

**Trade in *Anguilla* species,
with a focus on recent trade in European Eel *A. anguilla***

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Vicki Crook

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EXECUTIVE SUMMARY

Background—biology, production, trade and conservation

The family Anguillidae, commonly referred to as freshwater eels, contains 15 species, all in the genus *Anguilla*, distributed throughout tropical and temperate waters, except for the eastern Pacific and south Atlantic (Silfvergrip, 2009). The various life stages, ranging from juvenile to adult, of all *Anguilla* species are harvested and traded on a global scale for consumption.

The European Eel *Anguilla anguilla*, the Japanese Eel *A. japonica*, the American Eel *A. rostrata* and the Short-finned Eel *A. australis*, are known to be particularly important commercially (FAO, 2009). In addition to being fished and used directly for consumption, wild juvenile eels or “glass eels” are also caught and used as “seed” in aquaculture production or farming. Eel farming, which is responsible for over 90% of all *Anguilla* production worldwide (FAO, 2009), is reliant on catching and rearing wild-caught glass eels, as raising eel larvae to the glass eel stage in captivity has only had limited success as yet (Briand *et al.*, 2008). Prior to 1990, eel farming was almost exclusively carried out using species of local provenance. European Eel was cultured in Europe and Japanese Eel in Asia. However, a decline in *A. japonica* stocks, the relatively abundant supplies of *A. anguilla* glass eels and their cheap price compared to *A. japonica*, led to many Asian eel farms switching to *A. anguilla* for their culture material at the end of the 1990s (Ringuet *et al.*, 2002). What was once a European fishery feeding European farms and consumption therefore became an industry of global significance.

Populations of *Anguilla* species have declined considerably over the last 30 years (Casselmann and Cairns, 2009); this loss has been attributed to a number of factors, including catches for international trade. Due to concerns that trade was having a serious impact on *A. anguilla* populations in particular, this species was proposed for listing in Appendix II of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES) in 2007. The listing came into force on 13 March 2009, as did the listing of *A. anguilla* in Annex B of *Council Regulation (EC) No. 338/97*, which implements CITES within the European Union (EU). Prior to this, the European Commission (EC) also adopted *Council Regulation (EC) No. 1100/2007* establishing measures for the recovery of the stock of the European Eel (18 September 2007). This includes the requirement for Member States to establish national Eel Management Plans and measures for restocking.

Trade in *A. anguilla* glass eels (defined in the EU as eels less than 12 cm in length) is currently a principal concern for European Eel conservation. It was decided at the 47th Meeting of the Scientific Review Group Meeting in March 2009 that future export quotas for glass eels (only permitted from Member States with management plans approved by the EC) are to be based on catches from the 2007/2008 fishing season and that exports of other live eels and eel products need to be considered on a case-by-case basis by national CITES authorities, taking into account national Eel Management Plans (EC, 2009a).

To ensure future management decisions for the European Eel are based on the best available information, the dynamics of global trade in eel commodities have to be properly understood, in addition to EU Member States having knowledge of European Eel stocks, recruitment and catches. Trade in eels and eel products, however, is very complex, and although there are a number of data sources for eel trade available, individually they only provide a partial and sometimes inaccurate picture of this trade.

Data sources and complexities

Live, dead and processed European Eel commodities are transported all over the world. Due to the various levels of consumption and further processing that may take place between the country/territory of origin and the final destination, and the ensuing complex trade patterns, it is very difficult to establish the true quantities of eels being traded. Furthermore, until recently, Customs data that follow the Harmonized Commodity

Description and Coding System (HS), were the only source of trade data that could be used to monitor global trade in eel commodities. The HS system includes only four main *Anguilla* commodities—live, fresh or chilled, frozen and smoked or prepared/preserved/products. National/territorial Customs trade data, therefore do not differentiate between the various life stages involved (some Asian countries/territories being the exception), the different *Anguilla* species being traded or the source of these products (i.e. directly taken from the wild or farmed). The commodity “live eel”, for example, includes eels of various life stages, used for various purposes, i.e. direct consumption, farming and “restocking”. It must also be noted that the term restocking has been used in the past to describe movement of specimens for the purpose of boosting fisheries, and not necessarily for augmenting wild breeding stocks as per the purpose of restocking as outlined in *Council Regulation (EC) No. 1100/2007*.

Following the listing of *A. anguilla* in CITES, more detailed trade data for this species should be reported by CITES Parties, including information on the source, life stage and country/territory of origin. However, as the listing only came into force on 13 March 2009, there will be a time lag before significant data are available for analysis. Therefore, despite the limitations of existing Customs trade records for *Anguilla* species outlined above, when combined, these data provide the best overall picture of trade levels and patterns for eels in the times prior to and at the onset of the CITES listing of *A. anguilla*.

This report assessed the most recent trade data available from the principal sources covering trade in the European Eel, using different data sources for different purposes. Data from the Food and Agriculture Organization of the United Nations (FAO) were used to identify global eel production and trade patterns and to estimate European Eel exports from non-EU range States. European Community trade data (EUROSTAT) provided information specifically on EU exports and imports, and intra-Community trade. European glass eel trade was analysed indirectly using Asian Customs data, which distinguishes between trade in glass eels and other life stages. Any recent CITES data, received from EU Member States on request, and qualitative data covering Internet trade, was also summarised.

Recent global, EU and Asian eel production and trade

Global production of *Anguilla* spp. increased nearly 20-fold between 1950 and 2007, with aquaculture attributing to over 95% of production in recent years. According to FISHSTAT data, *A. anguilla* is the most important species in capture fisheries and *A. japonica* the most important species in aquaculture (also being capture-based). However, there are known problems with these data, including the fact that aquaculture of *A. anguilla* in Asia is not included in production values for aquaculture of the European Eel and reported *A. japonica* aquaculture production may in fact include *A. anguilla*.

Global exports of all *Anguilla* commodities for the period 1997–2007 totalled over one million tonnes, valued at over EUR10 000 million. Annual exports of all eel commodities reached a maximum of over 130 000 tonnes in 2004, however, since then there has been a decline, with exports falling to below 100 000 tonnes in 2007. Smoked and live eel were the two main commodities in global trade. It must be noted that these totals, calculated using FISHSTAT data, include intra-Community trade, as the data in FISHSTAT do not differentiate between exports from the EU to non-EU countries/territories and dispatches within the EU. FISHSTAT data were therefore useful for examining global movement in eel commodities, and for identifying the top non-EU traders of eel. However, FISHSTAT data were not suitable for determining actual exports from the EU or for determining actual quantities in trade due to the likelihood of double counting. Overall, Taiwan and mainland China were the principal exporters of eel (all commodities combined) and Japan the principal importer. The most important non-EU *A. anguilla* range State exporters of eel were Norway, Tunisia and Algeria.

According to EUROSTAT, between 1998 and 2008, the EU exported fewer than 3000 tonnes of eel commodities to non-EU countries/territories. Live eels (all life stages, including glass eels) accounted for

nearly 40% and 90% of these exports by weight and value, respectively, with an average of fewer than 100 tonnes of live eels being exported every year. France and Spain were the principal exporters of live eels and Hong Kong, mainland China and the Republic of Korea the top three destinations for this commodity. The high value of these EU exports to non-EU countries/territories suggest that the majority of these exports are of glass eels. This corresponds with import data reported by Asian countries/territories—over 750 tonnes of eel fry (glass eels) were imported into mainland China and Hong Kong from EU Member States during this period. This weight is equivalent to 2000 million glass eels and it can be assumed that all of these are *A. anguilla*. There was a gradual decline in EU live eel exports between 1998 and 2008, apart from to mainland China, to which there has been a steady increase in exports over this period. Russia also appeared as an emerging market / trader during this period: in 2007 and 2008, exports of live eels to Russia became greater than those to Hong Kong, totalling nearly 13 tonnes.

Imports of eels into the EU between 1998 and 2008 were considerably larger than exports. The EU reported importing over 30 000 tonnes of eel commodities from non-EU countries/territories between 1998 and 2008. Live eels were imported in particular from the USA, Norway, Canada, Morocco and New Zealand, suggesting that a mix of *A. anguilla*, *A. rostrata* and *A. australis* was being traded and consumed within the EU. There has also been a gradual decline in live eel imports into the EU over this period.

The quantity of eel commodities being dispatched within the EU (dispatches being equivalent to “exports” for trade between individual EU Member States) between 1998 and 2008 was 30-fold greater than exports from the EU to non-EU countries/territories. Over 100 000 tonnes, equivalent to nearly 500 million adult eels and an average of 9000 tonnes a year, were dispatched within the EU during this period. Denmark and the Netherlands were the principal EU dispatchers of live eels by weight during this period, and in 2008 alone, they dispatched nearly 3500 tonnes of live eels within the EU, compared to exports of fewer than 20 tonnes to non-EU countries/territories. Using known extra- and intra-EU trade percentages for glass eels (Briand, *et al.*, 2008), it is estimated that the same number of glass eels were dispatched within the EU between 1998 and 2008, as were exported to Asia—2000 million. An estimated 4000 million glass eels were therefore fished and traded by EU Member States during this period, and this figure does not include glass eels caught and consumed within national borders.

Trade of glass eels, both to Asia and within the EU, has been the focus of several studies in the past leading to the control of trade in eels of this life stage becoming a priority for European Eel conservation. However, trade data presented in this report highlight that the EU market is responsible for the consumption of most of the large quantities of *Anguilla* commodities being imported and dispatched throughout the EU.

Although it is known that the low overall weight of exports from the EU is due to highly valued glass eels being the principal commodity, it must be noted that by weight, EU imports of eel commodities from non-EU countries and territories were ten-fold greater than EU exports to the same countries/territories over the same period (1998–2008). Furthermore, over 100 000 tonnes of eel were dispatched within the EU during this time. This includes trade in unknown quantities of juvenile eels for restocking purposes (ICES, 2003) and transport of partly grown eels from farming facilities back into the wild for fisheries (ICES, 2005). With such large quantities of eels being traded throughout the EU and the lack of detailed trade data currently available to establish an accurate picture of what is happening, CITES trade data, including details concerning purpose for trade (i.e. whether intended for consumption, restocking, grow-out in aquaculture facilities or direct export, etc.), is essential for filling these knowledge gaps.

At present the only available CITES data for *A. anguilla* trade are those provided by 18 out of the 27 EU Member States, covering exports, imports and seizures of *A. anguilla* since 13 March 2009. Since the CITES listing came into force, these 18 EU Member States have recorded exporting nearly 28 tonnes and importing nearly 1500 tonnes of *A. anguilla* specimens. Destinations for exports of live eels (including all life stages) were mainland China, the Republic of Korea, Russia, Ukraine and the Former Yugoslav Republic of

Macedonia. France and the UK were the only EU Member States to have reported (re-)exports of glass eels during this period—14.18 tonnes of wild-taken specimens and 2.25 tonnes of pre-Convention specimens, respectively. All were destined for China. Data on intra-Community trade were also provided by some EU Member States: for example, France issued over 100 EC internal trade certificates covering dispatches/national trade of over 12 tonnes of glass eels; Greece reported dispatches of 233 tonnes of live eels to Italy and the arrival of 0.1 tonnes of glass eels from the UK; and the Netherlands reported the arrival of 63 tonnes of live eels from France. The UK and Poland also reported two large seizures of frozen eels declared as *A. japonica* (but in fact being a mixture of *A. anguilla* and *A. japonica*) since March 2009. Even these limited CITES data (from only two thirds of EU Member States and for a period of approximately one year) already help to provide a better indication of the trade patterns of *A. anguilla*, particularly within the EU.

Conclusions and recommendations

This report combined a number of different trade data sources to overcome some of the data complexities and inaccuracies surrounding the trade in *Anguilla* species. This helped to develop an insight into the global eel trade, and more specifically patterns in *A. anguilla* trade, both of which are essential to ensure adequate management of the European Eel. In addition to providing the most up to date information on patterns of international and EU eel trade and the quantities of commodities involved, the results of the analyses carried out as part of this report highlighted important issues hitherto not considered priorities for action within eel conservation and management. The majority of past and present efforts in determining the EU's role within the global eel trade have been focused on understanding the levels of exports of glass eels from the EU. However, this report shows that EU imports and internal trade of *Anguilla* commodities are of such a large magnitude that monitoring and management of this trade is essential.

The recommendations accompanying the report therefore focus primarily on ways of addressing this newly-identified issue at the same time as dealing with well-known problems such as the export of glass eels. Detailed recommendations are provided in the report, but broadly speaking, these recommendations cover aspects including reporting procedures, raising consumer awareness and further research. Recommendations related to reporting deal with the need for consistent use of internal trade certificates; the development of a real time database for CITES record; agreement on the use of source codes for wild captured and farmed specimens; and the introduction of a separate code “live eel fry” under the HS system. Combined, these measures will ensure adequate traceability of all trade in eels, from, to and within the EU. Informing consumers of the conservation status of *A. anguilla* is considered a priority, as is research into the demand for this species and the options for replacing *A. anguilla* with a more sustainable resource. Time and resources should also be allocated to research into establishing a concrete conservation restocking plan; understanding the use of American Eel *A. rostrata* in Europe; and analysing the levels of eel production and trade arising from newly emerging markets and traders. Guidance on dealing with possible increases in illegal trade is also provided.

INTRODUCTION

The European Eel *Anguilla anguilla* is a commercially important species that is threatened with extinction. International trade has been identified as a principal factor in this species's decline. This report aims to provide up to date information on trade in *A. anguilla* that is essential for conservation and management purposes.

Biology and distribution

Eels are long, thin bony fish of the order Anguilliformes (Nelson, 1994). The family Anguillidae, commonly referred to as freshwater eels, contains 15 species, all in the genus *Anguilla*, distributed throughout tropical and temperate waters, except for the eastern Pacific and south Atlantic (Silfvergrip, 2009). All *Anguilla* species are catadromous—spending their lives in freshwater rivers, lakes, or estuaries and returning to the ocean to spawn.

According to data recorded by the Food and Agriculture Organization of the United Nations (FAO), the four most readily identifiable *Anguilla* species of commercial importance are the European Eel *Anguilla anguilla*, the Japanese Eel *A. japonica*, the American Eel *A. rostrata* and the Short-finned Eel *A. australis* (FAO, 2009). The European Eel has an area of distribution covering Europe, Iceland and North Africa, the Japanese Eel ranges from Vietnam, the Philippines, Taiwan, mainland China and the Korean Peninsula to the Japanese archipelago, the American Eel is found on the east coast of the United States of America (USA) and Canada and the Short-finned Eel is native to Australia, New Zealand and the South Pacific (Ringuet *et al.*, 2002). Although little is known about their life cycles or migration routes, it is known that both the European and American Eel spawn in the Sargasso Sea in the western Atlantic Ocean, the Japanese Eel spawns off the Mariana Islands in the western Pacific and the Short-finned Eel spawns in the Coral Sea, off New Caledonia (Silberschneider, 2005).

Figure 1: Broad distributional ranges of *A. rostrata*, *A. anguilla*, *A. japonica* and *A. australis*



Source: Adapted from Silfvergrip (2009)

Anguilla eel life cycles can be divided into five main stages: eggs and larvae carried inland from marine spawning sites on currents; “glass eels” of approximately five to eight centimetres and one gram in weight reaching the continental shelf and estuaries; “elvers” with a darker skin colour reaching freshwater habitats; “yellow eels” over 10 cm long living in freshwater habitats; and adult or “silver eels” living in freshwater/estuaries before returning to the sea to spawn (Silfvergrip, 2009). The yellow eel phase can last between five and nine years, depending on the species, sex and geographic location of the growing habitat.

The male European Eel reaches maturity at between three and nine years and the female between five and 18 years. Adult *A. anguilla* eels can reach over one metre in length and up to six kg in weight (Silfvergrip, 2009) and can spend 20 years in inland waters (Keith and Allardi, 2001). All anguillid eels die after spawning (Haro *et al.*, 2000). The migratory life-cycle of eels is now known to be facultative—some specimens never enter fresh water (Daverat *et al.*, 2006).

Use, production and trade

Anguilla species are harvested and traded on a global scale for consumption. Marinated grilled eel (using only silver eels) is favoured in Japan, smoked and stewed eel (yellow and silver eels) is favoured in Europe and North America, and in Spain, France and Italy glass eels are also consumed (Ringuet *et al.*, 2002; Briand *et al.*, 2008). For the European Eel, all the continental life stages are therefore exploited by commercial fisheries for human consumption. European glass eels are caught in southwest Europe and northwest Africa, predominantly along the Atlantic coasts of France, Morocco, Portugal, Spain and the Bristol Channel in the UK. Yellow eels of *A. anguilla* are caught throughout the species's distributional area and silver eels mostly in northern Europe. Local fisheries are supplemented through the regular release into natural waters of juveniles, often caught in France, Spain and Portugal (Dekker, 2000). This is a form of low intensity farming, however, it is commonly referred to as “restocking”. It must not be confused with conservation restocking programmes that aim to increase the escapement of silver eels (see Eel conservation and management in the EU).

In addition to being fished and used directly for consumption, wild juvenile eels are also caught and used as “seed” in aquaculture production or farming. Eel farming, which is responsible for over 90% of all *Anguilla* production worldwide (FAO, 2009), is capture-based. It is reliant on catching glass eels or elvers from the wild (glass eels are preferred). Japanese researchers have succeeded in reproduction and the breeding of larvae to the glass eel stage for *A. japonica* (Tanaka *et al.*, 2001). In the case of *A. anguilla*, however, reproduction has not yet been achieved in captivity and the European Eel farming industry is totally dependent on wild-caught eels for rearing. In Europe, 2.5kg of glass eels are needed to produce one tonne of live eels for trade (approximately seven eels per kilogramme) (Nielson and Prouzet, 2008).

Prior to 1990, farming of eel species was almost exclusively carried out using species of local provenance. European Eel was cultured in Europe—Italy, Denmark and the Netherlands being the main producers (ICES, 2005)—and Japanese Eel in Asia. However, at the end of the 1990s, a decline in *A. japonica* stocks combined with the apparently abundant supplies of *A. anguilla* glass eels and their cheap price compared to *A. japonica*, led to many Asian eel farms switching to *A. anguilla* for their culture material (Ringuet *et al.*, 2002). What was once a European fishery feeding European farms and consumption, therefore became an industry of global significance (Ringuet *et al.*, 2002).

