American hake entering the German market suggest that a quantitative assessment for all hake species should be conducted.

4.2.6 Toothfish (*Dissostichus spp*.)

Germany imports toothfish primarily from the Netherlands, Denmark and UK, who in turn import from Spain, Argentina, Falkland Islands and South Korea (EuroStat, 2014). Toothfish is a relatively high value fish with market prices reaching Approximately EUR 9 per kg (FIS, 2014).

From the mid 1990′s to the mid 2000′s, the level of IUU fishing for toothfish (both Patagonian and Antarctic) was a very serious problem. Since the 1990s though, the level of IUU fishing has been reduced systematically in the various toothfish fisheries to a fraction of its former levels (see Agnew (2004) for details). This started with a reduction in the fishery around South Georgia and the South Sandwich Islands and then moved eastwards through the South African, French and Australian territories. This reduction has been achieved through a combination of increased surveillance, high-profile apprehensions and prosecutions (e.g. Elqui and Viarsa in the 1990s) and some of the strictest port and market regulations in world fisheries. Estimates of IUU catches are developed annually and built into the toothfish stock assessment process through a variety of models which are made possible by the data rich nature of the fisheries (See Table 1 of Appendix G, WGFSA, 2011 and Agnew and Kirkwood, 2005).

IUU fishing of toothfish also changed as from the mid 2000′s onwards, the IUU fleet, which had already been severely reduced in numbers switched from longlines to gillnet and these have further been reduced. The numbers of IUU boats has been reduced from an estimated peak of 55 longliners the late 1990′s to the latest estimate in 2012 of only 4 IUU gillnetters (Pers. Comm.).

A number of toothfish fisheries have received certification by the Marine Stewardship Council as sustainable and well-managed fisheries. These fisheries require one-up-one-down style Chain of Custody certification, in addition to the standard CCAMLR Electronic Catch Documentation Scheme (e-CDS).

The Members of CCAMLR, concerned that IUU fishing compromises the objectives of the CAMLR Convention, adopted additional conservation measures to specifically address the threat of IUU fishing. CCAMLR conservation measures support a suite of monitoring and compliance systems and tools. Members implement compliance systems that include:

- Vessel licensing (Conservation Measure 10-02)
- Monitoring of vessel movements (Conservation Measure 10-04)
- Monitoring of vessel transhipments (Conservation Measure 10-09)
- System of Inspection
- Vessel Monitoring System (Conservation Measure 10-04)
- Catch Documentation Scheme (Conservation Measure 10-05)

The remaining IUU fleet is now small, typically flagged under flags of non-compliance and has, due to the measures put in place by CCAMLR and its members, been forced to land their fish in non-compliant ports. IUU vessels attempted to use African ports as a weak link in the chain but prompt action by the port States concerned e.g. Mauritius (and driven by the EU, UK, South Africa and Australia as CCAMLR members) pushed the illegal catches further away to Southeast Asia, reducing the profitability of the illegal fishery further. There is now a

split market according to industry insiders with legal certified catch supplying Europe, Japan and the US, and the only market for the illegal catch being China and Southeast Asia.

The current CCAMLR IUU list (https://www.ccamlr.org/en/compliance/non-contracting-party-iuu-vessel-list) contains 18 vessels. Most of these vessels are currently stateless, with a number under Nigerian and Iranian flags. It is unlikely that any catch from these vessels could enter European markets due to the requirements of the eCDS which would block catches from IUU listed vessels.

We would therefore recommend that toothfish is not put forward for additional analysis in phase 2.

4.2.7 Pangasius (*Pangasius spp.*)

Pangasius spp. are wild caught and farmed with aquaculture dominating global production. Indonesia and Thailand are the top catching nations of *Pangasius spp* (FAO, 2014). EU trade statistics do not differentiate between wild caught and farmed *Pangasius spp*, furthermore some trade codes aggregate *Pangasius spp.* with other catfish and freshwater species. Germany imports nearly all *Pangasius spp.* from Vietnam, and a small volume from China. *Pangasius spp.* from Vietnam will be from aquaculture, although it is not clear if *Pangasius spp.* from China is wild caught or farmed.

Pangasius spp. in itself is not high risk. It is a relatively low-value predominately farmed freshwater species that is used as a legitimate low cost option to higher value whitefish, but it is also one of the commonest species used to illegally substitute for other more expensive species e.g. cod and haddock, with a pangasius being misreported for cod, other whitefish and grouper[36]. This can be as processed products (e.g. breaded fillets) or simply processed in a form so as to appear to be sole or grouper[37]. Farmed pangasius is usually about half the price of other whitefish species. The majority of the pangasius is produced in Vietnam, processed in Vietnam or China and then exported to the EU, USA and other countries where demand for whitefish is high[38]. It is presumed that the substitution occurs in the processing chain and most of the pangasius in Europe are imported from China or Vietnam. Vietnam, under pressure from other governments has recently introduced new regulations (Decree No. 36) that stipulates that catfish (pangasius) exporters must register their export contracts with the Vietnam Pangasius Association (VPA) in an effort to trace exports and avoid substitution. ASC certified pangasius is now available from Vietnam with 45 farms now being certified.[39] Due to the resources available and possible mixing of species, it is recommended to conduct further analysis if the origin of the fish is known.

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36 http://fishwise.org/press/blog?start=10

37 http://seafoodhealthfacts.org/seafood_choices/pangasius.php

38 http://www.undercurrentnews.com/2013/08/05/pangasius-exports-to-china-up-72-in-june/

39 http://www.asc-aqua.org/index.cfm?act=tekst.item&iid=4&iids=204&lng=1#ldbbvevqjulu

4.2.8 Saithe (*Pollachius virens*)

Saithe imports into Germany mainly come from Iceland (29%) and Denmark (28%). In turn, Denmark imports saithe from Norway (31%), Germany (21%), the Faroe Islands (19%) and France (12%).

Iceland has a Fisheries Management Plan in place for Icelandic saithe. The management strategy for Iceland saithe is to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long term. In accordance with this general aim the harvest control rule below was formally adopted by Icelandic authorities in April 2013 for the next period of 5 fishing years, starting from the 2013/14. The harvest control rule will be reviewed by the end of this period. The harvest control rule is applied to calculate the annual total allowable catch (TAC) based on the mean of the TAC in the current year and 20% of the biomass of 4 year and older saithe in the assessment year. ICES has evaluated the plan and found it to be consistent with the precautionary approach[40].

Norway is also complying with the Electronic reporting systems (ERS) and VMS for fishing vessels[41], through the agreements reached between the EU and Norway in 2013. Norway also informed the EU delegation that bilateral arrangements on exchange of electronic catch and activity data have been entered with Iceland.

Denmark (in respect of the Faroe Islands), the European Union, Iceland and Norway are Member States of the North East Atlantic Fisheries Commission (NEAFC) and their commercial vessels must abide by both the Current Management Measures and the NEAFC Scheme of Control and Enforcement. These countries are also Member States of the Northwest Atlantic Fisheries Organisation (NAFO). Vessels are required to have VMS on board, and send their information to the NAFO Fisheries Monitoring Centres. The NAFO Joint Inspection and Surveillance Scheme is implemented to ensure compliance of NAFO-registered fishing vessels in the NAFO Regulatory Area.

The Faroe Island fisheries are regulated by the Ministry of Fisheries and Natural Resources. The framework for the regulation of commercial fisheries, both in home, foreign and international waters, is the Commercial Fisheries Act of 1994 and its subsequent amendments. Based on this legislation, detailed regulations are implemented governing vessel and fishing license, area closures, gear and data requirements and other technical regulations for commercial fisheries[42]. In addition, all Faroese vessels fishing in the United Kingdom-Faroe Island Special Area must be equipped with VMS and subject to control by the Party of Parties issuing the fishing licence[2].

In 2012, an EU–Norway request was made to ICES on options to revise the long-term management plan for saithe (ICES, 2012). ICES advised that all harvest control rule (HCR) options in the request result in less than 5% annual risks of the stock being below the limit

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40 http://www.fisheries.is/main-species/codfishes/saithe/management-plan/

41 https://www.regjeringen.no/globalassets/upload/fkd/vedlegg/kvoteavtaler/2013/eu/agreedrecordfisherieseunorway18jan2013.p df

42 http://www.eumofa.eu/

biomass reference point (B_{lim}) in the short term (next four years).) The long-term performance of the HCRs is less clear, as it is uncertain whether the stock will develop in accordance with the precautionary approach (i.e. with less than 5% risk of being below B_{lim}) in the long term. No substantial differences were found between the options in terms of risk or yield, although the stability of yield is slightly more different between options. The EU and Norway agreed to keep the old management plan. Because the long-term performance is not clear, ICES advises that the HCR selected for management should be re-evaluated within four years (i.e. no later than 2016) and revised if necessary[4].

Norway has two management plans for the saithe; for the North East Arctic saithe and for the North Sea saithe. For the North East Arctic saithe Norway sets the TAC as a unilateral quota after advices from ICES and the Institute of Marine Research. For the North Sea saithe EU and Norway have adopted a management plan for setting annual total allowable catch[43].

Many of the saithe fisheries that would contribute fish to the German market through landings direct into Germany or by imports are independently certified to the Marine Stewardship Council (MSC) environmental standard for sustainable fishing. Within the Principle 3 text for these fisheries there are no references to IUU fishing in the relevant fisheries and areas[44]. It is a requirement for MSC fisheries to not have any significant IUU occurring before the fishery could have been certified i.e. ISF Iceland saithe, DFPO Denmark North Sea & Skagerrak saithe, and Faroe Island saithe.

From 2011 to 2013, saithe prices have been declining noticeably. In 2014, prices in Norway dropped by 22%, however from Iceland it is reported that prices for whitefish such as saithe are up[45]. The average market price for saithe is very low in the EU with a first landing price between 2005 and 2013 of only €1.10 per kg[46].

None of the interested countries are impacted by IUU (no National Plan of Action applies) or EU Yellow flags. According to the World Bank, they are all above 80% for the four indicators considered of relevance to the rate of IUU fishing (Governance Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption)[47].

According to the NEAFC no compliance issues with IUU saithe were recorded from relevant countries[48] and no Apparent Infringements (AI) were detected in 2013 (or recent years) by NAFO at sea inspectors and port authorities[49] that related to saithe.

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[43] http://www.fisheries.no/ecosystems-and-stocks/marine_stocks/fish_stocks/saithe/#.VT-ZsWd0w5g

[44] http://www.msc.org/search?facet=true&fq=portal_type%3A%22Fisheries%22&SearchableText=saithe

[45] http://www.globefish.org/groundfish-june-2014.html

[46] http://www.eumofa.eu/

[47] http://info.worldbank.org/governance/wgi/index.aspx#reports

[48] Permanent Committee on Control and Enforcement (PECCOE) of the North-East Atlantic Fisheries Commission. 17-18 September 2014, London.

[49] Northwest Atlantic Fisheries Organisation. 36th Annual Meeting – September 2014. Annual Compliance Review 2014. Serial No. N6386. NAFO/FC Doc.14/21 (Adopted)

In summary, there is little evidence that saithe on the German market would be at risk of any IUU fish entering the market. All of the sources of saithe are highly regulated and many have achieved MSC certification.

4.3 Shrimp

In 2012, capture production of shrimp species registered a new maximum at 3.4 million tonnes. Shrimp continues to be the largest single commodity in value terms, accounting for about 15 percent (over US$50bn) of the total value of internationally traded fishery products in 2012[50].

4.3.1 Tropical shrimp (*Penaeus spp., Parapaneus longirostris*)

The top countries from which Germany imports tropical shrimp are Bangladesh, Vietnam, India, and Thailand. It is also likely that tropical shrimp from Ecuador and Honduras also enters the German market through other EU Member States (e.g. Belgium) as indicated by import data presented in the Market Study (Lüdemann and Jessel, 2014). Shrimp production is dominated by aquaculture in these countries but wild capture shrimp fisheries are also important sources of production. However, captured and farmed shrimp are combined in export statistics so it is more difficult to determine whether tropical shrimp entering the market are wild caught or farmed.

Tropical shrimp are caught in mixed fisheries using trawl gear which results in high proportions of bycatch of mixed demersal species, often over 80-90%, including juveniles of commercially important species, which are either discarded at sea or landed and marketed as trash fish. A vast under-reporting of target and bycatch species occurs and the use of illegal mesh sizes is widespread. There is a high component of unrecorded artisanal catch that is difficult if not impossible to document accurately. It is estimated that overall in some areas, shrimp fisheries are responsible for 50-80% of regional discards. In total, shrimp fisheries account for 35% of global commercial fisheries discards.

