





Published by TRAFFIC International and ZSL

© 2014 TRAFFIC International and ZSL All rights reserved.

All material appearing in this publication is copyrighted and may be reproduced with permission. Any reproduction in full or in part of this publication must credit TRAFFIC and ZSL as the copyright owners.

This is a joint TRAFFIC and ZSL report, prepared as part of a collaborative Darwin Initiative and Department for Environment, Food and Rural Affairs (Defra) funded project: *Eels – A flagship species for freshwater conservation in the Philippines*.

The views of the author expressed in this publication do not necessarily reflect those of the Darwin Initiative, Defra, ZSL, BFAR, TRAFFIC network, WWF or IUCN.

The designation of geographical entities in this publication, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of the Darwin Initiative, Defra, ZSL, BFAR, TRAFFIC or its supporting organizations concerning the legal status of any country, territory, or area, or its authorities, or concerning the delimitation of its frontiers or boundaries.

The TRAFFIC symbol copyright and Registered Trademark ownership is held by WWF. TRAFFIC is a strategic alliance of WWF and IUCN.

Suggested citation:

Crook, V. (2014). *Slipping away: International* Anguilla *eel trade and the role of the Philippines*. TRAFFIC and ZSL, UK.

ISBN: 978-1-85850-376-9

Front cover photograph:

Giant mottled freshwater eel (A. marmorata)

Photograph credit: © WWF-Canon/Juergen Freund







Slipping away: International *Anguilla* eel trade and the role of the Philippines

Vicki Crook



Diora River, Santa Ana, Cagayan province – a river with glass eel fisheries. © Matthew Gollock

Contents

| Executive Summary | 1 |
|---|----|
| Introduction | 3 |
| Methods | 6 |
| Food and Agricultural Organization (FAO) of the United Nations (UN) | 6 |
| Bureau of Agricultural Statistics (BAS) | 6 |
| UN Comtrade | 6 |
| East Asian Customs data | 7 |
| CITES and Eurostat data | 7 |
| Business to Business Trade Platforms | 7 |
| Other sources | 8 |
| Eel production – catch and aquaculture | 9 |
| Eel trade | 12 |
| Live eel trade - general | |
| Live eel trade – glass eel/live eel fry | 14 |
| Trade data | 14 |
| Advertisements/companies | 18 |
| Enforcement action - seizures/operations | 21 |
| Live eel trade – other live eel | 22 |
| Farming and the market for Philippine eels in East Asia | 24 |
| Conclusions | 26 |
| Recommendations | 28 |
| Data collection, monitoring and availability | 28 |
| Legislation and enforcement | 28 |
| Additional collaboration and consultation with stakeholders | 29 |
| References | 30 |
| Annov | ວາ |

Acknowledgements

A special thanks goes to Hiromi Shiraishi and Joyce Wu from TRAFFIC for providing ongoing support throughout the compilation of this report, in addition to vital trade and consumer demand information from East Asia. The author would like to thank other TRAFFIC colleagues, including Huang Ying for helping to request and collate mainland China Customs data, and Katalin Kecse-Nagy, Glenn Sant, Richard Thomas, Stephanie von Meibom and Sabri Zain for their reviews. The author also wishes to acknowledge the support and information provided by Matthew Gollock and Louise Baldwin from ZSL and Evelyn Ame from BFAR.

Executive Summary

There are 16 species of freshwater eels in the genus *Anguilla*, distributed throughout temperate and tropical waters. Various life stages of all *Anguilla* species, ranging from juveniles to adults, are harvested and traded on a global scale, with current demand being mainly in East Asia for consumption. Eel farming, which is responsible for over 90% of all *Anguilla* production worldwide, is reliant on growing out wild-caught juvenile eels ("glass eels" or "eel fry"). Historically, farming and trade focused on the temperate species, but with population declines and new catch/trade measures limiting exploitation and export levels for species such as *Anguilla anguilla* (European Eel) and *A. japonica* (Japanese Eel), industry has been looking to other sources, in particular tropical *Anguilla* species such as *A. bicolor*, to fulfil demand.

The Philippines has been identified as an increasingly important source of *Anguilla* spp. in recent years. Owing to the dramatic increase in exploitation and price of glass eels in the Philippines in 2011 and 2012, in May 2012 the Philippine Bureau of Fisheries and Aquatic Resources (BFAR) brought in a precautionary measure banning the export of juvenile eels ≤15cm in length. Despite this, there have been concerns that large quantities of glass eels continue to be exported from the Philippines.

Noting the urgent need for developing complementary management at the local, regional, national and international levels for eel conservation, catch and trade in the Philippines, the Zoological Society of London (ZSL), TRAFFIC, BFAR and the Philippine Biodiversity Management Bureau (BMB) initiated a collaborative project in May 2014 - this report is one of the first project outputs. It provides an overview of Philippine eel catch and trade levels and its role and importance at the international level for supplying eels for farming and consumption purposes. This information is used to inform recommendations for future trade-related management and conservation of this ecologically and economically important group of species in the Philippines.

Various sources of *Anguilla* spp. production (catch and farming) and trade data/information were analysed, focusing mainly on the most recent ten year period for which data are available (2004-2013). Sources included Food and Agricultural Organization (FAO) global production data, Philippine Bureau of Agricultural Statistics (BAS) national/regional catch data, UN Comtrade export data, East Asian Customs import data, Business to Business Trade Platforms, seizures and additional literature and internet research.

Although there are discrepancies between datasets, in addition to a number of uncertainties related to the actual eel commodities in trade (species and life stages), research suggests that the Philippines became an increasingly important player in both the legal and illegal global eel markets from 2011 onwards, and in particular in 2012 and 2013. Between 2004 and 2013, the Philippines exported mostly live eels and the main destinations for these were the four principal eel farming/consuming countries/territories in East Asia: mainland China, Japan, Korea and Taiwan, in addition to Hong Kong, which is a major trade hub for live eels. In 2012 and 2013, the Philippines was the source of approximately 30% of all East Asian live eel fry imports.

Information obtained from Customs data, seizures and online advertisements indicates that shipment of eels below the size authorized to be exported from the Philippines has continued, illegally, despite the ban in place since May 2012. The Philippines was also identified as a potential transit country for illegal trade in non-native species such as the European Eel. Furthermore, large discrepancies between catch and trade datasets from local, national and international sources raise concerns over potential illegal and unreported fishing of eels in the Philippines.

Historically, Cagayan Valley has been the primary area of *Anguilla* fishing within the Philippines, however research suggests that glass eel exploitation is expanding to other areas, in particular Mindanao. In addition to catching glass eels for export, there appears to be a move to initiate farming, or at least the "growing out" of eels to sizes permitted for export (>15 cm). The trade data also suggest that, in addition to the Philippines, many other countries have become increasingly important sources of live eel fry in recent years, including

Canada, United States of America and the Dominican Republic in the Americas, Madagascar in Africa, and Viet Nam, Malaysia, Thailand and Indonesia in South-East Asia.

The information presented in this report clearly shows the ever-changing dynamics of eel trade and that if *Anguilla japonica* recruitment in East Asian waters is low, other sources of *Anguilla* will be found (legally or illegally); and their availability/recruitment will in turn affect exploitation of other sources. Increased controls and management in certain source countries, such as European Union Member States, the Philippines, Indonesia and the Dominican Republic (all of which currently have export bans in place) and changes in consumption behaviour/demand are also affecting trade dynamics. All these factors, together with other threats potentially affecting eels in the Philippines, such as pollution and habitat destruction, need to be considered when deciding on appropriate eel conservation and management measures in the Philippines.

The recommendations for eel conservation and management provided in this report focus mainly on pressures from over-harvesting and action that can be taken by Philippine authorities, including the national and regional offices of BFAR, BAS, BMB, Bureau of Customs and Local Government Units (LGUs). The vital role of wide national and third-country stakeholder and partner participation is emphasised, however. Recommendations cover the following main issues:

- 1) Data collection, monitoring and availability assign clear responsibilities for carrying out regular reporting, monitoring and analysis of global, national and local datasets; investigate and address reasons for large data discrepancies identified in the report; collect more species and life stage specific catch and trade data; collate details of farming facilities; and in relation to all of these, build capacity through training and making resources more widely available.
- 2) Legislation and enforcement analyse implications of current/potential eel conservation and management measures and based on this, develop complementary national, regional and local legislative instruments; ensure any management measures are implemented and enforced at the appropriate level, through clear assignation of roles and training; while export bans remain in force, enhance national enforcement effort and capacity through sharing of information, training and establishing a risk assessment model for Philippine eel trade; co-operate and share intelligence and information with consumer/transit countries/territories; and exchange experiences and collaborate with other Anguilla spp. range States.
- 3) Additional collaboration and consultation with stakeholders contact fisheries authorities, trade and farming associations and researchers in East Asia to raise awareness of concerns and the importance of traceability and legality of sourcing of eels from the Philippines; request support from East Asian experts with regard to species identification and eel farming techniques; and collaborate with global B2B trade platform companies, including contacting them regularly to request the removal of advertisements offering potentially illegally sourced eels.

Introduction

There are 16 species of *Anguilla*¹ in the Anguillidae family distributed throughout tropical and temperate waters, except for the eastern Pacific and south Atlantic. *Anguilla* species (also called freshwater eels) exhibit facultative catadromy, living in fresh, brackish and coastal waters but migrating to pelagic marine waters to breed. Various life stages (Figure 1), ranging from glass to silver eel, of all *Anguilla* species are harvested and traded on a global scale for consumption - directly or after culture - and for stocking purposes, with current demand predominantly driven by East Asian markets, in particular Japan and mainland China. Historically, use and trade focused on the temperate species – *A. anguilla* European Eel, *A. rostrata* American Eel, *A. japonica* Japanese Eel and *A. australis* Short-finned Eel. However, with population declines and new catch/trade measures coming into force limiting exploitation and export levels for certain species / populations, industry has been looking to other sources, in particular tropical *Anguilla* species, such as *A. bicolor*, to fulfil demand.

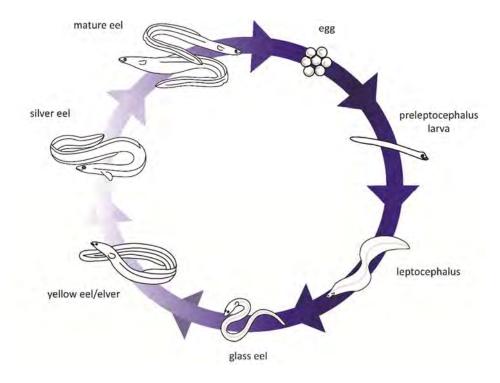


Figure 1 The life cycle of Anguillid eels. Adapted from Jacoby et al. in prep, and Henkel et al. (2012).

Eel farming, which is responsible for over 90% of all Anguilla production worldwide, is reliant on wild-caught juvenile eels or "glass eels", as reproducing and raising *Anguilla* eel larvae to the glass eel stage in captivity is not yet commercially viable. Historically, Asian eel farms in mainland China, Japan, the Republic of Korea (hereafter referred to as Korea) and Taiwan used *A. japonica* glass eels for this purpose, however declines in *A. japonica* recruitment, combined with the apparently cheap and abundant supplies of other species has caused a change in sourcing over the last decades (*A. japonica*, nevertheless, still remains the preferred species for consumption in Japan).

Towards the end of the 1990s, *A. anguilla* was imported into Asia in large quantities for this purpose. However, concerns over the impact international trade was having on this species led to it being listed in Appendix II of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This listing came into force on 13 March 2009. Since then any international trade in *A. anguilla* needs to be

¹A. anguilla, A. australis, A. bengalensis, A. bicolor, A. borneensis, A. celebesensis, A. dieffenbachii, A. interioris, A. japonica, A. luzonensis, A. marmorata, A. megastoma, A. mossambica, A. obscura, A. reinhardtii and A. rostrata (Teng et al., 2009). Three species (A. bengalensis, A. bicolor, A. australis) have been proposed to have sub-species by some researchers (Froese and Pauly, 2014; M. Gollock, in litt., July 2014).

² Also described as "fry", "fingerlings" and "elvers" – these terms are used interchangeably depending on the country, however can also be used to describe different sizes of juveniles. In the Philippines, according to the Fisheries Administrative Order No. 242 "eel fry" are defined as the post larval form of eels not exceeding 5 cm in length, with a glass-like transparency, also called glass eels. "Eel fingerlings" are defined as the juvenile form of all eels more than 5 cm but not exceeding 15 cm in length. See Table 1 for the different use of these terms in East Asian Customs codes.

accompanied by a permit. In December 2010, the European Union (EU) decided to take a stricter measure by banning all imports and exports of *A. anguilla* to and from the EU, as authorities felt they were unable to determine that trade would not be detrimental to the conservation of the species³.

As a consequence, the Americas and South-East Asia have become increasingly important sources of juvenile eels for farming and larger live eels for direct consumption. In Asia, the Philippines in particular was identified as an important source, being the home to at least five different *Anguilla* species: *A. bicolor, A. marmorata, A. japonica, A. celebesensis* and *A. luzonensis,* the latter only described in 2009 (Watanabe *et al.,* 2009; Yoshinaga *et al.,* 2014). Due to its similar texture and taste, if *A. japonica* is not available to the consumer, *A. bicolor* is the preferred second option and therefore in particular demand (Anon, 2013; Anon, 2014a). All five species have recently been assessed against the IUCN Red List criteria, and due to concerns that a variety of threats, including over-exploitation, are causing declines in their populations, *A. japonica* was rated as Endangered and *A. bicolor, A. celebesensis* and *A. luzonensis* as Near Threatened (*A. marmorata* was rated as Least Concern) (Jacoby and Gollock, 2014).

In May 2012, the Philippine Bureau of Fisheries and Aquatic Resources (BFAR) brought in Fisheries Administrative Order No. 242⁴ (BFAR, 2012a) as a precautionary measure due to the dramatic increase in exploitation and price of glass eels in the Philippines in 2011 and 2012, in particular in Cagayan province in northern Luzon (Figure 2), and concerns over the long-term sustainability of fishing of glass eels for export (Ame *et al.*, 2013). Fisheries Administrative Order No. 242 imposes an export ban for juvenile eels ("eel fry/glass eels" and "eel fingerlings") not exceeding 15 cm (i.e. ≤15cm); non-compliance with this order carries a penalty of eight years imprisonment, confiscation of catch or a fine equivalent to double the export value of the same, and revocation of fishing and / or export permits. Although export of glass eels from the Philippines is currently not permitted, fishing is still allowed.

BFAR has also been running local eel conservation initiatives in the Cagayan Valley Region (BFAR Region 02⁵) in recent years, including a re-stocking project since 2008; however high prices of glass eels due to demand from East Asia prevented re-stocking the planned quantity of eels in the Cagayan Valley in 2012 (BFAR, 2012b). Other activities have included meeting with local stakeholders to discuss options for the regulation of harvest with the intention of drafting a municipal fisheries ordinance specifically for eel management and conservation, and carrying out a preliminary survey of glass eel fishermen and their fisheries to provide baseline data for future assessments (BFAR, 2012b; BFAR 2013a).

Despite these attempts, according to East Asian Customs data and farming reports, online advertisements and seizures reported by BFAR, large quantities of juvenile eels ≤15cm in length continue to be exported from the Philippines, illegally. Noting the urgent need for developing complementary management at the local, regional, national and international levels for eel conservation, catch and trade, the Zoological Society of London (ZSL) and TRAFFIC, in collaboration with BFAR and the Philippine Biodiversity Management Bureau (BMB⁶), carried out a project scoping trip in May 2013 (BFAR, 2013a). Based on information collected and priorities identified during this trip, these partners developed an eel conservation project, which commenced in May 2014, with funding from the Darwin Initiative and the UK Department for Environment, Food and Rural Affairs (Defra).

This report is one of the first outputs under this project and aims to provide an overview of Philippine eel catch and trade levels and its role and importance at the international level for supplying eels for farming and consumption purposes. Information from catch and trade data, combined with online business to business advertisements, seizures and additional literature and internet research is summarized and forms the basis of recommendations for future trade-related management and conservation of this ecologically and economically important group of species in the Philippines.

³ A "non-detriment finding" (NDF) and a legal finding are requirements for issuing permits for CITES Appendix I- and II-listed species.

⁴ http://www.bfar.da.gov.ph/LAW?fi=405#post

⁵ BFAR Region 02 is one of the 16 regional BFAR offices, also known as the Cagayan Valley Region.