Status and threats

European, Japanese and American Eel populations have declined considerably over the last 30 years (Casselman and Cairns, 2009). This loss has been attributed to a number of factors, including changes in ocean currents, pollution, diseases, the loss of river habitat, the introduction of invasive species, local fishing and more recently, catches for international trade (Ringuet *et al.*, 2002). *A. anguilla* is currently listed as Critically Endangered on the IUCN Red List (Freyhof and Kottelat, 2008). In 2007, with the European Eel stock at a historical low and continuing to decline (ICES, 2007), and international trade known to be the driver for a large proportion of the harvesting of European glass eels, *A. anguilla* was proposed for listing in Appendix II of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES). The listing came into force on 13 March 2009.

The International Council for Exploration of the Sea (ICES) has recently published advice that all negative human impacts on European Eel populations should be reduced to an absolute minimum, including commercial fishing (ICES, 2009). ICES highlighted the alarming decline of the European Eel stock and the

fact that recruitment, which has dropped to between 1 and 9% of that observed in the 1970s, may be impaired by the current low level of spawning stock. It advises that fishing and the use of glass eels for any purpose, including restocking, should be re-considered (see Eel conservation and management in the EU).

Eel conservation and management in the European Union (EU)

The European Commission (EC) adopted *Council Regulation (EC) No. 1100/2007 establishing measures for the recovery of the stock of the European Eel* on 18 September 2007. This regulation includes the requirement for EU Member States to establish national Eel Management Plans and measures for re-stocking.

The objective of each national Eel Management Plan is to reduce anthropogenic mortalities so as to permit, with high probability, the escapement to the sea of at least 40% of the silver eel biomass, relative to the best estimate of escapement that would have existed if no anthropogenic influences had impacted the stock. Concerning restocking, the Regulation states that if an EU Member State permits fishing for glass eels (defined in the EU as eels less than 12 cm in length), it needs to reserve at least 60% of the glass eels caught by the fisheries in that EU Member State each year for use in restocking in eel rivers, for the purpose of increasing the escapement levels of silver eels. At least 35% of the glass eels caught in the first year of application of a national Eel Management Plan must be reserved, this increasing by steps of at least 5% per year until the level of 60% is achieved by 31 July 2013 (The Council of the European Union, 2007). At the time of writing, 14 Member States had approved management plans in place: Belgium, the Czech Republic, Germany, Denmark, Estonia, Finland, France, Ireland, Lithuania, Luxembourg, Latvia, the Netherlands, Poland and Sweden; the United Kingdom (UK) plan is likely to be adopted mid-April 2010. Plans submitted by Greece, Spain, Italy and Portugal are still under evaluation (EC *in litt.* to TRAFFIC, April 2010).

It is of note that the French Management Plan includes the results from a model adapted by Lambert, testing different management scenarios under which legal fishing is reduced by 0%, 25%, 50%, 75% and 100%, combined with the same reductions in mortality due to other negative impacts (Ministère de l'Écologie, de l'Énergie du Développement durable et de la Mer, ONEMA and Ministère de l'Agriculture et de la Pêche, 2009). The model highlights the huge effort that is required to ensure that the *A. anguilla* stock recovers—even in the theoretical case where all sources of mortality are removed, stock recovery will only be achieved in 60 years. Under its adopted management plan, France proposes to reduce fisheries off-take by 30%; using the closest comparable value of a 25% reduction in fishery mortality, according to the model *A. anguilla* will become extinct in 24 to 109 years unless mortality resulting from all other negative impacts is reduced by 100% (an extremely unlikely possibility).

Since 13 March 2009, the EU has also been implementing the listing of *A. anguilla* in Annex B of the European Union Wildlife Trade Regulation, *Council Regulation (EC) No. 338/97*, which implements CITES within the EU. The Scientific Review Group (SRG), established under this Regulation, set up a working group on eels to consider aspects related to the making of non-detriment findings (NDFs) and to advise on the setting of export quota levels for *A. anguilla* (EC, 2009a). The SRG decided that export quotas are initially to be set for glass eels only, and then it will be considered in later years whether and how such quotas for other eels and eel products need to be set. The setting of export quotas and making of NDFs is reliant on there being the necessary mechanisms in place to quantify catches of eels and enable traceability of those catches that are destined for export. It is therefore required that internal EC trade certificates be issued to control internal trade before specimens can be exported from a different Member State from which it was harvested (EC, 2009b).

At its 47th Meeting in March 2009 (SRG47), the SRG decided the following: a) that export quotas be set for 1 November to 31 October in accordance with the glass eel fishing season; b) that the baseline of catches against which future quota reductions will be measured is to be taken from the 2007/2008 fishing season; c) that export levels for the 2008/2009 fishing season be set at a maximum of 85% of this baseline; d) that export levels for the 2009/2010 season will be set at a maximum of 43% of the baseline for those countries

with approved national Eel Management Plans and zero for those with no approved plans; and e) that the situation will be reviewed by the SRG in 2010 for the next fishing seasons (EC, 2009b). At the 48th Meeting of the Committee on Trade in Wild Fauna and Flora (COM48) in September 2009 it was finally decided to set export levels for the 2009/2010 glass eel fishing season at only 21.5% of the baseline for those Member States with approved Management Plans in place, due to the sharp decline in catches of glass eels during the 2008-2009 fishing season reported by the SRG.

SRG47 also advised that exports of other live eels, e.g. adult eels, and eel products can take place until the review in 2010, but need to be considered on a case by case basis by national CITES authorities based on their national Eel Management Plans. With regards to imports of eels and eel products, the SRG applied a similar approach, suggesting that these are in principle to be accepted if they are of specimens exported by countries of origin with approved management plans based on suitable scientific advice (EC, 2009b).

Finally, eels and eel products being re-imported into the Community need to be derived from eels harvested and exported before the CITES listing came into force (pre-Convention) or from eels having been exported legally by the EU and/or other non-EU European Eel range States that have similar approved management plans in place. The SRG noted that this requires close tracking, monitoring and reporting by the exporting countries by which the re-exported products are linked to export documents originally approved by the EU or other non-EU range States. Cut off dates after which specimens of European Eel can no longer be considered as pre-Convention were agreed at COM48: 01 April 2011 for live specimens and 01 April 2012 for any other eel products.

Eel trade complexities and report objectives

To enable future decision making on export quotas and issuing of import and export permits, and to ensure it is based on the best available information, in addition to EU Member States having knowledge of European Eel stocks, recruitment and catches, the dynamics of global trade in eel commodities have to be properly understood. Trade in eels and eel products, however, is very complex and difficult to analyse. With the involvement of Asian countries/territories, in particular, in the European Eel market, live, dead and processed European Eel commodities are now being transported all over the world (Ringuet *et al.*, 2002). Due to the various levels of consumption and further processing that may take place between the country/territory of origin and the final destination, it is very difficult to establish the true quantities of eel being traded.

Furthermore, until recently, Customs data that follow the Harmonized Commodity Description and Coding System (HS), were the only source of trade data that could be used to monitor global trade in eel commodities. The HS system includes only four main *Anguilla* commodities—live, fresh or chilled, frozen and smoked or prepared/preserved/products. National/territorial Customs trade data, therefore do not differentiate between the various life stages involved (some Asian countries/territories being the exception), the different *Anguilla* species being traded or the source of these products (i.e. directly taken from the wild or farmed). The commodity “live eel”, for example, includes eels of various life stages, i.e. glass eels, elvers, yellow eels and silver eels, used for various purposes, i.e. direct consumption, farming and restocking. The grouping of all life stages in the live eel commodity, in particular, makes calculations of the number of eels in trade particularly difficult. There are approximately four adult European Eels per kilogramme (Otsuka, 1996; Nielson and Prouzet (2008) quote figures of seven per kilogramme for aquaculture production), but on average 3000 glass eels per kilogramme (Tabeta *et al.*, 1977).

The global dimensions of trade in eels have therefore been poorly understood. Following the listing of *A. anguilla* in CITES, more detailed trade data for this species should be reported by CITES Parties, including information on the source, life stage and country/territory of origin. However, as the listing only came into force on 13 March 2009, there will be a time lag before significant data are available for analysis. Therefore, despite the limitations of existing Customs trade records for *Anguilla* species outlined above, these data

provide the best overall picture of trade levels and patterns for eels in the times prior to and at the onset of the CITES listing of *A. anguilla*.

Ringuet *et al.* (2001) examined eel harvest and trade in Europe and Asia, and this report aims to provide an updated overview of the trade in all eel commodities using a variety of trade data sources, but with a focus on Europe. More recently Briand *et al.* (2008) used extensive analytical methods to establish levels of European glass eel trade using a variety of European trade, shipping and price records. This report, on the other hand, analyses European glass eel trade indirectly by using Asian Customs data, which distinguishes between trade in glass eels and other life stages. The general trade patterns that can be inferred from these analyses will not only be useful for guiding European Eel conservation activities in the coming years, but will also provide an essential basis for future monitoring of conservation measures such as those outlined in *Council Regulation (EC) No. 1100/2007*.

METHODS

Anguilla spp. trade data were collected from a number of different sources, namely:

- a) FAO fisheries statistics (FISHSTAT)
- b) European Community trade data published by Statistical Office of the European Communities (EUROSTAT);
- c) national/territorial Customs data from five Asian countries/territories known to be involved in European Eel trade: mainland China (the People's Republic of China, hereafter referred to as China), Hong Kong Special Administrative Region of the People's Republic of China (Hong Kong), Taiwan, Japan and the Republic of Korea (Korea);
- d) data on imports and exports of *A. anguilla* since the CITES listing in 13 March 2009 provided by individual EU Member States on request; and
- e) qualitative Internet trade from www.alibaba.com.

Table 1 summarises the various Customs codes and commodities used by the reporting countries and territories included in the report. Customs data for eel trade are generally separated into four main commodities: live; fresh/chilled; frozen; and smoked/prepared/preserved/products of *Anguilla* spp. (hereafter referred to as the four main commodities). Throughout the analysis, unless specified otherwise, “live eel/s” refers to live specimens of all life stages of *Anguilla* species, including glass eels, elvers, yellow eels and adult eels. A number of countries/territories further specify trade in different life stages of live *Anguilla* eels—live eel is divided into “live eel fry” (which refers to glass eels only) and “other live eel” (which refers to all life stages apart from glass eels). The situation for Taiwan is more complex, see Table 1.

Data are not generally recorded at the species level, and the difficulty in determining which species are in trade is exacerbated by inaccurate trade and production records. FAO aquaculture production data for European and Japanese Eels, for example, are known to be unreliable (see FISHSTAT section below). Geographic provenance can be used, however, to estimate trade in certain species. This report attempts to do this by focusing on data relating to specific trade routes: exports from *A. anguilla* range States (FAO), exports from the EU and intra-Community trade (EUROSTAT), and imports into China, Hong Kong, Taiwan, Japan and Korea from Europe (Asian Customs data). However, the only trade figures contained in this report specifically known to relate to *A. anguilla* are those provided by EU Member States following the CITES listing.

In particular, it must be emphasised that double counting is very likely to play a part when looking at the total quantities of all commodities being traded. This is because many commodities are known to be traded internationally before and after they are converted from one type to another. Figures quoted throughout this report are totals as reported by trading partners—there is no compensation for double counting, if this occurs. They are therefore more indicative of overall trade movements and patterns than the actual quantities of eel that were captured/cultured and entered into trade (see additional analysis).

The different datasets, ranging from global to national, were analysed in turn, with a focus on eel trade by weight. However, total trade values in the reporting currency and an approximate conversion to euro, based on average conversion rates for the 1998–2008 period (OANDA, 2009), were also provided where relevant. Values were only provided for comparative purposes between countries/territories and years—they were not compensated for inflation. Although most sources provided both weight and value data, there were instances when only one or the other was reported for certain transactions; this being a possible source of error when comparing data sources. One billion refers to 1000 million.

Table 1: Customs codes and descriptions of *Anguilla* spp. commodities traded in Europe and Asia

	Customs Code	Commodity	
Europe	0301.92.00	Live eels " <i>Anguilla</i> spp."	
	0302.66.00	Fresh or chilled eels " <i>Anguilla</i> spp."	
	0303.76.00	Frozen eels " <i>Anguilla</i> spp."	
	0305.49.50	Eels " <i>Anguilla</i> spp.", smoked, incl. fillets	
China / Hong Kong	0301.92.10	Live eel fry " <i>Anguilla</i> spp." (Hong Kong started using this code only in 2002)	
	0301.92.90	Live eels, other than fry (<i>Anguilla</i> spp.) (For Hong Kong, prior to 2002 this code also included fry)	
	0302.66.00	Fresh or chilled eels " <i>Anguilla</i> spp.", excluding fillets, livers and roes	
	0303.76.00	Frozen eels " <i>Anguilla</i> spp.", excluding fillets, livers and roes	
Japan	0301.92.10.0	Live eel fry " <i>Anguilla</i> spp." (only used for imports, general live eel code used for exports: 0301.92.00.0)	
	0301.92.20.0	Live eels, other than fry (<i>Anguilla</i> spp.) (as above)	
	0302.66.00.0	Fresh or chilled eels " <i>Anguilla</i> spp."	
	0303.76.00.0	Frozen eels " <i>Anguilla</i> spp."	
	1604.19.01.0	Prepared or preserved eels (<i>Anguilla</i> spp.)	
Korea	0301.92.10.00	Live eel fry " <i>Anguilla</i> spp."	
	0301.92.90.00	Live eels, other than fry (<i>Anguilla</i> spp.)	
	0302.66.00.00	Fresh or chilled eels " <i>Anguilla</i> spp.", excluding livers and roes	
	0303.76.00.00	Frozen eels " <i>Anguilla</i> spp.", excluding livers and roes	
	1604.19.10.30	Prepared or preserved eel caviar and caviar subs (<i>Anguilla</i> spp.)	
Taiwan	Live	0301.92.10.10-1	Eels, <i>Anguilla japonica</i> , live
		0301.92.10.20-9	Eels, <i>Anguilla marmorata</i> , live
		0301.92.10.90-4	Other eels (<i>Anguilla</i> spp.), live (included in 0301.99.29.915 "other freshwater fishes, live" before 23/06/2006)
		0301.92.20.10-9	Glass eel (>5000 pcs per kg)
		0301.92.20.20-7	Eel fry (>500 and <5000 pcs per kg)
		0301.92.20.30-5	Young eel (elver) (>10 and <500 pcs per kg)
		0301.99.29.40-7	Live Australian eels
	Fresh/chilled	0302.66.00.00-6	Eels (<i>Anguilla</i> spp.), fresh or chilled
		0304.10.20.10-5	Offals of eel, fresh or chilled
		0304.10.90.20-8	Eel fillets or steaks, fresh or chilled
		0304.19.20.10-6	Offals of eel, fresh or chilled (0304.10.20.10-5 from 01/01/2009)
		0304.19.90.10-1	Eel fillets or steaks and meat (whether or not minced), fresh or chilled (0304.10.20.20-8 from 01/01/2009)
	Frozen	0303.76.00.00-3	Eels (<i>Anguilla</i> spp.), frozen
		0304.20.90.15-3	Eel (<i>Anguilla</i> spp.), fillets or steaks, frozen
		0304.29.90.10-9	Eel (<i>Anguilla</i> spp.), fillets or steaks, frozen (0304.2090.15-3 from 01/01/2009)
		0304.90.11.00-1	Eel, minced, frozen
		0304.90.90.10-3	Offals of eel, frozen
		0304.99.11.00-2	Frozen eel, minced (surimi) (0304.90.11.00-1 from 01/01/2009)
		0304.99.90.10-4	Offals of eel, frozen (0304.90.90.10-3 from 01/01/2009)
	Products	1604.19.10.11-2	Eel, whole or in pieces, but not minced, prepared or preserved, frozen
		1604.19.10.13-0	Roasted eel whole or in pieces, but not minced, prepared or preserved, frozen
1604.19.10.20-1		Eel (incl. conger eel), whole or in pieces, but not minced, prepared or preserved, canned	
1604.19.10.91-5		Other eel, whole or in pieces, but not minced, prepared or preserved	
1604.20.90.21-0		Other offals of eel prepared or preserved, frozen	
1604.20.90.29-2		Other offals of eel prepared or preserved	

Source: EUROSTAT (2010); China Customs (2008); Census and Statistics Department, Hong Kong (2009); Ministry of Finance, Japan (2009); Korea International Trade Association (2009); and Bureau of Foreign Trade, Taiwan (2009).

The section titled “additional analysis” covers a brief analysis of unit value (price) of live eel commodities, in order to estimate trade in glass eel from general live eel data, and of actual numbers of eel individuals in trade. Briand *et al.* (2008) should be referred to for methods for carrying out a detailed analysis of EU glass eel trade using price, destination, weight and process as factors for identifying the various life stages of live eel in trade. The additional analysis section also discusses qualitative eel trade data derived from “Alibaba” (www.alibaba.com), considered the world’s largest marketplace for global trade and a leading provider of online marketing services for importers and exporters. Information was downloaded on 30 March and 14 April 2010, and was compared to equivalent tables in Silfvergrip (2009) from 19 October 2008.

The following descriptions relate to the equivalent sections under the trade analysis. They highlight the type of data available and any possible problems in interpretation. The most recent available data, at the time of writing, was analysed in all cases. For most trade data sets, the analysis covered 1998–2008 (1997–2007 in two instances due to data from 2007 being the most recent), providing a sufficient time period to determine trends. Exports refer to exports and re-exports combined.

FISHSTAT

Fisheries data compiled by the FAO Fisheries and Aquaculture Department (FAO, 2009) were analysed using FISHSTAT Plus software. The following FISHSTAT datasets were used to provide an overview of eel production and trade at the global level:

- Global Production (1950–2007)
- Global Aquaculture Production (1950–2007)
- Global Capture Production (1950–2007)
- Fishery Commodities and Trade (1976–2007)

Yearly eel production data were available to the species level for European Eel *A. anguilla*, Japanese Eel *A. japonica*, American Eel *A. rostrata* and Short-finned Eel *A. australis*. The category “River eels nei” refers to all other *Anguilla* spp. in production. FISHSTAT production data by species, however, appears to be divided by geographic provenance of the species, i.e. European Eel aquaculture assumes aquaculture in European and African countries refers to *A. anguilla* (because they are located within *A. anguilla*’s distribution), and Japanese Eel aquaculture is assumed to refer to aquaculture of *A. japonica* in Asian countries/territories. However, many eel farms in Asia are known to use glass eels of *A. anguilla* as their culture material (Ringuet *et al.*, 2002). FISHSTAT production data by species is therefore misleading. The International Council for the Exploration of the Sea (ICES) has highlighted problems with reliability of FAO reported production values a number of times in the past (ICES, 2009).