There are reports that wild-caught shrimp is occasionally illegally exported mislabelled as farmed shrimp (Pramod *et al.,* 2014). Wild shrimp from the South East Asian region is often purchased at sea and transhipped to Thailand and China for processing (Dessy Angraenii Pers. Comm. In Pramod *et al.* (2014)), and is therefore not landed or reported in source country trade statistics. Part of this catch is unreported but licensed through joint venture agreements with Thai, Taiwanese and Korean vessels. Part of the catch is also from unlicensed vessels selling supplies to transhipping vessels at sea (EJF, 2013). The incentive for IUU fishing appears to be the lack of transparency on trade flows at sea where supplies are amalgamated for large, shore-based processing interests. Recent focus has been on the Thai shrimp industry due to the unregulated nature of its pre-processing factories and exploitative labour practices rather than on IUU[51]. It should not be understated though that IUU remains a significant problem with between 24-39% of all catch being IUU (Pramod *et al.,* 2014) and with high-value prawn fisheries this may be even higher. Furthermore, illegal

[50] FAO, 2014, The State of World Fisheries and Aquaculture: Opportunities and challenges http://www.fao.org/3/a-i3720e.pdf

[51] http://www.theguardian.com/global-development/2014/jun/10/supermarket-prawns-thailand-produced-slave-labour

shrimp trawling activities are associated with shrimp farming in relation to the catching of brood stock for hatcheries (WWF, 2011).

Pramod *et al.* (2014) reported that wild-caught shrimp from Mexico (25-40%), Indonesia, and Ecuador (25-35%) are also more likely to be illegal, and some illegal wild-caught shrimp may be disguised as farmed shrimp. Other shrimp fisheries worldwide commonly report illegal fishing e.g. Bahrain[52]. It would be highly likely that rates in Bangladesh and India are in similar ranges though not reported and India is reported as having an average IUU rate of 21-36% by Pramod *et al.* (2014).

Given the uncertainty around the source of tropical shrimp (i.e. farmed or wild caught) and the issues relating to shrimp aquaculture, tropical shrimp should be considered for further assessment.

4.3.2 Cold-water shrimp (*Crangon spp.*, Pandalidae)

Germany imports cold-water shrimp primarily from the Netherlands but also Denmark and Greenland. The Netherlands imports cold-water shrimp from Norway, USA, China, Canada and Iceland. Cold-water shrimp are predominately wild caught as they are difficult and expensive to be culture.

The main IUU issue encountered in cold-water shrimp fisheries is the underreporting of bycatch and the impact whitefish species bycatch has on the management of whitefish fisheries. Alverson *et al.* (1994) for instance suggest, that in the Northwest Pacific 97% of the shrimp bycatch is discarded producing over 4 million tonnes of waste fish and most shrimp fisheries are recognised as being high in bycatch with the North Atlantic fishery for Nephrops (N*ephrops norvegicus*) having approximately 65% bycatch (Redant and Polet, 1994) made up of undersized whitefish and flatfish and that these figures are based on landings data which were underreporting the discards. Progress has been made in the development of bycatch reduction devices, e.g. Hannah and Jones (2007), but the problem remains. With the new landings obligation in European fisheries the situation should improve but landings from non-EU countries will still have the same problem.

The majority of source countries are well managed with a high level of regulation and low levels of corruption and would suggest a low level of IUU. In a similar way to whitefish though, China is a key processing location and concerns over regulation, traceability and substitution exist. There are also concerns over the unregulated use of additives such as sodium tripolyphosphate (Aitken, 2001)[53] that are designed to help products to retain additional moisture hence bulking up the product weight allowing product to be skimmed i.e. less product is produced allowing some additional product to be retained and sold a second time. This process of adding (allowing) excess water into the product is called "soaking".

Cold-water shrimp supply chains incorporate processing in China and therefore further assessment is recommended.

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[52] http://www.thefishsite.com/fishnews/23931/bahrains-shrimp-stocks-drop-due-to-illegal-fishing

[53] http://www.fao.org/wairdocs/tan/x5909e/x5909e00.htm#Contents

4.4 Other Species

4.4.1 Herring (*Clupea spp*)

European trade data and CN8 codes indicate two main species of herring are traded throughout the European Union: Atlantic herring (*Clupea harengus*) and Pacific herring (*Clupea pallasii*). Both species contribute significantly to global fisheries production, with ~ 0.5 million tonnes of Pacific herring and ~ 1.8 m tonnes of Atlantic herring landed in 2013 (FAO, 2015). Reported catch statistics show that Pacific herring is primarily caught by the Russian Federation (76% of the global catch in 2013), with Korea (9%), United States (8%), China (3%), Canada (3%) and Japan (1%) catching the remainder (FAO, 2015). For Atlantic herring, the primary catching nation is Norway (28% of global catch in 2013), followed by Iceland (9%), Denmark (8%), Canada (7%) and Finland (7%). For 2013, Germany reported direct catches of Atlantic herring at ~ 72,000 tonnes (~ 4% of global capture production), whereas no direct catches of Pacific herring were reported (FAO, 2015).

Import data on herring products to the EU (EU-28 countries) indicates that Norway (23%) Germany (16%), Denmark (15%) and Poland (9%) were the key exporters during 2013, with smaller quantities originating from Sweden (7%), the Netherlands (6%) and France (5%). German imports of herring have fluctuated without a clear trend between approximately 127,000 and 169,000 tonnes during the 2006-2013 period (Federal Statistical Office Germany as presented in Lüdemann, 2015). Key exporting countries of herring products to Germany during 2013 were Denmark (36%), Poland (23%), Norway (14%), the Netherlands (8%), UK (4%), and the Faroe Islands (3%), all of which had significant national fisheries catches for Atlantic herring during 2013: Norway (507,119 t) Denmark (141,028 t) the United Kingdom (93,570 t), the Netherlands (88,010 t), the Faroe Islands (115,552 t).

To draw conclusions about the risk of IUU associated with herring products imported to Germany, herring trade flows of key exporting countries can be examined alongside the effectiveness of national MCS regimes. This allows inferences to be made regarding the provenance of herring products (*i.e.* from national wild capture fisheries or re-exports from other countries) and the likelihood of fisheries management regimes within these countries detecting/preventing IUU.

For Denmark and the United Kingdom herring exports exceed imports (Lüdemann, 2015) and it can be inferred that imports into Germany from these countries are likely to be from national capture fisheries. Both countries are regarded to have comprehensive MCS regimes in place; for example, the MSC certification report for Danish North sea herring fishery indicates that the Danish MCS regime has appropriate sanctions in place to deal with violations[54]; similarly, herring caught in scottish waters are regarded to be subject to a high degree of enforcement and control in accordance with comission regulation (EC) No. 1542/2007, meaning that regular landings inspections, inspections at sea, and monitoring of fleet activity occurs[55]. Therefore, herring products imported into Germany from Denmark and the United Kingdom are likely to originate from well-managed capture fisheries within these countries and can be considered to have a low IUU risk.

[54]https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/dppo-and-dfpo-north-sea-herring/assessment-downloads-1/24.06.2009-Public-Cert-Report-DPPO-North-Sea-Herring.pdf

[55]https://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-east-atlantic/spsg-scotland-herring/assessment-downloads-1/20120404_PCR.pdf pg. 24

Assessing the risk associated with herring products from Norway and the Faroe Islands is more problematic. However, given the size of reported national herring catches and the comprehensive fisheries management regimes within these nations, it can be inferred that imports from Norway and the Faroe Islands are likely to originate from well managed fisheries and should be of little concern with regards to IUU. For example, in the case of Norway, the system for recording catches by the Norwegian fleet is regarded as comprehensive and involves daily monitoring of individual vessels, and, furthermore, Norway has implemented actions against IUU fishing in accordance with the FAO Global Plan of Action against IUU fishing[56]. In the case of the Faroe Islands it is regarded that an effective national MCS management system for the Atlanto-Scandian herring fisheries is in place; including severe penalties for illegal fishing practises, such as confiscation of fishing licences in addition to confiscation of catch, fishing gear and financial penalty[57].

The Netherlands and Poland both import larger volumes of herring than they capture, and it is possible that herring products exported to Germany from these countries are re-exports. In this context it is important to analyse herring imports into the Netherlands and France in order to identify the origin of herring products and any associated IUU risks. Lüdemann (2015) indicates that the Netherlands import herring products primarily from Norway (45%), Denmark (18%) the Faroe Islands (10%) and France (10%); whereas Poland imports herring from Germany (30%), Norway (19%), Iceland (19%) and Denmark (16%). The comprehensive fisheries management regimes of Denmark, Norway and the Faroe Islands have been previously discussed and a low risk of IUU concluded; however, the management regimes of Iceland and France warrant further discussion. Similar to other nations considered in this assessment, both countries are regarded to have comprehensive fisheries management regimes; for example, in the case of Iceland, fisheries are subject to an extensive regulatory framework and it is reported that no IUU fishing occurs on the Norwegian spring spawning herring or Icelandic summer spawning herring[58]. France, like other EU nations, is also considered to operate a comprehensive MCS regime, administrating penalties such as the suspension of licenses and fines[59]. In conclusion, imports of herring products from the Netherlands and Poland are likely to be re-exports from countries with comprehensive fisheries management regimes and can be regarded as having little associated risk of IUU.

This examination of import/export data alongside fisheries catch data demonstrates that the majority of herring imports into Germany are likely to be Atlantic herring: nations with wild capture fisheries landing Pacific herring do not directly trade herring products with Germany or the countries identified as potentially re-exporting herring to Germany (the Netherlands and Poland). If the majority of herring products imported into Germany are indeed Atlantic herring, additional evidence can be considered which infers low IUU risk.

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[56] https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/norway-spring-spawning-herring/assessment-downloads-1/30-04-2009-Norwegian-Spring-Spawning-Herring.pdf pg.52

[57] https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/fpo-as-herring/assessment-downloads-1/25.02.2010-fpo-as-herring-pcr.pdf pg. 137

[58] https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/isf-norwegian-and-icelandic-herring-trawl-and-seine/assessment-downloads-1/20140529_PCR_HER360.pdf pg. 21

[59] https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/from-nord-north-sea-and-eastern-channel-pelagic-trawl-herring/assessment-downloads-1/20150422_PCR_HER459.pdf

In recent years, it was widely considered that the main IUU problem encountered with herring fisheries was “slippage”, where fish are caught but deemed not of sufficient quantity or size to land and then are discarded/released often with high levels of mortality. The MSC assessment of Norwegian spring spawning herring purse-seine and pelagic trawl fisheries acknowledges that slippage is occurs and, although it is not possible to assess the magnitude of this issue, the relative importance of slippage is likely to be low[60]. Similarly, slippage is speculated to be an issue in the MSC certified Danish North Sea herring fishery[61]. However, under the new EU landings obligation (discard ban), the pelagic landing obligation was implemented on the 1st of January 2015 which only allows slippage under *force majeure* for safety reasons. The implementation of the landings obligation should have therefore reduced the overall level of IUU fish from EU fleets, but at this time no documentary evidence is available.

For example, the latest publication from the ICES herring assessment working group (ICES, 2014c), which provides stock assessments for various Atlantic herring stocks, does not provide any reference to IUU, thus indicating that IUU, that would include under-reporting through slippage) is not considered a major issue that would affect the stock assessment.

Furthermore, a total of 17 fisheries targeting Atlantic herring are currently certified by the marine stewardship council[62]. Herring products sourced from these fisheries are therefore likely to have a low risk of associated IUU.

When assessing IUU risk associated with herring fisheries it is important to consider that there is little incentive to fish illegally or land illegal herring due to the low price, and quotas are often not reached for some fisheries. Herring, like most small pelagics, are of relatively low value compared to other fish on the German market (market value of up to EUR 2.4 per kg for a whole fish (GlobeFish, 2014).