⁶ BMB, an agency within the Department of Environment and Natural Resources (DENR), was previously called the Protected Areas and Wildlife Bureau (PAWB), and was re-named in January 2014: http://www.mb.com.ph/pawb-renamed-to-biodiversity-management-bureau/



Figure 2 Map of the Philippines showing the main island groups and highlighting Cagayan province, historically the primary area of *Anguilla* fishing within the Philippines.

Methods

The various sources of *Anguilla* spp. production (catch and farming) and trade data/information analysed for this report are summarised below. Double-counting, under-reporting and misreporting must be taken into consideration when interpreting all available catch and trade data (Crook, 2010).

A number of the sources used provide data in both weight and value. Weight (in kg or tonnes) was used as the principal measure for analysis, and value or price was only referred to where it was considered useful background information and/or to provide an indication of the type of commodity in trade (e.g. in advertisements). Globally, trade in live eels is grouped together under one Harmonised System⁷ Customs code: HS 030192. As smaller glass eels are of much higher value than larger juveniles (per individual), and these in turn have a higher value than adult eels, value can be a useful indicator of the life stage of eels in trade. However, under-reporting of value in Customs data has been identified across various datasets, and for this report East Asian data, which differentiates life stages and species of live *Anguilla* spp. to varying degrees (see Table 1), were used to overcome this problem partly. It is important to note, however, that the data presented in Figures 3-5 and 7-9 do not differentiate between life stages.

In addition to analyses of all collated data and information being presented in this report, all data were added to TRAFFIC's database, which facilitates analysis of links between seizures, intelligence and trade/survey data. TRAFFIC will continue to input information collected on possible illegal eel trade related to the Philippines, and details of any specific relationship/persons/organizations that may be relevant for enforcement effort will be shared with the Philippine authorities in the future.

Food and Agricultural Organization (FAO) of the United Nations (UN)

Global *Anguilla* spp. capture and aquaculture data for 1976-2012 were downloaded in July 2014 from "Global Production 1950-2012" dataset http://www.fao.org/fishery/statistics/software/fishstatj/en. Estimated quantities (F) were included in the analysis. *Anguilla* spp. trade data, downloaded in July 2014 from "Fisheries Commodities Production and Trade 1976-2011" were also analysed briefly for comparison with UN Comtrade data. FAO data do not differentiate life stages.

Bureau of Agricultural Statistics (BAS)

"Igat" (freshwater eel in Tagalog) production (catch) in the Philippines for 2002-2013 (all years available) was downloaded in July 2014 from "Inland Municipal Fisheries: Volume of Production by Species, by Region and by Province" http://countrystat.bas.gov.ph/?cont=10&pageid=1&ma=D40PNVIP. 2012 and 2013 data were corrected to take into account Rice Eel (or Swamp Eel) *Monopterus albus* production due to this species (together with *Anguilla*) currently being reported under "Igat". Prior to and including 2011, *Anguilla* spp. composed 100% Igat production, in 2012 *Anguilla* made up 95% and *M. albus* 5% and in 2013 *Anguilla* only 30% and *M. albus* 70% (E. Ame, BFAR, *in litt.*, June 2014). BAS catch data were compared to export data from UN Comtrade. BAS data do not differentiate life stages.

UN Comtrade

Global Anguilla spp. exports for 2002-2013, with a focus on live eels (HS Code 030192), were downloaded in July 2014 from the UN Comtrade Database: http://comtrade.un.org/. UN Comtrade export data were more detailed (providing data of individual trading partners) and up to date than FAO data and were therefore selected for further analysis (totals from these two sources being comparable). UN Comtrade was used as the source for Philippine export data (as Philippine trade data for relevant individual commodities were not publically available from national sources), which were compared with imports reported by East Asian Customs. UN Comtrade data do not differentiate life stages.

⁷ The Harmonized Commodity Description and Coding System (HS) is an internationally standardized system of names and numbers for classifying traded products developed and maintained by the World Customs Organization (WCO). To ensure harmonization, contracting parties to the HS Convention must employ all 4- and 6-digit (HS6) provisions, but are free to adopt additional subcategories and notes. The Harmonized System is revised every five to six years and was most recently updated in 2012:http://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools.aspx

Taiwan data are reported under "Other Asia nes" in UN Comtrade. In principle, trade data for other territories belonging to Asia, but not specified by country, could be included in this, however, in practice, only Taiwan trade is included under this code⁸. For this report all eel trade data reported under "Other Asia nes" was assumed to be for Taiwan.

East Asian Customs data

Customs import data for live Anguilla spp. for the main eel importing countries/territories were requested or downloaded in June and July 2014 from the following sources: China Customs Information Centre (data China Cuslink Ltd.); Co., Hong Kong Trade Development Council Statistics http://bso.hktdc.com/bso/jsp/bso home.jsp; Ministry of Finance, Trade Japan of Association http://www.customs.go.jp/toukei/info/index e.htm; Korea Trade International http://global.kita.net/; Taiwan Bureau of Foreign Trade http://cus93.trade.gov.tw/ENGLISH/FSCE/.

As a minimum, East Asian data differentiate between "live eel fry" for aquaculture purposes and "other live eel" for consumption purposes; however, some countries/territories divide live eel fry into additional size categories. Table 1 shows all live eel Customs codes used in mainland China, Hong Kong Special Administrative Region of the People's Republic of China (hereafter referred to as Hong Kong), Japan, Korea and Taiwan over the last decade. East Asia is used throughout this report to describe these five countries/territories, unless otherwise specified.

Where "Source" is described/presented in the report, this is the reported exporting country in East Asia importer data. 2004-2013 annual import data from all sources and 2011-2014 monthly data for imports from the Philippines were analysed (at the time of writing available to April 2014 in all East Asian countries/territories). It is important to note, however, that monthly data are often not confirmed at publication and still open to adjustment due to various reasons (e.g. misclassification of commodities or country/territory of consignment, wrong reporting of value or quantity, and lodging of more than one declaration for the same consignment). In Hong Kong, adjustments relating to earlier months of a particular year are incorporated in the cumulative totals of that year only (annual data), i.e. monthly data are not amended (Hong Kong Census and Statistics Department, *in litt.*, July 2014).

As Hong Kong is a major trade hub, in particular for glass eels, Figures 10, 11 and 13 showing imports of live eel fry exclude Hong Kong as a "source", i.e. imports into mainland China, Japan, Korea and Taiwan from Hong Kong are excluded. This is to minimize double-counting, as Hong Kong is not an actual source of glass eels nor does it farm eels; it imports from various sources and then re-exports these within East Asia. Hong Kong reports two different types of imports – by origin, and by exporter – origin data were used for this report. It is important to note also that Japan supposedly reports imports as per origin of the commodity⁹, however Hong Kong is reported by Japan as the source for significant quantities of live eel fry, and therefore it is unclear if this process is followed at all times.

CITES and Eurostat data

CITES data for *Anguilla anguilla* trade 2009-2012 and European Union Customs data for live *Anguilla spp.* trade 2004-2013 were also downloaded in July 2014 from http://trade.cites.org/ and http://epp.eurostat.ec.europa.eu/portal/page/portal/international_trade/data/database. There was very little trade relevant to the Philippines reported in these data sources, and therefore they were not used, apart from for a brief comparison with Philippines import data in 2011 (Figure 9).

Business to Business Trade Platforms

English language versions of Global Business to Business (B2B) trade platforms Alibaba http://www.alibaba.com/, EC21 http://www.ec21.com/, Food & Beverage (F&B) Online http://www.tradekey.com/, and Weiku http://www.weiku.com/ were searched for advertisements of "glass eel", "eel fry" and "baby eel", in addition to quick checks of more

⁸ http://unstats.un.org/unsd/tradekb/Knowledgebase/Taiwan-Province-of-China-Trade-data?Keywords=taiwan

⁹ http://www.customs.go.jp/toukei/sankou/howto/gaiyou_e.htm

general search terms such as "eel" and "Anguilla" in May and July 2014. Results from searches were filtered according to product types (to exclude non-fishery products) and location of suppliers, with a focus on the Philippines and companies offering eels sourced in the Philippines (but based elsewhere).

Each trade platform provides different types of useful information, such as time of last login (only those who have logged in within the last 6 months on Alibaba were recorded), company address, contact details and enquiry records. Therefore in several cases advertisements from more than one site were used to collate all the relevant information presented in Tables 5 and 6 in the Annex. Information provided in the advertisements was edited to correct for clear orthographic errors, however all the detail provided was noted, even where its accuracy/validity was unclear/unknown, e.g. *A. japonica* being offered for sale and being cultivated in the Philippines, new species names, supply capability and months. Names of companies provided in the report are as stated in the relevant web pages/advertisements when accessed in July 2014.

Overall numbers of advertisements/suppliers for glass eels/eel fry on each of these sites were briefly compared between each other and with previous research carried out in June and November 2012. However, as several companies advertise on various sites and often have more than one advertisement each, it is important to note that the total numbers presented in the discussion and graphs are for illustrative purposes only. Weiku results are included in Tables 5 and 6 in the Annex, but excluded from the totals summarized in the text, due to this site providing less user-friendly search and filtering options.

Other sources

Scientific publications, government reports, press releases, classified advertisements, company websites, social media sites and blogs in English, Japanese and Chinese languages were searched for information on recent eel fishing and trade issues involving the Philippines, Japan, Taiwan and mainland China. Some specific stakeholders were also contacted for further details on seizures and eel trade patterns, including representatives of BFAR, the Japan Eel Importers Association, and Spanish CITES Management and Enforcement authorities.

Table 1 East Asian Customs codes and descriptions for trade in Live *Anguilla* spp. <u>Source:</u> China Customs Information Centre; Hong Kong Census and Statistics Department; Ministry of Finance, Trade Statistics of Japan; Korea International Trade Association; Taiwan Bureau of Foreign Trade.

| | Customs Code | Commodity | | |
|-----------|---------------------|---|--|--|
| China/ | 0301.92.10 | Live eel fry "Anguilla spp." | | |
| Hong Kong | 0301.92.90 | Live eels, other than fry (Anguilla spp.) | | |
| Japan | 0301.92.10.0 | Live eel fry "Anguilla spp." | | |
| | 0301.92.20.0 | Live eels, other than fry (Anguilla spp.) | | |
| Korea | 0301.92.10.00 | Live eel fry "Anguilla spp." Definition applicable until end 2012 | | |
| | 0301.92.10.00 | Glass eel (≤0.3g per unit, for aquaculture) Used from 2013 onwards | | |
| | 0301.92.22.00 | Young eel (>0.3g and ≤50 g per unit, for aquaculture) Used from 2013 onwards | | |
| | 0301.92.90.00 | Live eels, other than fry (Anguilla spp.) | | |
| Taiwan | 0301.92.10.10-1 | Eels, Anguilla japonica, live | | |
| | 0301.92.10.20-9 | Eels, Anguilla marmorata, live | | |
| | 0301.92.10.90-4 | Other eels (Anguilla spp.), live Included in 0301.99.29.915 "other freshwater fishes, live" before 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) | | |

Eel production – catch and aquaculture

Global eel production has steadily increased over the last 30 years. Figure 3 shows the important role that eel farming (or aquaculture) plays, with the latter being increasingly responsible for the majority of eel production (nearly 95% in 2012 according to FAO data). Farms are supplied by wild-caught juvenile eels, and although capture production appears to have gradually declined over the years it is important to note that the data presented in Figure 3 (and Figures 4-5 and 7-9) do not differentiate between life stages. Reported aquaculture production is composed of live eels grown to a size ready for consumption (i.e. adults), however capture production includes catch of all life stages – glass eels and larger juveniles for farming and adults for direct consumption. The catch data therefore mask the scale of glass eel catch due to the higher weight of adult eels and the corresponding decline in catch of older life stages.

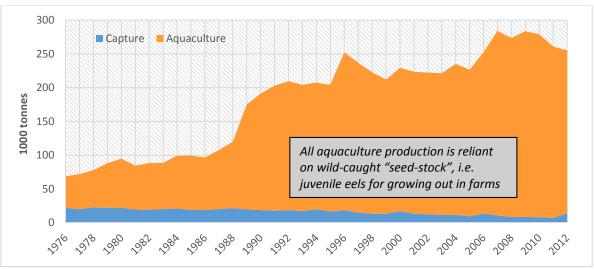


Figure 3 Global *Anguilla* aquaculture and capture production, 1976-2012, 1000 tonnes. <u>Source: FAO Fisheries Production data http://www.fao.org/fishery/statistics/software/fishstati/en Estimated quantities (F) included. Data do not differentiate life stages.</u>

Figure 4 shows the overall decline of global eel capture combined with the proportionally increasing importance of tropical eel range States over the last few decades. Indonesia and the Philippines are the only countries to report catch to FAO of tropical *Anguilla* spp. under the term "River Eels Nei" (with the exception of small quantities by Australia); all other countries/territories report catch in temperate *Anguilla* species (*A. anguilla*, *A. japonica*, *A. rostrata* or *A. australis*¹⁰). Figure 4 shows that catch from Indonesia is responsible for the majority of the peaks that occur from the early 1990s onwards¹¹; and the Philippines has been reporting regular annual catch between 100 and 500 tonnes per year from 1980 onwards, with catch gradually increasing from 2006 onwards, reaching over 1000 tonnes in 2012 (8% of the global total).

FAO catch data reported as "River eels nei" were compared with the Philippine Bureau of Agricultural Statistics (BAS) data reported as "Igat" (freshwater eel in Tagalog) and these were identical for the last 12 years. Inland fisheries production of "Igat" steadily increased over the last decade, from 200 tonnes in 2002 to over 1000 tonnes (valued at over 100 million Philippine Pesos, PHP) in 2012 (Figure 5). The majority of catch occurs in the main island group of Luzon and within that in Cagayan Valley (see Figure 2 for map of these locations), and the importance of Cagayan Valley increased significantly in 2012 and 2013. It is important to note that catch and trade in *Monopterus albus* (Swamp or Rice Eel), both for local consumption and export within Asia, has been encouraged in recent years due to this species becoming a pest (BFAR, 2013b) and catch of this species is reported to BAS under the same code (Igat) as *Anguilla* at present (E. Ame, BFAR, *in litt.*, June 2014). The 2012 and 2013 BAS catch data presented in Figure 5 (and also in Figure 8) were therefore corrected to take into account Swamp Eel production, based on figures provided by BFAR (see methods).

¹⁰ FAO production (catch and aquaculture) appears to be divided into species based on geographic provenance, which can lead to mis-reporting, in particular where non-native species are farmed (see Crook, 2010).

¹¹ The last two peaks in 2006 and 2012 were caused by large catches reported by Egypt.

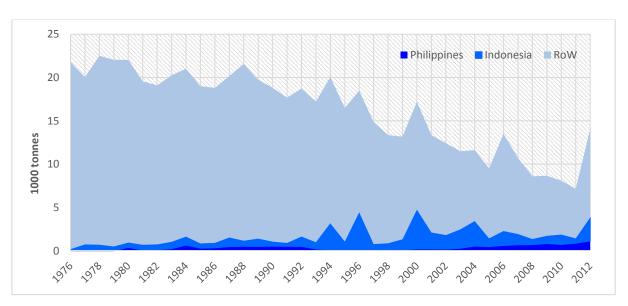


Figure 4 Global *Anguilla* capture production, 1976-2012, 1000 tonnes. <u>Source:</u> FAO Fisheries Production data <u>http://www.fao.org/fishery/statistics/software/fishstati/en.</u> RoW – Rest of World. Estimated quantities (F) included. Data do not differentiate life stages.

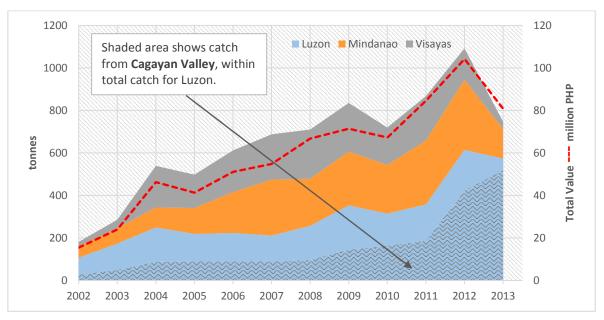


Figure 5 Total "Igat" production (catch) in the Philippines, 2002-2013, tonnes and million PHP. <u>Source:</u> BAS Inland Municipal Fisheries: Volume of Production by Species, by Region and by Province: http://countrystat.bas.gov.ph/?cont=10&pageid=1&ma=D40PNVIP Weight by main island group with principal producer province Cagayan Valley (within Luzon), highlighted; and total national value. 2012 and 2013 data corrected to take into account Swamp Eel production. Data do not differentiate life stages.