Yearly eel trade data were available for the four main commodities. Trade reported in FISHSTAT is uni-directional, i.e. exports and imports are reported by each country/territory, but the trading partners are not defined. Trade involving EU Member States as presented in FISHSTAT is derived from EUROSTAT and includes intra-Community trade (see below for EUROSTAT data complexities). FISHSTAT also provides some re-export data for certain countries/territories, such as Hong Kong and Malaysia. These data are not included in the analysis, being insignificant quantities compared to the totals involved (they amounted to only 5433 tonnes for the 1997–2007 period, which is equivalent to 0.5% of all exports recorded during this time). FISHSTAT records trade using the following units: tonnes and 1000 US dollars.

EUROSTAT

European Community trade data provided by Member State Customs authorities is published by the Statistical Office of the European Communities: EUROSTAT. Eel trade data can be extracted from the External Trade Database - EU27 Trade since 1995 by CN8, for the four main commodities (EUROSTAT, 2010). Monthly and yearly trade quantities and values are recorded in 100kg and euro. Data can be extracted by individual EU Member State or for the 27 EU Member States as a group (EU27).

Exports and imports recorded in EUROSTAT include both extra- and intra-Community trade. Within the Community, these are referred to as dispatches and arrivals, respectively. The EUROSTAT user guide (EC, 2006) provides details of all the possible intra and extra-EU statistical discrepancies and differences between Community figures and other international and national sources. A system of thresholds, dealing with exemption, simplification and statistical value, is operated for both intra-EU and extra-EU trade, below which no information, or reduced information, is collected (see EU (2009) for full details). Particular care must be taken when interpreting intra-Community trade as overall “movement” within the EU may be underestimated if a large number of small quantities below the specified thresholds were being traded.

Complete data for 2009 only became available on EUROSTAT in March 2010, as the writing of this report was coming to an end. The main analysis was therefore based on yearly data for 1998 to 2008; this time period being comparable to most other data sources used in the report. However, some 2009 EUROSTAT data were used for comparison with CITES trade data and some additional analysis. Monthly 2009 exports and imports to and from the EU, and dispatches and arrivals within the EU, by Member State and eel commodity, are presented in a separate information document for use by authorities.

Asian national/territorial Customs data

National/territorial Customs data for eel trade were acquired from five Asian countries/territories identified as principal traders of eels with Europe: China, Hong Kong, Taiwan, Japan and Korea. All these countries/territories separate live eels into a minimum of two commodities – live eel fry (equivalent to that referred to as the glass eel stage in Europe) and other live eel, with Taiwan further splitting live eels into species and several different life stages. Analysis of these data focused on the imports of live eels from EU Member States to establish the proportions of glass eels versus other life stages being exported from the EU (these life stages not being differentiated in EUROSTAT). Values were also compared with live eel exports recorded by EU Member States in EUROSTAT.

China

Data were acquired from the China Customs Statistics Yearbook 1997-2007 published by the Customs General Administration of the People’s Republic of China (China Customs, 2008). Yearly trade quantities and values are recorded in kg and 1000 US dollars.

Hong Kong

Data were acquired from the Government of the Hong Kong Special Administrative Region Census and Statistics Department (Census and Statistics Department, Hong Kong, 2009). Yearly trade quantities and values are recorded in kg and Hong Kong dollars. Hong Kong only started recording live eel fry under a separate Customs code in 2002. Before this date, live eel fry were recorded under “other live eel”. Therefore, an accurate picture of live eel fry trade between 1998 and 2008 cannot be obtained from these data. Hong Kong only imports and re-exports eel commodities—there were no data for exports.

Taiwan

Data were acquired from the Bureau of Foreign Trade, Taiwan (2009). Yearly trade quantities and values are recorded in kg and US dollars. Taiwan has recorded *Anguilla* spp. eel trade using 25 different Customs codes over the last 10 years, including seven codes relating to different commodities of live eel (see Table 1). Prior to 2006 “other eels, *Anguilla* spp., live” (i.e. those not included in the separate commodities for *A. japonica* and *A. marmorata*, see Table 1) were recorded under the general code for “other freshwater fishes, live”. Therefore, data on live adult eel trade of all *Anguilla* species are not available for the entire 1998–2008 period.

Japan

Data were acquired from the Trade Statistics of Japan, provided by the Ministry of Finance, Japan (2009). Yearly trade quantities and values are recorded in kg and 1000 Japanese yen. Japan uses five Customs codes for imports, however only three for exports: live eel, fresh/chilled eel and frozen eel.

Korea

Data were acquired from the Korea International Trade Association (2009). Yearly trade quantities and values are recorded in kg and 1000 US dollars.

CITES data provided by EU Member States

EU Member States were requested to provide information on *A. anguilla* imports, exports and seizures since 13 March 2009. Only eighteen EU Member States responded.

EU Member States submitted their data in a number of different formats and the data covered variable time periods depending on submission dates (responses were received between February and June 2010). With individual EU Member State data therefore not being directly comparable, and a two-third response rate resulting in an incomplete dataset, the CITES data collected for this report could only be used to provide an indication of EU eel trade since March 2009—detailed analysis was not possible.

TRADE ANALYSIS

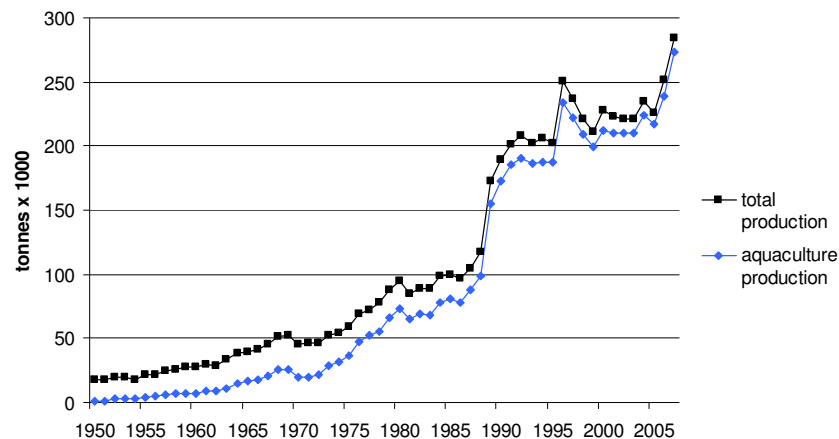
Overview of FISHSTAT data

Global production 1950–2007

General analysis

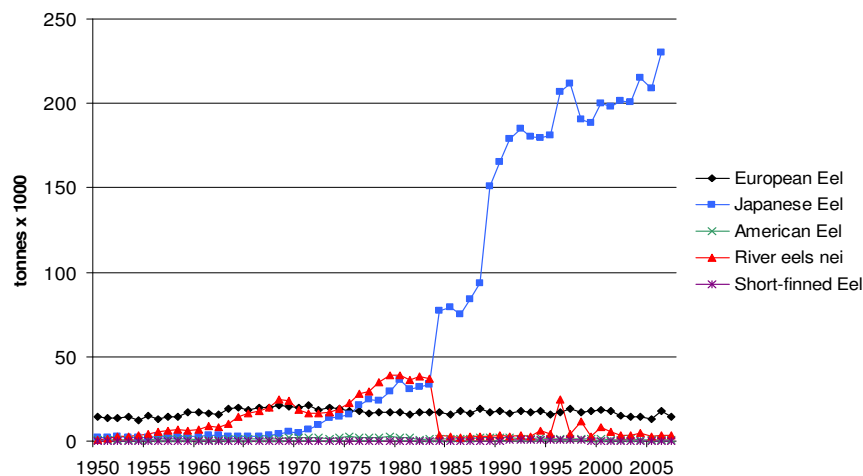
Figure 2 shows the increase in world production of *Anguilla* species (hereafter referred to as “eels”) between 1950 and 2007 based on FISHSTAT data. Total production of eels rose from 17 750 tonnes in 1950 (only 3% coming from aquaculture) to 284 274 tonnes in 2007 (96% coming from aquaculture). Since 1990, aquaculture has made up over 90% of the world’s total eel production. According to FISHSTAT data, European Eel production remained relatively constant between 1950 and 2007 (Figure 3). Aquaculture of Japanese eel *A. japonica* appears to be responsible for the steep increase in eel production since the 1990s. However, with FAO data for European Eel aquaculture production only covering production in *A. anguilla* range States and not including *A. anguilla* cultured in Asia, these figures are likely to considerably underestimate the overall role of *A. anguilla* in aquaculture production (see Methods for more details). It can also be noted that the sharp increase in Japanese eel production in 1984 coincides with an equivalent decrease in “River eels nei” production, suggesting there were changes in reporting or identification practices during this time.

Figure 2: World production of eels – total and aquaculture (1950–2007), tonnes x 1000



Source: FAO (2009)

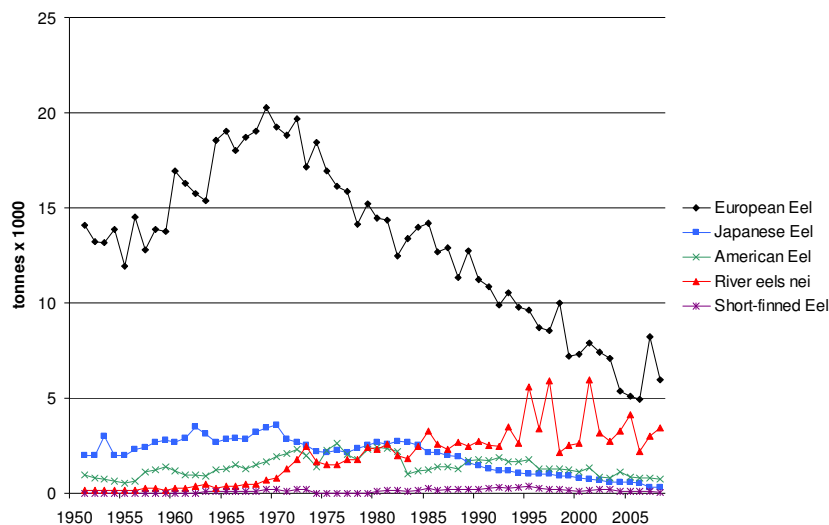
Figure 3: World production of eels – by species (1950–2007), tonnes x 1000



Source: FAO (2009)

Capture data between 1950 and 2007 for the five commercial eel species/groups can be seen in Figure 4. European Eel, *A. anguilla*, is the most important species in eel fisheries, making up over 70% of all eel captures during this period. Catch per year of *A. anguilla* reached a peak of over 20 000 tonnes in the 1970s, after which there was a steady decline to a minimum catch of under 5000 tonnes in 2005.

Figure 4: World capture of eels – by species (1950–2007), tonnes x 1000



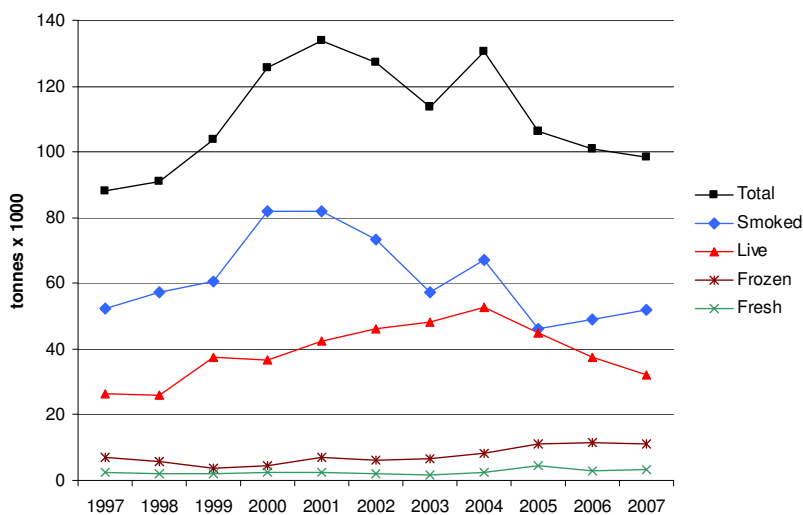
Source: FAO (2009)

Global trade 1997–2007

General Analysis

Based on FISHSTAT data, total global exports of all eel commodities between 1997 and 2007 reached over one million tonnes, with a value of over USD11 billion (~EUR10 billion). Smoked eel was the most important commodity, by weight, making up over 60% of all trade during this period. Live eel was the second most important commodity. Total exports of all commodities by weight peaked both in 2001 and 2004 at over 130 000 tonnes per year (see Figure 5).

Figure 5: World eel exports by commodity (1997–2007), weight (tonnes x 1000)



Source: FAO (2009)

China and Taiwan were the principal exporters of eel and Japan the principal importer. Detailed FISHSTAT global export and import data of the four commodities of *Anguilla* spp. (live, fresh, frozen and smoked), ordered by top ten exporters and importers and the rest of the world, are shown in Annex A. For commodities where trade is dominated by a small number of traders (i.e. fewer than ten), only details for those responsible for $\geq 1\%$ of all exports/imports are provided. The significant exports of live eels by Saudi Arabia and imports of frozen eels by Nigeria are particularly noteworthy, considering the fact that neither country is a range State for any *Anguilla* species.

Trade by commodity

Over 400 000 tonnes of live eels were exported between 1997 and 2007, reaching a peak in 2004 of over 50 000 tonnes (see Figure 5). The principal live eel exporters, Taiwan, China and Myanmar, together exported nearly 75% of all live eels during this period (see Annex A). EU Member States were responsible for over 17% of all live eel exports, exporting over 70 000 tonnes, and five EU Member States were in the top ten exporters of live eels: Denmark, Netherlands, Sweden, Italy and the UK. Japan alone, was responsible for over 60% of all imports of live eel during this period. The Netherlands, Germany, Denmark, Belgium and Italy together imported over 20% (see Annex A). It must be noted, however, that EU trade recorded in FISHSTAT includes both extra- and intra-Community trade (see Methods for details).

EU Member States exported over 42% of all fresh eels, 7% of frozen eels and less than 1% of smoked eels between 1997 and 2007. The top global exporter of each of these commodities was Indonesia (22%), USA (25%) and China (91%), respectively. EU Member States imported over 70% of all fresh eels, 19% of frozen eels and less than 1% of smoked eels between 1997 and 2007. The top global importer of fresh eels was Spain (24%), frozen eels Taiwan (42%) and smoked eels Japan (98%). On a global scale, EU Member States therefore appear to play important roles in the trade of live, fresh and frozen eels, and in particular in fresh eel exports and imports.

In order to estimate global trade in live eels of *A. anguilla* only, exports recorded in FISHSTAT for all EU Member States and other range States of European Eel between 1997 and 2007 were analysed (see Table 2). The list of range States is based on information included in the IUCN Red List (Freyhof and Kottelat, 2008). Assuming that all exports of live eels from those countries were exclusively of European Eel, *A. anguilla* made up at least 20% of the total weight of all live *Anguilla* exported between 1997 and 2007 (400 000 tonnes). This does not include any live *A. anguilla* eels cultured in Asia, however. The EU was responsible for nearly 94% of all exports of live *A. anguilla* from range States—Denmark and the Netherlands together exported over half the total. The Netherlands and Denmark were also the first and third EU importers of live eels, respectively (see Annex A), suggesting that these two countries are trade hubs for live eels. The top non-EU exporter of live eels was Norway, followed by Tunisia, Morocco and Algeria.

Although trade in live glass eels and other life stages cannot be easily differentiated using FISHSTAT data, overall value and unit value (price) can be used in an attempt to quantify trade in different life stages. By value, the top EU exporter of live eels was not Denmark, but France. Although France only exported 4000 tonnes of live eels between 1997 and 2007, these were valued at over USD400 million (~EUR350 million). Each kg of live eels therefore had an average unit price of USD100 (~EUR89). The average unit price per kg for Denmark, on the other hand was only USD9 (~EUR8). Knowing that glass eels fetch much higher prices than other eel life stages (Ringuet *et al.*, 2002), it can be inferred that France is exporting principally glass eels and Denmark principally adult eels. See exports reported in EUROSTAT and additional analysis for more value evaluations and links to the life stage of the commodity in trade.

Table 2: Live eel exports from *A. anguilla* range States (1997–2007), tonnes

EU	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Denmark	2935.0	2147.0	4843.0	1985.0	1873.0	2265.0	2348.0	2059.0	1840.0	2002.0	1726.0	26023.0
Netherlands	1471.0	1310.0	1704.0	1502.0	1107.0	1078.0	1003.0	1475.0	1632.0	1477.0	1264.0	15023.0
Sweden	826.0	585.0	1828.0	724.0	726.0	302.0	256.0	507.0	565.0	531.0	366.0	7216.0
Italy	1424.0	1598.0	1035.0	1091.0	541.0	398.0	299.0	224.0	148.0	179.0	156.0	7093.0
United Kingdom	748.0	652.0	622.0	552.0	568.0	537.0	459.0	420.0	401.0	280.0	368.0	5607.0
France	714.0	411.0	462.0	421.0	311.0	371.0	370.0	304.0	286.0	286.0	333.0	4269.0
Belgium	337.0	190.0	202.0	360.0	245.0	141.0	174.0	89.0	176.0	160.0	136.0	2210.0
Spain	194.0	183.0	200.0	205.0	207.0	240.0	192.0	188.0	145.0	137.0	168.0	2059.0
Germany	114.0	113.0	106.0	146.0	110.0	150.0	167.0	214.0	188.0	120.0	434.0	1862.0
Hungary	96.0	143.0	155.0	78.0	77.0	43.0	0.0	10.0	0.0	0.0	0.0	602.0
Portugal	0.0	0.0	15.0	1.0	9.0	3.0	2.0	13.0	8.0	94.0	87.0	232.0
Austria	86.0	62.0	2.0	1.0	2.0	6.0	1.0	1.0	0.0	0.0	0.0	161.0
Slovakia	32.0	46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.0
Lithuania	0.0	0.0	0.0	0.0	0.0	9.0	16.0	20.0	10.0	11.0	0.0	66.0
Poland	12.0	8.0	14.0	5.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	45.0
Estonia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.0	0.0	23.0
Czech Republic	1.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0	0.0	0.0	0.0	22.0
Latvia	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0
Ireland	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	3.0
EU Subtotal	8996.0	7448.0	11188.0	7071.0	5776.0	5543.0	5288.0	5552.0	5399.0	5300.0	5039.0	72600.0
Non-EU												
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Norway	522.0	325.0	422.0	273.0	262.0	305.0	229.0	211.0	231.0	254.0	187.0	3221.0
Tunisia	58.0	54.0	67.0	25.0	48.0	31.0	30.0	43.0	70.0	93.0	95.0	614.0
Morocco	77.0	81.0	56.0	37.0	48.0	44.0	47.0	56.0	42.0	32.0	32.0	552.0
Algeria	20.0	29.0	13.0	0.0	34.0	33.0	16.0	27.0	7.0	6.0	20.0	205.0
Turkey	19.0	0.0	0.0	0.0	0.0	23.0	23.0	23.0	19.0	0.0	11.0	118.0
Albania	7.0	4.0	6.0	7.0	8.0	13.0	0.0	9.0	28.0	29.0	3.0	114.0
Croatia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	45.0	55.0
Non-EU subtotal	703.0	493.0	564.0	342.0	400.0	449.0	345.0	369.0	397.0	424.0	393.0	4879.0
Total	9699.0	7941.0	11752.0	7413.0	6176.0	5992.0	5633.0	5921.0	5796.0	5724.0	5432.0	77479.0

Source: FAO (2009) Exports from EU countries include both extra- and intra-Community trade.