Although there is an inferred low risk of IUU for Atlantic herring, it should be considered that incidents of IUU have been previously reported in herring fisheries operating from countries with apparently comprehensive MCS regimes. For example, between 2002 and 2005, significant landings of herring and mackerel into Scottish ports went unreported (black landings) by fishermen aiming to avoid quota restrictions; for this specific case fishermen confessed to making 524 undeclared landings worth £37,212,271. However, although the black landings in Scotland was once considered common, improvements to the country’s fisheries management regime, such as tighter port controls, are thought to have largely eliminated them.[63]

The low levels of IUU would not normally suggest that a quantitative analysis be conducted, however, with about 100,000t of herring imported to Germany each year along with catches

[60] https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/norway-spring-spawning-herring/assessment-downloads-1/30-04-2009-Norwegian-Spring-Spawning-Herring.pdf, pg. 30

[61] https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/dppo-and-dfpo-north-sea-herring/assessment-downloads-1/24.06.2009-Public-Cert-Report-DPPO-North-Sea-Herring.pdf, pg. 20.

[62] https://www.msc.org/track-a-fishery/fisheries-in-the-program/fisheries-by-species/fisheries-by-species#salmon

[63] http://www.theguardian.com/environment/2010/nov/22/scotland-fishermen-illegal-landings-mackerel-herring

of 72,000t make it a key component of the German market. This means that a small level of IUU, from slippage (while landing obligations are implemented), non-EU fleets not subject to landings obligations or other sources could be significant in terms of the tonnage of IUU overall when compared to other species and that a quantitative assessment should be carried out. This will allow a more accurate representation of the level of IUU in the entire German market and not skewed if only those species with high IUU were used to raise estimates to the overall market.

In summary, there are at this time no countries with a significant IUU risk associated to herring products that are exporting herring to the German market. Germany also has significant direct landings of herring into domestic ports with a negligible or zero level of IUU.

4.4.2 Orange roughy (*Hoplostethus spp.)*

Orange roughy (*Hoplostethus atlanticus*) is a typical deep-sea, they are long lived (more than 50 years in most cases and up to 150 years), they are slow to grow and mature and have a low fecundity. There are found in deep-water (900-1800m) particularly around seamounts and mid-ocean ridges (Reykjanes ridge in the North Atlantic, Walvis ridge in the southeast Atlantic) where they can aggregate in large numbers. This behaviour makes them particularly prone to IUU fishing as they form dense aggregations for spawning and feeding and coupled with the remote locations often outside EEZs of coastal States they are vulnerable to IUU fishing. There are a number of fisheries for orange roughy in the North Atlantic, South Atlantic, Southwest Indian Ocean and in the Southeast and Southwest Pacific Ocean. The top catching nations are New Zealand, Australia and the Faroe Islands (FAO FishStat, 2014). The fisheries off New Zealand are considered to be good examples of management of deep-water species and recent increases in orange roughy quota on two of the fished areas provide evidence for this (Orange roughy 7A (1155t extra) and 3B (525t extra))[64].

Due to the remote locations, lack of good biological information and high incidence of IUU management and assessment of orange roughy is difficult. Many fisheries are extremely limited in the legal opportunities to fish to protect the fish stocks e.g. NEAFC banned targeted fishing on orange roughy in 2007 and the latest ICES advice for all ICES Areas is "ICES recommends no directed fisheries for this species. Bycatches in mixed fisheries should be as low as possible" (ICES, 2014).

Due to the high value and ease of fishing orange roughy remain a target of IUU operators. Reports of IUU have occurred frequently within these various fisheries worldwide. The problem is compounded with deep-water species where by the time the IUU has been detected, the particular seamount may have been "fished out" and virtually no fish remain and due to the slow growth and low fecundity it will be at least twenty years before a sufficient stock is available for a fishery to be re-established.

Tracking of orange roughy is difficult as there are no species specific and product-form specific (CN8) trade codes. It is not possible to estimate the level of landings, imports or exports of orange roughy (from Eurostat and other sources) into the German market as

[64] http://en.mercopress.com/2014/09/02/new-zealand-increases-hoki-taac-following-successful-stock-conservation-management

statistics are therefore not available at the species level. This is a common problem for deep-water species (see grenadiers below) and needs to be addressed.

There is also a risk of substitution[65], where supposed orange roughy are substituted for cheaper oreo dory (*Pseudocyttus maculatus*) and John Dory (*Zeus faber*).

At this time, considering the available landings, import and export data it may be difficult to perform a quantitative risk assessment for orange roughy.

4.4.3 Horse mackerel (*Trachurus trachurus, Scomber japonicus, Lepidocybium spp*.)

Horse mackerel is a generic term for a wide number of pelagic species including the true horse mackerel (*Trachurus* spp.), but also to Carangidae and scads. The main species likely to be found on the German market are *Trachurus trachurus* (Atlantic horse mackerel) *Trachurus capensis* (Cape horse mackerel) and *Trachurus japonicus* (Japanese horse mackerel), with a possibility of some *Trachuurs mediterraneus* (Mediterranean horse mackerel).

Denmark and the Netherlands are the main countries from which Germany imports *Trachurus spp.* (EuroStat, 2014). Horse mackerel are typified by relatively high volume and low value species and as such are of typically low IUU risk. The only recorded large scale IUU of horse mackerel was in Namibia's exclusive economic zone (EEZ) before independence when it was actively targeted by DWFNs. Since independence, MCS in Namibia has increased greatly and the rate of IUU has decreased to virtually nil for horse mackerel. Where other fisheries are poorly regulated, such as off Central and Northwest Africa where control of foreign fleets, and especially those operating offshore in pelagic fisheries is limited (MRAG, 2005) then there is a possibility that illegal fishing can occur but this is relatively rare with most of the stocks covered by an RFMO and the fisheries most likely to feed into the German market from the Northeast Atlantic are well regulated with designated ports for landing, mandatory VMS, reporting systems etc.

The most frequent recorded incidences of IUU with respect to horse mackerel appear in the well regulated fisheries off Namibia where catches of undersized or poor quality horse mackerel have been discarded illegally at sea by distant water fishing vessels (PE Bergh, Pers. Comm.). In these cases it is clear that such fish could not enter the Germen market chain.

It is recommended that a further quantitative assessment of horse mackerel is not required.

4.4.4 Anglerfish (*Lophius spp*.)

Members of the Lophius genus, referred to as monkfish, fishing-frogs, frog-fish and sea-devil, are predominantly caught by European-flagged vessels in the North East Atlantic (Marine Conservation Society, 2014). Catches are mostly taken using demersal trawls (e.g. otter and beam trawls) and nets (gill or fixed) (Marine Conservation Society, 2014). The majority of capture production in 2012 occurred by flagged vessels from the UK (34%), Korean (31%), Norwegian (11%), Irish (10%) and Icelandic (7%); catches by Korean vessels

[65] US Food and Drug Administration. FDA's Examples of Substitute Seafood http://www.fda.gov/Food/FoodScienceResearch/RFE/ucm071528.htm

are recorded as Anglerfishes nei whereas those caught by European countries are recorded as Angler (Monk) fish (FAO, 2014). The top countries from which Germany imports anglerfish are Iceland, Denmark, the United States, France and China (Lüdemann and Jessel, 2014).

Two Lophius species are caught commercially in EU waters, namely white bellied monkfish (*Lophius piscatorius*) and black bellied monkfish (*Lophius budgegassa*) (Marine Conservation Society, 2014) Within the EU there is a minimum marketing weight of 500g in order to reduce capture of juvenile specimens, however it is uncertain whether these regulatory mechanism fulfils its purpose (Marine Conservation Society, 2014). Illegal undersized fish are likely to be landed when caught due to the high value.

There were no recorded instances of anglerfish IUU occurring by the European-flagged vessels that target Lophius species, however South Korea is a nation that is currently yellow-carded by the EU for a lack of effort in the fighting IUU and may target these species in countries that have poor MCS (Undercurrent News, 2014). However, there is a large demand within the domestic market and therefore it is likely that German markets receive anglerfish from European-flagged vessels that are not thought to be associated with IUU ("Exporter wants bite out of Korean monkfish market," 2011).

It is recommended that a further quantitative assessment of Anglerfish (Lophuis spp.) is not required.

4.4.5 Zander (*Sander spp., Stizostedion spp*.)

The global pike-perch production is dominated by wild capture. Kazakhstan, Russia and Finland have the biggest catches, with a combined 75% of the global catch.

The main European importers of freshwater fish are the United Kingdom, France and Germany. It should be noted, that this category includes a variety of fish species. Pike-perch is currently not categorized at an individual species level in the official trade statistics (EEC 1536/92). All freshwater fish are combined into one category "freshwater fish". Thus it is not possible to draw a detailed picture of the trade chains of pike-perch based on trade statistics. In the absence of species specific information, trade statistics can only be analysed for "freshwater fish", which, due to a lack of clear traceability, increases the level of risk.

According to FAO (2015b), the main importers of pike-perch include countries of Western Europe, such as Germany and France. In the period 2010-2013, imports of freshwater fish to Germany were in the range of 11,000-13,000 tonnes and exports ranged from 5,000-7,000 tonnes. Imports were mainly originating from Kazakhstan (26% in 2013), Russia (16%), the Netherlands (16%) and Poland (10%).

Traceability of pike-perch is extremely difficult, due to a lack of categorization noted above in the official trade statistics (i.e.CN8 code). There is for example no data on level of Kazak pike-perch imports into Germany, as all freshwater fish are aggregated together with the exception of a few species such as sturgeon. However, according to FAO Kazakhstan mainly exports sturgeon and caviar to European countries, while other exports primarily go

to Russia and Kyrgyzstan[66]. It is therefore possible that that pike-perch exports to Germany are not significant.

Overall, Kazakhstan is considered to be at high risk of IUU, which continues to be a major problem in the countries fisheries sector; as a result, maybe only less than one-third of fish production is reported.67 There are five large processing enterprises that are European Union (EU) certified for exporting fish to Europe.

In recent years, the Ministry of Agriculture of Kazakhstan, with support from its Fisheries Committee, has made many improvements to the legal framework for the fisheries sector. It is however recognized that there are still many gaps in the policy and legal framework for the sector and that enforcement of rules and regulations needs more attention. The country still lacks a proper long-term fishery and aquaculture sector policy and a strategy which is carried out by all key stakeholders in the sector[67].

The direct catches of freshwater fish recorded in Poland (431 t) and the Netherlands (305 t) are lower than the exports to Germany alone, highlighting that the exports to Germany may be re-exports.(FishStat, 2005) The Netherlands import most of their freshwater fish from Kazakhstan (25%), China (19%), Germany (9%), Denmark (7%), Turkey (6%) and Russia (5%). (EuroStat, 2015). Whilst China has a large freshwater fish production, and exports to other countries there is no evidence of pike-perch being exported to China and reimported to Germany (EuroStat, 2015).

Poland imports its freshwater fish primary from Lithuania (24%), Kazakhstan (18%), Hungary (12%), Russia (11%), Germany (9%) and the Czech Republic (6%).

Poland has become a relatively low risk country in terms of importing marine capture fish from IUU sources due to regulatory improvements, though the situation is not as clear for freshwater fish due to the aggregation of all fish into one group.

The average market price for pike-perch in the EU between 2005 and 2013 is €3.83 per kg[68]. This is a relatively low to medium value fish compared to other fish on the market and would not greatly increase the risk of pike-perch being IUU due to market demands.

In summary any estimate of IUU pike –perch entering the German market will not be possible as the volume of pike-perch will be hidden amongst the wider freshwater fish classification. There is generally a medium to high level of IUU risk when the potential sources of pike-perch i.e. Kazakhstan, Russia, Hungary are considered with the level of regulation in the freshwater fisheries in these countries.

[66] http://www.fao.org/fishery/facp/KAZ/en

[67] http://www.thefishsite.com/articles/981/fisheries-and-aquaculture-in-kazakhstan-introduction/

[68] http://www.eumofa.eu/

4.4.6 Parrot fish *(Scarus spp., Sparisoma spp.)*

Data for parrot fish entering the German market are highly deficient. No records of parrot fish IUU were found during the study and with the estimated low level of imports it is recommended that no quantitative study would be possible for parrot fish.

4.4.7 Grenadierfisch (*Coryphaenoides rupestris and Macrourus berglax*)

Roundnose grenadiers (*Coryphaenoides rupestris*) and roughhead grenadier (*Macrourus berglax*) are not differentiated in EU trade statistics, therefore at this stage it has not been possible to ascertain the countries from which Germany imports. However, the top catching nations of roundnose and roughhead grenadier are Spain, France, Lithuania and Portugal (FAO FishStat, 2014) so it likely that Germany imports from one or more of these.