As for FAO data, BAS data available online do not differentiate life stages. Regional catch and fishing effort data specifically focusing on glass eel fisheries, however, have been collected in Cagayan Province since 2007 (Ame *et al.,* 2013). Prior to 2009, the principal collection area for glass eels in Cagayan province was around the Cagayan River. However, with increasing demand for export, fishermen have spread to other river systems draining into the Babuyan channel (Ame *et al.,* 2013). Fishermen in other regions in the Philippines also appear to have started glass eel fishing, in particular around Mindanao from 2008 onwards (J. Wu, TRAFFIC, *in litt.* May 2013).

Figure 6 shows the quantity of *Anguilla* glass eels fished in Cagayan, traded with consolidators (middle-men) in Aparri and on to exporters in Manila, and the total quantity of "live eel fry" reportedly imported into East Asia from the Philippines, between 2007 and 2012. In 2007 glass eel catch traded with consolidators

amounted to ~2.5 tonnes, which then dropped to less than a tonne for several years, increasing again in 2011 (1.5 tonnes) and 2012 (3.8 tonnes). Trade with East Asia shows a similar trend, however, total annual quantities being imported from the Philippines are three to 16 times higher than Cagayan catch. It would be important to establish the reasons for these differences, which may include illegal and unreported fishing, the growing out of eels to larger sizes in the Philippines (and correspondingly greater weight in trade) and/or other regions in the Philippines fishing comparably much higher quantities. See section on live eel trade for further details on glass eel trade, monthly variations in catch and trade, and species involved.

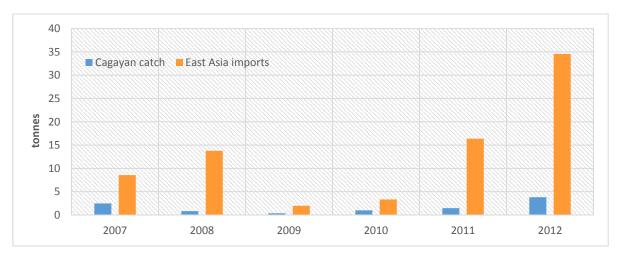


Figure 6 Glass eels caught in Cagayan, traded in Aparri and on to Manila; and East Asian imports of live eel fry from the Philippines, 2007-2012, tonnes. <u>Source:</u> Ame et al. (2013); East Asian Customs data - see Figure 10 for details.

According to Ame *et al.* (2013) mean annual glass eel catch per fishermen ranged from 2.7 kg in 2009 to 15.2 kg in 2012. According to fishermen and consolidators interviewed during the scoping trip in May 2013, average annual harvest could reportedly amount to as much as 10-29 kg per gatherer. The number of active fishermen ranged from 20 to 70 between 2007 and 2010, and then increased to 112 and 161 in 2011 and 2012 (Ame *et al.*, 2013). Many of the fishermen that were catching glass eel in 2011 and 2012 were totally new to the industry, attracted by increasing demand and prices. Competition from Mindanao, which is currently experiencing a "development boom" (Anon, 2014b; Satake, 2014), however, was believed to be the cause for an apparent decrease in demand from Cagayan from spring 2013 onwards (J. Wu, TRAFFIC, *in litt.*, May 2013). According to a report by BAS in May 2013, Camiguin in northern Mindanao has an ordinance in place to conserve *Anguilla*, and the total volume of inland fisheries catch decreased in the region in 2013 due to the prohibition of eel fishing (BAS, 2013). This suggests that some other regions outside Cagayan are implementing eel conservation measures. It is critical that experiences and plans of any similar measures be shared and co-ordinated across the Philippines.

To improve monitoring of catch in *Anguilla* species in the future, it would be important to report (and make available) catch of different life stages and of *Anguilla* spp. and *Monopterus albus* separately. According to percentages provided by BFAR, in 2013 ~1750 tonnes of *M. albus* were caught in the Philippines, already over double that of *Anguilla* catch (~750 tonnes of all life stages) (E. Ame, BFAR, *in litt.*, June 2014). This suggests that Swamp Eel is going to be an important commodity in the future, further emphasising the need for separating this species from *Anguilla* spp. in reporting. Reporting *Anguilla* catch to the species level, would also be beneficial. This may be possible for adult catch of the two main species *A. marmorata* and *A. bicolor*, which are easily differentiated. However, as the five native *Anguilla* species are known to co-exist and be harvested together this may be difficult to monitor. Furthermore, identifying these species at the glass eel level is complex (Yoshinaga *et al.*, 2014). However, according to studies carried out in 2011 and 2012, the species composition of glass eels entering the Cagayan River in northern Luzon varies throughout the year, which could facilitate more species-specific data recording (Aoyama, 2013; see section on live eel trade and discussion under monthly trade data of live eel fry).

Eel trade

Live eel trade - general

Anguilla spp. are traded globally as four main commodities – live, fresh, frozen and smoked/prepared eels. According to Philippines export data reported in UN Comtrade, between 2002 and 2013 the Philippines traded predominantly in live eels (on average 1600 tonnes per year), in addition to very small quantities of frozen eels (on average 60 tonnes per year). The following analysis, therefore focuses on live eels only.

Figure 7 shows total global and Philippine exports of live *Anguilla* eels reported under HS code 030192 to UN Comtrade and Figure 8 shows Philippine catch reported to BAS combined with imports and exports of live eels, since 2002 (all life stages grouped together). According to UN Comtrade export data, between 2002 and 2010, the Philippines was responsible for less than 1% of global live *Anguilla* exports, however in 2011 this percentage increased to 7%, then to 24% in 2012 and 44% in 2013 (Figure 7). Total live eel exports from the Philippines in 2011-2013 (~18 000 tonnes) were ten times that during 2004-2010 (~1700 tonnes) and the main destinations of these eels were mainland China, Hong Kong and Taiwan¹². This level of trade with the Philippines was not reported in Asian Customs data, however, and it is therefore likely that non-*Anguilla* eel species are being reported under this Customs code by the Philippines (see section on other live eel below and Table 8 in the Annex).

According to UN Comtrade trade and BAS catch data, in 2002, Philippine catch/imports and exports are comparable, but after this for every year up to and including 2010, catch is higher than exports, with catch being at least double exports in all years (and in some cases considerably higher). This was unexpected, as the Philippines does not reportedly have a large domestic market for eel consumption (E. Ame, BFAR, *in litt*, July 2014). From 2011 onwards, exports became more than catch/imports, with a dramatic increase in 2012 and 2013. It is important to note that the data presented for catch includes the correction for the catch in Swamp Eel which commenced in 2012, however the trade data do not (as it is not known if this definitely includes Swamp Eel). Even when taking this into consideration, exports are considerably larger than catch.

It would be important to determine the reasons for these large differences between reported catch and exports in 2012 and 2013, as this will have significant implications for management. Possible reasons could include use of the incorrect Customs code for exports (see section on other live eel below), large amounts of un-reported or illegal fishing (not being reported in catch data, but being reported in trade data), the growing out of eels in farms to sizes permitted for export, and/or exports of live eels in particular glass eels or other younger eels being reported as gross weight, including packaging (reported as weight of bags which include water). The export data presented in Figures 7 and 8 do not differentiate between life stages, and can therefore not be used to monitor exports of juveniles specifically, however East Asian Customs data can be used for this purpose (see below).

Finally, prior to 2011, the Philippines imported very small quantities of live eels (less than 0.5 tonnes in total since 2004). However, in 2011 and 2012 the Philippines reportedly imported nearly 6 tonnes of live eels from *A. anguilla* range States (Figure 9). Exports of live *A. anguilla* eels (of any life stage) from EU Member States have not been permitted since December 2010. The reported imports from Bulgaria and France may therefore involve illegally exported eels. As part of a Spanish enforcement operation ("Operación Suculenta") in 2011 and 2012, Bulgaria and the Philippines were identified as transit points for smuggling glass eels out of Europe (see section on enforcement action below). Although eels can be legally exported from Morocco (and other North African *A. anguilla* range States), this route has also been of concern in relation to smuggling from the EU. None of this trade was reported in EU Customs (EUROSTAT) or CITES trade data. The only record of live eel export between the EU and the Philippines between 2004 and 2013 in EUROSTAT was for 100 kg from Romania in 2011 (again, if this occurred, and was *A. anguilla* originating in the EU, this would have been illegal).

. .

¹² Reported under "Other Asia nes", see methods.

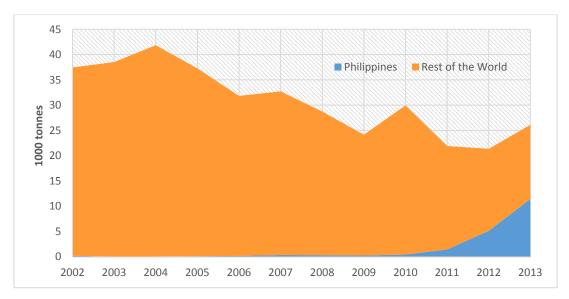


Figure 7 Total exports of live eel, *Anguilla* spp. (HS code 030192), 2002-2013, 1000 tonnes. <u>Source:</u> UN Comtrade data: http://comtrade.un.org/ Data do not differentiate life stages and were not corrected for possible inclusion of Swamp Eel exports (commodity code specifically refers to Anguilla spp.).

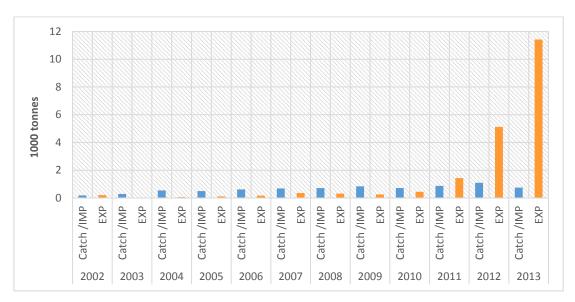


Figure 8 Annual Philippine catch and live eel trade for *Anguilla* species. <u>Source:</u> UN Comtrade data: http://comtrade.un.org/ and BAS data: Inland Municipal Fisheries: Volume of Production by Species, by Region and Province: http://countrystat.bas.gov.ph/?cont=10&pageid=1&ma=D40PNVIP. Data do not differentiate life stages and export data were not corrected for possibly inclusion of Swamp Eel exports (commodity code specifically refers to Anguilla spp.).

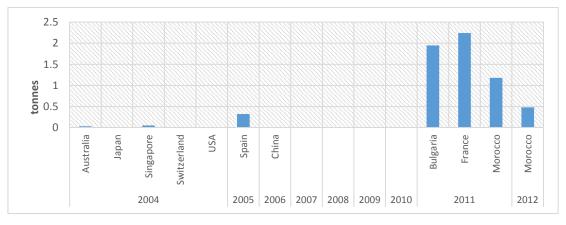


Figure 9 Imports of live *Anguilla* species into the Philippines, tonnes. <u>Source:</u> UN Comtrade trade data: <u>http://comtrade.un.org/</u> Data do not differentiate life stages.

Live eel trade – glass eel/live eel fry

Trade data

East Asian Customs data differentiate life stages of live eel in trade, either at the basic level of "live eel fry" for farming and "other eel" (mainland China, Hong Kong and Japan) or at a more detailed level of different sizes of juveniles (Korea and Taiwan, see methods for more details). This makes East Asian import data particularly useful for identifying the most important sources of live eel fry (for farming) versus live eels for consumption. In addition, analysis of these data enables monitoring of potential illegal trade. The Fisheries Administrative Order 242 introduced by BFAR in May 2012 bans the export of juvenile eels ≤15cm from the Philippines. However, according to Asian Customs import data, "live eel fry" have continued to be imported in large quantities after this ban came into force. In addition, there have been a number of seizures of glass eel shipments, further corroborating this (see enforcement action below).

Table 3 in the Annex shows reported annual imports of live eel fry for farming purposes into the five main East Asian eel trading/producing countries/territories (mainland China, Hong Kong, Japan, Korea and Taiwan) for the last ten years (2004-2013), by source. Between 2004 and 2013, nearly 120 tonnes of live eel fry were reportedly imported by East Asia from the Philippines. The Philippines was the fourth greatest supplier (excluding Hong Kong) of live eel fry over this period, coming after Japan, France and mainland China.

Between 2004 and 2013 total eel fry imports into East Asia gradually declined, however imports from the Philippines increased significantly (Figure 10). Hong Kong was consistently the main importer across these years (from all sources), followed by Taiwan, mainland China, Korea and Japan. The importance of Taiwan and China as importers decreased significantly in recent years, with Korea increasing in importance, in 2013 in particular. The majority of imports from the Philippines came into Hong Kong, and increasingly, Korea.

Figure 11 and Table 4 in the Annex show the changes in source countries/territories before and after 2010. 2010 was selected as a pivotal year, due to the ban in trade in *A. anguilla* from EU Member States from December 2010 onwards (with a few exceptions). The proportional importance of the Philippines as a supplier increased significantly from 2011 onwards - according to East Asian import data the Philippines was the source of 42% and 25% of live eel fry imports in 2012 and 2013, making it the top supplier in these two years. In addition to the Philippines becoming the main supplier in recent years, many other source countries became increasingly important, such as Canada, the United States of America (USA), Viet Nam, Madagascar and Malaysia. Furthermore, the number of different countries/territories supplying East Asia increased from 19 in 2004-2010 to 27 in 2011-2013. Japan continued to supply the greatest quantity within East Asia, however these were predominantly larger sized juveniles almost exclusively destined for Taiwan.

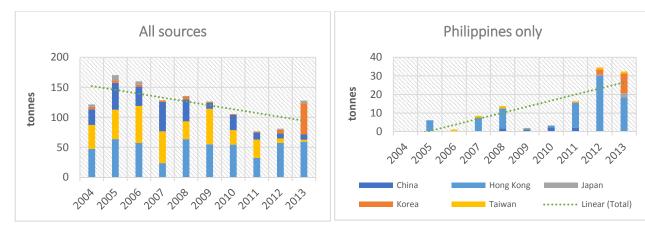


Figure 10 Total annual imports of "live eel fry" into mainland China, Hong Kong, Japan, Korea and Taiwan from all sources and from the Philippines only, 2004-2013, tonnes. <u>Source:</u> East Asian Customs data: mainland China requested from the China Customs Information Centre; Hong Kong Trade Development Council http://bso.hktdc.com/bso/jsp/bso-home.jsp; Ministry of Finance, Trade Statistics of Japan http://www.customs.go.jp/toukei/info/index-e.htm; Korea International Trade Association http://global.kita.net/; Taiwan Bureau of Foreign Trade http://cus93.trade.gov.tw/ENGLISH/FSCE/. All sizes of "live eel fry" for farming grouped together (see Table 1, methods). Excluding Hong Kong as a "source".

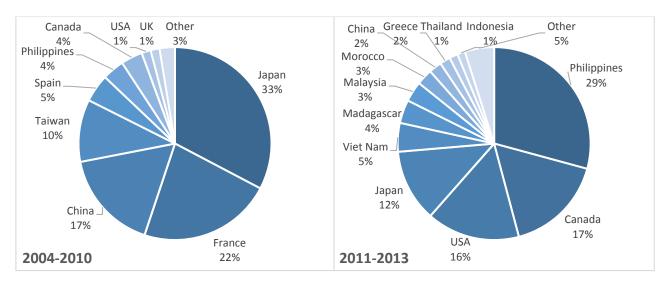


Figure 11 Source of imports of live eel fry into mainland China, Hong Kong, Japan, Korea and Taiwan, percentages of total imports in tonnes for two time periods: 2004-2010 and 2011-2013. <u>Source:</u> East Asian Customs data, as Figure 10. Excluding Hong Kong as a "source".

Figure 12 shows monthly live eel fry imports from the Philippines into East Asia for 2011-2013. There was considerable variation between years in the quantities imported each month, however overall the majority of live eel fry was imported into East Asia in April, with February-March and August-November also being important months. As was noted above, Korea considerably increased in importance as a destination in 2013, importing over 10 tonnes, nearly 5 tonnes in April alone (see eel sizes reported by Korea below).