Overview of EUROSTAT data

Exports from the EU to non-EU countries/territories 1998–2008

General Analysis

Total exports based on EUROSTAT data, by weight and value, from EU27¹ to non-EU countries and territories of the four commodities of *Anguilla* spp. (live, fresh, frozen and smoked) between 1998 and 2008 are shown in Table 3. Over this period, EU27 recorded exporting a total of nearly 3000 tonnes of eel commodities to non-EU countries and territories, with a value of over EUR300 million.

Details of the major non-EU destinations of exports of *Anguilla* spp. commodities from EU27 are shown in Annex B. The top non-EU destinations, by weight, for EU27 exports of all eel commodities between 1998 and 2008 were: Hong Kong, China, Switzerland and Russia.

¹ Data extracted for the 27 EU Member States as a group.

Table 3: Total EU27 eel exports to non-EU countries and territories (1998–2008), by weight (tonnes) and value (million euro)

WEIGHT

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	%
Live	156.9	143.9	184.8	63.2	116.1	96.1	64.3	77	37.8	71	59.7	1070.8	37.4
Fresh	24.5	24.9	24.1	23.9	7.4	8.2	627.8	0	0.2	1.8	0.2	743.0	25.9
Frozen	69.2	12.0	21.9	33.1	56.1	35.1	29.5	42.7	87.0	45.4	19.3	451.3	15.8
Smoked	22.5	20.4	353.4	35.0	60.4	22.5	21.7	14.9	13.4	19.6	15.8	599.6	20.9
Total	273.1	201.2	584.2	155.2	240.0	161.9	743.3	134.6	138.4	137.8	95.0	2864.7	

VALUE

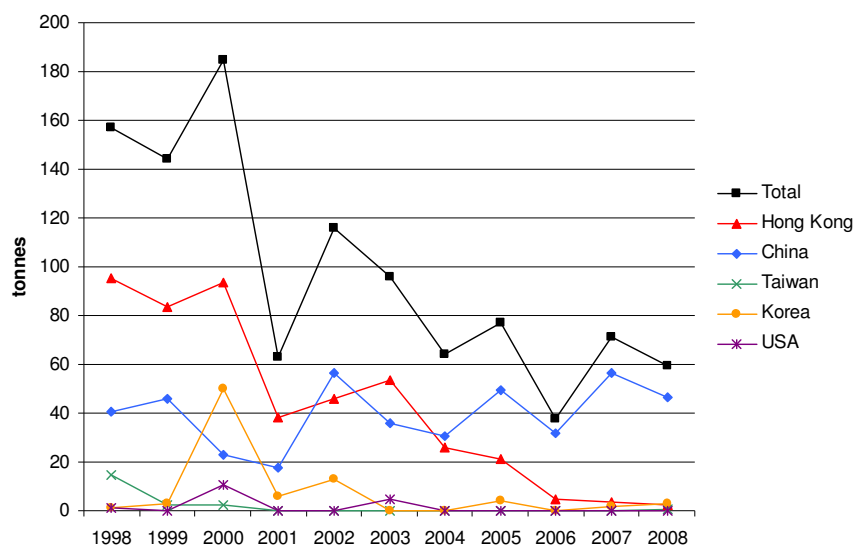
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	%
Live	31.7	22.3	24.0	16.3	20.6	18.9	25.0	54.8	14.9	30.9	26.3	285.6	90.0
Fresh	4.0	5.4	2.8	3.0	1.5	1.4	5.4	0	0	0	0	23.4	7.4
Frozen	0.7	0.2	0.3	0.4	0.6	0.3	0.3	0.4	0.4	0.5	0.1	4.2	1.3
Smoked	0.3	0.3	0.5	0.4	0.5	0.4	0.4	0.3	0.3	0.4	0.3	4.0	1.3
Total	36.7	28.1	27.7	20.0	23.0	21.0	31.0	55.5	15.6	31.7	26.7	317.2	

Source: EUROSTAT(2010) Values of 0 refer to unit value of less than 0.05.

Trade by commodity

Live eels were the most exported commodity, by weight and value, making up 37% of the weight (1071 tonnes) and 90% of the value (EUR286 million) in eels exported from the EU between 1998 and 2008. The average unit value of live eel commodities exported from the EU during this period was EUR260/kg (fluctuating between a minimum of EUR130/kg in 2000 to a maximum of EUR700/kg in 2005). This high price suggests that glass eels were the main life stage being exported. Hong Kong, China and Korea were the top three destinations for live eels by weight (see Figure 6), importing over 90% of all live eels exported from the EU during this period.

Figure 6: EU27 exports of live eels (1998–2008) by weight (tonnes) - total and top destinations



Source: EUROSTAT(2010)

A general decline in live eel exports from EU27 to non-EU destinations can be seen from Figure 6. Exports peaked in 2000, with a total of 185 tonnes; Hong Kong and Korea being the top importers that year. Exports to all top destinations declined after 2000, except for exports to China, which showed a gradual increase over the whole period. EU27 exports of live eels to Russia in 2007 and 2008 totalled 13 tonnes, making Russia the

sixth most important destination between 1998 and 2008 for live eels coming from the EU, just from trade in these two recent years.

Fresh eel was the second most important commodity exported by the EU. However, 84% of all exports of fresh eels from EU27 to non-EU countries/territories occurred in a single year (2004) to two destinations: 545 and 83 tonnes of fresh eel were recorded as being exported to Hong Kong and China, respectively. Hong Kong and Chinese national Customs data, however, have no records of such imports from the EU in 2004. A large proportion of smoked eel exports (331.5 tonnes, over 55% of the total) can also be attributed to exports in one year (2000) and to one destination (Switzerland). Therefore, the accuracy of these figures needs to be verified.

Trade by individual EU Member States

18 EU Member States exported eel commodities to non-EU destinations between 1998 and 2008. By weight, the principal exporters were Denmark, France, Germany, the Netherlands and Spain (see Table 4). France was the principal exporter of live, fresh and smoked eels, exporting 61.4%, 84.6% and 55.7% of each commodity, respectively. Germany was the principal exporter of frozen eels (54.5%).

Table 4: Total EU Member State eel exports to non-EU destinations, 1998–2008, weight (tonnes)

	LIVE		FRESH		FROZEN		SMOKED		ALL	
	Total	%	Total	%	Total	%	Total	%	Total	%
Belgium	15	1.4	1.4	0.2	0	0.0	0.3	0.1	16.7	0.6
Bulgaria	0	0.0	0	0.0	0	0.0	0.1	0.0	0.1	0.0
Denmark	84.4	7.9	2.2	0.3	106.5	23.6	109.6	18.5	302.7	10.6
Estonia	0	0.0	0	0.0	2.6	0.6	0	0.0	2.6	0.1
Finland	0	0.0	0	0.0	0	0.0	0.9	0.2	0.9	0.0
France	657.3	61.4	628.6	84.6	0.4	0.1	330.9	55.7	1617.2	56.6
Germany	27.1	2.5	0.3	0.0	245.5	54.5	16.8	2.8	289.7	10.1
Greece	6	0.6	0	0.0	0	0.0	0.3	0.1	6.3	0.2
Hungary	6	0.6	0	0.0	0	0.0	0	0.0	6	0.2
Italy	1.3	0.1	1.2	0.2	2.6	0.6	0.4	0.1	5.5	0.2
Latvia	0	0.0	0	0.0	0	0.0	1.5	0.3	1.5	0.1
Lithuania	1.9	0.2	0	0.0	0	0.0	0.5	0.1	2.4	0.1
Netherlands	47.5	4.4	2	0.3	41	9.1	127.2	21.4	217.7	7.6
Poland	0.2	0.0	0	0.0	22.8	5.1	2	0.3	25	0.9
Portugal	0	0.0	0	0.0	0.1	0.0	0	0.0	0.1	0.0
Spain	122	11.4	40.5	5.5	15.7	3.5	1.6	0.3	179.8	6.3
Sweden	1.2	0.1	3.9	0.5	0.3	0.1	1.9	0.3	7.3	0.3
UK	100.9	9.4	63	8.5	13	2.9	0	0.0	176.9	6.2
Total	1070.8		743.1		450.5		594		2858.4	

Source: EUROSTAT(2010) Grey shading shows the top two EU exporters of each commodity.

Imports into the EU from non-EU countries/territories 1998–2008

General analysis

22 EU Member States reported importing nearly 33 000 tonnes of eel commodities, worth over EUR200 million, from non-EU destinations, between 1998 and 2008 (see Table 5). By weight, EU27 imported ten times more eels from non-EU countries/territories than it exported (under 3000 tonnes for the same period). However, by value, the EU was a greater exporter than importer (exporting over EUR 300 million for the same period). This difference coincides with the fact that although the EU exports a smaller quantity of eels, a large proportion of this is composed of glass eels, which have a much higher unit value than any of the commodities imported. The average unit value of live eels imported into the EU was only EUR7/kg.

Table 5: Total EU27 eel imports from non-EU countries/territories (1998–2008), by weight (tonnes) and value (million euro)

WEIGHT

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	%
Live	1277.0	1219.2	914.8	1009.9	934.8	970.7	951.2	824.2	833.0	778.7	801.3	10514.8	32.0
Fresh	56.4	45.6	62.4	134.5	95.6	90.2	129.2	78.5	60.6	61.9	21.2	836.1	2.5
Frozen	1612.3	1680.3	987.7	2675.2	1147.0	1449.8	1497.8	2369.8	1357.2	3759.6	2850.1	21386.8	65.1
Smoked	39.8	5.0	8.2	18.8	10.0	2.7	6.1	4.4	9.6	9.4	20.9	134.9	0.4
Total	2985.5	2950.1	1973.1	3838.4	2187.4	2513.4	2584.3	3276.9	2260.4	4609.6	3693.5	32872.6	

VALUE

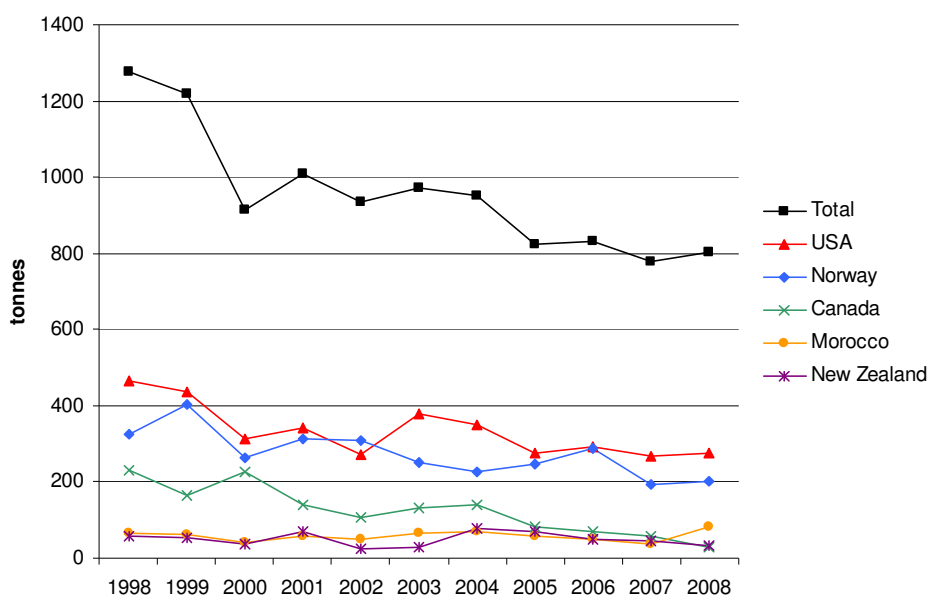
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	%
Live	8.1	7.8	5.7	7.2	5.8	5.5	6.3	6.4	6.1	5.6	5.5	69.9	33.5
Fresh	0.3	0.3	0.3	0.8	0.3	0.3	0.9	0.3	0.3	0.4	0.1	4.2	2.0
Frozen	9.8	10.6	5.7	17.3	6.6	7.5	8.5	14.2	8.8	25.9	18.8	133.7	64.1
Smoked	0.3	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.8	0.4
Total	18.5	18.7	11.7	25.4	12.8	13.4	15.7	20.9	15.3	31.8	24.5	208.6	

Source: EUROSTAT(2010) Values of 0 refer to unit value of less than 0.05.

Live and frozen eels were the most imported commodities by weight (10 515 tonnes and 21 413 tonnes respectively). Five EU Member States imported over 90% of all live eels, and over 80% of all frozen eels: Belgium, Denmark, Italy, the Netherlands and Sweden (EUROSTAT, 2010).

Between 1998 and 2008 there was a gradual decline in live eel imports (see Figure 7). USA, Norway and Canada supplied over 75% of all live eels imported into the EU during this period. Based on the top source countries for live eel imports during this period, it is likely that a mixture of live American Eel (~5000 tonnes), European Eel (~4700 tonnes) and Short-finned Eel (~500 tonnes) was imported into the EU.

Figure 7: EU27 imports of live eels (1998–2008) by weight (tonnes)—total and top source countries



Source: EUROSTAT(2010)

Over the same period there was an increase in frozen eel imports. China, New Zealand and Canada supplied nearly 75% of all frozen eels imported during this period. Details of the major non-EU source

countries/territories for all *Anguilla* spp. commodities imported into EU27 are provided in Annex B. Of particular note are the single large import into the EU of fresh eels from Venezuela in 2002 (over 50 tonnes) and several imports of smoked eels from Togo, Benin and Côte D'Ivoire between 1998 and 2008. Although Venezuela is a range State of *A. rostrata*, its occurrence is sporadic and it is unlikely that Venezuela could produce such quantities (A. Silfvergrip pers. comm. to TRAFFIC, 2010); and no West African countries are range States for *Anguilla* species. Mis-reporting or the re-routing of trade for eel commodities could be reasons for these anomalies.

Intra-EU trade 1998–2008

Dispatches

EU27 reported dispatching (the equivalent of “exporting” within the EC) over 100 000 tonnes and one billion euro worth of eel commodities within the EU between 1998 and 2008 (see Table 6).

Table 6: Total eel dispatches within the EU, by weight (tonnes) and value (million euro)

WEIGHT												
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Live	7755.0	11407.1	7346.4	6698.3	6111.8	5593.6	5699.7	5511.9	5678.6	5319.3	5479.0	72600.7
Fresh	1364.6	1089.8	1244.8	1273.8	1487.8	1372.5	1079.5	1215.3	921.2	878.7	1049.1	12977.1
Frozen	725.0	825.3	827.4	1460.9	958.1	945.3	798.1	1558.3	1360.5	1580.4	1094.3	12133.6
Smoked	366.1	456.3	516.1	553.8	726.5	745.4	644.6	530.5	405.3	262.7	323.6	5530.9
Total	10210.7	13778.5	9934.7	9986.8	9284.2	8656.8	8221.9	8816.0	8365.6	8041.1	7946.0	103242.3
VALUE												
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Live	87.6	90.5	72.5	70.7	63.8	55.2	75.5	92.8	78.1	68.5	65.2	820.6
Fresh	11.3	10.5	8.3	7.8	8.3	10.1	9.0	10.3	8.7	9.7	9.0	102.8
Frozen	5.9	6.5	6.3	12.3	6.9	6.6	6.0	12.1	12.1	15.1	8.6	98.3
Smoked	5.5	7.4	6.3	5.6	8.2	8.0	9.7	9.6	7.5	5.6	5.2	78.5
Total	110.2	114.8	93.4	96.4	87.2	79.9	100.1	124.8	106.5	98.9	88.0	1100.2

Source: EUROSTAT(2010)

The quantities of all eel commodities being dispatched within the Community are thirty times higher those being exported from the EU over the same period (less than 3000 tonnes). For live eels alone the difference is even larger: over 70 000 tonnes were dispatched within the Community between 1998 and 2008 as opposed to just over 1000 tonnes being exported from the EU to non-EU destinations. Imports into the EU from non-EU destinations are also significantly lower (approximately 30 000 tonnes) than overall arrivals (the equivalent of “importing” within the EC). All these data highlight that movement of eel commodities within the EU is much larger than any eel trade between the EU and external partners.

The average unit price of live eels dispatched during this period was only EUR11/kg, in comparison to EUR266/kg for exports of live eels outside the EU. This suggests that in comparison to EU exports of live eels (composed mostly of glass eels), a large proportion of intra-EU trade is composed of older life stages.