Grenadiers are deep-sea fish species, which due to their life histories (slow growing and low reproductive rates) are highly vulnerable to over-exploitation and have a low resilience to fishing (as described for orange roughy). There is currently very limited data on the ecosystem and fish stocks that are fished and many of the stocks of grenadier are found on the high seas. These fisheries are therefore typically governed by RFMOs and compliance with any regulations imposed can be low and subsequently IUU catches can be high. Typically little or no enforcement activity is expended by the RFMO members and compliance other than VMS coverage is limited beyond port State control mechanisms.

European grenadier fisheries are divided into four stock units by ICES (ICES WGDEEP Report, 2014)

- Skagerrak (IIIa);
- The Mid-Atlantic Ridge 'MAR' (Divisions Xb, XIIc, Subdivisions Va1, XIIa1, XIVb1);
- The Faroe-Hatton area, Celtic sea (Divisions Vb and XIIb, Subareas VI, VII); and
- All other areas (Subareas I, II, IV, VIII, IX, Division XIVa, Subdivisions Va2, XIVb2).

Landings data are uncertain for some divisions due to catches made in international waters and impacts on the assessments made.

There are no defined fisheries targeting the two grenadier species that are likely to supply the German market (i.e. north Atlantic), but it has been reported (P. Lorence, Pers. Comm. In Pitcher *et al.,* 2002) that up to 50% of the catch from European deep-water fisheries is discarded and unreported. Estimates of the level of IUU fish in these fisheries have not been published or are anecdotal only.

Recently one of the remaining companies in the dominant French fleet operating in the North Atlantic has agreed to cease fishing deeper than 800m from 2015, alongside an increase in transparent reporting of catch and effort data to NGOs (including Bloom, Pew and WWF-France). As this is likely to be one of the main suppliers of grenadier to the German market, supply may decrease and if demand remains high then the likelihood of IUU fish from other less transparent sources entering the market would increase.

It should be noted that roughhead and roundnose grenadier are not to be confused with hoki (also confusingly called grenadier). Confusion over importation names may result in substitution or IUU fish able to enter the market disguised as fish with no known IUU threats.

It is recommended that in the absence of detailed import data a further quantitative assessment of grenadiers (or deep-water fish in general including scabbardfish etc.) may be required though it may be data deficient for accurate definition of potential levels.

4.4.8 Dorade (*Dentex spp., Lithognatus mormyrus, Diplodus spp., Pagellus spp., Pagrus spp., Sparus spp., Spondyliosoma cantharus*)

The trade name "dorade" can refer to a large number of species, which includes gilt-head sea bream, sea bass, Dentex spp., *Lithognatus mormyrus*, Diplodus spp., Pagellus spp., Pagrus spp., Sparus spp. and *Spondyliosoma cantharus*. These species are also imported into Europe and then possibly imported into Germany under a wide variety of names. A clearer identification of the species required to be analysed would be required before a further analysis could be conducted.

4.4.9 Soles (*Soleidae; Cynoglossus spp., Microstomus pacificus*)

This assessment considers *Solea spp., Cynoglossus spp*. and *Microstomus pacificus* (Pacific dover sole). EU trade statistics do not disaggregate sufficiently, soles are represented by trade codes for *Solea spp*. and flatfish (including Cynoglossidae but excluding sole). Germany imports from mostly from Netherlands, Denmark, France and Spain. Top catching nations for *Solea spp.* are the Netherlands, France, Nigeria, Belgium, Morocco, Italy and the UK (FAO FishStat, 2014). Top catching nations for *Cynoglossus spp*. are Nigeria, Senegal, Thailand, Malaysia, the Republic of Korea and a number of West African coastal states (FAO FishStat, 2014). The top catching nations for *M. pacificus* is the USA.

Soles and other flatfish (excluding halibut and turbot) typically exhibit some of the lowest rates of IUU globally (Agnew *et al.,* 2009). The market value of sole depends on the species. For example, *Solea vulgaris* has a market value of approximately EUR 11.5 per kg (GlobeFish, 2014) whereas other *Solea spp.* have a much lower value of approximately EUR 1.2 per kg. Soles that are imported from distant water fisheries e.g. the tongue-soles (*Cynoglossus spp.*) from West Africa where they are often caught illegally in the coastal waters and Pacific Dover sole (*Microstomus pacificus*) which has been documented and prosecuted when substituted with the cheaper arrowtooth flounder (*Atheresthes stomias*) in the US[69].

Soles, primary tongue-soles (*Cynoglossus spp.*) have been shown to be a major bycatch of trawl fisheries in West Africa from Senegal to Nigeria (MRAG, 2008). There are major concerns that the vast majority of bycatch species are unreported and removals are not taken into account for stock assessment. For example, EJF (2012) have detailed a number of occurrences of illegal fishing, transhipment and landings into the European Union of fish from West Africa with €4m worth of illegal fish being impounded by the EU from the Korean flagged Seta No. 73[70]. However, after the European Commission and Spain received information from West African coastal States confirming that their fisheries laws had been breached by the vessels involved, Spain is understood to have received assurances made by Korea that the catches were legal, despite its boats not having VMS on board and evidence to the contrary from the coastal States (Sierra Leone and Liberia). In this way, €4m fish caught illegally by a number of vessels fish were still able to be landed and therefore "laundered" into the European seafood market, even when it is subject to inspections and verifications, simply by the assurance of the flag State which is not in a position to verify the

[69] http://www.fda.gov/Food/FoodScienceResearch/RFE/ucm071528.htm

[70] http://www.theguardian.com/environment/2011/apr/19/fish-4m-seized-crackdown-illegal

catches or their location. This highlighted a weakness in the catch documentation scheme where it relies on the flag State alone to verify catches.

Sole are also subject to large scale misidentification and substitution, with 9% of sole in the US found to have been mislabelled (Warner, Timme and Lowell, 2012) and substituted with cheaper flounders and pangasius along with cheaper sole species. Once processed (as skin-off fillets) soles are difficult to differentiate from other flatfish species. In order to assist in their identification DNA microarrays have now been developed to identify some sole species including the Senegalese sole (*Solea senegalensis*) (Cerda *et al.,* 2008) which has been particularly hit by IUU fishing off West Africa.

Soles cannot be individually distinguished in the trade statistics that use the harmonised customs codes (CN8) (where they are listed in many categories with plaice and flounders). Therefore the level of imports into the EU and specifically into the German market of sole cannot be fully assessed. It would be preferable to conduct a full risk assessment but this would need to consider the lower risk plaice and flounder species as well as sole and due to the relative volumes of the species concerned the true risk to soles may be masked within the group of species.

Table 4.1 Reported combined, plaice, sole and flounder imports into (t) Germany from outside the EU (2009 – 2014).

Year	2009	2010	2011	2012	2013
Imports	115.4	151.5	147.9	2215.7	1352.5

Source: Eurostat Import Data.

It is therefore recommended that a further quantitative assessment of soles should be required although differentiating soles from other flatfish may be difficult.

4.4.10 Greenland halibut (*Reinhardtius hippoglossoides*)

In 2012, Germany imported 3,400 tonnes of Greenland halibut with the majority of imports originating from Denmark (37%), Greenland (27%) and Norway (27%) although there were also imports from the Netherlands, the Faroe Islands, Iceland, Spain, Sweden, and Portugal (Lüdemann, 2015). Germany has in the past had landings of Greenland halibut directly into German ports, but none has been landed since 2011 (EUMOFA, 2015).Denmark is not a catching nation, most imports of Greenland halibut come from Greenland, Norway and Faroe Islands (Statistical office of the European Communities, 2015).

Market data for halibut data are presented for both Greenland and Pacific halibut species combined for some products (see Annex 3 for all the relevant CN customs codes). Most of these are Greenland halibut specific but one also includes data for Pacific halibut. However, it is very unlikely that any Pacific halibut will be imported into Germany and we have assumed for this risk assessment that all imports are Greenland halibut.

Stock assessments are conducted by ICES on the eastern stock and NAFO on the western stock. In the eastern fishery, discarding is considered to be negligible so isn't included in stock assessments. Like cod, Greenland halibut in the Barents Sea is slowly recovering from

overfishing which included high levels of IUU catch[71]. In European waters ICES has not developed a recovery plan, and the 2010–12 TAC was set above that recommended for recovery for Greenland halibut and the fishing pressure is above MSY. Although, the most recent assessments of Greenland halibut stocks in the northeast Atlantic show gradual increases over the last decade although the rate of increase is not confirmed (ICES, 2014). Greenland halibut is a typically a medium to high value fish (approximately EUR 7 per kg (InfoFish, 2014) with a history of IUU fishing in the North Atlantic. The Grand Banks fishery provides an opportunity for vessels to fish in shallow international waters which can facilitate the capture of IUU fish that can then enter the EU market. Historic catches of Greenland halibut increased sharply in 1990 due to a developing fishery in the NAFO Regulatory Area in Div. 3LMNO and continued at high levels during 1991-1994. The catch was only 15,000 to 20,000 t per year in 1995 to 1998 as a result of lower TACs under management measures introduced by the Fisheries Commission. The catch increased after 1998 and by 2001 was estimated to be 38,000 t, the highest since 1994. It was estimated that 10,000t of groundfish (cod, plaice etc.) were caught illegally in 2001 and 3,100 overcatch of Greenland halibut (OECD, Review of Fisheries 2003). The management response involved the development of a rebuilding plan based on reduced TACs with increased monitoring and enforcement including enhanced data collection and reporting, a compliance observer programme,100% VMS coverage and inspection by both Canadian and EU fisheries patrols on the main fishing grounds. An updated 15 year rebuilding plan implemented in 2003 by NAFO.

Quotas are now set for this species by both NAFO and NEAFC although these tend to be set higher than recommended by ICES (ICES, 2014a, 2014b). A fishing licence scheme is in place for this fishery and vessels are prohibited from landing Greenland halibut if they do not hold a special permit. In order to obtain a permit, the vessel must be registered with NAFO (EC Regulation 2115/2005).

As Greenland halibut is a medium to high value species, vessels are shown to be willing to take risks. On 18 November 2005, Norwegian coastguards arrested the Spanish trawler “Monte Meixueiro” in the Spitsbergen Fisheries Protection Zone (Norwegian EEZ), suspecting her of illegal fishing. Subsequent inspections in port revealed just over 354 tonnes of illegally caught Greenland halibut, at an estimated value of €1 million. On 20 November 2005, the Norwegian Coastguard arrested a second Spanish trawler, the “Garoya Segundo”, again for illegal fishing for Greenland halibut in the Spitsbergen Fisheries Protection Zone. The Garoya Segundo held 508 tonnes of Greenland halibut on board, 308 tonnes more than allowed under a research quota that had been granted to the vessel by the Spanish government (nearly another €1m worth of fish). (Greenpeace, 2005). This has led over the last ten years to an increase in flag State responsibility, driven by the EU, for all EU MS. In particular over the last few years, the Spanish government has put particular emphasis on reducing IUU and increasing their MCS.

As well as these historical incidences of IUU fishing of Greenland halibut, there have also been some incidences of IUU fishing of Greenland halibut in recent years, mainly by Spanish vessels. There have been claims of non-compliance of closed areas by vessels within the NEAFC region (Fish2fork, 2014) but these have not yet been confirmed or investigated by NEAFC or the flag States themselves. In 2014, the European Commission sanctioned 10 Member States for fishing over their quotas and among the Member States sanctioned

[71] http://www.imr.no/temasider/fisk/kveite/blakveite/en

overall (for all species) was Denmark. However, the sanctions applied to Denmark were not made clear, neither were the species concerned (Mercopress, 2014). In 2014, there was also a recorded incidence of IUU fishing (under reporting and failing to maintain an accurate stowage plan) of Greenland halibut on Spanish vessels operating in NAFO waters. The vessel in question was recalled to port by Spanish officials for an investigation (The Telegram, 2014). The same Spanish vessel had violations in 2013-2014 relating to bycatch limits, catch reporting and stowage plans. The violations in 2013 led to a fine while the more recent violations resulted in a three-month suspension from NAFO waters while the proceedings to sanction were underway (NOAA Fisheries, 2015). Another Spanish vessel was found guilty of violating NAFO conservation and enforcement measures relating to product labelling, capacity plans and bycatch which resulted in a fine and the seizure of IUU Greenland halibut (NOAA Fisheries, 2015).