Ame et al. (2013) reported that glass eels were available all year round in Cagayan (northern Luzon) between 2007 and 2012, the highest catch (and fishing effort) occurring in March, and the lowest catch in November and December. 2011-2013 East Asian import data suggest a similar pattern, with a high level of import in April, and low levels in December and January (allowing for a few weeks/one month delay for distribution/export by traders). On the other hand, online advertisements and fishermen in Cagayan Province (J. Wu, TRAFFIC, in litt. May 2013) indicated the main season in northern Philippines was October to February. Establishing peak fishing and trading seasons in the Philippines is further complicated by the fact that fishing for glass eels is known to occur in other regions such as Mindanao, they may vary between years, some of the live eel fry may be kept/grown out in farms in the Philippines for a few months prior to export, and there are different species involved.

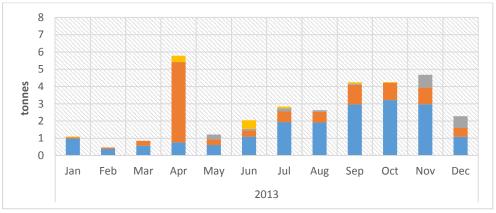
There is currently a large difference in the survival rate of different tropical species being farmed in East Asia, with *A. bicolor* and *A. marmorata* showing the best results (T. Moriyama, Japan Eel Importers Association, *in litt.*, July 2014). Identifying the best months and areas for fishing these species, and *A. bicolor* in particular (being the preferred species on Japanese markets) would have important conservation and commercial consequences. Korean traders based in the Philippines have already reportedly been targeting harvests with a high percentage of *A. bicolor*¹³.

Aoyama (2013) studied the species composition of glass eels recruiting in the Cagayan River between November 2011 and November 2012. *Anguilla marmorata* dominated from January to May, with a peak in March (this species making up 97.9% of the sample) and April (98.7%). According to East Asian trade data for 2012, the majority of imports from the Philippines occurred in February, March and April, which suggests that most of these were *A. marmorata*. *Anguilla bicolor* was mostly found in samples taken between October and December. However, proportions varied between years - in November 2011, *A. bicolor* made up 95% of the sample, but in November 2012, only 41% was *A. bicolor* and 49% *A. marmorata*. *Anguilla luzonensis* appeared mainly in the summer months, from June (87%) to September (75%), with a peak in July (97%).

¹³ http://glasseelsdavid.pixnet.net/blog/post/10189699-%E9%9B%99%E8%89%B2%E9%B0%BB%E9%B0%BB%E8%8B%97%E7%9A%84%E7%94%A2%25E%E2%80%A6







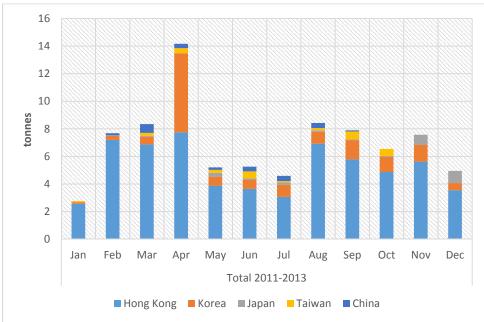


Figure 12 Reported monthly imports of "live eel fry" from the Philippines, into mainland China, Hong Kong, Japan, Korea and Taiwan, 2011-2013, tonnes.

Source: East Asian Customs data, as Figure 10. All sizes of "live eel fry for farming" grouped together. Although catch data from Cagayan (Ame *et al.*, 2013) and East Asian import data suggest that catch and trade in summer months (when *A. luzonensis* is prevalent; Aoyama, 2013) is lower than the rest of the year, as this is a newly discovered species with a restricted distribution, precautionary measures such as introducing and enforcing controls over fishing and trade in these months in particular should be considered.

In a separate study, which analysed the composition of a glass eel shipment seized by BFAR in September 2012 (see Table 2), 87% were *A. bicolor pacifica* and 17% were *A. marmorata* (Asis *et al.*, 2014; Anon, 2014c). These proportions contrast with those identified by Aoyama (2013) in August/September 2012, suggesting these eels may have originated from a different region in the Philippines. Further research into species composition in the Philippines, including in Mindanao, is underway (T. Yoshinaga, Kitasato University, *in litt.*, June 2014).

At the time of writing this report, monthly Customs data for 2014 were available only for January to April for all East Asian countries/territories. When comparing source countries/territories and quantities of live eel fry traded in the first four months of years 2011-2014, totals in 2011 and 2014 were similar (25-26 tonnes, excl. Hong Kong as source), and higher in 2012 and 2013 (42-49 tonnes). 2010-2013 were years¹⁴ of low recruitment of *A. japonica* (Anon, 2014d), with 2012 and 2013 being particularly low in Japan and Taiwan, suggesting that imports from other countries/territories increased to compensate for this. In 2012 and 2013 live eel fry imports into the rest of East Asia from Japan were minimal between January and April (under 3 kg), however, imports from Japan in the first months of 2014 (and 2011) were nearly 5 tonnes. Imports from the Philippines correspondingly decreased in the early months of 2014, with only two tonnes imported in January to April 2014, versus ~8, 19 and 6 tonnes in the same months of 2013, 2012 and 2011 respectively.

Korea introduced more detailed Customs codes for live eels for farming in 2013, separating live eel fry into two sizes: glass and young (see Table 1 in methods). Figure 13 shows that in 2013 most glass eels imported into Korea originated in the Philippines (6.4 tonnes) and most of the larger sized eels were imported from the USA and Viet Nam. The large import in April of live eel fry shown in Figure 12 was actually composed of "young eel" (4.2 tonnes), with all other imports in 2013 being of glass eels. Total Korean imports of glass and young eel for farming in 2013 were much higher than imports of "live eel fry" in previous years, and as this coincided with the change in Customs codes, the fact that these young eels may previously have been recorded under "other eel" and gone undetected must be considered. However, there was no corresponding decline in "other Eel" imports for 2013 (see section on live eel trade - other eel, below).

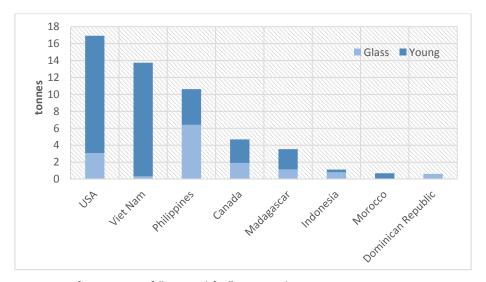


Figure 13 Korea imports of two sizes of "Live eel fry" in 2013 by source, tonnes. <u>Source:</u> Korea International Trade Association http://global.kita.net/. Glass eel - 030192100 and Young eel (exceeding 0.3g and not exceeding 50g per individual) – 030192200. Excluding Hong Kong as a "source". Haiti, Timor-Leste, mainland China and South Africa supplied <100 kg.

¹⁴ The A. japonica fishing season in East Asia spans ~November to May, and the years quoted refer to the year in which the season ends.

Figure 14 shows the different sizes of live eels for farming imported into Taiwan from the Philippines in 2011-2013. Sizes in trade vary considerably between years, with glass eels being the main commodity in 2012, whereas in 2011 and 2013, the largest size "elver" was mainly imported. Over half a tonne of glass eels were imported into Taiwan after May 2012 (between August-October), and 0.22 tonnes in 2013.

Taiwanese and Korean data therefore show that the smallest size (glass eels) were definitely still being sourced from the Philippines when export was not permitted. Customs codes for different sized juvenile eels used in Korea and Taiwan (and the EU¹⁵), however, use different units which are not directly comparable and make more detailed analysis very difficult. Taiwan uses number of eels (pieces) per kg, Korea uses weight in grams per eel and the EU uses size in cm of each eel. Converting Korean sizes to equivalent units used by Taiwan (assuming 5000 individuals of glass eels per kg) means that the young eel is equivalent to >3300 and <20 pcs per kg, which spans two of the Taiwanese categories. It would be beneficial for all countries/territories trading in these commodities to consider introducing similar size categories.



Figure 14 Taiwan imports of three sizes of "Live eel fry" from the Philippines, 2011-2013, tonnes. Source: Taiwan Bureau of Foreign Trade http://cus93.trade.gov.tw/ENGLISH/FSCE/. Glass >5000 pcs per kg - 03019220-109; Fry >500 and <5000 pcs per kg - 03019220-207; Elver >10 and <500 pcs per kg - 03019220-305.

Advertisements/companies

Alibaba, EC21, F&B Online, TradeKey and Weiku B2B trade platforms were searched in July 2014 for "glass eel" and "eel fry" advertisements (see methods for more details). Searching for "glass eel" resulted in the highest number of results - 150 advertisements across four sites 16, versus only 10 for "eel fry". The highest number of glass eel advertisements were found on Alibaba (61), followed by F&B Online (44). 30% of all advertisements across the four sites were from companies reportedly based in the Philippines, followed by the USA (15%), Indonesia (10%) and Thailand (7%) (Figure 15). The locations of countries/territories currently advertising on B2B trade platforms are comparable to those involved in glass eel trade in 2011-2013 according to East Asian live eel fry import data (Figure 11).

Alibaba.com was the preferred platform for companies from most countries/territories, with the exception of the Philippines and Indonesia, for which F&B Online appeared to be more popular. TRAFFIC has been collaborating with various Beijing-based B2B platforms in recent years, informing them of advertisements on their platforms that involve potentially illegally sourced species/specimens (TRAFFIC, 2013). In July 2012, TRAFFIC surveys found almost 50 advertisements from businesses in the Philippines offering eel fry or glass eels for sale and export on Alibaba.com. TRAFFIC contacted Alibaba.com about these potentially illegal exports, and the company responded by removing the suppliers from its website (TRAFFIC, 2012).

Alibaba.com was searched again in November 2012, and there was only one advertisement for glass eels/eel fry from a company reportedly based in the Philippines, and three from companies based in Korea, but

¹⁵ The EU also introduced Customs codes for different sizes of live Anguilla eel in 2012: 03013210 <12cm, 03019230 >12 <20 cm, 03019290 >20 cm.

¹⁶ Excluding Weiku, see methods.

supplying eels of Philippine origin. In July 2014, the numbers of advertisements on Alibaba from glass eel suppliers based in the Philippines had increased slightly (to five), however, there were many more on the other B2B platforms. The Philippines was the main country/territory of origin/seller location on EC21, F&B Online and TradeKey, which suggests sellers simply moved elsewhere when their adverts were removed from Alibaba. It would therefore be very important to collaborate with all these B2B platforms in the future and to share information with them concerning all countries/territories where export bans are known to be in place, currently including the Philippines, Indonesia and the Dominican Republic.

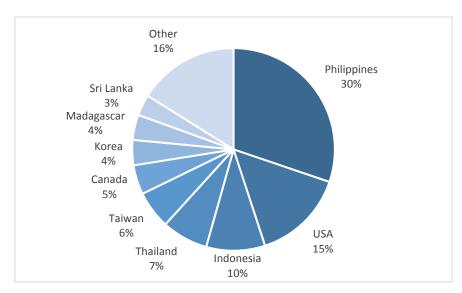


Figure 15 Reported locations of companies advertising "glass eel" on four global B2B trade platforms in July 2014. <u>Source:</u> Alibaba, EC21, F&B Online and TradeKey.

Table 5 in the Annex shows details of the companies found advertising live glass eels reportedly sourced from the Philippines on Alibaba, EC21, F&B Online, TradeKey and Weiku in July 2014. Table 6 shows screen shots of the relevant advertisements. Twenty companies were reportedly based in the Philippines, three were located in Korea and one each in Thailand, Malaysia, Taiwan and Hungary. Five of these companies had at least one alternative name and/or two addresses (with the same contact person provided). *Anguilla bicolor* was the most commonly advertised species (either or both sub-species offered by 15 companies), followed by *A. marmorata* (11) and *A. japonica* (10), with most companies offering several species or "mixes".

One company (Eve Eels) specified that no *A. japonica* was available in the Philippines, whereas another (Eico Marine Products) claimed that they were the "only eel farm in the Philippines that cultivates and breeds 100% A. japonica". This company also offered a so-called species "Anguilla tapika" which "is the newest replacement for hard to find A. japonica, with the same texture, taste and lots of fats. Better than A. mossambica". Recent research suggests that *A. japonica* is present in only small quantities in northern Philippines and its abundance varies greatly between sampling months (Aoyama, 2013; Yoshinaga et al. 2014). In 2013 several Japanese middlemen reportedly purchased eels in the Philippines incorrectly described as "Japanese Eel" - these were later identified as other *Anguilla* species (Shiotsuki, 2013; Yoshinaga, 2013).

Most companies on the B2B platforms claimed they could supply between 300 and 1000 kg of glass eels per month, with the maximum being three tonnes per month. A consolidator in Aparri reported being able to supply a similar quantity - on average 400 kg per month (J. Wu, TRAFFIC, *in litt*. May 2013). B2B advertisements suggested the main supply season was November to February, which is comparable to the peak season reported by fishermen in Cagayan Province (J. Wu, TRAFFIC, *in litt*. May 2013). Some companies said they could supply from October to July, depending on the species and sizes required. Five of the Philippine-based companies promoted the fact that they have many years' experience supplying clients in mainland China, Hong Kong, Japan, Korea and Taiwan. Several appear to be well established companies that

have recently added glass eels to their seafood products offered for sale, which include abalone, crab, lobster, prawns, sea cucumbers, seahorses, shrimp and tuna.

Several companies based in Metropolitan Manila were advertising on B2B trade platforms. Information obtained from consolidators in Aparri (Cagayan) in 2013 suggested there were at least six glass eel exporters of Philippine, Chinese and Korean nationality, based in Manila (J. Wu, TRAFFIC, *in litt.*, May 2013). In addition to these companies, suppliers/traders were spread across all of the Philippines main island groups: Babuyan Island and Catanduanes (Luzon), Bulacan (Visayas), and Basilan, Davao and General Santos (Mindanao). Two companies specified getting their supplies from northern Luzon. Babuyan Island Northern Phils Aqua Hatchery offered eels of five different sizes, collected in the Babuyan Islands, then shipped to a nursery in northern Cagayan province where they are allowed to rest for 7 - 30 days prior to transfer to Manila, where they are kept in a "hatchery" four miles from Manila airport, allowing for inspection prior to purchase. Northern Cagayan Aquatic Resources reported having its main headquarters in Aparri and Santa Ana, but now having opened an office in Manila, due to increased demand for the quality glass eel caught in northern Cagayan. This same company was advertising glass eels on the Philippines classified advertisement website olx.ph in July 2014¹⁷.

BAS catch data (Figure 5), trade advertisements (Table 5) and further research suggest that, in addition to Cagayan, Mindanao is becoming an increasingly important region for eel fishing and farming. Anecdotal reports indicate that there are many small scale eel nurseries operating in South Cotabato, North Cotabato and Maguindanao areas in Mindanao (R. Ortega, Inland Fisheries & Aquaculture Division, BFAR, *in litt.*, May 2014). A search on the Philippines classified advertisement website olx.ph in July 2014 resulted in two advertisements for glass eels/farming from this region¹⁸. A Japanese language Facebook page on eel farming titled "Eel of Davao" suggests that they are farming *A. bicolor* and *A. marmorata* and to a lesser extent *A. japanica*¹⁹. When contacted for more up to date information, the company stated they were still farming *A. bicolor* and *A. marmorata* mix (Eel of Davao, *in litt.*, July 2014). With support from Japanese investors, Equiparco Construction, a large construction company in Mindanao, has reportedly been farming eels to 15 cm and exporting these to Japan since the end of 2013. This company has received the Japanese Agricultural Standard (JAS) certification (which facilitates the traceability of products²⁰), and is planning on building a processing facility and exporting other eel products to Japan in the future (Anon, 2014b).

Other Japanese media reports and company websites suggest that several companies in Japan are specifically importing eels larger than 15cm²¹, which have been grown out to permitted export size in the Philippines (Anon, 2014e). The company JP Unagi Inc. claims to be trading legally as it has an "official export permit" from the Philippine government. On its website it mentions being able to provide juvenile eels that have been grown out from glass eels in the Philippines using feed imported from Japan, however it also suggests that glass eels can be exported directly (as do other Japanese trading companies)²²²³. One Philippine-based company (Eels for Less) was offering both eels and eel feed for sale on Alibaba. The eel feed was reportedly "proven for Philippine and Southeast Asian eels". Another seller ("selvy"), with a factory reportedly based in Plaridel, Bulacan, was found advertising glass eels, larger juveniles and eel feed (both locally produced and imported from Japan and Taiwan) on the Philippine classified advertisement website olx.ph²⁴. This seller promoted having a farm and being the largest glass eel exporter in the business, having been exporting to mainland China, Hong Kong, Korea, Japan and Taiwan for more than five years.