Intra-community eel trade by Denmark, France, the Netherlands and Spain in 2008

Dispatches and arrivals (referred to as exports and imports in Table 7 to enable comparison with extra-EU trade) from and to four of the known principal EU traders in live eels were selected to illustrate intra-Community trade patterns (see Table 7). The data provide an example of the type of eel trade flows that are occurring within the EU; for example, Denmark reported dispatches of 178 tonnes and arrivals of 51 tonnes from and to Sweden in 2008. The figures can also be compared with extra-Community trade figures for the same year to determine the importance of intra- and extra-Community trade for each Member State. For example Denmark reported dispatching a total of 1840 tonnes to EU countries in 2008, but exporting only

9.9 tonnes to non-EU countries/territories. By proportion, France exported nearly 14% of its live eels to non-EU countries/territories, Spain 3% and Denmark and the Netherlands only 0.5%.

Table 7: 2008 exports and imports of live eels as reported by Denmark, France, the Netherlands and Spain, to/ from individual EU countries and all non-EU countries/territories, weight (tonnes)

	Denmark		France		Netherlands		Spain	
	Export	Import	Export	Import	Export	Import	Export	Import
Belgium	48.8	1.0	45.4	14.5	157.7	1.7	0.0	0.0
Denmark	–	–	2.9	0.0	38.1	994.4	0.0	0.0
Estonia	0.0	0.0	0.0	0.0	0.2	41.2	0.0	0.0
Finland	0.0	0.0	0.0	0.0	14.6	0.0	0.0	0.0
France	0.2	79.8	–	–	53.9	4.7	5.4	23.7
Germany	158.5	67.3	2.8	0.0	1113.7	407.4	0.0	0.0
Greece	0.0	0.0	0.0	0.0	0.0	23.6	0.0	0.0
Ireland	0.0	0.0	0.0	0.0	0.0	124.9	0.0	0.0
Italy	397.6	0.3	125.4	0.6	128.8	90.2	40.6	10.9
Latvia	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Lithuania	8.4	0.0	0.0	0.0	0.0	8.9	0.0	0.0
Netherlands	1162.4	60.9	5.6	25.4	–	–	121.3	30.5
Poland	13.1	0.0	0.2	0.0	0.8	0.0	0.0	0.0
Portugal	0.0	0.0	39.5	1.4	4.2	0.0	117.1	7.5
Spain	0.0	4.6	18.6	6.4	3.0	51.8	–	–
Sweden	51.2	177.7	0.0	0.8	8.6	119.9	0.0	0.0
UK	0.0	120.4	4.9	1.9	87.3	123.3	0.0	0.0
EU total	1840.2	512.0	245.4	51.0	1610.9	1992.0	284.4	72.6
Non-EU total	9.9	275.2	39.4	53.6	7.8	357.7	8.8	105.7

Source: EUROSTAT(2010) Note: Dispatches and arrivals are referred to as exports and imports in this table to enable comparison with extra-EU trade

Despite there being some known differences in methods of reporting national and Community statistics (EC, 2006), figures for French trade in live eels in 2008 as reported by EUROSTAT were similar to those published by FranceAgriMer (2008). French national statistics reported exports and dispatches totalling 287 tonnes of live eels in 2008 (284.8 reported in EUROSTAT) and imports and arrivals totalling 89 tonnes of live eels (104.6 in EUROSTAT).

Overview of Asian national/territorial Customs data

This section focuses on imports into Asia of live eels, in particular live eel fry, from EU Member States. As Asian countries/territories differentiate between trade in live eel fry (referred to as glass eels in the EU) and trade in other life stages of live eels, imports from EU Member States, as recorded by Asian Customs authorities, can be used estimate the proportions of glass eels versus other life stages being exported from the EU (these life stages not being differentiated in EUROSTAT). For trends in EU exports of all live eels to China, Hong Kong, Taiwan and Korea, see Figure 6 under the section covering imports into the EU.

Asian imports of all live eels were also compared with live eel exports recorded by EU Member States in EUROSTAT, to establish data comparability between these two sources. Table 8 shows the total EU exports of live eels to China, Hong Kong, Taiwan, Japan and Korea as reported in EUROSTAT (tonnes), for comparison with Asian Customs data (1997–2007 for China, 1998–2008 for Hong Kong, Taiwan, Japan and Korea).

Table 8: Total reported EU exports of live eels to China, Hong Kong, Taiwan, Japan and Korea as reported in EUROSTAT (tonnes), 1997–2007 for China, 1998–2008 for Hong Kong, Taiwan, Japan and Korea

	China	Hong Kong	Taiwan	Japan	Korea	Total
Belgium	11.6	0.0	0.0	0.0	0.0	11.6
Denmark	0.0	0.0	1.2	0.0	75.4	76.6
France	425.3	290.9	3.8	0.3	3.3	723.6
Germany	3.8	23.3	0.0	0.0	0.0	27.1
Netherlands	0.5	0.0	14.3	7.6	0.6	23.0
Spain	46.0	68.5	0.0	0.3	0.1	114.9
UK	7.2	85.2	0.0	0.1	1.8	94.3
Total	494.4	467.9	19.3	8.3	81.2	1071.1

Source: EUROSTAT(2010)

China 1997–2007

According to national Customs data, China imported over 32 000 tonnes of *Anguilla* spp. commodities, including over 1000 tonnes of live eel fry, between 1997 and 2007 (see Table 9). 60% of China's eel fry imports came from the EU—95% of these from France and Spain. Live eel exports from the EU to China as reported in EUROSTAT (500 tonnes) were less than imports from the EU as reported by China (600 tonnes) during the same period (see Table 8).

Table 9: Total Chinese eel imports from the EU and the rest of the world (RoW) (1997–2007), weight (tonnes)

	Live fry	Other live	Fresh	Frozen	Total	% EU	% Total
France	516.0	2.8	0.0	0.0	518.8	83.4	1.6
Spain	77.2	0.2	0.0	0.0	77.4	12.4	0.2
Poland	0.0	0.0	0.0	16.9	16.9	2.7	0.1
UK	3.7	0.0	0.0	0.0	3.7	0.6	0.0
Denmark	1.9	0.0	0.0	0.0	1.9	0.3	0.0
Belgium	1.5	0.0	0.0	0.0	1.5	0.2	0.0
Germany	1.4	0.0	0.0	0.0	1.4	0.2	0.0
Netherlands	0.0	0.0	0.2	0.0	0.2	0.0	0.0
EU total	601.7	3.0	0.2	16.9	621.7	100.0	1.9
RoW	439.5	953.7	11.8	30431.2	31836.2		98.1
Total	1041.2	956.7	12.0	30448.1	32458.0		100.0

Source: China Customs (2008)

Hong Kong 1998–2008

According to territorial Customs data, Hong Kong imported nearly 30 000 tonnes of *Anguilla* spp. commodities, including nearly 400 tonnes of live eel fry between 1998 and 2008 (see Table 10). 40% of Hong Kong's eel fry imports came from the EU—France, Spain and the UK played important roles in this trade. Live eel exports from the EU to Hong Kong as reported in EUROSTAT (nearly 500 tonnes) were considerably more than imports from the EU as reported by Hong Kong (160 tonnes) during the same period (see Table 8).

Table 10: Total Hong Kong imports of eel commodities from the EU and the rest of the world (RoW) (1998–2008), by weight (tonnes)

	Live fry	Other live	Fresh	Frozen	Total	% EU	% Total
France	84.0	0.3	0.0	0.0	84.2	45.9	0.3
Spain	39.8	0.1	0.0	0.1	40.0	21.8	0.1
UK	31.8	0.0	0.0	0.0	31.8	17.3	0.1
Poland	0.0	0.0	0.0	22.0	22.0	12.0	0.1
Bulgaria	0.0	4.0	0.0	0.0	4.0	2.2	0.0
Germany	1.1	0.0	0.0	0.0	1.1	0.6	0.0
Netherlands	0.2	0.0	0.0	0.0	0.2	0.1	0.0
EU total	156.9	4.3	0.0	22.1	183.4	100.0	0.6
RoW	237.4	23290.6	1940.4	3827.4	29295.7		99.4
Total	394.3	23294.9	1940.4	3849.5	29479.1		100.0

Source: Census and Statistics Department, Hong Kong (2009)

Taiwan 1998–2008

According to territorial Customs data, Taiwan imported over 60 000 tonnes of *Anguilla* spp. commodities, between 1998 and 2008. Taiwan reported importing only live eels from the EU during this period (and no fresh, frozen or prepared eels). The only import of live adult eels reported for this period was 150 kg of *A. japonica* imported from the Netherlands in 2001 (however, this may be an underestimate of live adult eel trade due to changes in use of commodity codes, see methods).

Table 11 shows the Taiwan's reported imports of juvenile live eels (all *Anguilla* spp.) between 1998 and 2008, divided into three commodities according to the number of pieces per kg: glass eel (≥ 5000); eel fry ($500 < \text{pieces per kg} < 5000$) and young eel ($10 < \text{pieces per kg} < 500$). Taiwan reported importing 24 tonnes of juvenile eels from Denmark, the Netherlands, the UK and France between 1998 and 2008. The UK supplied over 50% of Taiwan's glass eel and eel fry imports from the EU, and Denmark over 70% of its young eel imports from the EU. According to EUROSTAT data, live eel exports from the EU to Taiwan totalled 19.3 tonnes during this period (see Table 8), this being slightly less than imports recorded by Taiwanese Customs (24.15 tonnes, including adult eels).

Table 11: Total Taiwanese imports of live eel commodities (excl. adult eels) from the EU and the rest of the world (RoW) (1998–2008), by weight (tonnes)

	Glass eel	Eel fry	Young eel	Total	% EU	% Total
Denmark	0.0	0.6	11.6	12.2	50.8	2.1
Netherlands	0.0	0.5	4.3	4.8	20.1	0.8
UK	0.9	3.4	0.0	4.3	17.8	0.7
France	0.0	2.7	0.0	2.7	11.3	0.5
EU Total	0.9	7.2	15.9	24.0	100.0	4.1
RoW	43.7	50.4	471.9	566.0		95.9
Total	44.6	57.6	487.8	590.0		100.0

Source: Bureau of Foreign Trade, Taiwan (2009)

Japan 1998–2008

According to national Customs data, Japan imported over 700 000 tonnes of *Anguilla* spp. commodities between 1998 and 2008. Japanese imports of live eels from the EU during this period were low—approximately 10 tonnes, of which only 0.7 tonnes was eel fry (see Table 12). Live eel exports from the EU to Japan as reported in EUROSTAT (8.3 tonnes) were only slightly less than imports from the EU as reported by Japan during the same period (see Table 8).

Overall, Japan was the largest Asian importer of eels from the EU out of the five selected countries/territories due to Japan's large imports of prepared eels from Denmark in 1998 and 1999.

Table 12: Total Japanese imports of eel commodities from the EU and the rest of the world (RoW) (1998–2008), weight (tonnes)

Country	Live fry	Other live	Fresh	Frozen	Prepared	Total	% EU	% Total
Denmark	0.0	0.0	0.0	0.0	660.1	660.1	92.3	0.1
France	0.3	0.0	0.0	0.1	42.2	42.6	6.0	0.0
Netherlands	0.0	7.8	0.0	0.0	0.0	7.8	1.1	0.0
Spain	0.0	0.0	0.0	1.7	0.6	2.3	0.3	0.0
Ireland	0.0	2.0	0.0	0.0	0.0	2.0	0.3	0.0
UK	0.4	0.0	0.0	0.0	0.0	0.4	0.1	0.0
EU total	0.7	9.8	0.0	1.8	702.9	715.2	100.0	0.1
RoW	67.6	208892.3	38.4	6.7	519689.6	728694.5		99.9
Total	68.3	208902.1	38.4	8.5	520392.5	729409.8		100.0

Source: Ministry of Finance, Japan (2009)

Korea 1998–2008

According to national Customs data, Korea imported 35 000 tonnes of *Anguilla* spp. commodities between 1998 and 2008. Korea imported 147 tonnes of live eels from EU Member States during this period; however this included only nine tonnes of live eel fry. Korea was the only Asian country/territory to import significant quantities of other live eels from the EU—nearly 140 tonnes between 1998 and 2008, over 90% coming from Denmark (see Table 13). Live eel exports from the EU to Korea as reported in EUROSTAT (80 tonnes), however were much less than imports from the EU as reported by Korea during the same period (see Table 8).

Table 13: Total Korean imports of eel commodities from the EU and the rest of the world (RoW) (1998–2008), weight (tonnes)

	Live fry	Other live	Fresh	Frozen	Smoked	Total	% EU	% Total
Denmark	5.6	128.9	0.0	0.0	0.0	134.4	91.3	0.4
UK	0.1	5.3	0.1	0.0	0.0	5.5	3.7	0.0
France	3.0	0.0	0.0	0.0	0.0	3.0	2.0	0.0
Slovakia	0.0	2.0	0.0	0.0	0.0	2.0	1.4	0.0
Netherlands	0.0	1.8	0.0	0.0	0.0	1.8	1.2	0.0
Austria	0.0	0.6	0.0	0.0	0.0	0.6	0.4	0.0
EU total	8.7	138.6	0.1	0.0	0.0	147.3	100.0	0.4
RoW	67.1	31586.6	4.4	92.9	2773.7	34524.7		99.6
Total	75.7	31725.2	4.5	92.9	2773.7	34672.1		100.0

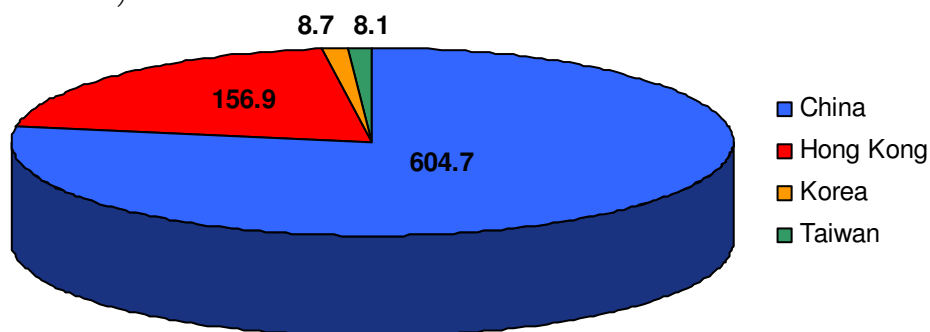
Source: Korea International Trade Association (2009)

Summary of Asian trade

Over the 1998–2008 period (or 1997–2007 for China), according to national/territorial Customs data, China, Hong Kong, Taiwan, Japan and Korea imported over 800 000 tonnes of eel commodities, with “other live eels” (excluding glass eels) and prepared eels together making up 98% of imports. Of this total, less than 1700 tonnes came from the EU. By overall import weight, the EU therefore did not play a major role in Asia's eel trade. However, between 1997(8) and 2007(8) China and Hong Kong respectively imported nearly 60% and 40% of their live eel fry from the EU.

The five Asian countries/territories imported a total of 776 tonnes of eel fry (likely all to be *A. anguilla*) from the EU between 1997/8 and 2007/8. China and Hong Kong together imported nearly 98% of all live eel fry coming from the EU (see Figure 8) and as glass eels are then re-exported from Hong Kong to China (Briand *et al.*, 2008), it can be assumed that nearly all live fry coming from the EU was destined for Chinese eel farms. France, Spain and the UK were the principal source countries for Asia's eel fry imports. Imports of live eel fry from each of these EU Member States into the five Asian countries/territories over the 1997/8–2007/8 period were 606, 117 and 40 tonnes respectively.

Figure 8: Live eel fry imports from the EU into China, Hong Kong, Taiwan and Korea (1997/8–2007/8), weight (tonnes, total = 776)



Source: Bureau of Foreign Trade, Taiwan (2009); Census and Statistics Department, Hong Kong (2009); China Customs (2008); and Korea International Trade Association (2009). Note: Imports into Japan were less than 0.1% of the total and were therefore excluded from the graph.

Specific partners for live eel trade can also be identified from Asian customs data. China imported most of its live eel fry from France and Spain, Hong Kong from France, Spain and the UK, Taiwan from the UK and Korea from Denmark. For other live eel stages, Hong Kong received most from Bulgaria, Taiwan from Denmark and the Netherlands, Japan from the Netherlands and Korea from Denmark.

CITES data provided by EU Member States

Post CITES-listing trade reported by EU Member States

To analyse trade in *A. anguilla* following its listing in CITES Appendix II came into force, information was requested from EU Member States. Eighteen responded and Tables 14 and 15 summarise the data provided. The incomplete dataset, combined with the different formats and time periods used by EU Member States in their submissions, limited data comparability and analysis potential (see methods).

The 18 EU Member States recorded exporting nearly 28 tonnes and importing nearly 1500 tonnes of *A. anguilla* specimens since March 2009. Of the 18 EU Member States, France, Greece and Denmark exported the largest quantities (together making up nearly 90% of exports) and Denmark imported the largest quantity (over 50%). France and the UK are the only EU Member States to have reported (re-)exports of glass eels during this period—all destined for China. Since March 2009 France has exported 14 179 kg of wild-taken glass eels and the UK has (re-)exported 2250 kg of pre-Convention glass eels.

In addition to exports and imports, France, Greece and the Netherlands provided details of internal trade since the CITES listing. France reported issuing over 100 EC internal trade certificates covering trade in over 12 000 kg of live and dead glass eels to a number of national and EU destinations (Denmark, Germany, the Netherlands, Spain and UK) for various purposes (direct consumption, re-sale and re-stocking). Greece reported dispatches of live eels (>30 cm) to Italy (232 730 kg) and the Netherlands (64 388 kg); and arrivals

of glass eels from the UK (100 kg) and whole smoked eels from the Netherlands (64 388 kg). The Netherlands reported the arrival of pre-Convention live eels from France (63 106 kg).

Total exports and imports of *Anguilla* spp. to non-EU countries/territories in 2009 according to EUROSTAT were 53.1 tonnes and 2693.8 tonnes respectively (EUROSTAT, 2010). These are both less than the total eel exports and imports reported for 2008 (95 and 3693.5 tonnes). However, at present, due to the short time frame involved, no concrete conclusions can be made concerning the impact of the CITES listing in March 2009 on eel trade, as eel exports and imports have been declining since 2007 (see Tables 3 and 5).