In recent years, the Department of Fisheries and Oceans Canada has increased monitoring of catch and landings of Atlantic halibut which has led to increased detection rates of IUU fishing and resulted in large fines paid to Canada (FIS, 2015). Although the main species here was Atlantic halibut, the IUU catches could also contain Greenland halibut. There have also been other instances of illegal halibut entering supply chains in Canada (FIS, 2014).

One of the key problems with Greenland halibut is that it is difficult to differentiate between different flatfish species when processed into block fillets. This makes it much easier to substitute lower value product (e.g. yellowtail flounder). This has led to the development of detailed DNA analysis using microarray technology. Such microarrays have now been developed for a large number of marine fishes, including Greenland (*Reinhardtius hippoglossoides*) and Atlantic halibut (*Hippoglossus hippoglossus*).This will reduce the risk of any IUU Greenland halibut entering any market, where checks can be made, i.e. the EU and US.

No vessels from the flag States importing Greenland halibut into Germany (either directly or via Denmark) appear on the IUU vessel lists of the North East Atlantic Fisheries Commission (NEAFC) or Northwest Atlantic Fisheries Organisation (NAFO). These vessels are not thought to have flags of non-compliance or convenience or be non-cooperating States. The flag States importing into Germany are all members of both NEAFC and NAFO.

Greenland has had an FPA in place since 2013 with the EU which is due to expire at the end of 2015. This is a mixed agreement with allocations of quotas which are submitted to the TAC and quota regulation. Licence fees and fishing possibilities (quota) are fixed for the EU under this FPA and are species dependent. Greenland halibut are covered under this protocol. The details of this agreement are publicly available.

Port State measures were introduced in 2009 by NAFO which set out required procedures for importing any fish products (NAFO, 2015). These originate from the EU's National Plan of Action in place to combat IUU fishing in the form of the IUU regulation (EC 1005/2008) so all vessels with flags of EU MS should be following these procedures. Control is exercised by a number of means including inspections, VMS requirements, and 100% observer coverage monitoring compliance. NAFO also has a collaborative inspection and surveillance scheme allowing for licensed inspectors board and inspect fishing vessels in international waters. Rigorous port inspections are also required for vessels landings in NAFO member state ports.

As imports into Germany mostly come from nations who fish for Greenland halibut themselves, the chain length is short. Processing activities are also thought to be limited before reaching Germany.

In summary, Greenland halibut has a relatively high value (at first landing) and a history of IUU fishing which would suggest a higher level of risk, but at the current time there is estimated to be only a low risk of IUU fish being imported into Germany due to the regulatory framework in place and the sources of halibut coming into the German market. Spain is the only country exporting halibut to Germany where there is a documented IUU risk associated with Greenland halibut products.

4.4.11 Snapper

The trade name “snapper” (like “dorade” earlier) can refer to a large number of species. These species are also imported into Europe and then, possibly unreported, into Germany under a wide variety of names. An example of the number of different species that have been reported as “red snapper” alone and sold in the USA as “snapper” that were not actually “red snapper” can be found in Figure 2. This clearly highlights a massive problem that occurs in a similar fashion throughout European markets.

A clearer identification of the species (1 or more) would be required before a further analysis could be conducted.

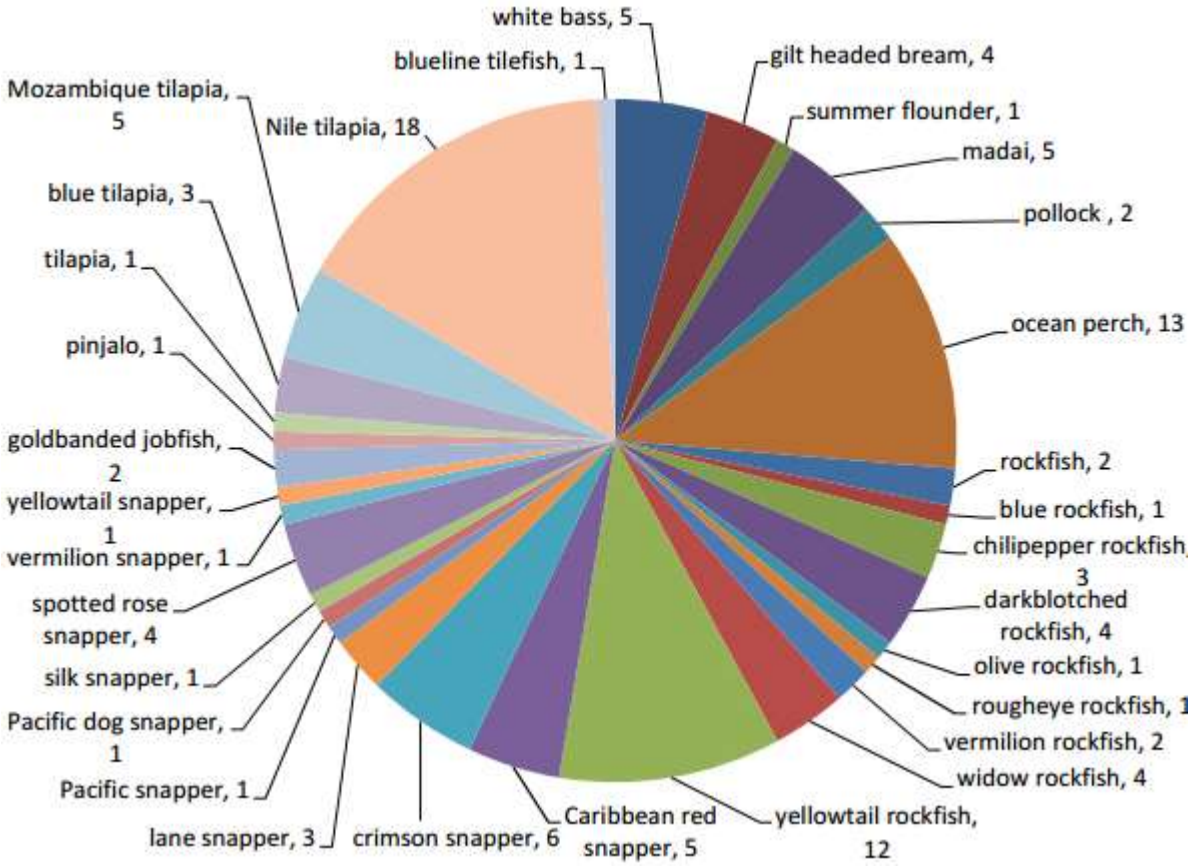

Figure 2 Misreporting of "red snapper" in the US.

Source: Warner, Timme and Lowell (2012)

4.4.12 Conger eel (*Conger conger*)

Data for conger eel entering the German market are highly deficient – EU trade data does not account for *Conger conger*. The top catching nations for *C. conger* are Spain, France, Portugal and Morocco (FAO FishStat, 2014). No records of conger eel IUU were found

during the study and with the estimated low level of imports it is recommended that no quantitative study would be possible for conger eel.

4.4.13 Hoki (Macruronus spp.)

There are four possible species of hoki (Macruronus spp.) identified for consideration for this assessment. These are as follows:

- *Macruronus capensis* (D. H. Davies, 1950) (Cape grenadier)
- *Macruronus maderensis* (Maul, 1951) (Madeira grenadier)
- *Macruronus magellanicus* (Lönnberg, 1907) (Patagonian grenadier)
- *Macruronus novaezelandiae* (Hector, 1871) (blue grenadier)

Hoki is not landed in Germany, or any other European country, therefore hoki products in the EU are imported from New Zealand (68%) and China (18%). However, the products that are processed in China also originate in New Zealand (AIPCE-CEP 2014). Germany is Europe`s second largest hoki importer (4,000 tonnes in 2011) with only France importing more (7,500 tonnes in 2011) (Lüdemann, 2015). The countries of interest to the review of IUU risk associated with hoki products entering the German market are identified as China and New Zealand, due to their dominance in exports into the EU (Lüdemann, 2015).

Hoki is a relatively low value species with prices per kg of frozen blocks of *M. novaezelandiae* reaching EUR 2.66 (GlobeFish, 2014).

M. novaezelandiae

M. novaezelandiae is afforded its own CN8 codes (five CN8 codes for different product types) in Europe. The nations catching *M. novaezelandiae* are New Zealand, Republic of Korea, Australia and Japan. Germany imports *M. novaezelandiae* from China and New Zealand, but does not import from the other catching nations (EuroStat, 2014). The importation of *M. novaezelandiae* from China is of concern given that it not recorded as a catching nation, therefore it can be assumed that China imports *M. novaezelandiae* from other catching nations for processing and then re-exports to Europe.

Further assessment is required to determine the origin of *M. novaezelandiae* being imported from China due to the issues with Chinese supply chains. It is possible that hoki imported from China originated in South Korea, given that it is the second highest catching nation (Lüdemann, 2015). In 2013 the European Commission issued the Republic of Korea with a formal warning (yellow card) in relation to their failure to keep up with international obligations to fight illegal fishing (EC, 2013). The Republic of Korea was been granted a six month extension to an original deadline in which to address IUU issues under a proposed action plan. In April 2015, The Republic of Korea was issued with a Green Card by the EC in recognition of reforms that were implemented to upgrade their fisheries governance and the alignment of the legal system to international law[72].

M. novaezelandiae from New Zealand is much lower risk given the comprehensive and robust fisheries management and MCS in place. New Zealand's hoki fisheries are managed

[72] http://europa.eu/rapid/press-release_IP-15-4806_en.htm

as two separate stocks although a single Total Allowable Commercial Catch TACC is set. Quota owners agree catch limits for the two stocks which are within the single TACC. Compliance is administered by the Deep Water Group (a 95% quota owner) and is audited by the Ministry of Fisheries. The hoki fishery in New Zealand is MSC certified. However, there is some risk (albeit at a very low level) due to historical incidences[73] of high grading – the act of dumping small fish of low value, and replacing them with larger fish of higher value, particularly where quota for a species is limited.

Interestingly, South Korean fishing vessels comprise a large majority of the Foreign Charter Vessels (FCVs)[74] that fish for hoki in New Zealand waters. South Korea was identified as a potential source of IUU fish through the issue of a "yell0w-card" in 2013 which was lifted in 2015[75] [76]. The New Zealand government has made a decision to reflag foreign fishing vessels to New Zealand by 2016[77].

Other Macruronus spp.

The volume of other *Macruronus spp*. available in the German retail market is not known. Other *Macruronus spp*. do not appear in CN8 codes. Further assessment is required to determine the species of hoki available in the German retail market, and the countries from which they are imported. Some general information can be provided based on the top catching nations of *Macruronus spp*.

The top catching countries of *M. magellanicus*, and therefore the most likely source countries, are Chile, Argentina and Spain. *M. magellanicus* is distributed along the southern coasts of South America, therefore Spain is not catching *M. magellanicus* within its EEZ it is more likely fishing in the highs seas or the EEZs of Argentina and Chile. This could present an IUU risk due to the IUU issues associated with these countries and the longer supply chain

FAO do not collect disaggregated catch statistics for *M. capensis* or *M. maderensis*, however catch statistics are collected for *Macrourus spp*. not elsewhere include (nei) which will include both these species. The Republic of Korea has the highest reported level of catch followed by Spain and the Falkland Islands..

There are two MSC certified hoki fisheries: Argentine hoki (*M. magellanicus*) and New Zealand hoki (*M. novaezelandiae*); and one in assessment.

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[73] http://www.fish.govt.nz/en-nz/Archive/News/Press+Releases+2007/September+2007/east+coast+fish+dumping.htm

[74] http://www.fish.govt.nz/NR/rdonlyres/0E670425-B6B0-4A74-8985-4B4F360CE80C/0/BackgroundpaperforFCVconsultation.pdf

[75] http://europa.eu/rapid/press-release_IP-13-1162_en.htm

[76] http://europa.eu/rapid/press-release_IP-15-4806_en.htm

[77] http://beehive.govt.nz/release/fisheries-foreign-charter-vessels-and-other-matters-amendment-bill-passes-third-reading

In summary the countries of most likely higher risk of IUU for hoki products entering the German market are identified as China and New Zealand, due to their dominance in exports into the EU (Lüdemann, 2015) and the potential for mixing and substitution of products during the long processing and supply chain from the source fisheries to the German market.