¹⁷ http://olx.ph/43937342: "Aparri, Cagayan is known for a huge population of Anguilla bicolor, pacifica, and japonica. We have been supplying eel fry to our clients for several years now. We can deliver 300 to 900 kilograms / week. And we can deliver to any point of Luzon or Manila. Our packaging is export ready. Upon arrival of the goods to Manila, we replace the water and refill the bag with oxygen. Each bag is weighed at 1 kilogram containing approximately 6,000 pieces of healthy eel fry."

¹⁸ http://olx.ph/45502550: "Davao Del sur is known for a huge population. We have been supplying eel fry to our clients for several years now. We can deliver 300 to 600 kilograms / week to any point of Luzon, Manila or overseas. Our packaging is export ready." http://olx.ph/48323381: South Cotabato "Eel fry for sale. 1-3g average weight, 2 weeks weaned to fry. Export packing".

¹⁹ https://ja-jp.facebook.com/davaoeel

http://www.maff.go.jp/e/jas/jas/system.html

²¹ This size eel is often referred to as "Curoco" in adverts (using various different spellings).

²²http://www.unagi.info/index.html

http://www.jetro.go.jp/ttppoas/anken/0001140000/1140594 j.html#

²⁴ http://olx.ph/48486317; http://olx.ph/48076804; http://olx.ph/48467804

Finally, it is interesting to note that according to Gutierrez (1977), in the late 1970s there were four known *Anguilla* eel culture projects in the Philippines, three in Luzon and one in Mindanao. The Fisheries Administrative Order 107²⁵, which banned the export of juvenile eels ≤15cm between 1973 and 1986, reportedly benefitted these companies greatly, ensuring there were enough glass eels to supply the local farms and keeping prices down. The main problem hampering progress was supposedly the high cost of feed (Gutierrez, 1977).

Enforcement action - seizures/operations

Since the ban on export of juvenile eels ≤15cm from the Philippines in May 2012, information on three seizures by Philippine authorities has been made publically available. These were shipments of glass eels destined for Hong Kong, Taiwan and Korea. The Philippines was also identified as a potential transit point for illegal trade in *A. anguilla* as part of another seizure and wider operation involving European authorities. Further details of these four seizures are provided in Table 2.

Table 2 Summary of publically available information on seizures of glass eels involving the Philippines.

| Seizure Date/ | Transport/ | Shipment | Further details | Sources |
|---|---|--|---|---|
| Location | Trade Route | Details | | |
| 17/12/2012 Ninoy Aquino International Airport, Manila | Philippines → Korea Cebu Pacific flight FJ 190 Manila to Seoul | 9 plastic bags in 7 boxes of glass eels (100 000 eels) | Boxes were checked in by Korean national Cho Young Sok bound for Incheon, Korea. Sok's request for quarantine clearance was denied upon identification of the contents by quarantine officers. | http://news.pia.gov.ph/ind ex.php?article=1851355882 957 |
| Export Division, Pair Cargo warehouse, Terminal 1, Ninoy Aquino International Airport, Manila | Philippines → Taiwan China Airlines flight CI 712 Manila to Kaohsiung | 256 kg of glass eels (13 boxes) | Initially declared as "live tropical fish". Unidentified person brought boxes to a trade control examiner at Pair Cargo warehouse. When Customs officer started opening the boxes to inspect their contents, the person left the shipment, saying he would return to bring the documents, but he did not. | http://www.interaksyon.co m/article/43348/1-12-m- worth-of-banned-eel-fry- destined-for-taiwan- intercepted-at-naia http://www.philstar.com/ metro/2012/09/18/850125 /boc-intercepts-p7-m- taiwan-bound-baby-eels |
| 08/07/2012 Maiscor warehouse, near Terminal 1, Ninoy Aquino International Airport, Manila | Philippines → Hong Kong Cathay Pacific flight CX 904 Manila to Hong Kong Originating in Cagayan province | 332 plastic bags in 46 boxes of glass eels, gross weight 949 kg | Were scheduled to be shipped by company Expertrans. Reportedly abandoned when Expertrans asked about their contents. | http://www.bfar.da.gov.ph /pages/AboutUs/news/box esofethreatenedelvers 10J uly12.html http://www.philstar.com/h eadlines/2012/07/09/8259 45/baby-eels-bound-hong- kong-seized |
| 12/2011 Sofia Airport | Spain → Bulgaria → Philippines Private Charter flight from Galicia to Sofia, then postal shipment to Philippines Originating in Spain and possibly Portugal | 120 kg glass eels Price 450 EUR/kg declared from Spain to Bulgaria, changed to 45 EUR/ kg for leaving Bulgaria | Intercepted by Customs in Sofia airport, in postal shipment. Final destination believed to be mainland China. Seizure arose as part of Spanish Operation "Suculenta". | In litt, Spanish CITES Management and Enforcement Authorities; http://sofiaecho.com/2011 /12/29/1735858 customs- officers-at-sofia-airport- seize-120-kg-of- endangered-anguilla-eels http://www.fis.com/fis/wor ldnews/worldnews.asp?mo nthyear=&day=26&id=5096 2&l=e&special=&ndb=1%20 target |

²⁵ http://www.bfar.da.gov.ph/LAW?fi=223#post

The Spanish enforcement operation focusing on illegal trade in eels "Operación Suculenta" commenced in October 2011 and was conducted by the Environmental Procedure Central Unit (UCOMA) of the Nature Protection Service (Seprona) of the Guardia Civil. One and half tonnes of glass eels valued at over EUR 1.6 million were seized, of an estimated five to six tonnes illegally exported out of the EU during the 2011-2012 European glass eel fishing season (from approximately October to May). Fourteen people were arrested, including Spanish, Romanian and Bulgarian nationals.

The glass eels came from Spain and Portugal - they were purchased in Asturias and Galicia and then mislabelled (both origin and product type/value) to enable export to Asia. Products were labelled as "Fisheel", A. rostrata, chilled fish (dead, ready for consumption), fishing worms or baby Mugil cephalus (Flathead Mullet). For example, boxes full of mullet were stacked on top of those with glass eels, in the hope that the latter went unchecked. Illegal activities involved a network of several companies. Most of the people involved had been working in the eel farming and marketing sectors for years, however some new "opportunistic" traders were also identified, such as transport companies.

Spanish and Bulgarian authority collaboration as part of this operation resulted in the seizure of 120 kg of glass eels in Sofia airport (destined for the Philippines) in December 2011. It is believed that the Philippines was being used as a transit country, when there was a high risk of shipments being seized if sent directly to mainland China or Korea. On permits accompanying the shipment from Spain to Bulgaria, the value was declared as 450 EUR/kg (total value EUR 54 000). In Bulgaria this was changed to 45 EUR/kg (total value EUR 5400) (A. Galilea Jiménez, CITES MA Spain; J. M. Vivas Prada, Guardia Civil; in litt., July 2014).

Intelligence collected as part of the Spanish operation is corroborated by the Philippines import data for 2011 (see Figure 9). Together with information obtained from East Asian 2012-2014 eel fry import data, seizures and online advertisements (showing that shipment of eels below the size authorized to be exported from the Philippines has been ongoing since May 2012), this highlights the usefulness of analysing various sources of information to identify the potential scale and routes used for illegal trade. Finally, in addition to these published sources, anecdotal information acquired from traders and other stakeholders can be a useful basis for further research. For example, there have been unconfirmed claims that Malaysia and Thailand are being used as transit countries for eels being smuggled out of Indonesia and the Philippines to East Asia.

Live eel trade – other live eel

Table 7 in the Annex shows annual imports of "other live eel" (not for farming purposes) into the five main East Asian eel trading/producing countries/territories for the last ten year period 2004-2013, by source. Mainland China and Taiwan were by far the main suppliers of other live eel (having been produced from live eel fry imported into farms and grown out there), responsible for over 90% of trade. These were followed by Indonesia, Bangladesh, Australia and the Philippines. According to East Asian import data, nearly 1400 tonnes of other live eel was imported from the Philippines between 2004 and 2013.

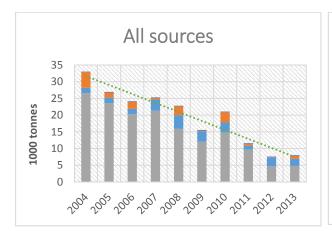
Other live eel imports into East Asia declined significantly during this period, from over 30 000 tonnes in 2004 to fewer than 8000 tonnes in 2013. However, as for eel fry imports (see Figure 10), imports from the Philippines increased significantly from 17 tonnes in 2004 to 437 tonnes in 2013, making up 5.5% of East Asian imports in 2013 (Figure 16). Japan was consistently the main importer across these years (from all sources), however the majority of imports from the Philippines came into Hong Kong and mainland China.

It is important to note that there appears to be a large discrepancy between the Philippines export data downloaded from UN Comtrade (and presented in Figures 7 and 8) and the import data reported by Asian Customs²⁶. Table 8 in the Annex shows Philippine live eel exports to mainland China, Hong Kong, Taiwan, Korea and Japan (the destinations of over 99.5% of Philippine exports) reported in UN Comtrade and imports of live eel (live eel fry and other live eel grouped together) from the Philippines into these five countries/territories according to their Customs data. Although both datasets show a similar trend and

²⁶ Import data reported by mainland China, Hong Kong, Taiwan, Korea and Japan in UN Comtrade are comparable to the Customs import data acquired individually from these countries/territories.

increase in trade from the Philippines over the last decade, every year UN Comtrade export data show much higher total values, ranging from 2.5 times (in 2005) to 25 times (in 2013) greater.

Taiwan has the most detailed Customs codes for eel commodities within the region, and in addition to different sizes of eel fry for farming, it reports "other live eel" imports according to different *Anguilla* species (*A. japonica*, *A. marmorata*, other *Anguilla* spp.)²⁷, "Australian eels" and "Swamp eels". Taiwan reports trade in live Swamp eels under code 03019921-003 (a detailed extension of HS code 030199 for "other live fish" which can include a large number of unknown species)²⁸. Figure 17 shows Taiwan imports of Swamp eel from the Philippines in recent years. There was no reported trade before 2009, but in 2012 and 2013 annual imports reached 200-250 tonnes. As Taiwan (and all other East Asian destinations) reported much fewer imports of live *Anguilla* species from the Philippines than Philippines reported exports, it is possible that some of this trade was in fact Swamp eel (*Monopterus albus*) and was reported under different Customs codes by the exporter and importers. This would not explain the entire difference between datasets however, which for Taiwan, for example, in 2012 and 2013 was 1100 and 1800 tonnes respectively (see Table 8 in Annex).



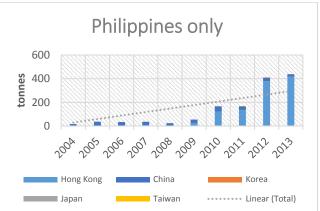


Figure 16 Total annual imports of "other live eel" into mainland China, Hong Kong, Japan, Korea and Taiwan from all sources and from the Philippines only, 2004-2013, tonnes. <u>Source</u>: East Asian Customs data, as Figure 10.

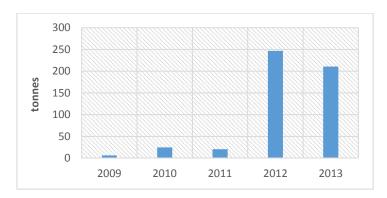


Figure 17 Taiwan imports of live Swamp Eel (Customs code 03019921-003) from the Philippines, tonnes. <u>Source:</u> Taiwan Bureau of Foreign Trade http://cus93.trade.gov.tw/ENGLISH/FSCE/.

Many of the Philippine-based companies found offering glass eels on B2B trade platforms were also offering other sizes of eel for sale – ranging from larger juveniles destined for farming to larger eels/adults for consumption (Table 5 in the Annex). In addition to these, there were a number of different companies offering purely larger size eels, such as Kumagai Shoji Co. Inc.²⁹, Caraga Seabounty Co. Ltd.³⁰, Kingsway Export and Fashion Accessories³¹ and Asbig Asia Inc.³².

²⁷ The 2011 import into Taiwan from the Philippines was reported under the species-specific code *A. marmorata* 03019210-209.

²⁸ Taiwan's detailed classifications of commodities can be searched here: https://fbfh.trade.gov.tw/rich/text/indexfhE.asp

²⁹ http://uk.alibaba.com/product/147893067-Live-juvenile-and-adult-eel.html

³⁰ http://uk.alibaba.com/product/141943714-LIVE-EEL.html

http://uk.alibaba.com/product/139255679-Live-eel.html

³² http://uk.alibaba.com/product/151529320-LIVE-EEL.html

Farming and the market for Philippine eels in East Asia

In 2012 and 2013, imports of *Anguilla bicolor* and other tropical species into East Asia for farming purposes increased significantly (Anon, 2014f), with the majority reportedly coming from the Philippines and Indonesia (Yoshinaga, 2013). Figure 18 shows the species composition of glass eels used for farming in mainland China, Japan, Korea and Taiwan between 2009 and 2014 according to data presented in the Japanese newspaper, *Nihon Yoshoku Shimbun*, in July 2014. These data assume that only *A. japonica* is farmed in Japan, *A. japonica*, *A. anguilla*, *A. rostrata* and *A. bicolor*/other tropical species (hereafter referred to as *A. bicolor* +) are farmed in mainland China and Korea, and *A. japonica* and *A. bicolor* + in Taiwan.

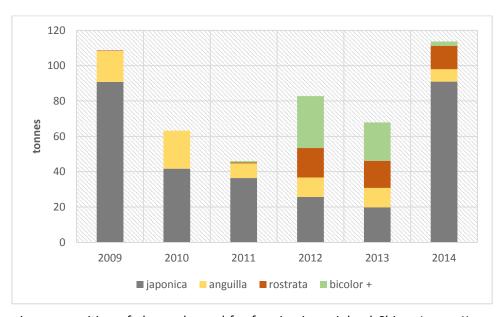


Figure 18 Species composition of glass eels used for farming in mainland China, Japan, Korea and Taiwan, 2009-2014. *Source: Nihon Yoshoku* Shimbun, 05 July 2014.

These data suggest that *A. bicolor+* was used in small quantities from 2011, and then in 2012 and 2013, nearly 30 and 22 tonnes respectively were used for farming, with these tropical species making up the largest proportion of the species used in these two years. These quantities are comparable (though slightly less) with those reportedly imported from the Philippines (see Figure 10). *Anguilla rostrata* also appeared to become increasingly important from 2012 onwards. The high quantities of *A. bicolor* corresponded with years of low availability of *A. japonica* – in 2014 quantities of *A. japonica* increased again and use of *A. bicolor+* consequently declined.

Farming of tropical eel species is being tested/is underway to varying degrees in mainland China, Japan, Korea and Taiwan. In 2012, several Japanese companies reported that farming *A. bicolor* was still very technically challenging: the best survival rate across ten companies trying to farm new *Anguilla* species (*A. rostrata*, *A. bicolor* and other tropical species) was 20%. The Shizuoka Eel Fisheries Cooperative Association reported an increase to 40% survival in 2013 for farming *A. bicolor* (Anon, 2013). In addition to difficulties with farming, selling these species can also be problematic when *A. japonica* becomes readily available, such as in 2014 (Anon, 2014d; T. Moriyama, Japan Eel Importers Association, *in litt.*, July 2014) and there have been concerns over parasites with serious human health implications being found in eels imported from the Philippines and Indonesia (Anon, 2011).

Glass eels of mixed species imported from the Philippines and Indonesia are generally farmed together as it is difficult to distinguish between the tropical *Anguilla* species at the glass eel stage, though morphological identification is reportedly possible with experience³³ (Anon, 2013). Further research into rapid glass eel identification through DNA testing (Asis *et al.*, 2014; H. Shiraishi, TRAFFIC, *in litt.*, August 2014) and

³³ http://glasseelsdavid.pixnet.net/blog/post/75007214-%e8%8f%b2%e5%be%8b%e8%b3%93%e8%8b%97%e7%8e%bb%e7%92%83%e9%ab%94%e5%88%E2%80%A6

determining which seasons result in higher proportions of certain species in catch (Aoyama, 2013; see discussion under monthly trade data for live eel fry) are ongoing. Yoshinaga (2013) carried out DNA analysis of over 80 different eel products found in fast food restaurants and supermarkets in Japan between 2011 and 2013 and only found one retailer selling *A. bicolor*, which was reportedly sourced from Indonesia. However, one company (Kaneka) is reportedly selling Philippine-sourced eels that have been farmed in Japan, with 50 tonnes having entered the market in 2013 (Anon, 2014g).