Table 14: EU exports of *A. anguilla* since 13 March 2009

Reporter	Weight	Specimens	Origin	Destination	Source	Notes
Austria	0					
Belgium	0					
Denmark	4348	Meat/Bodies–2848 Live–1500	France / Denmark	Switzerland / Norway / Korea	W and O/W	
Estonia	0					
Finland	0					
France	14444.44	Live glass eels-14179 Smoked-265.44	France	China Japan / USA / Qatar	W and O/W	Based on permits issued, not used: Live-27 Smoked-6
Germany	5.2	Whole smoked	Unknown	Switzerland	O/W	Shipment seized and then permit issued retrospectively
Greece	5558	Live >30 cm	Greece	Russia / Ukraine / Macedonia	Most R (and some W)	4508 - Russia, 650 - Ukraine, 400 - Macedonia
Ireland	0					
Malta	0					
Netherlands	30	Dead	Unknown	Japan	O	
Poland	0					
Romania	0					
Slovakia	0					
Slovenia	0					
Spain	930	Live >10 g/unit–750 Smoked meat–180	France Unknown	China (all live) Switzerland / Mexico	O/W and O/R	Four exports, two may not have taken place yet
Sweden	0					
UK	2250	Live glass eel 3000/kg– 1250 exported and 1000 re-exported	UK(exports) France/Italy (re-exports)	China	O	One piece of artwork was also re-exported
Total	27565.64					

Source: EU Member States (Weight: kg, Source: W—wild; O—Pre-Convention; R—Ranched)

There appear to be discrepancies between CITES trade as reported by EU Member States and that recorded in EUROSTAT. For example, according to CITES data, Greece exported 5.5 tonnes of European Eels to non-EU countries/territories, this being similar to that reported in EUROSTAT (five tonnes). However, Greece's intra-Community dispatches in 2009 reported in EUROSTAT was only 64 tonnes as opposed to the 297 tonnes as per CITES records (258 tonnes when excluding December data to compensate for time delays involved in reporting national trade data). The commodity "live eel" in EUROSTAT includes all *Anguilla*

spp., and therefore imports and exports recorded in EUROSTAT should not be less than those reported by EU Member States under CITES. Furthermore CITES data have only been recorded for the last ten months of 2009.

It should be also be noted that source codes R and W are being used by different EU Member States for eel commodities derived from capture-based aquaculture or farming—it is essential that source code reporting be standardised within the EU.

Table 15: EU imports of *A. anguilla* since 13 March 2009

Reporter	Weight	Specimens	Origin	(re-)Exporter	Source	Notes
Austria	0					
Belgium	87320	Frozen Meat	France	China	O/W	Values based on actual amounts imports
Denmark	797750	Meat–692750 Live–105000	Unknown / Norway	China / Norway	O/W and W	Figures based on permits issued rather than permits used/recorded import/export figures
Estonia	0					
Finland	0					
France	3500 (+36 pc)	Live	Tunisia Switzerland	Tunisia Switzerland	W	Based on permits issued, not used. 10 pairs of boots were also imported from Mexico (origin Korea)
Germany	239930		UNK	China	O/W	Likely previously taken from wild and exported from EU as glass eels
Greece	0					
Ireland	0					
Malta	0					
Netherlands	0					
Poland	321000	Frozen	Unknown	China	O	Value based on import permits issued. Imports into ports - 357000kg
Romania	0					
Slovakia	0					
Slovenia	0					
Spain	13750	Live >25 cm/unit	Morocco / Algeria	Morocco / Algeria	W	
Sweden	21225	Live	Norway	Norway	W	Destined for Sweden and Denmark
UK	7500	Frozen roasted	Unknown	China	Unknown	
Total	1491975	(+36 pc)				

Source: EU Member States (Weight: kg, Source: W—wild; O—Pre-Convention; R—Ranched)

Seizures reported by EU Member States

Of the 18 EU Member States providing information on seizures, only Germany, Poland and the UK reported border seizures of eel commodities since 13 March 2009. France also reported internal seizures of 11.45 kg of glass eels and 92 kg of yellow eels from fishing operations.

Germany originally seized the 5.2 kg of smoked eels listed in Table 14, however after the required export permit had been retrospectively issued, the seizure was cancelled.

On 31 August 2009, a shipment of 25 tonnes of frozen eels declared as *A. japonica* specimens arrived at the port of Szczecin, via Hamburg, from China. Polish Customs carried out DNA tests on the specimens and

confirmed that they included *A. anguilla* as well as *A. japonica* specimens. The importer claimed he was not aware of this fact. The consignment was seized and the case is under investigation.

The UK has seized three consignments of eels since March 2009. The largest seizure occurred in September 2009, when officers from the UK Border Agency at the port of Felixstowe intercepted a consignment of frozen *A. anguilla* being imported from China without the correct import documentation. 20 tonnes of eels were seized from the importer. The other two seizures involved a total of 16 individual eel specimens. 15 biological samples coming from Switzerland by parcel post were seized on 16 July 2009 and one artwork specimen originating in China was seized on 28 December 2009.

Additional analysis

Live eel prices

In the section focusing on EUROSTAT data, the average unit values of live eels being exported from the EU, imported into the EU and dispatched within the EU, were used to infer that the EU was exporting mostly glass eels (verified by analysing the Asian Customs data) and importing and dispatching predominantly adult eels. It must be noted, however, that live eel prices can fluctuate dramatically, both on a yearly and seasonal basis (Ringuet *et al.*, 2002).

Price calculations for live eel exports and dispatches by EU Member States can also be used to identify those individual countries predominantly involved in glass eel trade and those in other live eel trade (Briand *et al.*, 2008). Average unit values of live eels exported in 2009 by the EU and dispatched within the EU are shown in Table 15. The high unit value of exports from France and Spain (EUR345–361/kg) are indicative of glass eel exports (confirmed by Asian trade data). The mid-range prices for the UK and Denmark at EUR35/kg, suggests exports of several life stages (also confirmed by Asian trade data) and the lower prices for the Netherlands and Greece (EUR12–16/kg) suggest exports of mostly adult eels.

Unit values for intra-EU trade (dispatches) would suggest that Portugal is trading exclusively in glass eels (EUR229/kg), the Netherlands and France are dispatching both glass and older life stages (EUR 26–77/kg, however, glass eels are known to fetch lower prices in the European market than in Asia (CNOMEM, CONAPPED and Ifremer, 2009)) and the other EU countries are predominantly trading in adult eels within the EU (EUR6–11/kg). It should be noted that Portuguese glass eels are of a smaller size than those caught in other countries, making them particularly attractive to market (Ringuet *et al.*, 2002).

Table 15: Unit values of EU exports and dispatches of live eels in 2009, EUR/kg

	Export	Dispatch
Belgium	–	7.6
Denmark	35.5	7.5
Estonia	–	6.3
France	345.1	26.1
Germany	–	11.5
Greece	16.5	7.2
Italy	–	7.6
Netherlands	12.3	77.7
Portugal	–	228.9
Spain	361.5	7.6
Sweden	–	7.8
UK	69.0	12.2

Source: EUROSTAT (2010)

Number of eels in trade

Exports from the EU

The total number of eels exported from the EU to China, Hong Kong, Taiwan, Japan and Korea between 1998 and 2008 (1997 to 2007 for China) can be estimated using a number of conversion rates (Ringuet *et al.*, 2002). The average rate for converting fresh, frozen and smoked eel commodity weights to live weight is 1.5 and each kilogramme of live eels contains an average of 3000 *A. anguilla* glass eels and four *A. anguilla* adult eels.

776.1 tonnes of live eel fry (i.e. glass eels) were imported into the five Asian countries/territories from the EU between 1997/8 and 2007/8 (see Tables 9 to 13). For Taiwan, the commodities referred to as glass eel and eel fry were all included in live eel fry. Assuming that all live eel fry imported into Asia from the EU are of the species *A. anguilla*, a total of over two billion (2328 million) European glass eels were imported into the five Asian countries/territories between 1997/8 and 2007/8.

Determining the number of adult European Eels exported from the EU is more complicated, due to the fact that the EU is known to import a number of different *Anguilla* species and that these are cultured, processed, consumed and traded to varying extents. However, the equivalent number of adult live eels of *Anguilla* spp. used to supply the total quantity of traded eel commodities can still be estimated. It must be noted that any calculations are likely to lead to overestimates due to the fact that commodities enter international trade before and after they are converted from one type to another, leading to the double counting of actual quantities in trade.

Assuming that most glass eel exports out of the EU were destined for China, Hong Kong, Taiwan, Japan and Korea, EUROSTAT data presented in Table 3 can be used to convert the additional quantities to adult eel numbers. 294.7 tonnes of live eels (total live eel exports of 1070.8 minus those estimated to be glass eels—776.1) and 1787.5 tonnes of dead eels (fresh, frozen and smoked eel combined) were exported out of the EU between 1998 and 2008. Using the conversion rates above (1.5 for converting dead eel to live weight and each kilogramme of live eel containing four *A. anguilla* adult eels), this weight is equivalent to nearly twelve million adult eels. Considering the fact that all eel aquaculture is still based on wild source material, it can be assumed that these are equivalent to numbers of eels that may have survived in the wild.

Trade within the EU

Intra-EU trade of different life stages of eels is harder to estimate as true quantities of trade in glass eel and other live eels cannot be calculated from other national/territorial Customs data (Asian) as it can for extra-EU trade. It can, however, be inferred by using price calculations as shown in Table 15 or proportions of glass eel exports following specific trade routes as calculated by Briand *et al.* (2008).

Briand *et al.* (2008) concluded that in 2006 the export/dispatch routes for live glass eels fished in the EU were: Asia (50%—36 tonnes), Northern Europe (~44%—32 tonnes), Spain (4%—three tonnes for consumption) and restocking (~2%—one tonne). Asian Customs data confirm the quantities imported into Asia for this year. Therefore, assuming similar trade patterns throughout the 1998–2008 period (50% of all glass eels being traded within Europe), over two billion glass eels were also traded within Europe, i.e. the same quantity as was exported to Asia.

Finally, again assuming approximately the same weight of glass eels were traded within the EU as were imported into Asia from the EU (776 tonnes), using the remaining weight of live eels (71 825 tonnes, see Table 6) and the total weight of dead eels dispatched within the EU between 1998 and 2008 (30 642 tonnes), the total weight in all commodities apart from glass eel traded during this period was equivalent to 470 million adult eels.

As for extra-EU trade, it can be assumed that glass eels are of the species *A. anguilla*, however due to the mixture of *Anguilla* species being imported into the EU and the possibility of double counting, it is impossible to estimate how many of these adult eels dispatched within the EU correspond to actual numbers of *A. anguilla*.

Qualitative data—Internet trade

The Internet has become a fast and easy way for exporters and importers to meet; information on trade and traders in eel commodities can now be found on business-to-business Internet contact networks such as “Alibaba” (www.alibaba.com). The locations of trading partners identified on such websites can help to identify trade routes that have not been captured by available Customs data, and details concerning species and life stages provided in adverts can also help to confirm the identity of commodities being traded—this is often not possible from Customs data due to the broad categories used in reporting. Using data downloaded from Alibaba on 19 October 2008, Silfvergrip (2009) identified a number of trade routes for certain species such as frozen glass eels being exported from Madagascar (*A. mossambica* and *A. marmorata*), frozen adult eels from Indonesia (*A. bicolor*), and live “big eel” from Tahiti (*A. marmorata*, *A. megastoma* and *A. obscura*).

Comparison of data viewed on 19 October 2008 with information viewed in March and April 2010, showed a dramatic decrease in interested buyers for all eel products. For example, on 19 October 2008 there were over 500 interested buyers for frozen eels, 28 interested buyers of glass eels and over 300 interested buyers for live eels. On 14 April 2010 there were only seven, one and two interested parties, respectively (A. Silfvergrip *in litt.* to TRAFFIC, April 2010). Numbers on 30 March 2010 were similar to those in April, suggesting that this reduction in buyers was not a one-off occurrence. The listing of *A. anguilla* in the CITES Appendices came into force in March 2009, and it is possible that this has contributed to the reduction in business interest, due to the associated rise in trade controls.

There does not appear to have been a decline in the number of sellers, however. On 14 April 2010 there were 22 glass eel sellers, located in the following countries: Philippines, China, Madagascar, USA, French Polynesia, Indonesia, Japan, Malaysia, the Netherlands and Nigeria. This high number of sellers of glass eels, located in nine countries spread across the entire range of all fifteen *Anguilla* species and one non-range State (Nigeria), suggests the exploitation of many different *Anguilla* species at this life stage is ongoing. This is of particular concern for conservation. Further details of international trade of various eel products by categories, location and number of interested business partners, downloaded from Alibaba on 14 April 2010, can be found in Annex C (A. Silfvergrip *in litt.* to TRAFFIC, April 2010). These data can be compared directly with Table 8 in Silfvergrip (2009).

DISCUSSION AND CONCLUSIONS

The European Eel has been protected and managed under a number of regulations since 2007. The EC adopted *Council Regulation (EC) No. 1100/2007 establishing measures for the recovery of the stock of the European Eel* on 18 September 2007 and the species has been listed in Appendix II of CITES and Annex B of the EU Wildlife Trade Regulation since 13 March 2009. Within these frameworks, conservation and management decision-making is reliant on the best available information concerning European Eel stocks, recruitment, catches and trade.

Eel trade is complex, with a number of different species and life stages being traded, cultured, processed and consumed around the world. The current system for recording Customs data does not mirror this complexity, however, and therefore the global dimensions of trade in eels are poorly understood. There are a number of data sources for eel trade available; however, individually they only provide a partial and sometimes inaccurate picture of this trade. Most national/territorial Customs trade data are only recorded under broad categories for commodities of *Anguilla* species in trade: live, fresh or chilled, frozen and smoked or prepared/preserved/products, and do not differentiate between the various life stages involved, the different *Anguilla* species being traded or the source of these products (i.e. directly taken from the wild or farmed). The lumping together of all the life stages of live eel into one category, from glass eels weighing less than 12 grams to adult eels weighing over one kilogramme (some Asian countries/territories are the exception), in particular limits analysis possibilities. Nevertheless, when data sets are combined, they can be used to develop a more complete insight into the global eel trade and a better understanding of the patterns in European Eel trade, both of which are essential to ensure adequate management of this species.

Summary of global and European Eel trade

According to FAO data, the global annual production of all *Anguilla* species reached a peak of over 280 000 tonnes in 2007, having increased nearly 20-fold since 1950. *A. japonica* and *A. anguilla* are the principal species in production and 95% of all production in recent years can be attributed to eels produced in farms.

Global exports of all *Anguilla* commodities for the period 1997–2007 totalled over one million tonnes, valued at over EUR10 billion. Annual exports of all eel commodities reached a maximum of over 130 000 tonnes in 2004. However, since then there has been a decline, with exports falling to below 100 000 tonnes in 2007. Smoked and live eels were the two main commodities in global trade. It must be noted that these totals, calculated using FISHSTAT data, include intra-Community trade, as the data in FISHSTAT do not differentiate between exports from the EU to non-EU countries/territories and dispatches within the EU. FISHSTAT was therefore not a suitable source for establishing actual exports from the EU. It was useful, however, for identifying the top non-EU traders of eel. Overall, Taiwan and China were the principal exporters of eels (all commodities combined) and Japan the principal importer. The most important non-EU *A. anguilla* range State exporters of eels were Norway, Tunisia and Algeria.

Between 1998 and 2008 the EU exported fewer than 3000 tonnes of eel commodities to non-EU countries/territories. Live eels accounted for nearly 40% and 90% of these exports by weight and value, respectively, with an average of fewer than 100 tonnes of live eel being exported every year. France and Spain were the principal exporters of live eels and Hong Kong, China and Korea the top three destinations for this commodity. The high value of these EU exports to non-EU countries/territories suggest that the majority of these exports are of glass eels. This corresponds with import data reported by Asian countries/territories—over 750 tonnes of eel fry (glass eels) were imported into China and Hong Kong from EU Member States during this period. This weight is equivalent to two billion glass eels and it can be assumed that all of these are *A. anguilla*. There was a gradual decline in EU live eel exports between 1998 and 2008, apart from to China, to which there has been a steady increase in exports over this period. Russia also appeared as an emerging market / trader during this period: in 2007 and 2008, exports of live eel to Russia became greater than those to Hong Kong, totalling nearly 13 tonnes.

Imports of eels into the EU between 1998 and 2008 were considerably larger than exports. The EU reported importing over 30 000 tonnes of eel commodities from non-EU countries/territories between 1998 and 2008. Live eels were imported in particular from the USA, Norway, Canada, Morocco and New Zealand, suggesting that a mix of *A. anguilla*, *A. rostrata* and *A. australis* was being traded and consumed within the EU. There has also been a gradual decline in live eel imports into the EU over this period.

The quantity of eel commodities being dispatched within the EU (dispatches referring to trade between individual EU Member States) between 1998 and 2008 was 30-fold greater than exports from the EU to non-EU countries/territories. Over 100 000 tonnes, equivalent to nearly 500 million adult eels and an average of 9000 tonnes a year, were dispatched within the EU during this period. Denmark and the Netherlands were the principal EU dispatchers of live eels by weight during this period, and in 2008 alone, they dispatched nearly 3500 tonnes of live eels within the EU, compared to exports of less than 20 tonnes to non-EU countries/territories. Using known extra- and intra-EU trade percentages for glass eel (Briand, *et al.*, 2008), it is estimated that the same number of glass eels were dispatched within the EU between 1998 and 2008 as were exported to Asia—two billion. Excluding internal national consumption, an estimated four billion *A. anguilla* glass eels were therefore fished and traded by EU Member States during this period.

The EU's role in eel trade and the importance of CITES data

Trade in European live glass eels to Asia has been known to be significant for a number of years—it has been the focus of many discussions and one of the reasons behind the CITES listing of *A. anguilla*, in recognition that trade in this species has become a truly global issue. Trade of glass eels within the EU has also been the focus of studies such as that by Briand *et al.* (2008), who inferred the quantities of glass eels in trade within the EU from a number of factors, namely price, destination, total weight and process.