4.4.14 Octopus

There are no reported octopus catches for Germany, therefore the market relies upon imports entirely. Import data do not solely reflect octopus catches and include highly significant catches of squid and other cephalopods. Imports of cephalopods to Germany originate from Spain (36%), Thailand (10%), Italy (10%), Vietnam (9%), China (7%) and Peru (6%) (Lüdemann, 2015). Whilst Spain and Italy are catching nations, they also import from a number of countries outside of the EU. Spain imports cephalopods from the Falkland Islands (27% which will be almost entirely squid), Morocco (21%), India (12%), China (9%), Portugal (8%) and Peru (6%). Italy imports its cephalopods primarily from Spain (29%), Thailand (13%), Morocco (11%), China (8%) and India (7%) (Lüdemann, 2015). In 2013 the top countries from which Germany imported cephalopods were Spain, Italy and Thailand. Trade information is available by product type, i.e. frozen, fresh, preserved, smoked etc. but not by species, trade information aggregates all cephalopods species. Information on the IUU risk level associated with octopus from Spain, Italy and Thailand is therefore only able to be provided at a general level.

Octopus is a medium to high value commodity with prices per kg for whole octopus reaching up to EUR 9.50 (GlobeFish, 2014). Therefore, due to the relatively high value there is an inherent level of risk of IUU in octopus fisheries. In Spain, Portugal and Italy there are limited restrictions applied to octopus fisheries thereby introducing an element of risk off IUU. This is increased by the ease of opportunity to fish for octopus, which can be fished using a wide variety of fishing gears. These gears can be used with little or no capital outlay from the shore and are therefore accessible to a large number of people. If the price of octopus was to rise sharply (or supply decrease) the risk would be significantly increased as the potential for IUU fishing exists.

It has been reported that in the Spanish artisanal fishery around 40% of *Octopus vulgaris* (common octopus) landings go unregistered/unreported (Pramod *et al.*, 2008). This has improved in recent years due to an increase in MCS by the Spanish authorities but the unreported catches are still an issue (Seafood Watch, 2014[78]). Spain has national regulations pertaining to MCS but previous evaluations of these systems have scored Spain poorly due to ineffective systems (Pitcher at al., 2006), which, as mentioned previously, have recently improved greatly. Furthermore, artisanal and small-scale fisheries are often not subject to the same level of control as industrial fisheries for which the regulations are designed. In 2011, European authorities impounded catches of octopus, along with other species, that were landed in the Spanish port of Las Palmas in the Canary Islands[79].

Illegal and unreported fishing in Italy is a significant concern (Pramod et al., 2008). MCS and VMS are poorly implement and inefficient, as are catch inspection schemes and the control of access to fisheries (Pitcher et al., 2006). In Portugal, black-market landings of undersized

[78] http://safinacenter.org/documents/2014/06/octopus-common-full-seafood-watch-species-report.pdf

[79] http://www.ejfoundation.org/news/fish-worth-%C2%A34m-seized-eu-crackdown-illegal-fishing

octopus is reported and effort limitations are not respected by artisanal vessels (Seafood Watch, 2014).

Octopus fishing in West Africa waters (i.e. Morocco, Mauritania and Senegal) has historically been subject to high levels of IUU due to ineffective management, governance and MCS systems[80]. West Africa has long been engaged in fisheries partnership agreements with the EU and the licencing of foreign companies and fleets to fish in their waters. In Morocco, illegal cephalopod fishing along the Saharan coastline is one of the main illegal domestic fishing activities and underreporting of catches is observed (Seafood Watch, 2014). Moroccan authorities in Agadir declared in May 2014 that 20 tonnes of octopus caught and smuggled from Dakhla had been confiscated[81].

The EC issued Thailand with an IUU yellow card in April 2015 for 'for not taking sufficient measures in the international fight against illegal fishing (IUU)'[82]. The EU particularly noted the recurrence of IUU Vessels and IUU trade flows from Thailand (Article 31(4) of the IUU Regulation, (para 25-53) and a failure on behalf of Thailand to cooperate and enforce (para 54-77). Thailand will be given six months to implement a corrective tailor-made action plan, however the yellow card could lead to the EU banning all fisheries imports from Thailand. There is generally a medium level risk of IUU demand from cephalopod fisheries in Thailand. As there is no restrictive regulatory framework for cephalopod fisheries in Thai waters, as for most of Southeast Asia (i.e. open access without restrictions placed on inputs such as gear, seasons or effort, or on outputs such as quotas), the demand for "illegal" products is lowered, although unreported fish could still enter the market chain. This is increased by the ease of opportunity to fish for octopus, which can be fished using simple gears which can be used with little or no capital outlay from the shore and are therefore accessible to a large number of people.

In coastal waters of Thailand, there are widespread violations including fishing during closed period, use of illegal mesh sizes and the destruction of fish habitats (Panjarat, 2008). Some of the production that maintains Thailand in the top 10 largest fishery states is sourced from other countries EEZs, often by fishermen without licenses. Within Thailand, fisheries resources are facing large decline due to overcapacity and destructive fishing practices (Panjarat, 2008). Furthermore, the separate licensing of gear and fishing vessels by DOF and the Department of Harbours creates a potential loophole where legal vessels may continue to fish with illegal gear. Pramod *et al.* (2008) report large numbers of Thai vessels fishing illegally in foreign and domestic waters, a basic catch inspection scheme, poorly reported catch statistics and an inefficient MCS that lacks capacity.

In summary octopus imported from Thailand, Morocco and Mauritania, imported through Spain and Italy will be of higher risk IUU due to the reduced level of effective management. It is clear, however, that it is difficult to fully assess the risks due to the aggregation of all cephalopods.

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[80] http://www.chathamhouse.org/publications/twt/archive/view/197223
http://allafrica.com/stories/201402110244.html

[81] http://www.emsahara.com/article79.html

[82] http://europa.eu/rapid/press-release_IP-15-4806_en.htm

4.4.15 Wild salmon (Onchorhynchus spp., *Salmo salar*)

Significant global catches of wild salmon (*Oncorhynchus spp. and Salmo salar)* during 2013 included pink salmon (562,850t), chum salmon (199,501t), Sockeye salmon (136,597t), coho salmon (28,939t), Chinook salmon (9321t), rainbow trout (5,790t), sea trout (3,323t), and Atlantic salmon (2,223t) (FAO, 2015). Global capture production of salmon is therefore dominated by Pacific species (*Oncorhynchus spp.),* which are primarily caught by three countries: USA (485,081 t; 43%) Russia (438,193 t; 39%) and Japan (182,383 t; 16%) (FAO, 2015). In comparison, the wild capture production of these genera by EU nations is dominated by Atlantic salmon (*Salmo sala*r) and is relatively limited in terms of volume, with the top five catching nations landing a combined 6142t during 2013: Spain (1,855 t), United Kingdom (1,730 t) Finland (1,186t), Norway (721t) and Italy (650t).

Before examining the risk of IUU associated with wild caught *Oncorhynchus* and *Salmo salar* imported to Germany, it is important to consider that these genera contribute significantly to both global aquaculture and wild capture fisheries production. This unfortunately creates difficulties assessing the level of IUU risk associated with salmon products as official trade statistics (Eurostat CN8 codes) do not categorised fish by origin (i.e. "wild caught" or "farmed") and the supply chain can therefore be difficult to establish. Determining the supply chain and provenance of salmon products is further complicated by a number of particularly opaque supply chains which have been previously identified as potential entry points of IUU salmon into the global market: Clarke (2007) states that there is no reliable method for distinguishing legal from illegal salmon products in any East Asian market with the exception of MSC certified Alaskan salmon introduced to Japan in 2006. However, despite these issues, an overview of IUU risk associated with salmon products entering Germany can be given by considering the uncertainties surrounding the supply chains and MCS regimes of the top-catching nations.

German imports of salmon products between 2006 and 2013 fluctuated between 120,000-150,000t annually, whereas exports fluctuated between 40,000-50,000t (Federal Statistics Office Germany, as presented in Lüdemann, 2015). During 2013, Germany`s salmon imports came from Norway (33%) Poland (30%), Denmark (9%), China (8%) and Chile (5%). Norway, Denmark and Poland have limited wild capture fisheries for salmon (721t, 281t and 181t in 2013, respectively) but these volumes are small compared to their respective aquaculture production: Norway produced 1,239,772 t of salmon in 2013 whereas Denmark produced 29,744t and Poland produced 11,554t (FAO, 2015). Imports into the German market from Norway, Denmark and Poland are therefore unlikely to be wild caught as the levels of imports and wild catch suggest this would not be possible. China does not fish for or culture salmon and, therefore, imports from China can be concluded to be re-exports. Chile is the world`s second largest salmon farming nation but has no wild capture production of salmon: imports from Chile are therefore considered likely to originate only from aquaculture and will therefore not contribute to this analysis. It is therefore likely that imports originating from Norway, Poland, Denmark and Chile are farmed, but imports from China warrant further analysis as these are likely to be re-exports.

China is known to source salmon from a range of nations, including farmed salmon from Norway and the UK, and wild salmon from Russia, Alaska and Japan. Trade statistics analysed by Clarke (2009) suggested that China's processing industry sourced salmon raw material primarily from Russia and products were mainly destined for the USA and the EU.

Wild salmon originating from Russia, the USA and Japan could therefore enter Germany through China[83] and it is therefore important to consider the IUU risk associated with wild-caught salmon from these three nations.

For salmon originating from the USA there is a low risk associated with wild caught salmon due to the USA's robust and comprehensive fisheries management and MCS systems in place. For example, the MSC certification report for Alaskan salmon indicates that MCS mechanisms are in place and there is no evidence to suggest non-compliance[84]. However, Chinese processed salmon also ends up in USA and therefore any sourcing of salmon from the USA should ensure that its source is from the US or Canada and not re-export from other sources.

IUU is regarded as a major issue in Russian salmon fisheries, although the scope of the problem varies widely by fishery. A study by Portley (2014) provides an overview of Pacific salmon fisheries and indicates that only 47% of Russian salmon harvest comes from well or reasonably managed stocks, and, furthermore, a significant proportion of Russian fisheries are considered to have IUU issues: out of 26 Russian fisheries assessed by Portley (2014), 8 were considered to have illegal catch volumes which exceed the legal catch volumes by more than 25%. Other studies evaluating salmon poaching in Russia also indicate that IUU represents a significant issue: Augerot (2009) estimates that IUU could represent 40–92% of the legal catch, while Clarke (2009) reports that actual catches of sockeye salmon in Russia during 2003-2005 were 60-90% above reported levels. However, despite these significant estimates of IUU, positive steps have been taken recently to discourage IUU in Russia. For example, a bilateral IUU agreement has been implemented between Russia and China which has apparently motivated increased catch documentation, and, similarly, Russia and Japan have signed a bilateral agreement[85] designed to prevent IUU (Portley, 2014). The EU's IUU regulation should also function to discourage trade in IUU salmon originating from Russia and exported to the EU through China, as Chinese authorities are required to verify Russian catch origin certificates destined for the EU and issue re-export certificates. Clarke and Hosch (2013) however identified loopholes existing within the regulation which allows for IUU fish to enter the supply chain. Furthermore, there are signs of improving fisheries management for salmon fisheries in Russia as a number of fisheries have recently gained MSC certification or entered the certification process; for example, Iturup island pink salmon, which has a commercial market in Europe, has been certified by the MSC since 2009[86].

Japan has significant wild capture of pacific salmon and is the world's largest importer of salmon products. Both imports to Japan and fish caught through national capture fisheries can be inferred to have an associated risk of IUU. Approximately 20% of salmon imported to Japan comes from Russia (Clarke, 2007), and, therefore, salmon imported to Germany from

[83] Germany also imports small quantities of salmon products directly from the USA (5,522t) and Russia.

[84] https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/pacific/alaska-salmon/new-client-2nd-re-assessment-download-documents/20131114_PCR_V3_SAL002.pdf pg.389

[85] http://www.undercurrentnews.com/2014/12/23/russia-japan-iuu-agreement-kicks-in/

[86] https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/pacific/iturup-island-pink-and-chum-salmon/iturup-island-pink-and-chum-salmon

Japan through China may be of Russian provenance. Consequently, salmon which is re-exported by Japan has the same IUU risks as Russian salmon (discussed in the previous paragraph). Salmon originating from Japan's wild capture fisheries have also been implicated in IUU fishing within Russia's Exclusive Economic Zone (Clarke, 2013).