Furthermore, processed eel products derived from *A. bicolor* and *A. marmorata* glass eels imported from the Philippines and farmed in mainland China have entered the Japanese market – in 2013, 300 tonnes were imported (Anon, 2013). Mainland China reportedly attempted to export three times this quantity, however the remainder did not pass Japan's tests for chemical residues. Eel farms in mainland China use a number of chemicals which are not permitted on the Japanese market. Mori *et al.* (2013) identified the presence of malachite green, furazolidone, dicofol and endosulfan in eel products as the reasons for rejection of shipments coming from mainland China by the Japanese Ministry of Health, Labour and Welfare between 2006 and 2011. Many of the eels derived from the Philippines and grown out in mainland China are either consumed in China or exported to other markets such as Russia (T. Moriyama, Japan Eel Importers Association, *in litt.*, July 2014). *Anguilla bicolor* (market name: Black Eel) from the Philippines is also for sale in Taiwan and one Taiwanese fisheries products company specifically noted that there was high competition for Philippine glass eel shipments from Korean traders³⁴.

³⁴http://www.webdo.cc/cayenne_in/portal_c1_cnt_page.php?owner_num=c1_73119&button_num=c1&folder_id=10005&cnt_id=129802&search_field=&search_word=&search_field2=&search_word2=&search_field3=&search_word3=&bool1=&bool2=&search_type=1&up_page=1

Conclusions

Although there are discrepancies between datasets, in addition to a number of uncertainties related to the actual eel commodities in trade (species and life stages), the various data and information sources analysed for this report suggest that the Philippines became an increasingly important player in both the legal and illegal global eel markets from 2011 onwards, and in particular in 2012 and 2013.

According to global FAO capture data, in 2012 the Philippines was responsible for 8% of global *Anguilla* catch and according to exports reported to UN Comtrade, the Philippines exported 24% and 44% of the world's live *Anguilla* spp. in 2012 and 2013 respectively. The Philippines traded principally in live eels and the main destinations for these commodities were the four principal eel farming/consuming countries/territories in East Asia: mainland China, Japan, Korea and Taiwan, in addition to Hong Kong, which is a major trade hub for live eel. Total East Asian imports of both live eel fry (for farming purposes) and other live eel (for consumption) declined over the last decade, however the quantities sourced from the Philippines increased.

According to East Asian Customs data, in 2012 and 2013, the Philippines was the source of 29% of total East Asian live eel fry imports and 5.5% of other eel imports. Similar percentages for the Philippines' role in supplying live eel fry arose from analysis of advertisements for glass eels on the main global B2B trade platforms in July 2014 (30% of advertisements were from companies based in the Philippines) and also from East Asian farming data, which suggests that in 2012 and 2013, 35% and 32% of all live eel fry used in farms was *Anguilla bicolor* or other tropical species (sourced from the Philippines, and possibly other countries such as Indonesia). The small amount of 2014 data available at the time of writing this report suggest that imports of live eel fry from the Philippines at the start of 2014 were much lower than in the two previous years, however, due to much improved recruitment and a consequent abundant supply of *A. japonica* in East Asia.

Since May 2012, export of juvenile eels ≤15cm from the Philippines has been banned. According to East Asian Customs data, live eel fry imports from the Philippines continued after May 2012, in 2013 and in early months of 2014. The exact size of live eel fry being imported into mainland China, Hong Kong and Japan is not defined in Customs codes, and therefore their imports could potentially include larger size juveniles over 15 cm, which are permitted for export. Traditionally, however, the smaller glass eels have been the "seed" of choice, and Taiwanese and Korean data which differentiates between the different sizes being imported, show that eels ≤15cm continued to be imported after May 2012. Information collated from online advertisements, company websites, social media sites, blogs and seizures all support this. Intelligence collected during a Spanish enforcement operation 2011-2012, combined with UN Comtrade import data, also suggest that the Philippines was being used as a transit country for illegal eel trade of *A. anguilla* from the EU. Furthermore, large discrepancies between catch and trade datasets from local, national and international sources raise concerns over potential illegal and unreported fishing of eels in the Philippines.

Historically, Cagayan Valley has been the primary area of *Anguilla* fishing within the Philippines. However, comparisons of catch and trade data, online advertisements and further research suggest that other areas in the Philippines are becoming increasingly important, in particular Mindanao. In addition to catching glass eels for export, there appears to be a move to initiate farming, or at least the "growing out" of eels to sizes permitted for export (over 15 cm in length). The trade data also suggest that, in addition to the Philippines, many other countries have become increasingly important sources of live eel fry, including Canada, USA and the Dominican Republic in the Americas, Madagascar in Africa, and Viet Nam, Malaysia, Thailand and Indonesia in South-East Asia. In addition, Bangladesh, Indonesia and Myanmar are increasingly supplying other live eel to East Asia.

The information presented in this report clearly shows the ever-changing dynamics of eel trade and that if *A. japonica* recruitment in East Asian waters is low, other sources of *Anguilla* will be found (legally or illegally); and their availability/recruitment will in turn affect exploitation of other sources. Increased controls and management in certain source countries, such as EU Member States, Philippines, Indonesia and the Dominican Republic (all of which currently have export bans in place) and changes in consumption behaviour/demand are also affecting trade dynamics.

All these factors, together with other threats potentially affecting eels in the Philippines, such as pollution and habitat destruction, need to be considered when deciding on appropriate eel conservation and management measures in the Philippines. The recommendations presented below focus on eel conservation and management action related to pressures from over-harvesting, however it is important they are considered in light of other potential threats to eels. They are broken down into three main categories 1) data collection, monitoring and availability, 2) legislation and enforcement and 3) additional collaboration and consultation with stakeholders.

The majority of recommendations are aimed at Philippine authorities, including the national and regional offices of BFAR, BAS, BMB, Bureau of Customs and Local Government Units (LGUs), as it is being proposed that these organisations consider, initiate and lead these activities as part of the three-year Darwin project, in collaboration with ZSL and TRAFFIC. However, all recommended actions would benefit from the greatest national and third-country stakeholder and partner participation possible, including support from fishermen, trade associations, scientific and socio-economic researchers and non-governmental organizations. Furthermore, most of the recommended activities would benefit from longer-term planning, implementation and adaptive management, beyond the initial three year project.

Recommendations

Data collection, monitoring and availability

The national and regional offices of the Bureau of Fisheries and Aquatic Resources (BFAR), Bureau of Agricultural Statistics (BAS) and Local Government Units (LGUs) across the Philippines, are urged to:

- Assign clear responsibilities amongst the various authorities for reporting, monitoring and analysis of
 global, national and local datasets and resources available on eel catch and trade relevant to the
 Philippines, ensure this continues on a regular basis and make this information publically available.
- Investigate and address the reasons for the many data discrepancies identified throughout this report, including the large differences between Philippine eel catch data (local and national) and live eel export data (for 2012 and 2013 in particular), and between reported exports and imports of Anguilla to Taiwan; further research into the scale of the domestic market for Anguilla would also be warranted.
- Collect, record and make publically available catch data which as a minimum differentiate between
 Anguilla spp. and Monopterus albus, and the main life stages of Anguilla spp. It would also be
 important to consider the feasibility of reporting Anguilla catch to the species level, in particular the
 two main species A. marmorata and A. bicolor, and the newly described A. luzonensis.
- Collate details and develop an online register of farming or "growing out" facilities currently operating
 or being set up in the Philippines; and collect, record and make publically available farming data (as
 for catch).
- Improve accessibility of national Customs trade data and introduce specific Customs codes for different life stages of Anguilla and for M. albus. This should be carried out in consultation with the Philippines Bureau of Customs and other countries/territories, in particular Taiwan and Korea, which have already introduced these types of codes. Size and species categories should ideally be comparable across countries/territories further research into sizes and weights of the various life stages of different Anguilla species would be of considerable use in developing appropriate conversion factors and guidelines for accurate reporting of trade.
- Participate in and/or organize training at the national and local levels to improve capacity for collecting and analysing catch, farming and trade data, throughout the supply chain in the Philippines.

Legislation and enforcement

The national and regional offices of BFAR, the Biodiversity Management Bureau (BMB) and LGUs across the Philippines, are encouraged to:

- Analyse the conservation, socio-economic, implementation and enforcement implications of current/potential management measures for eels at the international, national, regional and local levels. These include CITES listings, export bans, development of a traceability system for catch and trade in eels, restrictions on types of fishing gears used, national and local registers and/or permit systems for fishermen and farming operations, setting effort and catch limits and designating reserves.
- Develop complementary national, regional and local legislative instruments for eel conservation and management (based on the afore-mentioned analysis). Consultation and exchange of experiences between different regions in the Philippines is especially important for ensuring the creation of consistent and mutually supportive local ordinances by LGUs.
- Ensure any current or new management measures are implemented and enforced at the appropriate level, through clear assignation of roles and training of officials in issues such as national and local legislation, inspection procedures for farming operations and species identification.
- Make all national, regional and local legislative instruments for eel conservation and management publically available on a searchable online portal.

While Fisheries Administrative Order 242 (and corresponding export ban for juvenile eels ≤15cm), the CITES listing of *A. anguilla* and eel export bans in other countries remain in force, it is recommended that relevant national and regional offices of BFAR, in collaboration with Philippine Bureau of Customs:

- Enhance national enforcement effort and capacity through sharing of information, training and
 establishing enforcement priorities/a risk assessment model for Philippine eel trade. This could be
 based initially on some of the information collated in this report (and inputted into the TRAFFIC
 database), such as main or newly important destinations (e.g. Hong Kong, Korea) and routes, months
 of highest known catch/trade and companies suggesting they are able to supply large quantities in
 their online advertisements.
- Co-operate and share intelligence and information on national legislation with consumer countries/territories, in particular with authorities in Hong Kong, mainland China, Korea, Japan and Taiwan, and with countries in Southeast Asia, such as Indonesia, Malaysia and Thailand, which may be used as transit points for illegal shipments. Opportunities for collaboration through the Association of Southeast Asian Nations' Wildlife Enforcement Network (ASEAN-WEN)³⁵ could be explored.
- Exchange experiences and collaborate with other Anguilla spp. range States in relation to implementation and enforcement of CITES provisions and national export bans, e.g. EU Member States, Indonesia and the Dominican Republic.

Additional collaboration and consultation with stakeholders

Demand from East Asian eel farming and consumer countries/territories is the cause of increased exploitation of tropical eels from the Philippines and therefore collaboration with consumer markets is essential. In addition, these countries/territories have considerable expertise and knowledge in relation to *Anguilla* spp. biology, species identification, farming potential and capacity, and market and consumer demand/preferences, in addition to participating in extensive ongoing research in these areas.

Philippine authorities and other stakeholders are therefore encouraged to:

- Contact fisheries authorities, trade and farming associations and researchers in East Asia, to raise
 awareness of concerns and the importance of improving traceability and legality of sourcing of eels
 from the Philippines. Discussions could possibly initiated through the East Asia Eel Resource
 Consortium (EASEC)³⁶, which aims to bring together East Asian countries/territories to conserve
 shared eel resources and which has invited the Philippines, Indonesia, Malaysia and Viet Nam to
 previous meetings.
- Request support from East Asian experts with regard to developing in-house capacity in species identification and eel farming techniques.
- Collaborate and develop ongoing relationships with global B2B trade platforms such as Alibaba.com, including contacting these on a regular basis to request the removal of advertisements offering potentially illegally sourced eels.

_

³⁵ http://www.asean-wen.org/

³⁶ http://easec.info/EASEC WEB/EASECdeclarationsFinal.pdf

References

Ame, E., Ayson, J. and Ame, R. (2013). Status of Elvers Fisheries in Cagayan Province, Luzon, Philippines. *Kuroshio Science* 7(1): 41-48. https://ir.kochi-u.ac.jp/dspace/bitstream/10126/5255/1/kuro.7.1.4.pdf

Anon (2011). Dangerous parasite discovered in imported eels. *English.EastDay.com.* 18 May 2011. http://english.eastday.com/e/110518/u1a5895312.html

Anon (2013). Survival strategy of the eel farming industry and how to distinguish eel species. *Aquaculture Business*. 01 June 2013.

Anon (2014a). Cheaper Bicolor with similar texture could replace Japanese Eel. *Chinatimes.com.* 14 June 2014 http://www.chinatimes.com/realtimenews/20140614002615-260405

Anon (2014b). From electrical power generation to eel farming in Mindanao, Philippines: Chodai, construction company, will become a regional development model. *Global Interface Japan.* 30 April 2014. http://hri.hidajapan.or.jp/u/news/g4dz1if9mfcki4

Anon (2014c). DNA reveals illegal trade of aquatic species. *Business Mirror*. 14 June 2014 http://www.businessmirror.com.ph/index.php/en/features/science/33818-dna-reveals-illegal-trade-of-aquatic-species

Anon (2014d). Will the price of roasted eel go up or down this year? *Nikkei* (Chinese version). 11 June 2014 http://cn.nikkei.com/industry/tradingretail/9661-20140611.html

Anon (2014e). Trying to protect traditional eel food culture: wholesaler in Kuwana and eel farm are farming foreign species. *Ise Simbun*. 06 January 2014. http://www.isenp.co.jp/news/20140106/news01.htm

Anon (2014f). 91 tonnes of *A. japonica* introduced into farms in four countries. *Nihon Yoshoku Shimbun*. 05 July 2014.

Anon (2014g). The spread of use of alien eel species, including from the Philippines. *Nikkei Online*. 08 April 2014. http://www.nikkei.com/article/DGXNASDJ0500L V00C13A4MM0000/

Aoyama, J. (2013). Glass Eels in the Philippines – a preliminary report of the species composition in the Cagayan River. Presentation at the 16th annual meeting of the East Asia Eel Resource Consortium (EASEC). Tokyo, Japan. 01 December 2013.

Asis, A.M., Lacsamana, J.K. and Santos, M.D. (2014). Illegal trade of regulated and protected aquatic species in the Philippines detected by DNA barcoding. *Mitochondrial DNA*. 19: 1-8. 19 May 2014.

BAS (2013). *Monthly Regional Agricultural Situation Report, Northern Mindanao, April 2013.* Philippine Bureau of Agricultural Statistics. http://www.bas.gov.ph/?ids=masr&id=752&mon=2013-04

BFAR (2012a). BFAR issues ban on elver exportation. *Official Gazette*: 03 May 2013. http://www.gov.ph/2012/05/03/bfar-issues-ban-on-elver-exportation/

BFAR (2012b). *Annual Report 2012*. Bureau of Fisheries and Aquatic Resources Region No.2. http://region2.bfar.da.gov.ph/Downloads/BFAR2012AR.pdf

BFAR (2013a). BFAR pushes for eel conservation. *KALAP – A Semestral Newsletter of BFAR R02*: 14 (1): January – June 2013. http://region2.bfar.da.gov.ph/Downloads/KALAPVol14No01jul29.pdf

BFAR (2013b). BFAR-2 launches Oplan Kiwet project. *Balita*: 23 August 2013. http://balita.ph/2013/08/23/bfar-2-launches-oplan-kiwet-project/

Crook, V. (2010). *Trade in Anguilla species, with a focus on recent trade in European Eel* A. anguilla. TRAFFIC. Report prepared for the European Commission. <u>www.traffic.org/species-reports/traffic_species_fish38.pdf</u>

Crook, V. and Nakamura, M. (2013). Glass eels: Assessing supply chain and market impacts of a CITES listing on *Anguilla* species. *TRAFFIC Bulletin* 25(1): 24-30. http://www.traffic.org/traffic-bulletin/traffic pub bulletin 25 1.pdf

Froese, R. and Pauly, D. (eds.) (2014). FishBase www.fishbase.org. Version 06/2014.