However, trade data presented in this report highlight the fact that the EU market is responsible for consumption of most of the large quantities of eel commodities being imported and dispatched throughout the EU. Although it is known that the low overall weight of exports from the EU is due to the highly valued glass eels being the principal commodity, it must be noted that by weight, EU imports of eel commodities from non-EU countries and territories were ten-fold greater than EU exports to the same countries/territories over the same period (1998–2008). Furthermore, over 100 000 tonnes of eels were dispatched within the EU during this time. This includes trade in unknown quantities of juvenile eels for “restocking” purposes (ICES, 2003) and transport of partly grown eels from farming facilities back into the wild for fisheries (ICES, 2005). Considering the concerns that restocking has only masked or delayed, and possibly even exacerbated, the ongoing decline in *A. anguilla* due to “stocking” in areas that restrict migration (Westin, 1998; Westin, 2003; Dekker, 2003; and ICES, 2009), it is particularly important that the true levels of trade in wild-captured eels for “restocking”, both for supplementing fisheries and conservation, be established. With such large quantities of eels being traded throughout the EU and the lack of detailed trade data currently available to establish an accurate picture of what is happening, CITES trade data, including details concerning purpose of trade (i.e. whether intended for consumption, restocking, grow-out in aquaculture facilities or direct export, etc.), is essential for filling these knowledge gaps.

At present the only available CITES data for *A. anguilla* trade are those provided by 18 out of the 27 EU Member States, covering exports and imports of *A. anguilla* since 13 March 2009. Since the CITES listing came into force, these 18 EU Member States have recorded exporting nearly 28 tonnes and importing nearly 1500 tonnes of *A. anguilla* specimens. Destinations for exports of live eels (including all life stages) were mainland China, the Republic of Korea, Russia, Ukraine and the Former Yugoslav Republic of Macedonia. France and the UK were the only EU Member States to have reported (re-)exports of glass eels during this period—14.18 tonnes of wild-taken specimens and 2.25 tonnes of pre-Convention specimens, respectively. All were destined for China. Data on intra-Community trade were also provided by some EU Member States: for example, France issued over 100 EC internal trade certificates covering dispatches/national trade of over

12 tonnes of glass eels; Greece reported dispatches of 233 tonnes of live eels to Italy and the arrival of 0.1 tonnes of glass eels from the UK; and the Netherlands reported the arrival of 63 tonnes of live eels from France. The UK and Poland also reported two large seizures of frozen eels declared as *A. japonica* (but in fact being a mixture of *A. anguilla* and *A. japonica*) since March 2009. Even these limited CITES data (from only two thirds of EU Member States and for a period of approximately one year) already help to provide a better indication of the trade patterns of *A. anguilla*, particularly within the EU.

Data limitations and discrepancies

A number of problems and discrepancies with the trade data obtained from different data sources have been highlighted throughout the report, in addition to possible errors in data recording. There are known problems with FAO production data, and as export and import data recorded in FISHSTAT include intra-Community dispatches and arrivals for EU Member States, imports into and exports from the EU cannot be established from these data. EUROSTAT records Community statistics, and these can be different from national statistics when commodities are exported out of the EU from a different Member State than that where the commodity originally entered trade. When comparing datasets, trade between the EU and China, Hong Kong, Taiwan, Japan and Korea as recorded by EU Member States in EUROSTAT varied in a number of cases from that recorded by Asian country/territory Customs. Furthermore, differences between CITES trade as reported by EU Member States and that recorded in EUROSTAT for 2009 can already be seen.

Due to these limitations, discrepancies and the lack of specific trade data currently available on European Eel trade, it is essential that any CITES trade data recorded are made available for analysis as soon as possible. With the delays inherent in presenting yearly CITES trade data on the CITES Trade Database managed by UNEP-WCMC (there often being a two-year time lag), the development of a near real-time database, such as the sturgeon database already managed by UNEP-WCMC (the World Conservation Monitoring Centre), would be extremely beneficial. With *A. anguilla* being one of the few CITES-listed species that is native to the EU and exported commercially, EU Scientific Authorities have a substantial responsibility when making NDFs for both exports and imports of this species. It is essential that trade data recorded under CITES are made fully available for this purpose.

Standardised recording of CITES data, including the use of source codes, is vital. The use of source codes in a manner that allows for differentiation between aquaculture raised or farmed specimens and eels traded directly after being taken from the wild, would be beneficial for analysis. There are ongoing discussions concerning the appropriate use of source code “R” (UNEP-WCMC (2007), and it is encouraged that a conclusion concerning its use for eels be reached as soon as possible.

Illegal trade

Finally, illegal trade is one of the considerable number of complex issues surrounding the global market in eels that the EU must take into account when establishing management strategies. Silfvergrip (2009) describes a number of cases of illegal eel fishing and trade between 2006 and 2008 and Briand *et al.* (2008) quoted estimated percentages of between 20 and 40% of all trade in *A. anguilla* glass eels being derived from non-licensed fisherman and poachers, according to personal communications with traders. They also noted that it is likely the black market trade of live *A. anguilla* glass eels will increase in the near future due to the restricted availability of glass eels for farming—caused by both declines in stock and the setting of export quotas associated with the listing of this species in CITES. The listing of only one *Anguilla* species in CITES may also result in false declarations, which may already be the case for two recent seizures of frozen eel declared as *A. japonica* (but in fact being a mixture of *A. anguilla* and *A. japonica*) reported by EU Member States. False labelling of eel products is also a known problem in Japan and China (The Japan Times, 2009).

Conclusion

This report combined a number of different trade data sources to overcome some of the data complexities and inaccuracies surrounding the trade in *Anguilla* species. This helped to develop an insight into the global

eel trade, and more specifically patterns in *A. anguilla* trade, both of which are essential to ensure adequate management of the European Eel. In addition to providing the most up to date information on patterns of international and EU eel trade and the quantities of commodities involved, the results of the analyses carried out as part of this report highlighted important issues hitherto not considered priorities for action within eel conservation and management. The majority of past and present effort in determining the EU's role within the global eel trade has been focused on understanding the levels of exports of glass eels from the EU. However, this report shows that EU imports and internal trade of *Anguilla* commodities are of such a large magnitude that monitoring and management of this trade is essential.

The recommendations accompanying the report therefore focus primarily on ways of addressing this newly-identified issue at the same time as dealing with well-known problems such as the export of glass eels. With all EU Member States being involved in eel trade to some extent or another, it is essential that a concerted effort be made across the EU to monitor trade in *Anguilla* species in an attempt to overcome many of the uncertainties surrounding trade in eel commodities, and to verify that the best possible steps are being taken to ensure the conservation of the European Eel and other *Anguilla* species.

RECOMMENDATIONS

Internal trade certificates for monitoring intra-EU trade in eels

Internal EC trade certificates are required before any eel specimens can be exported from a different EU Member State from which they were harvested, as stated in Notification to the Parties No. 2009/20 EC (2009b). Standardised use of such certificates across the EU will enable better monitoring of the quantities of eels being traded internally for export and will assist EU Member States in the making of Non-detriment Finding (NDFs). It is further recommended that the Commission and the Eel Working Group assess the need to extend this requirement to all forms of commercial internal trade in eels and eel products, clearly stating the purpose of the transaction (as France currently does for glass eels). Commercial trade in eel commodities for use in farming, restocking (both for fisheries and conservation, see other priority areas for research) and processing within the EU is very complex and this can lead to considerable complications when attempting to determine the country of origin of eels harvested within the EU. Consequently, it is likely that the use of internal trade certificates only in those cases when specimens are known to be destined for export will significantly hinder the traceability of trade in eels caught by EU Member States and lead to difficulties in ensuring export quotas are not being exceeded.

Real time database facilitating access to CITES data

The Committee on Trade in Wild Fauna and Flora is urged to agree on the format and consequent initiation of the real time database on trade in eel specimens before or at its next meeting. This will ensure that EU Member States have access to the most up to date CITES trade information for eels, which is essential for the making of accurate NDFs.

Appropriate use of source codes to standardise data recording

The Committee should also provide clear guidance to EU Member States on the appropriate use of source codes for farmed specimens of *A. anguilla*. Source codes “W” and “R” are currently known to be used under different circumstances across the EU, due to apparent uncertainties concerning whether farmed specimens qualify as being “ranching”. The Commission is to inform the CITES Secretariat of any decisions.

EU trade in all *Anguilla* species and introduction of new Customs code

Trends of trade in all *Anguilla* species to and from the EU need to be reviewed and monitored more closely. This is particularly important considering the large quantities of *Anguilla* commodities, derived from a number of species which are already known to be suffering from serious declines in population numbers, that have been imported into the EU over the last decade. Furthermore, with an ongoing reduction in the populations of the currently most commonly-traded species, there is concern that other species could become threatened by unsustainable exploitation (*A. Silfvergrip in litt.* to TRAFFIC, 2009). As no other *Anguilla* species are currently listed on CITES, Customs trade data is essential for any future monitoring. EU Customs authorities should therefore initiate the process for introducing a separate code for “live eel fry” under the HS system, to enable future monitoring of the trade in this life stage for all *Anguilla* species and to gain a better understanding of the actual number of individuals of *Anguilla* species being traded to and from the EU, and not only of *A. anguilla*.

Consumer demand, awareness and alternative resources

Recognising that the EU is responsible for 10% of the world’s exports/dispatches of all eel commodities, and that intra-EU trade is responsible for most of this, the Commission, EU Member States, commercial stakeholders and non-government organisations, should focus on informing consumers of the conservation status of *A. anguilla* and carrying out research into the demand for this species and options for replacing *A. anguilla* with a more sustainable resource.

Other priority areas for research

EU Member States and the Commission are encouraged to allocate time and resources for research into the following priority areas:

- a. Establishing a concrete restocking plan for the EU, taking into account all the possible negative effects of restocking as highlighted by ICES, including current “restocking” practices that are being carried out for commercial purposes. In particular, the conservation impact of and the extent of the subsequent EU internal trade in eels for traditional “restocking”, i.e. for maintaining fisheries and not specifically for conservation purposes, needs to be better understood. This will help to ensure that all restocking of eels within the EU contributes to the conservation of *A. anguilla* and not only to the longevity of its fisheries production.
- b. Investigating the use of American Eel *A. rostrata* in Europe. Large quantities of live eels are being imported into the EU from the USA and Canada, and it is important to clarify if any glass eels/young eels used in farming, and even restocking, within Europe are *A. rostrata*. Frankowski *et al.* (2009) have already identified *A. rostrata* specimens in samples taken from German, Danish and Dutch aquaculture farms and from several natural German waters draining into the Baltic and North Seas. They specifically emphasise the need for genetic monitoring of eels used for stocking purposes. Although there are many unknowns surrounding the biology of these two species, including the likelihood of hybridisation between *A. rostrata* and *A. anguilla*, at a minimum, introduced specimens of *A. rostrata* would compete for food and habitat with wild *A. anguilla* populations (A. Silfvergrip *in litt.* to TRAFFIC, 2009). The growth of *A. anguilla* is known to be density dependent (Vollestad and Jonsson, 1988; De Leo and Gatto, 1996) and competition with a closely related species can only be detrimental to its survival.
- c. Acquiring additional information concerning eel production and trade from non-EU *A. anguilla* range States that have recently started exporting higher quantities of live eels, such as Croatia, and from non-EU countries/territories that have recently imported large quantities of live eels from the EU, such as Russia.

Combating illegal trade in eels

Finally, EU CITES Management and Enforcement Authorities are urged to be vigilant regarding exports from and imports into the EU:

- a. Concerning exports, there is the possibility of a rise in illegal eel trade to Asia, in particular when export quotas are reduced.
- b. Concerning imports into the EU, large illegal eel shipments from Asia have been detected, such as those seized by the UK and Poland in 2009. Vigilance should therefore be maintained and such large shipments targeted for inspection. Suggested protocols for Customs officers and accredited institutions outlined in Silfvergrip (2009) should be followed in all circumstances. It is possible that knowledge of the existence of such protocols and the associated identification schemes (molecular and morphological) will serve as a deterrent for mislabelling of *Anguilla* shipments, and in the long term, improve the accuracy of trade data, including for non-CITES listed species.

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ANNEXES

Annex A—Global exports and imports (FISHSTAT)

Table 1: Exports of eels by commodity ordered by top exporters and the rest of the world (1997 to 2007) in tonnes (exports by country/territory and totals) and million USD dollars (totals) ((For commodities where trade is dominated by a small number of traders (i.e. less than 10) only details for those responsible for $\geq 1\%$ of all exports are shown).

LIVE EEL

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total	%
Taiwan	9349	8133	6859	15044	17112	22226	19237	17516	11801	8820	13445	149542	34.8
China	5043	5929	8184	2694	6446	5337	9734	14972	14237	14201	10449	97226	22.6
Myanmar	0	948	7944	8115	8238	9683	10303	11446	10303	6623	0	73603	17.1
Denmark	2935	2147	4843	1985	1873	2265	2348	2059	1840	2002	1726	26023	6.1
Netherlands	1471	1310	1704	1502	1107	1078	1003	1475	1632	1477	1264	15023	3.5
Sweden	826	585	1828	724	726	302	256	507	565	531	366	7216	1.7
Italy	1424	1598	1035	1091	541	398	299	224	148	179	156	7093	1.6
United Kingdom	748	652	622	552	568	537	459	420	401	280	368	5607	1.3
Indonesia	27	369	449	1027	1517	302	421	269	107	13	45	4546	1.1
Saudi Arabia	0	255	113	716	682	563	738	752	638	13	9	4479	1.0
Rest of the World	4549	3839	3699	3320	3630	3278	3253	3099	3305	3444	4168	39584	9.2
Total weight	26372	25765	37280	36770	42440	45969	48051	52739	44977	37583	31996	429942	100
Total value	402	291	295	213	228	267	316	439	526	404	379	3760	

FRESH EEL

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total	%
Indonesia	39	43	87	38	1	12	1	387	2130	1221	2055	6014	21.5
Denmark	602	729	247	361	290	350	369	305	212	197	202	3864	13.8
France	284	180	240	228	211	514	275	752	106	157	110	3057	10.9
United Kingdom	418	342	421	376	302	280	219	166	157	139	115	2935	10.5
China	53	96	417	652	543	16	8	0	70	130	6	1991	7.1
Thailand	0	2	28	3	15	173	285	321	343	293	163	1626	5.8
Spain	59	44	34	34	74	119	115	158	256	97	42	1032	3.7
USA	392	193	29	50	125	7	30	4	46	3	121	1000	3.6
Sweden	34	109	8	60	34	48	88	87	172	171	135	946	3.4
India	0	0	0	52	131	51	0	73	428	107	0	842	3.0
Rest of the World	467	500	412	510	571	320	462	397	436	270	269	4614	16.5
Total weight	2348	2238	1923	2364	2297	1890	1852	2650	4356	2785	3218	27921	100
Total value	25	23	22	14	12	10	14	22	29	21	26	218	

FROZEN EEL

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total	%
USA	2151	1211	234	1491	2595	3056	3320	1970	1677	1246	1481	20432	24.9
China	1575	1170	548	304	1489	251	366	978	1744	2048	1475	11948	14.6
Canada	373	327	331	178	128	95	214	2270	1609	1353	1083	7961	9.7
Thailand	151	225	308	128	18	25	95	40	987	1514	2741	6232	7.6
New Zealand	642	565	446	308	394	336	444	349	335	494	640	4953	6.0
Malaysia	614	397	389	420	151	243	114	366	531	746	501	4472	5.4
India	281	0	0	479	280	75	0	314	1013	648	641	3731	4.5
Denmark	165	257	354	332	452	464	321	157	139	180	163	2984	3.6
Singapore	189	271	146	156	170	231	504	320	320	244	256	2807	3.4
Netherlands	195	182	183	176	616	269	128	87	210	270	100	2416	2.9
Rest of the World	681	1008	779	591	889	935	881	1206	2412	2598	2199	14179	17.3
Total weight	7017	5613	3718	4563	7182	5980	6387	8057	10977	11341	11280	82115	100
Total value	28	22	14	14	25	17	22	28	41	40	47	298	

SMOKED EEL

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total	%
China	46512	53005	58239	69828	73322	66996	53653	60860	42449	46646	48182	619692	91.3
Taiwan	5588	3685	1900	11101	8015	5595	3002	5707	2905	1960	3274	52732	7.8
Rest of the World	381	614	552	995	399	777	763	682	577	435	277	6452	0.9
Total weight	52481	57304	60691	81924	81736	73368	57418	67249	45931	49041	51733	678876	100
Total value	833	680	668	881	693	644	507	820	636	625	627	7614	

GRAND TOTAL

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Weight	88218	90920	103612	125621	133655	127207	113708	130695	106241	100750	98227	1218854
Value	1288	1016	999	1122	958	938	859	1309	1232	1090	1079	11890

Table 2: Imports of eels by commodity ordered by top importers and the rest of the world (1997 to 2007) in tonnes (imports by country/territory and totals) and million USD dollars (totals) (For commodities where trade is dominated by a small number of traders (i.e. less than ten) only details for those responsible for $\geq 1\%$ of all imports are shown).