In summary, the countries of interest to the review of IUU risk associated with wild salmon products entering the German market are identified as those imported from China, originating from Russia or Japan. However, despite the IUU risk associated with these supply chains it is important to consider that not all fish imported through these paths will be IUU. There is indication that the transparency of the supply chains previously associated with IUU is increasing due to bilateral agreements to deter IUU and improved fisheries management regimes, as indicated by the increasing number of MSC certified salmon fisheries operating from countries associated with IUU.

4.4.16 Turbot (*Scophthalmus maximus*)

In 2012, Germany imported 650 tonnes of turbot and the majority of imports originate from the Netherlands (34%), Spain (24%), France (20%) and Denmark (16%) although there are also imports from Norway, Belgium, Greece, Italy and the UK (Federal Statistical Office Germany, 2015; Lüdemann, 2015). Spain, although the second biggest exporter of turbot to Germany, is not a major catching nation having caught only 53 tonnes in 2012 but the majority of its turbot comes from imports from Portugal and the Netherlands (Statistical office of the European Communities, 2015) which are major catching countries for turbot (EUMOFA, 2015).

NB: The CN8 codes utilize the previous scientific name for turbot (*Psetta maxima*). Turbot is now scientifically recognized by the updated *Scopthalmus maximus*.

In the Black Sea (GFCM, 2015a) and North Sea (ICES, 2014d), turbot is considered to be overexploited and overfished and data are lacking for the species. It is mainly considered to be a bycatch species in the North Sea by ICES (2014). Quotas are in place for landing turbot in the Black Sea, North Sea (Subdivision IV) and the Norwegian Sea (Division IIa). In the Mediterranean Sea fisheries are managed by input controls rather than TACs.

Turbot is a high value species – the average price in 2014 ranged from 12.3 - 19.6 EUR/kg depending on the size of the fish sold (Globefish, 2014). This increases the risk of IUU fishing of this species. Aside from the EU's IUU regulation, there are few mitigation procedures in place for high value species. Vessels fishing in EU waters are required to have fishing licences but these are not always species specific.

No vessels from the nations importing turbot into Germany (either directly or indirectly) occur on relevant IUU vessel lists or have been issued with EU yellow/red flags. Historically there have been disputes between Canada and Spain over turbot fishing off the Canadian coast over IUU fishing by Spanish vessels close to Canadian waters. This was resolved in 1996 with a settlement between the two countries (ICE, 1997). In recent years there are no reported IUU catches of turbot in most European waters, but the Black Sea has seen instances of IUU fishing and where turbot are one of the main target species (Moth-Poulsen, 2013; Öztürk, 2014). The nations targeting these species in the Black Sea are thought to be the coastal states including Bulgaria, Georgia, Romania, Russia, Turkey and Ukraine, none of which are thought to import the species into Germany either directly or via Spain (Öztürk, 2014). Specific control plans are being developed for turbot in the Black Sea (GFCM, 2015b) However, none of the main importers of turbot are likely to be fishing in the Black Sea, therefore no IUU fish from the Black Sea is likely to be imported into Germany.

As imports into Germany mostly come from nations who fish for turbot themselves, the chain length is short. Processing activities are also thought to be limited before reaching Germany.

Outside of the Black Sea there are no major recorded incidences of IUU fishing directed on turbot, from those countries that supply the EU markets.

In summary due to the high value of turbot and the history of IUU fishing in the Black Sea, there is a medium risk of IUU fish being imported into Germany if products can be shown to have been sourced from the Black Sea but this is unlikely as none of the main importers of turbot fish in the Black Sea. The countries of interest to the review of IUU risk associated with turbot have been identified as: Turkey, Romania and Bulgaria. However, none of these countries are known to import directly into Germany and none are thought to import indirectly either.

4.4.17 Crayfish (*Procambarus clarkia*)

Native to the USA, and introduced throughout much of the world, Crayfish Roter (*Procambarus clarkia*) (commonly known as red swamp crayfish) is both farmed and caught from the wild stocks, although aquaculture dominates. Wild catch is reported by FAO for Spain and Kenya, although in small quantities and with uncertainty. China and the USA dominate *P. clarkia* aquaculture. EU trade statistics aggregate all freshwater crayfish species and do not distinguish between farmed and wild caught species. Germany imports the vast majority of freshwater crayfish from Spain and in turn Spain imports from Italy (EuroStat, 2014). *P. clarkii* has also been introduced into Spain for cultivation, where its success is attributed to its ability to colonise disturbed habitats that would be unsuitable for the native crayfish. (Food and Agriculture Organisation (FAO), n.d.). However FAO production statistics do not reflect Spain as large producer of *P. clarkia*.

It is recommended that a further quantitative assessment of *P. clarkia* is not required given that aquaculture dominates the source of *P. clarkia*.

4.5 Generic problems identified with Chinese and Russian supply chains

Chinese importing, processing and re-exporting of seafood products is a very common element of seafood supply chains. The chains due to the size and complexity of the Chinese seafood processing sector are highly complex and are characterised by a lack of transparency and traceability. This problem is not helped by the generic nature of the customs and commodity codes (CN8) used by Chinese processors which were in the order of 400,000t in 2006 and are reported as being “rife with opportunities for obfuscations and the laundering of illegal catches into legitimate trade flows“ (Pramod *et al*., 2014).

Many of the Chinese processing facilities source raw materials from Chinese fleets, often vertically integrated with the processing company which allows for a lower standard of transparency as there will be no sales notes or equivalent. Another key source of imports is direct from Russian fleets landing into China or third country ports, or having transhipped catch without being recorded, thereby avoiding inspection by Russian officials[87].

[87] http://en.rian.ru/russia/20130820/182872588.html

Several studies highlight the problems of traceability and laundering catches via China and Russia (e.g. Clarke, 2009, Clarke and Hosch, 2012 and Clarke, McAllister and Kirkpatrick, 2009). Although the problem is improving as processors have been exposed to traceability requirements the levels of IUU fish supplied from these routes are still extremely high (Pramod *et al*., 2014).

5 Supplier guidelines

5.1 Introduction

WWF Germany have requested MRAG to provide a briefing/guidance document which describes the process of the supplier IUU risk analysis which will take place in Phase 2. This works towards satisfying the 7th and 8th bullet points in Section 1 of the Terms of Reference (please see Annex 1).

5.2 Objectives

The objective of this document is to provide a briefing of the process which will identify the specific supply chains of key players in the German market (i.e. supermarkets, food service sector, processors etc.) for selected whitefish, tuna and shrimp species, and determine the risk of IUU associated with these. This process is termed the supplier IUU risk analysis and will be conducted in Phase 2.

5.3 Process and approach

WWF Germany will identify the key players in the German market that they wish to be analysed. Key players can encompass different stages of seafood supply chains and can include the following sectors of the seafood industry:

a. Importers/Distributors
b. Processors
c. Wholesalers (can be to the food service, retail and processing industries)
d. Food service providers (including catering companies and 'out-of-home' consumption)
e. Retailers

It is important to establish the main point of contact for each organisation, ensuring that the individual is well positioned to deal with the project requests. All details will be stored and maintained in a supplier communications database.

WWF Germany and MRAG will draft a letter of introduction to the chosen suppliers which outlines the project and the input required from the supplier. The supplier will be invited to meet with WWF Germany / MRAG so that the project can be explained in more detail and confidentiality can be discussed. The meetings will also be an opportunity to detail the expectations and benefits of taking part in the study, and what it will entail for the supplier.

Once the meetings have taken place, WWF will draft and finalise confidentiality agreements between the suppliers, WWF Germany and MRAG. It is likely that different suppliers may have different confidentiality stipulations. It is expected that there will be some discussion and a number of iterations of the agreement before each can be finalised and signed by all parties. An example of a confidentiality agreement is presented in Annex 5.

A questionnaire will be developed and tailored for each sector of the industry. The questionnaire will include data requests as described in Table 5.1. In addition suppliers will be asked about the volume of raw materials they received and the volume of product sold. Suppliers will be asked to provide details of sustainability and sourcing policies, or other systems in place to trace and identify supply chains, and address IUU. The questionnaires will be sent to suppliers who will have approximately four weeks (to be confirmed with WWF Germany) to compile the data and complete the questionnaires.

Table 5.1 Data requirements for supplier IUU analysis

Date requirement	Example
Product	*Breaded fish fingers (12pieces)*
Brand	
Species name (common)	*Alaska pollock*
Species Latin name	*Theragra chalcogramma*
Catch area	*Northwest Pacific*
FAO area	*FAO 61*
Fishery name	*Russia Sea of Okhotsk pollock*
Catch flag(s)	*Russia*
Catch method	*Pelagic trawl*
Processing chain • **On board processing** • **Transhipment** • **Point of landing** • **Subsequent processing – country, company name, location**	• *On-board processing (H&G) and freezing.* • *Product in transhipped to reefer vessels* • *Landed in Vladivostok and other designated Russian ports* • *Transported to China for processing, Fish Processors Ltd, Qingdao. Fillet blocks* • *Transported to Germany* • *Further processing at XXX – portioned and breaded* • *Point of sale.*
Certification	*MSC certified, 2013*
Documentation • **Catch certificate** • **Log books**	*MSC certificate, catch certificate*

The information provided by the suppliers will be used, along with other sources of data, to perform a desk based IUU risk assessment for specific supply chains and fisheries. Table 5.2 presents the categories of IUU risk against which a score is assigned using a scoring plan which has been developed for IUU risk assessments by MRAG. This risk assessment approach, and the risk categories, is aligned with that of Step 3 of the 7-step IUU risk assessment. The crucial difference here is that the additional information on the supply chain provided by the suppliers will enable a more specific analysis of a particular supply chain and fishery, rather than a general supply chain.

The individual scores for each criterion are equally weighted. The unweighted scores are given a value of risk from 0 (no observed risk) to 10 (very high risk) relating to a number of criteria related to the fishery and the risk of IUU fish entering the market. Each criterion is assigned a score based on a number of parameters relating to an established standard scoring guideline. Scores are then highlighted according to a modified traffic light scheme, zero being green with no or negligible observed risk, yellow for scores between 1 and 3 highlights a low-level of risk, amber for scores of 4-7 indicate where a known risk exists and finally red for scores of between 8 and 10 which indicates a serious risk for those criteria.

Table 5.2 Categories of IUU risk assessment

Risk Category	Specific Risk
1.0 Fishing vessels, legal personalities and companies (IUU and whitelists)	1.1 Vessel Identification
	1.2 Vessels on IUU lists.
	1.3 IUU fishing carried out by vessels flying its flag, by its nationals or by companies based in that country.
2.0 Fisheries (sustainability, impacts)	2.1 Status of fisheries and sustainability
	2.2 History of IUU
	2.3 Access to fishery
	2.4 Price
	2.5 MSC certification
	2.6 Other certification/FIP processes
3.0 Flag State (corruption, control systems in place)	3.1 Flag of non-Compliance (FONC)
	3.2 Non-Cooperating
	3.3 Flag of convenience
	3.4 Corruption
	3.5 Transparent licensing
	3.6 Fair transparent fisheries agreements
	3.7 RFMO Membership/Compliance & Engagement
	3.8 Multi-lateral organisations e.g. FAO Guidelines or UNCLOS
	3.9 NPOAs (IUU + others)
	3.10 Flag State Control
	3.11 Observer Programme
	3.12 Cooperation on MCS issues
4.0 Coastal State (corruption, control systems in place)	4.1 IUU fishing suitably documented as carried out or supported by fishing vessels operating in its maritime waters.
	4.2 Effective MCS
	4.3 Clear and transparent quota management and licensing arrangements
	4.4 Sanctions sufficient and appropriate
	4.5 Regional cooperation
	4.6 Fishing capacity
5.0 Port States (control systems in place, PSMA provisions in place)	5.1 IUU fishing suitably documented as carried out or supported by fishing vessels using its ports.
	5.2 Port based control sufficient and targeted
	5.3 Designated ports
	5.4 Appropriate ports used by fleets
	5.5 PSMA implemented
	5.6 Transhipment
6.0 Market State[88] - Traceability and national requirements	6.1 Chain length
	6.2 Chain complexity and transparency
	6.3 Use of known PONCs
	6.4 Post landing inspections
	6.5 Supply chain traceability
	6.6 3rd Party Verifications

[88] For market State and corresponding measures, see FAO International Plan of Action to Prevent, Deter and Eliminate IUU Fishing, paragraphs 65 to 76, and FAO 1995 Code of Conduct for Responsible Fisheries, Article 11.2.