Gutierrez, P.C. (1977). *The Prospect of Eel Culture in the Philippines*. BFAR, Manila, Philippines. http://www.apfic.org/Archive/symposia/1976/33.pdf

Henkel C.V., Burgerhout E., de Wijze D.L., Dirks R.P., Minegishi Y., Jansen H.J., Spaink H.P., Dufour S., Weltzien F.A., Tsukamoto K., van den Thillart G.E.E.J.M. (2012). Primitive Duplicate Hox Clusters in the European Eel's Genome. *PLoS ONE* 7:e32231.

Jacoby, D. and Gollock, M. (2014). Anguilla bicolor, Anguilla celebesensis, Anguilla japonica, Anguilla luzonensis and Anguilla marmorata. The IUCN Red List of Threatened Species. Version 2014.2: www.iucnredlist.org

MAFF (2014). *Consideration of supporting measures for eel farming*. Ministry of Agriculture, Forestry and Fisheries, Fisheries Agency. 01 April 2014. http://www.jfa.maff.go.jp/j/press/saibai/140401.html

Mori, R., Nabeshima, K. and Yamada, N. (2013). Food Safety Control System of Chinese Eel Exports and its Challenges. Institute of Developing Economies. IDE discussion paper no. 418. May 2013. http://ir.ide.go.jp/dspace/bitstream/2344/1244/1/ARRIDE Discussion No.418 mori.pdf

Satanake, M. (2014). Asia's other frontier in the Philippines. *Nikkei Asian Review*. 02 July 2014. http://asia.nikkei.com/Politics-Economy/Economy/mindanao

Shiotsuki, Y. (2013). Made in Philippines becomes made in Japan. *Asahi Shimbun weekly (AERA)*. 11 August 2013.

Teng H-Y., Lin Y-S, Tzeng C-S. (2009). A new Anguilla species and a reanalysis of the phylogeny of freshwater eels. *Zoological Studies* 48:808-822. <u>zoolstud.sinica.edu.tw/Journals/48.6/808.pdf</u>

TRAFFIC (2012). *TRAFFIC and Alibaba.com work together to prevent illegal exports of young eels from the Philippines*. Beijing, China, 26th October 2012. http://www.traffic.org/home/2012/10/26/traffic-and-alibabacom-work-together-to-prevent-illegal-expo.html

TRAFFIC (2013). *E-commerce, logistics firms commit to protect endangered species.* Beijing, China, 2nd September 2013. http://www.traffic.org/home/2013/9/2/e-commerce-logistics-firms-commit-to-protect-endangered-spec.html

Watanabe, S., Aoyama, J. & Tsukamoto, K. (2009). A new species of freshwater *eel Anguilla luzonensis* (Teleostei: Anguillidae) from Luzon Island of the Philippines. *Fisheries Science* 75: 387-392.

Yoshinaga, T. (2013). *Tropical eels in the market*. Presentation at the 16th annual meeting of the East Asia Eel Resource Consortium (EASEC). Tokyo, Japan. 01 December 2013.

Yoshinaga, T., Aoyama, J., Shinoda, A., Watanabe, S., Azanza, R.V. and Tsukamoto, K. (2014). Occurrence and biological characteristics of glass eels of the Japanese eel *Anguilla japonica* at the Cagayan River of Luzon Island, Philippines in 2009. *Zoological Studies* 53:13. http://www.zoologicalstudies.com/content/53/1/13

Annex

Table 3 Imports of "live eel fry" for farming (all sizes) into East Asia (mainland China, Hong Kong, Japan, Korea, Taiwan) by source, 2004-2013, kg. <u>Source</u>: East Asian Customs data: mainland China - requested from China Customs Information Centre; Hong Kong Trade Development Council http://bso.hktdc.com/bso/jsp/bso-home.jsp; Ministry of Finance, Trade Statistics of Japan http://www.customs.go.jp/toukei/info/index-e.htm; Korea International Trade Association http://cus93.trade.gov.tw/ENGLISH/FSCE/.

| Source | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | Total |
|--------------------------|--------|--------|--------|--------|--------|--------|--------|-------|-------|--------|---------|
| Japan | 39043 | 48790 | 60086 | 51907 | 28567 | 57875 | 23444 | 27355 | 5155 | 2110 | 344332 |
| France | 41468 | 51991 | 27939 | 41460 | 28045 | 6005 | 15413 | 0 | 0 | 0 | 212321 |
| Hong Kong | 4549 | 6871 | 19741 | 7111 | 24584 | 22142 | 25850 | 20204 | 14290 | 21103 | 166445 |
| China | 2456 | 3950 | 20196 | 386 | 44886 | 47125 | 40436 | 3054 | 672 | 2358 | 165519 |
| Philippines | 0 | 6168 | 1130 | 8563 | 13774 | 1993 | 3347 | 16379 | 34549 | 32388 | 118291 |
| Taiwan | 21677 | 34968 | 30657 | 11561 | 80 | 92 | 0 | 568 | 858 | 2227 | 102688 |
| Canada | 1675 | 6373 | 4891 | 1280 | 5420 | 6536 | 8146 | 13836 | 15033 | 18609 | 81799 |
| USA | 404 | 802 | 4498 | 3649 | 2319 | 1461 | 1367 | 5764 | 12188 | 26593 | 59045 |
| Spain | 5972 | 10436 | 6144 | 7664 | 6699 | 750 | 6585 | 1360 | 0 | 0 | 45610 |
| UK | 3239 | 5855 | 2008 | 1282 | 1282 | 0 | 553 | 0 | 0 | 200 | 14419 |
| Viet Nam | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13739 | 13739 |
| Madagascar | 0 | 262 | 40 | 0 | 403 | 1370 | 22 | 1797 | 3783 | 5562 | 13239 |
| Morocco | 0 | 0 | 0 | 0 | 0 | 837 | 3413 | 2612 | 1973 | 3093 | 11928 |
| Malaysia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 402 | 9354 | 9756 |
| Korea | 2805 | 187 | 1783 | 99 | 480 | 820 | 408 | 150 | 1042 | 0 | 7774 |
| Denmark | 1190 | 0 | 0 | 0 | 2997 | 1500 | 1500 | 0 | 0 | 0 | 7187 |
| Greece | 0 | 0 | 0 | 0 | 0 | 0 | 51 | 1846 | 3199 | 0 | 5096 |
| Indonesia | 0 | 90 | 0 | 0 | 182 | 87 | 868 | 636 | 1045 | 2008 | 4916 |
| Thailand | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 498 | 3569 | 4067 |
| Singapore | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3304 | 3304 |
| Germany | 1125 | 0 | 0 | 256 | 150 | 0 | 0 | 0 | 0 | 0 | 1531 |
| Australia | 197 | 333 | 458 | 0 | 263 | 0 | 0 | 0 | 0 | 0 | 1251 |
| Dominican Republic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 351 | 875 | 1226 |
| Cuba | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 264 | 628 | 892 |
| Haiti | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 626 | 626 |
| Belgium | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 600 | 0 | 0 | 600 |
| Ireland | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 440 | 440 |
| Romania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 360 | 0 | 0 | 360 |
| Netherlands | 140 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 140 |
| Central/South America | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 80 |
| Korea DPR | 0 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 |
| Mauritius | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 22 |
| Timor-Leste | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 |
| South Africa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 |
| TOTAL | 125940 | 177076 | 179594 | 135218 | 160131 | 148593 | 131403 | 96543 | 95302 | 148886 | 1398686 |
| Total excl Hong Kong | 121391 | 170205 | 159853 | 128107 | 135547 | 126451 | 105553 | 76339 | 81012 | 127783 | 1232241 |

Table 4 ab Total imports of "live eel fry" for farming (all sizes) into East Asia (mainland China, Hong Kong, Japan, Korea, Taiwan), for two time periods 2004-2010 and 2011-2013, by source, kg. <u>Source</u>: East Asian Customs data, as for Table 3. Excluding Hong Kong as "source" for imports. RoW – Rest of the World.

| Source | 2004-2010 |
|-------------|-----------|
| Japan | 309712 |
| France | 212321 |
| China | 159435 |
| Taiwan | 99035 |
| Spain | 44250 |
| Philippines | 34975 |
| Canada | 34321 |
| USA | 14500 |
| UK | 14219 |
| Denmark | 7187 |
| Korea | 6582 |
| Morocco | 4250 |
| Madagascar | 2097 |
| Germany | 1531 |
| Australia | 1251 |
| Indonesia | 1227 |
| RoW | 214 |
| Total | 947107 |

| Source | 2011-2013 |
|--------------------|-----------|
| Philippines | 83316 |
| Canada | 47478 |
| USA | 44545 |
| Japan | 34620 |
| Viet Nam | 13739 |
| Madagascar | 11142 |
| Malaysia | 9756 |
| Morocco | 7678 |
| China | 6084 |
| Greece | 5045 |
| Thailand | 4067 |
| Indonesia | 3689 |
| Taiwan | 3653 |
| Singapore | 3304 |
| Spain | 1360 |
| Dominican Republic | 1226 |
| Korea | 1192 |
| Cuba | 892 |
| Haiti | 626 |
| Belgium | 600 |
| Ireland | 440 |
| Romania | 360 |
| UK | 200 |
| RoW | 122 |
| Total | 285134 |

Table 5: Details of advertisements on B2B Trade Platforms in July 2014 for live glass eels/eel fry (juveniles) reportedly coming from the Philippines. <u>Source:</u> Alibaba http://www.alibaba.com/, Food & Beverage (F&B) Online http://www.alibaba.com/, TradeKey http://www.tradekey.com/ and Weiku http://www.weiku.com/. All advertisements refer to eels reportedly originating in the Philippines. Names of companies are as stated in the advertisements when accessed in July 2014.

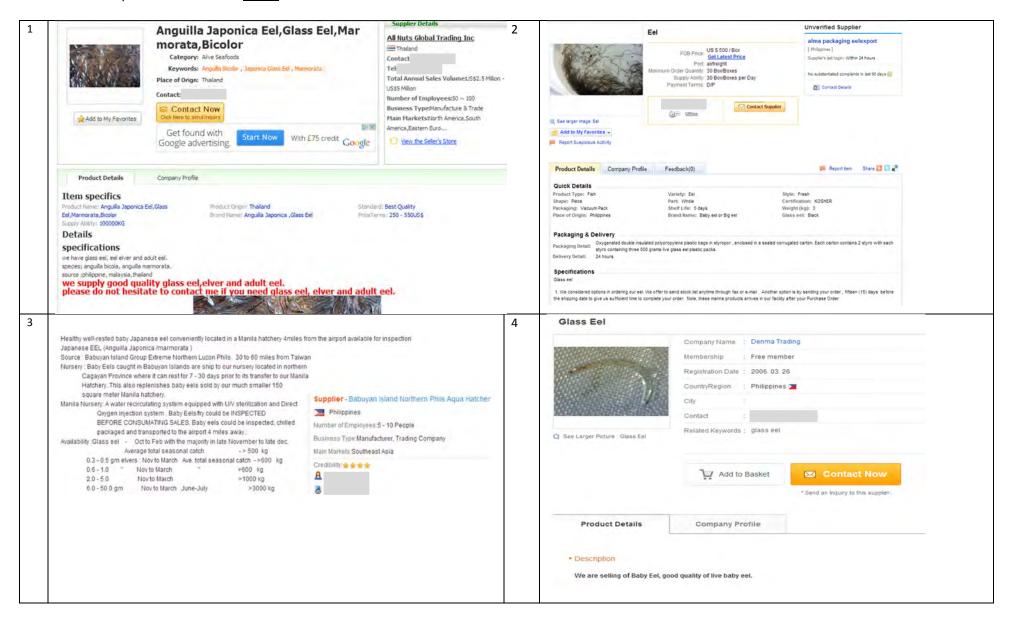
| Company/ Location | B2B Platform and advertisement link (screen shot | Species | Notes and information on product for sale (size, price, |
|----------------------------|--|-----------|---|
| | number, links to Table 6) | | availability; if specified) |
| All Nuts Global Trading | F&B http://www.21food.com/products/anguilla-japonica- | Anguilla | From Philippines, Thailand and Malaysia |
| Inc | eel,glass-eel,marmorata,bicolor-831177.html (s01) | bicolor, | Supply all sizes (glass eels, elvers, adults) |
| Thailand | | marmorata | |
| Alma Packaging Export | Alibaba http://uk.alibaba.com/product/159103611-Eel.html (s02) | Black eel | Can supply 30 boxes per day |
| Philippines | | | • USD 500 per box |
| | | | Packaging details: oxygenated double insulated polypropylene |
| | | | plastic bags in styropor, enclosed in a sealed corrugated carton. |
| | | | • Carton contains 2 styropor, each styropor contains 3 x 500 g live |
| | | | glass eel bags |
| Babuyan Island Northern | Weikuhttp://www.weiku.com/products/3853975/Japanese Eel F | Anguilla | Collected from Babuyan Island Group in extreme northern Luzon, |
| Phils Aqua Hatchery | <u>ry.html</u> (<u>s03</u>) | japonica, | then shipped to nursery in northern Cagayan where rest for 7 - 30 |
| (Jester Trading) | | marmorata | days prior to transfer to Manila |
| Philippines | | | "Healthy well-rested baby Japanese eel located in Manila hatchery |
| | | | 4 miles from the airport available for inspection". |
| | | | Availability: |
| | | | Glass eel, Oct to Feb with majority in late Nov to Dec, ~total |
| | | | seasonal catch >500 kg |
| | | | 0.3-0.5 g elvers, Nov to Mar, ~total seasonal catch >600 kg |
| | | | 0.6-1.0 g elvers, Nov to Mar, ~total seasonal catch >600 kg |
| | | | 2.0 -5.0 g elvers, Nov to Mar, ~total seasonal catch >1000 kg |
| | | | 6.0 -50 g, Nov to Mar and Jun-Jul, ~total seasonal catch >3000 kg |
| Denma Trading | EC21 http://www.ec21.com/product-details/Glass-Eel | | Glass eel for aquaculture purposes |
| Eastern Samar, Philippines | 1467499.html (s04) | | |
| AND | F&B http://www.21food.com/showroom/734640/product/glass- eel.html (s05) | | |
| Kuon Trading | Weikuhttp://www.weiku.com/products/3922294/Sell Glass Eel.h | | |
| Bulacan, Philippines | tml (s06) | | |
| Dong Jin Trading Co. Ltd | Alibaba http://uk.alibaba.com/product/151519951-live-eel.html | Anguilla | • USD800-1400/kg |
| Korea | (s07) | bicolor | • Various sizes: 1,000-800, 800-600, 500-300, 200-100 pieces per kg |
| Dragon Eels | EC21 http://www.ec21.com/product-details/Live-Eels | Anguilla | Been dealing in eels for 14 years, including Korean, Chinese, |
| Basilan, Philippines | <u>5026963.html</u> | japonica | Taiwanese and Japanese clients |
| | TradeKey http://www.tradekey.com/product-free/Live-Eels- | | • USD350/kg |
| | <u>1625658.html</u> (s08) | | = |