LIVE EEL

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total	%
Japan	13635	13033	11628	14356	17375	20884	24052	26601	23552	20236	21298	206650	61.1
Korea Republic of	173	226	2889	2769	5493	5107	3881	4731	1519	2045	429	29262	8.6
Netherlands	2517	2556	2499	2044	2176	2156	2468	2286	2019	1465	1689	23875	7.1
Taiwan	1828	1786	1882	1845	1788	1673	1751	1795	1721	1553	1546	19168	5.7
Germany	1474	1643	1452	1224	1116	1077	1210	1116	1864	1193	1043	14412	4.3
Denmark	1542	1127	1566	890	1373	1214	1081	1295	963	644	460	12155	3.6
Belgium	867	854	903	947	829	770	816	813	885	855	775	9314	2.8
Italy	1168	827	1084	922	895	630	875	710	723	740	736	9310	2.8
Rest of the World	1612	1366	1460	1144	1254	1077	903	1136	1502	1460	1377	14291	4.2
Total weight	24816	23418	25363	26141	32299	34588	37037	40483	34748	30191	29353	338437	100
Total value	334	280	269	183	206	243	301	402	444	358	337	3357	

FRESH EEL

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total	%
Spain	254	453	565	641	514	479	430	388	207	165	128	4224	24.2
Germany	418	371	440	448	431	430	337	212	260	216	206	3769	21.6
Denmark	101	40	158	166	450	144	123	65	114	65	35	1461	8.4
USA	52	29	22	41	102	325	16	97	49	145	30	908	5.2
Belgium	117	120	100	128	145	62	82	33	26	19	16	848	4.9
Italy	31	65	34	151	124	58	32	68	159	77	46	845	4.8
France	68	40	75	114	115	130	66	36	50	36	16	746	4.3
Poland	2	0	1	5	19	27	101	102	47	128	226	658	3.8
Canada	30	114	48	73	127	18	16	16	17	13	165	637	3.7
United Kingdom	5	16	12	66	6	33	3	1	89	139	177	547	3.1
Rest of the World	171	228	220	203	263	273	267	340	268	151	423	2807	16.1
Total weight	1249	1476	1675	2036	2296	1979	1473	1358	1286	1154	1468	17450	100
Total value	21	21	24	20	20	19	15	15	24	20	19	218	

FROZEN EEL

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total	%
Taiwan	4956	7034	9402	12813	11463	7871	3278	2336	1645	1170	1036	63004	42.3
China	37	79	92	2329	1851	1254	664	1377	5464	7151	10619	30917	20.8
USA	447	568	702	886	724	601	1076	1106	1498	1564	768	9940	6.7
Germany	880	800	691	521	747	546	523	523	567	510	1421	7729	5.2
Poland	78	164	170	231	385	364	791	932	1537	694	1268	6614	4.4
Netherlands	445	503	382	313	873	235	234	195	295	160	463	4098	2.8
Belgium	367	241	279	223	243	205	359	227	285	341	798	3568	2.4
Greece	3	3	6	13	0	226	700	579	562	481	570	3143	2.1
Denmark	379	232	423	138	683	347	260	55	81	52	395	3045	2.0
Nigeria	1201	0	0	0	0	0	962	0	0	0	0	2163	1.5
Rest of the World	925	1006	830	1322	1613	946	1237	1501	2172	1415	1687	14654	9.8
Total weight	9718	10630	12977	18789	18582	12595	10084	8831	14106	13538	19025	148875	100
Total value	36	34	40	41	48	31	39	43	58	53	82	505	

SMOKED EEL

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total	%
Japan	55276	52002	56717	71313	69385	59753	42312	48758	32408	35490	35434	558848	98.1
Rest of the World	444	674	1027	545	734	1204	1009	1272	1338	1286	1408	10941	1.9
Total weight	55720	52676	57744	71858	70119	60957	43321	50030	33746	36776	36842	569789	100
Total value	959	655	685	796	555	505	361	620	476	488	445	6545	

GRAND TOTAL

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Weight	91503	88200	97759	118824	123296	110119	91915	100702	83886	81659	86688	1074551
Value	1350	990	1018	1040	829	798	716	1080	1002	919	883	10625

Annex B—EU exports and imports (EUROSTAT)

Table 1: EU27 exports of eels by commodity ordered by top destinations and the rest of the world (1998 to 2008) in tonnes (exports to country/territory and totals) and million euro (totals) (For commodities where trade is dominated by a small number of traders (i.e. less than 10) only details for those destinations receiving ≥1% of all exports are shown).

LIVE EEL

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	%
Hong Kong	95.1	83.7	93.8	38.1	45.6	53.5	25.8	21.4	4.7	3.7	2.5	467.9	43.7
China	40.8	45.9	23.2	17.5	56.7	36.0	30.8	49.5	31.6	56.3	46.5	434.8	40.6
Korea	1.2	2.8	50.0	5.9	12.9	0.0	0.0	4.1	0.0	1.5	2.8	81.2	7.6
Taiwan	14.5	2.2	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	19.3	1.8
USA	1.1	0.0	10.4	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.0	16.4	1.5
Russia	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	7.8	5.1	13.3	1.2
Rest of the World	4.2	9.3	5.1	1.3	0.9	1.7	7.7	2.0	1.5	1.7	2.5	37.9	3.6
Total weight	156.9	143.9	184.8	63.2	116.1	96.1	64.3	77.0	37.8	71.0	59.7	1070.8	100.0
Total value	31.7	22.3	24.0	16.3	20.6	18.9	25.0	54.8	14.9	30.9	26.3	285.6	

FRESH EEL

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	%
Hong Kong	11.7	16.2	21.8	20.3	6.0	7.6	545.2	0.0	0.0	0.0	0.0	628.8	84.6
China	6.6	5.5	1.1	1.6	1.2	0.0	82.5	0.0	0.0	0.0	0.0	98.5	13.3
Rest of the World	6.2	3.2	1.2	2.0	0.2	0.6	0.1	0.0	0.2	1.8	0.2	15.7	2.1
Total weight	24.5	24.9	24.1	23.9	7.4	8.2	627.8	0.0	0.2	1.8	0.2	743.0	100.0
Total value	4.0	5.4	2.8	3.0	1.5	1.4	5.4	0.0	0.0	0.0	0.0	23.4	

FROZEN EEL

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	%
Russia	33.5	5.7	13.0	13.6	11.3	30.2	26.3	19.3	29.3	39.3	17.2	238.7	52.9
USA	0.4	0.6	0.9	0.8	0.7	0.2	0.0	0.0	53.3	0.0	0.0	56.9	12.6
China	0.0	0.0	0.0	0.0	21.0	0.0	0.0	21.9	0.0	0.0	0.0	42.9	9.5
Japan	24.9	0.3	0.1	0.3	0.3	0.2	0.2	0.0	0.1	0.1	0.0	26.5	5.9
Switzerland	1.0	2.1	3.4	1.3	2.0	0.0	1.0	1.0	1.2	4.5	0.1	17.6	3.9
Korea	0.0	0.2	0.0	11.4	0.0	0.5	0.0	0.0	0.0	0.0	0.0	12.1	2.7
Ukraine	0.6	1.3	0.0	0.0	8.1	0.1	0.0	0.0	0.0	0.3	1.0	11.4	2.5
Brazil	0.0	0.0	0.0	0.0	8.5	0.0	0.0	0.0	0.0	0.0	0.0	8.5	1.9
Taiwan	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	1.0
Rest of the World	4.5	1.8	4.5	5.7	4.2	3.9	2.0	0.5	3.1	1.2	1.0	32.4	7.1
Total weight	69.2	12.0	21.9	33.1	56.1	35.1	29.5	42.7	87.0	45.4	19.3	451.3	100.0
Total value	0.7	0.2	0.3	0.4	0.6	0.3	0.3	0.4	0.4	0.5	0.1	4.2	0.9

SMOKED EEL

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	%
Switzerland	4.7	6.1	331.5	5.6	5.6	7.6	0.3	0.0	0.2	0.4	0.1	362.1	60.4
Norway	6.4	4.9	5.3	5.4	6.8	7.6	11.7	10.3	7.0	7.8	7.1	80.3	13.4
Russia	1.9	0.6	0.5	0.0	26.0	0.0	0.1	0.0	0.0	0.8	0.1	30.0	5.0
Netherlands Antilles	0.7	0.3	0.1	13.7	0.0	0.5	0.2	0.2	0.3	2.2	0.4	18.6	3.1
UAE	1.6	2.5	2.7	1.9	2.1	1.3	0.3	1.5	1.0	1.2	0.3	16.4	2.7
Kazakhstan	2.5	0.0	0.0	0.8	0.6	0.0	0.0	0.2	0.9	3.7	3.5	12.2	2.0
Iceland	0.5	0.7	0.3	0.4	4.3	0.5	1.1	0.9	1.3	0.3	0.2	10.5	1.8
Japan	0.3	0.6	1.9	0.5	3.2	0.2	0.5	0.2	0.4	0.4	0.0	8.2	1.4
Not specified non-EU	0.0	0.7	0.7	1.0	2.2	1.1	0.8	0.2	0.0	0.6	0.5	7.8	1.3
Canada	0.8	1.0	1.2	0.6	0.8	0.7	1.7	0.0	0.0	0.0	0.2	7.0	1.2
Rest of the World	3.1	3.0	9.2	5.1	8.8	3.0	5.0	1.4	2.3	2.2	3.4	46.5	7.8
Total weight	22.5	20.4	353.4	35.0	60.4	22.5	21.7	14.9	13.4	19.6	15.8	599.6	100.0
Total value	0.3	0.3	0.5	0.4	0.5	0.4	0.4	0.3	0.3	0.4	0.3	4.0	0.7

GRAND TOTAL

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Weight	273.1	201.2	584.2	155.2	240.0	161.9	743.3	134.6	138.4	137.8	95.0	2864.7
Value	36.7	28.1	27.7	20.0	23.0	21.0	31.0	55.5	15.6	31.7	26.7	317.2

Table 2: EU27 imports of eels by commodity ordered by top source countries/territories and the rest of the world (1998 to 2008) in tonnes (imports from country/territory and totals) and million euro (totals) (For commodities where trade is dominated by a small number of traders (i.e. less than 10) only details for those source countries/territories providing $\geq 1\%$ of all imports are shown).

LIVE EEL

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	%
USA	466.1	435.7	311.2	341.4	273.4	377.7	350.4	275.0	293.7	267.8	277.2	3669.6	34.9
Norway	324.5	404.7	262.7	312.5	310.6	250.0	227.9	246.4	287.1	192.6	201.3	3020.3	28.7
Canada	231.8	165.4	224.8	139.1	105.5	132.5	140.9	83.7	68.8	56.5	28.1	1377.1	13.1
Morocco	67.5	60.1	42.3	59.6	50.6	64.0	68.9	55.6	48.2	37.5	82.8	637.1	6.1
New Zealand	58.9	54.4	35.5	70.4	25.8	27.4	77.5	71.5	47.5	46.8	34.5	550.2	5.2
Tunisia	55.1	39.2	25.8	35.8	33.0	48.5	34.1	57.8	63.2	85.6	61.1	539.2	5.1
Algeria	22.7	7.0	8.0	27.7	25.3	14.3	23.0	14.0	5.6	22.9	21.3	191.8	1.8
Turkey	9.5	0.0	0.0	8.1	21.3	24.1	23.9	12.2	3.0	11.4	15.3	128.8	1.2
Rest of the World	40.9	52.7	4.5	15.3	89.3	32.2	4.6	8.0	15.9	57.6	79.7	400.7	3.8
Total weight	1277.0	1219.2	914.8	1009.9	934.8	970.7	951.2	824.2	833.0	778.7	801.3	10514.8	100.0
Total value	8.1	7.8	5.7	7.2	5.8	5.5	6.3	6.4	6.1	5.6	5.5	69.9	

FRESH EEL

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	%
Russia	0.0	0.1	2.7	19.1	26.9	48.7	55.8	26.9	12.8	0.0	0.0	193.0	23.1
Albania	24.6	17.8	13.1	14.8	0.0	4.4	30.3	42.9	23.1	0.2	0.0	171.2	20.5
Israel	0.0	0.3	26.5	76.8	7.7	12.3	0.0	0.0	0.0	0.0	0.0	123.6	14.8
China	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0	52.8	0.0	77.8	9.3
Norway	8.1	19.5	4.3	2.2	5.1	0.3	7.3	0.0	0.6	0.1	6.7	54.2	6.5
Venezuela	0.0	0.0	0.0	0.0	53.3	0.0	0.0	0.0	0.0	0.0	0.0	53.3	6.4
Tunisia	0.1	0.0	0.0	0.0	0.4	0.0	1.4	0.0	9.3	7.2	13.8	32.2	3.9
USA	4.1	3.3	7.5	0.6	0.4	6.0	0.8	0.0	0.0	0.0	0.0	22.7	2.7
Taiwan	0.2	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.2	1.9
Turkey	0.0	0.0	0.1	0.3	0.2	3.7	2.6	8.6	0.2	0.0	0.0	15.7	1.9
Rest of the World	19.3	4.6	8.2	4.7	1.6	14.8	6.0	0.1	14.6	1.6	0.7	76.2	9.1
Total weight	56.4	45.6	62.4	134.5	95.6	90.2	129.2	78.5	60.6	61.9	21.2	836.1	100.0
Total value	0.3	0.3	0.3	0.8	0.3	0.3	0.9	0.3	0.3	0.4	0.1	4.2	

FROZEN EEL

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	%
China	261.6	569.4	105.8	1697.2	400.8	574.8	277.3	388.3	127.9	2433.3	2394.0	9230.4	43.2
New Zealand	625.7	587.9	436.4	445.6	359.3	457.7	361.6	355.7	364.6	427.4	191.6	4613.5	21.6
Canada	312.7	186.9	207.4	110.1	134.7	238.0	207.1	174.3	180.5	167.8	48.0	1967.5	9.2
Indonesia	0.0	0.0	0.0	1.5	0.6	0.0	229.6	1116.2	348.4	0.0	0.0	1696.3	7.9
Australia	236.3	131.2	85.0	100.8	55.5	21.6	54.0	68.2	17.6	75.9	0.0	846.1	4.0
Turkey	46.7	80.5	73.0	63.3	82.5	62.8	72.5	100.3	96.1	93.1	23.3	794.1	3.7
Viet Nam	34.9	51.1	46.1	74.7	42.4	32.0	37.7	31.6	25.4	99.1	42.2	517.2	2.4
Philippines	0.0	0.0	0.0	0.0	0.0	0.0	195.9	0.0	47.8	98.6	100.0	442.3	2.1
Taiwan	22.5	0.4	0.0	155.7	49.0	19.7	0.0	0.0	23.8	1.1	13.7	285.9	1.3
Malaysia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.2	49.9	173.9	0.0	271.0	1.3
Rest of the World	71.9	72.9	34.0	26.3	22.2	43.2	62.1	88.0	75.2	189.4	37.3	722.5	3.4
Total weight	1612.3	1680.3	987.7	2675.2	1147.0	1449.8	1497.8	2369.8	1357.2	3759.6	2850.1	21386.8	100.0
Total value	9.8	10.6	5.7	17.3	6.6	7.5	8.5	14.2	8.8	25.9	18.8	133.7	

SMOKED EEL

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	%
China	0.0	0.0	0.0	2.7	0.0	0.0	0.5	0.0	6.3	9.3	20.1	38.9	28.8
Togo	4.5	0.6	6.6	3.3	6.7	0.0	0.0	0.0	0.0	0.0	0.0	21.7	16.1
Canada	14.6	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.5	13.0
Benin	0.0	0.0	0.0	11.4	2.6	0.8	0.0	0.0	0.0	0.0	0.0	14.8	11.0
Turkey	12.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5	9.3
Thailand	0.0	0.2	0.1	0.0	0.0	0.0	2.0	3.2	2.7	0.0	0.8	9.0	6.7
New Zealand	0.3	0.7	0.0	0.0	0.2	1.2	0.6	0.7	0.5	0.1	0.0	4.3	3.2
Cote D'Ivoire	0.0	0.0	0.2	0.7	0.0	0.0	1.5	0.4	0.0	0.0	0.0	2.8	2.1
Taiwan	0.0	0.0	0.7	0.0	0.3	0.6	0.0	0.0	0.0	0.0	0.0	1.6	1.2
Rest of the World	8.1	0.6	0.4	0.7	0.2	0.1	1.5	0.1	0.1	0.0	0.0	11.8	8.7
Total weight	39.8	5.0	8.2	18.8	10.0	2.7	6.1	4.4	9.6	9.4	20.9	134.9	100.0
Total value	0.3	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.8	

GRAND TOTAL

Weight	2985.5	2950.1	1973.1	3838.4	2187.4	2513.4	2584.3	3276.9	2260.4	4609.6	3693.5	32872.6	
Value	18.5	18.7	11.7	25.4	12.8	13.4	15.7	20.9	15.3	31.8	24.5	208.6	

Annex C—Qualitative internet trade

Trade of eel commodities as per categories available on the business-to-business Internet contact network www.alibaba.com on 14 April 2010. Numbers within parentheses indicate the number of interested business partners.

Smoked eel		Frozen eel	
<i>Sellers</i>	<i>Buyers</i>	<i>Sellers</i>	<i>Buyers</i>
China (3)	Russia (1)	Pakistan (26)	China (4)
Denmark (1)		China (23)	Hong Kong (1)
Estonia (1)		Indonesia (8)	Russia (1)
Pakistan (1)		Bangladesh (7)	United States (1)
Poland (1)		India (7)	
Thailand (1)		Malaysia (4)	
		Taipei (4)	
		Hong Kong (3)	
		Myanmar (2)	
		Singapore (2)	
		United states (2)	
		Canada (1)	
		Chile (1)	
		Estonia (1)	
		French Polynesia (1)	
		Japan (1)	
		Mexico (1)	
		Morocco (1)	
		Peru (1)	
		South Korea (1)	
Kabayaki			
<i>Sellers</i>	<i>Buyers</i>		
China (5)	Russia (1)		
Indonesia (5)			
Japan (1)			
United States (1)			
Roasted eel			
<i>Sellers</i>	<i>Buyers</i>		
China (17)	China (1)		
United States (4)	Russia (1)		
Taiwan (3)			
Hong Kong (2)			
Cote D'Ivoire (1)			
Indonesia (1)			
Japan (1)			
Thailand (1)			

Glass eel	
<i>Sellers</i>	<i>Buyers</i>
Philippines (8)	Brunei (1)
China (4)	
Madagascar (2)	
United States (2)	
French Polynesia (1)	
Indonesia (1)	
Japan (1)	
Malaysia (1)	
Netherlands (1)	
Nigeria (1)	

Live eel	
<i>Sellers</i>	<i>Buyers</i>
Indonesia (13)	Bangladesh (1)
Bangladesh (9)	Hong Kong (1)
Pakistan (7)	
United states (6)	
China (3)	
Singapore (3)	
South Korea (3)	
Philippines (2)	
Thailand (2)	
Australia (1)	
Canada (1)	
Egypt (1)	
French Polynesia (1)	
Hong Kong (1)	
India (1)	
Madagascar (1)	
Netherlands (1)	
New Zealand (1)	
Sri Lanka (1)	
Tanzania (1)	

Big eel	
<i>Sellers</i>	<i>Buyers</i>
India (5)	China (1)
Bangladesh (3)	
Pakistan (2)	
Mexico (1)	
Nigeria (1)	
Philippines (1)	
Singapore (1)	
Taipei (1)	

European Eel	
<i>Sellers</i>	<i>Buyers</i>
China (9)	No matches
French Polynesia (1)	
Hong Kong (1)	

Japanese Eel	
<i>Sellers</i>	<i>Buyers</i>
Philippines (3)	China (1)
China (2)	
India (2)	
Pakistan (2)	
Hong Kong (1)	
Japan (1)	
United Arab Emirates (1)	

American Eel	
<i>Sellers</i>	<i>Buyers</i>
China (5)	China (1)
Canada (1)	

Atlantic eel	
<i>Sellers</i>	<i>Buyers</i>
Canada (2)	No matches
China (2)	
Chile (1)	