Risk Category	Specific Risk
	6.7 CDS / CoC certification
	6.8 Distant water without effective verification.
	6.9 Adoption of trade-related measures
	6.10 Processing or transhipment vessels involved in market chain.
	6.11 Level of market demand for fish products from fishery

NB: all legal personalities i.e. owners (and beneficial owners), agents, charterers, captains and fishing masters should be identified and examined. The lack of transparency or inability to gather such information may in itself be an indicator of higher risk and would increase the upper limit of possible IUU**.**

5.4 Timeline

It is important that an adequate amount of time is available to engage with suppliers, build an understanding of the project and the data requirements and to allow suppliers to gather and compile information. An indicative timeline is presented in Table 5.3 to illustrate the potential timeframe need to conduct a comprehensive supplier IUU risk assessment. The timeframe does not indicate the number of days, rather the length of time needed. Sufficient time has been given to each step of the process described above. For example 3 weeks is assigned to face to face meetings and the discussions and negotiations relating to the confidentiality agreements. Suppliers are given four weeks to respond to questionnaires and data requests.

Table 5.3 Indicative timeline

Task \ Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Identify key players in German market & establish main contacts																			
Develop communications log																			
WWF to send introduction letter																			
Face to face meetings																			
Confidentiality agreements																			
Questionnaire development																			
Pilot questionnaire																			
Send questionnaires to suppliers																			
Suppliers gathering information																			
Receive completed questions																			
Analysis of questionnaire																			
Desk based risk analysis																			

6 Technical Advice on WWFs Traceability Guidelines

WWFs draft traceability guidelines were supplied to the consultants on 05/09/2014 via Benjamin Freitas (WFF/Traffic).

Comments and advice on the structure and content of the guidelines were provided on 15/09/2014.

Whilst reviewing the principles, it was suggested that elements that companies have to conform with should be separated from recommendations / suggestions and also from statements recalling what WWF is already aware of. It was also suggested that the overall principles might be easier to read if structured to reflect different stages in the supply chain.

Annex 1 Terms of Reference

1. Initial review of seafood species on the German market in relation to their origin from countries and fisheries in relation to their IUU risk.

    - Initial review of WWFs market study for tuna, whitefish, shrimp and other selected species.

    - Production of a short report (15-25 pages) if potential IUU hotspots and countries / fisheries of origin with a high risk of IUU fishing. The report should provide reasons (qualitative, based on MRAGs global experience in fishery supply chains and the EU's 19 criteria for listing third countries) why certain supply chains may be at risk of IUU fishing, provide examples and brief case studies related to IUU fishing occurring in some countries and fisheries, if available.

    - Give feedback and recommendations to WWF Germany regarding the WWFs market study and which supply chains should be investigated further with regard to IUU risk.

    - Discuss with WWF Germany what resources they have available regarding WWF Germany's contacts.

    - Discuss with WWF Germany appropriate methodologies, which can be used for Phase 2.

    - Define the scope of the traceability and IUU study for Phase 2.

    - Clarify potential confidentiality issues.

    - Start initial contact with companies.

2. Technical advice on WWF's traceability guidelines:

    - The contractor will advise WWF on technical issues related to improving traceability in the seafood industry, as WWF is currently developing Guidelines for legal and traceable wild-caught seafood.

Annex 2 Species Lists

Initial Species List[89]

Fischart (species)	Wiss. Name (scientific name)
Skipjack tuna	*Katsuwonus pelamis*
Yellowfin tuna	*Thunnus albacares*
Albacore	*T. alalunga*
Bigeye tuna	*T. obesus*
Atlantic bluefin tuna	*T. thynuus*
Pacific bluefin tuna	*T. orientalis*
Southern bluefin tuna	*T. maccoyi*
Alaska pollock	*Theragra chalcogramma*
Atlantic cod	*Gadus morhua*
Atlantic redfish	*Sebastes spp.*
Haddock	*Melanogrammus aeglefinus*
Hake	*Merluccius spp.*
Anglerfish	*Lophius spp.*
Tropical shrimp	*Penaeus spp, Parapaneus longirostris*
Cold-water shrimp	*Crangon spp. Pandalidae*
Various shrimp	Various

Additional Species List[90]

Fischart (species)	Wiss. Name (scientific name)
Zander (pikeperch)	*Sander* spp., *Stizostedion* spp.
Papageifisch (parrot fish)	Scarus spp., *Sparisoma* spp.
Schwertfisch (swordfish)	*Xiphias gladius*
Grenadierfisch (grenadier, roughhead grenadier)	*Coryphaenoides rupestris, Macrourus berglax*
Granatbarsch, Atlantischer Sägebauch (orange roughy)	*Hoplostethus atlanticus*
Dorade (gilt-head sea bream, sea bass?)	*Dentex* spp., *Lithognatus mormyrus*, *Diplodus* spp., *Pagellus* spp., *Pagrus* spp., *Sparus* spp., *Spondyliosoma cantharus*
"Zungen": Seezunge, Tropenzunge, Rotzunge, Sandzunge, Hundszunge (soles)	*Soleidae; Cynoglossus spp.; add also Microstomus pacificus ("pacific dover sole")?*
Schwarzer Heilbutt (halibut)	*Reinhardtius hippoglossoides*
Snapper, Schnapper	*Lutjanus spp*
Horse mackerel and others	*Trachurus trachurus*, *Scomber japonicus*, *Lepidocybium* spp.
Meeraal (conger eel)	*Conger conger*
Blauer Marlin (blue marlin)	*Makaira nigricans*
Schwarzer Seehecht, Schwarzer Zahnfisch (Patagonian Toothfish)	*Dissostichus* spp.
Hoki	*Macruronus spp.*
Octopus	

[89] As defined in Lüdemann and Jessel (2014).

[90] As provided by Anna Holl (Anna.Holl@wwf.de) 07/07/2014

Wildlachs (salmon, wild caught)	*Oncorhynchus spp; Salmo salar* (?)
Roter/Louisiana Flusskrebs (crayfish)	*Procambarus clarkii*
Pangasius	*Pangasius spp*

Key:

Higher priority – In both lists
Lower priority – Removed from second shorter list.

Annex 3 Categories of IUU estimation methods showing key references, main data requirements, advantages and disadvantages, and a preliminary conclusion regarding the usefulness for this study.

#	Method	Key Reference and Application	Main Data Requirements	Advantages for this Study	Disadvantages for this Study	Useful?
1	Discrepancies in catch, product flow and trade quantities identified through comparisons	Clarke *et al.* (2009) – Russian sockeye salmon	Available and reliable catch, product flow and trade data specific to the issues of interest	Good catch and trade data for some species into Germany.	Flows within EU are not recorded, therefore difficult to estimate IUU in the German Market independently. Coverage of import and exports for a number of species is not recorded.	No
2	Extrapolation of detected offences	Sutinen *et al.* (1990) – compliance in Northeast US fisheries	Violations detected, number of inspections, probability of detection and a measure of effort or catch*.	n/a	Large variation in sources of fish, different levels of detection and prosecution would not allow accurate comparison.	No
3	Extrapolation from observer data	Bremner *et al.* (2009) – unreported bycatch in the hoki fishery	Reliable and representative observer coverage	n/a	Lack of observer coverage in the majority of fisheries	No
4	Economic modelling / Forensic accounting	Wernerheim & Haedrich (2007) – Newfoundland marine fisheries	Fish prices, operating costs, and catch and effort data	Possibility of data from a small sample of suppliers to ground truth other analyses.	No existing large scale databases to cover the species and sources that are required. Expensive data collection.	No
5	Interviews / Surveys	Kazmierow *et al.* (2010) – New Zealand Southeast fin fishery	Design and conduct a survey/surveys	Could be tailored for each specific fishery.	One-off surveys present a single snapshot and expensive data collection process.	Yes
6	Mathematical analysis	Plagányi *et al.* (2011) – South African abalone fishery	Complex model, such as a stock assessment model, and sufficient data to parameterise IUU fishing	n/a/	Impractical for the number of species and sources.	No
7	Expert Judgment	Ainsworth & Pitcher (2005) – Canadian West Coast fisheries and used in Agnew *et al.* (2009) for global estimate of IUU.	Expert opinion on levels of IUU fishing and its trends over time	Incorporates information from large number of sources (including examples of all other 8 methods). Only consistent method for comparison between methods due to data availability.	Need consistency of scoring for differences between species, stocks and sources. Harder to justify judgement for spot estimates therefore a range would be specified for each.	Yes

#	Method	Key Reference and Application	Main Data Requirements	Advantages for this Study	Disadvantages for this Study	Useful?
8	Capture-Recapture	Dalebout *et al.* (2002) – Asian whale meat market	Marking in the wild (e.g. through DNA fingerprinting); then determine recapture rates in illegal supply chains	n/a	Impractical for the number and variety required.	No
9	Indicators	Stahl (2005) – no fishery specific application cited	Specifies an index value (empirical or expert judgment-based) for IUU which varies over time	Simple index would be useful, but replaced by estimated range of IUU/	Difficult to create standardised indices across species, fisheries and sources.	No

* note that the unit of analysis used in Sutinen *et al.* (1990).

Annex 4 EU Criteria for Identification of Non-Cooperating Countries

The EU 19 criteria are laid out in Article 31 (Identification of non-cooperating third countries) of COUNCIL REGULATION (EC) No 1005/2008.

The criteria consider information on the following:

1. Chapter II (Inspections of third country fishing vessels in Member States ports);

2. Chapter III (Catch certification scheme for importation and exportation of fishery products);

3. Chapter IV (Community Alert System);

4. Chapter V (Identification of fishing Vessels Engaged in IUU Fishing);

5. Chapter VIII (Nationals);

6. Chapter X (Implementation of provisions adopted within certain regional fisheries management organisations pertaining to fishing vessel sightings); and

7. Chapter XI (Mutual Assistance);

or, as appropriate, any other relevant information, such as

8. The catch data, trade information obtained from national statistics and other reliable sources, vessel registers and databases, catch documents or statistical document programmes; and

9. IUU vessel lists adopted by regional fisheries management organisations; as well as

10. Any other information obtained in the ports and on the fishing grounds.

The Commission shall primarily rely on the examination of measures taken by the third country concerned in respect of:

11. Recurrent IUU fishing suitably documented as carried out or supported by fishing vessels flying its flag or by its nationals, or by fishing vessels operating in its maritime waters or using its ports; or

12. Access of fisheries products stemming from IUU fishing to its market.

The Commission shall take into account:

13. Whether the third country concerned effectively cooperates with the Community, by providing a response to requests made by the Commission to investigate, provide feedback or follow-up to IUU fishing and associated activities;

14. Whether the third country concerned has taken effective enforcement measures in respect of the operators responsible for IUU fishing, and in particular whether sanctions of sufficient severity to deprive the offenders of the benefits accruing from IUU fishing have been applied;

15. The history, nature, circumstances, extent and gravity of the manifestations of IUU fishing considered;

16. For developing countries, the existing capacity of their competent authorities.

The Commission shall also consider the following elements:

17. The ratification of, or accession of the third countries concerned to, international fisheries instruments, and in particular the UNCLOS, the UN Fish Stocks Agreement and the FAO Compliance Agreement;

18. The status of the third country concerned as a contracting party to regional fisheries management organisations, or its agreement to apply the conservation and management measures adopted by them;

19. Any act or omission by the third country concerned that may have diminished the effectiveness of applicable laws, regulations or international conservation and management measures.

Where appropriate, specific constraints of developing countries, in particular in respect to monitoring, control and surveillance of fishing activities, shall be duly taken.

Annex 5 Example of confidentiality agreement

Example

Issue of Confidentiality

WWF-funded [*insert name of project*]

TO WHOM IT MAY CONCERN

We have been commissioned by WWF-Germany to undertake a market study to establish IUU fish entering the German market (the “Purpose”). You will be disclosing information (the “Confidential Information”) in order for us to complete the Purpose on the terms set out below. We confirm:

- To treat in the strictest confidence any Confidential Information not already in the public domain other than through a breach of our obligations.
- To restrict disclosure of Confidential Information only to employees necessary to complete the Purpose.
- Not to disclose that you are involved in providing Confidential Information for the Purpose.
- To use the Confidential Information solely for the Purpose.
- We shall continue to be bound by the obligations in this letter after completion of the study.
- To obtain from each relevant member of staff to who Confidential Information is disclosed an undertaking that they will comply with the terms of this letter.
- Information and data will be aggregated and analysed in such a way that specific details cannot be readily linked to your company

Yours faithfully,

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