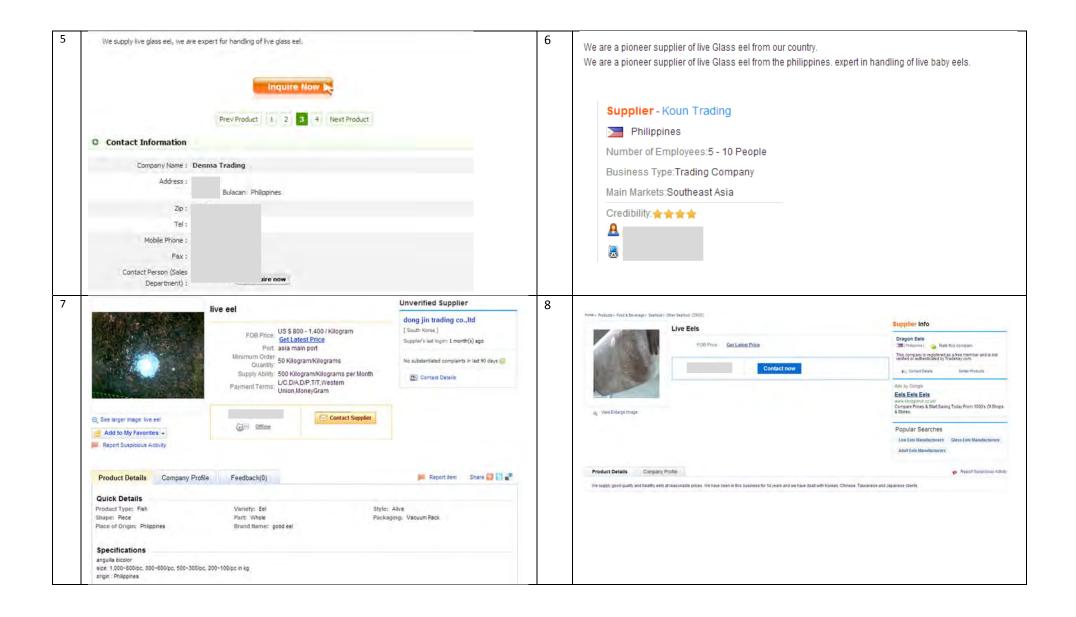
| Company/ Location | B2B Platform and advertisement link (screen shot | Species | Notes and information on product for sale (size, price, |
|---|---|--|---|
| | number, links to Table 6) | | availability; if specified) |
| East Asia Dragon Eels Catanduanes, Philippines | F&Bhttp://www.21food.com/showroom/203375/productlist/list.h tml (s09) TradeKey http://www.tradekey.com/product-free/Eels-Live-Eel-Baby-Eels-Glass-Eels-5729481.html (s10) | | Serve clients from South East Asia, Korea, Hong Kong, Japan, China, Taiwan |
| Eels for Less Philippines | Alibaba http://uk.alibaba.com/product/138107537-live-babyeels.html (s11) | | Also sell eel feed, "proven for Philippine and Southeast Asian eels" |
| Eico Marine Products Davao AND Metro Manila, Philippines | EC21 http://www.ec21.com/product-details/Live-Anguilla-Japonica-Glass-Eels4347987.html (s12) F&Bhttp://www.21food.com/showroom/63326/productlist/list.html (s13) | Anguilla bicolor, tapika, japonica and marmorata | "Only eel farm in Philippines that cultivates/breeds 100% Anguilla japonica Been dealing in glass/adult eels since 1998 "Anguilla tapika is the newest replacement for hard to find japonica, same texture, same taste and lots of fats. Better than mossambica." |
| ES Marine Trading Philippines | F&Bhttp://www.21food.com/showroom/211585/productlist/list.h tml (s14) | | Glass and adult eels |
| EUNNAM KIM Sarangani, Mindanao, Philippines | Alibaba http://uk.alibaba.com/product/150960083-live-glass-eel- Anguilla-Bicolor-Pacifica.html (s15) | Anguilla bicolor pacifica | USD 1000-1500/kg Can supply 100 kg per week and cheaper than other companies, as trading directly with fishermen ~5000-6000 eels per kg |
| Eve Eels Seafood Trading Company Metro Manila, Philippines AND J.J. Sport Chainat, Thailand | Alibaba http://uk.alibaba.com/product/151263495-Glass-Eel.html (s16 s17) http://uk.alibaba.com/product/170623601-Anguilla-Bicolor-and-Japonica-Glass-Eel.html (s18) EC21 http://www.ec21.com/product-details/Glass-Eel-8640112.html | Mix of Anguilla marmorata and bicolor (bicolor and pacifica) Specified that there was no japonica. | 2 inches long Can supply 500 kg - 1 tonne a month, have "stock rooms" in each catch area USD 1000/kg Have Japanese and Korean speaking employees to assist buyers Supply local distributors in Manila |
| EXPORTVIN TERMELO ES (EXPORT TVIN KFT) Hungary | Alibaba http://uk.alibaba.com/product/168133896-Anguilla-Bicolor-and-Japonica-Glass-Eel.html (s19) | Anguilla bicolor, japonica | Can supply 500-800 kg glass eel per month Supply glass eels from other locations incl. Indonesia, Canada and Europe. |
| First Trader Metro Manila, Philippines | TradeKey http://www.tradekey.com/product-free/Glass-Eels-3230999.html (s20) | Anguilla bicolor, pacifica, marmorata, japonica | |

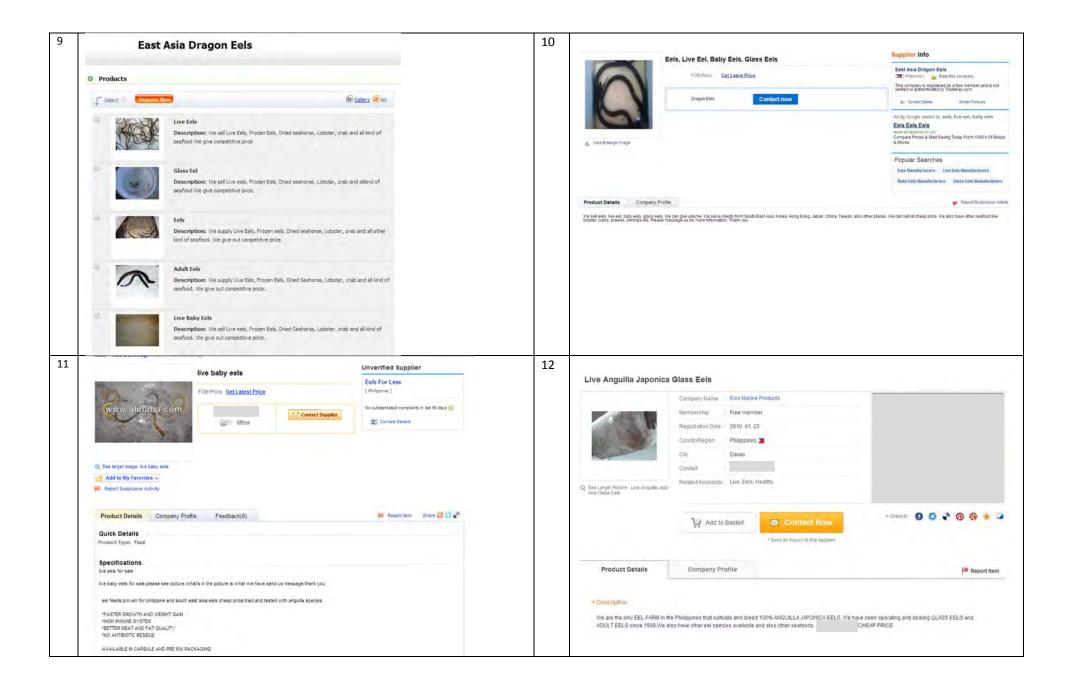
| Company/ Location | B2B Platform and advertisement link (screen shot number, links to Table 6) | Species | Notes and information on product for sale (size, price, availability; if specified) |
|--|--|--|---|
| Global Seafood SDN BHD Malaysia | Weikuhttp://www.weiku.com/products/15785346/live eel fish.html (s21) | Anguilla bicolor, japonica, marmorata | From Philippines and Malaysia 5000-6500 pieces per kg (5-6 cm) Supply all sizes (glass eels, elvers, adults), also eels from Bangladesh |
| Jiarellarn Sarangani, Mindanao, Philippines | EC21 http://www.ec21.com/product-details/Eel-Fry8308292.html (s22) | | Can supply 50-300kg per month |
| JSD Seafood Metro Manila, Philippines | EC21 http://www.ec21.com/product-details/Anguilla-Bicolor-and-Japonica-Glass8335866.html (s23) | Anguilla japonica, and bicolor (pacifica) | Can supply up to 800 kg per month Eels are quarantined in their nursery |
| KR Marine Products Corp Metro Manila, Philippines | Alibaba http://uk.alibaba.com/product/162846363-glass-eel.html EC21 http://www.ec21.com/product-details/Glass-Eel-8782823.html (s24) | Live Anguilla bicolor (bicolor and pacifica) and marmorata | Claim they can "export huge quantity of glass eel at discount price" |
| Live Glass Eel Metro Manila, Philippines | Weikuhttp://www.weiku.com/products/18738456/live glass eel. html (s25) | | Packaging details: same as for Alma Packaging Export |
| Maruai Corporation Philippines | Alibaba http://uk.alibaba.com/product/159928489-EEL.html (s26) | Black Eel, A. marmorata | Selling Glass Eel, Black Eel and "Guruku", and buying larger Marmorata 180~500 g per piece |
| Nooribio Jeollabuk-do Korea | Alibaba http://uk.alibaba.com/product/128279709-Live-glass-eel.html (s27) | Anguilla bicolor, marmorata | From Philippines and Malaysia Supply all sizes: Fry - less than 5cm Glass eel - 5~6 cm Fingerling - >7cm Elver - 7-30 cm Adult - 200g - 1 kg per piece |
| Northern Cagayan Aquatic Resources Metro Manila Philippines | F&B http://www.21food.com/showroom/734133/product/live-glass-eel.html (s28) EC21 http://www.ec21.com/product-details/Eel-Fry6621579.html (s29) | Anguilla japonica, bicolor and pacifica | Been in eel fry trading business for 8 years Main headquarters in Aparri and Santa Ana, plus office in Manila "N. Cayagan has quality eel fry preferred by clients in Taiwan, China, Japan" Can supply 300-900 kg per week Packing: chilled oxygenated double plastic bag sealed in a styrofoam container. Each bag is 1 kg with ~ 6,000 eel fry. |

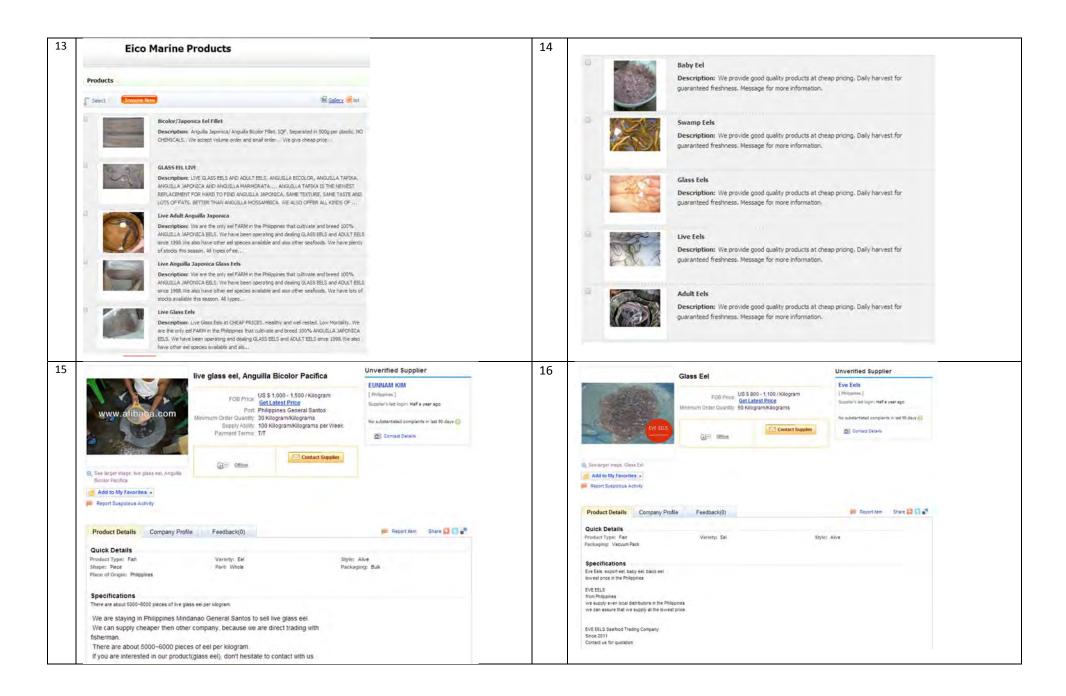
| Company/ Location | B2B Platform and advertisement link (screen shot number, links to Table 6) | Species | Notes and information on product for sale (size, price, availability; if specified) |
|--|---|--|---|
| Pacific Trade Zone Metro Manila Philippines Phiko company Philippines Samuel Manda Live Glass Eels Metro Manila | TradeKey http://www.tradekey.com/product-free/Glass-Eel-Unagi-japanese-Eel-907599.html (s30) Weiku http://www.weiku.com/products/3166139/glass_eel.html TradeKey http://www.tradekey.com/product-free/Glass-Eel-7071355.html (s31) TradeKey http://www.tradekey.com/product-free/Live-Glass-Eels-Anguilla-Bicolor5315649.html (s32) | Anguilla japonica, marmorata Anguilla bicolor and marmorata Anguilla bicolor | Can supply 300 kg per week Season: <i>japonica</i> Nov- Feb, <i>marmorata</i> Aug-Apr (northern PH) Export glass eel to Japan and Taiwan Can supply 3 tonnes per month Exported from Aparri, Cotabato, General Santos, Davao and Zamboanga cities. Current price 1500 PHP/kg |
| Philippines Sein Trade Corporation AND A Pro-Woori International Corp Metro Manila Philippines AND Busan, Korea | EC21 http://www.ec21.com/product-details/Glass-Eel-3425434.html (s33) F&B http://www.21food.com/showroom/339953/product/fry-eel.html (s34) http://www.21food.com/showroom/665708/product/glass-eel.html http://www.21food.com/showroom/437500/product/glass-eel.html (s35) Weiku http://www.weiku.com/products/4992304/glass_eel.html http://www.weiku.com/products/3207340/GLASS_EEL.html Alibaba http://uk.alibaba.com/product/136216644-Glass-eel.html http://kr1014883076.fm.alibaba.com/product/135732401-0/glass_eel.html | Anguilla japonica, marmorata and bicolor mix | 400~500g/bag 1kg/box 2.4kg/box ~6000 pieces per kg Can supply 700- 2000kg/month Supply season Nov to Feb (Jun) Ships to Hong Kong Supply glass eels from many other countries incl. Indonesia, USA, Canada, Dominican Republic. |
| Shin Sheng International Development Taiwan | Alibaba http://uk.alibaba.com/product/115915706-Live-Marbled-eels-Anguilla-marmorata-live.html (s36) http://uk.alibaba.com/product/115916009-Live-Shortfin-eels-Anguilla-Bicolor-live.html (s37) | Anguilla bicolor, marmorata | From Philippines and Indonesia Glass eels 5-6 cm (plus larger sizes) |

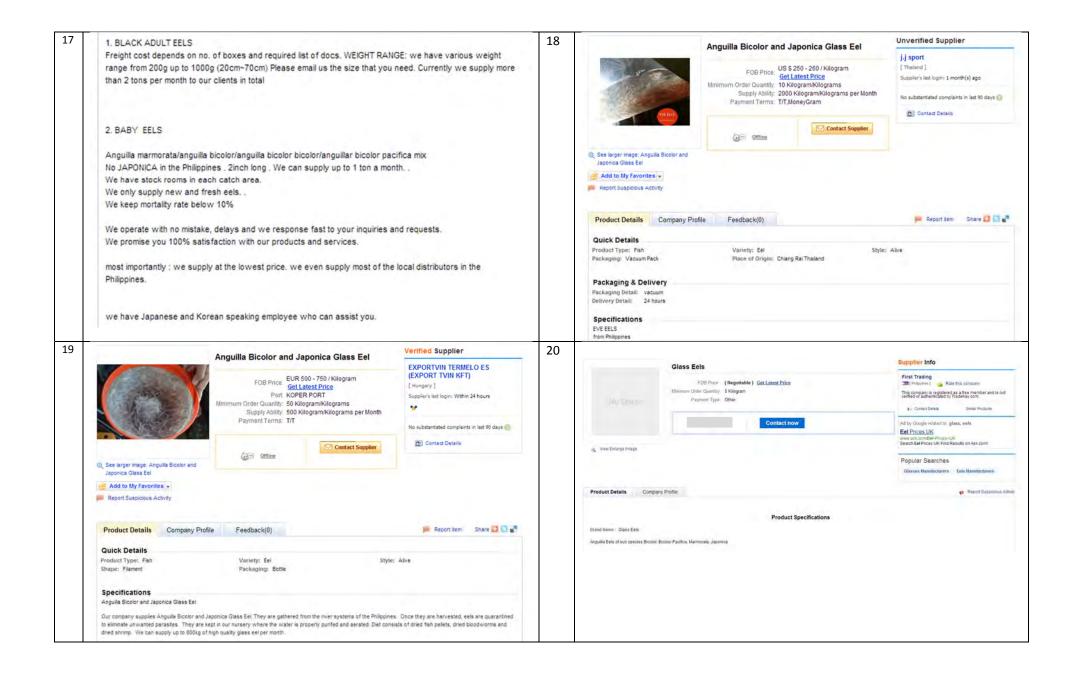
Table 6 Screen shots of advertisements on B2B Trade Platforms in July 2014 for live glass eels/eel fry (juveniles) reportedly coming from the Philippines. Images link to details provided in Table 5. *Source: See Table 5.*

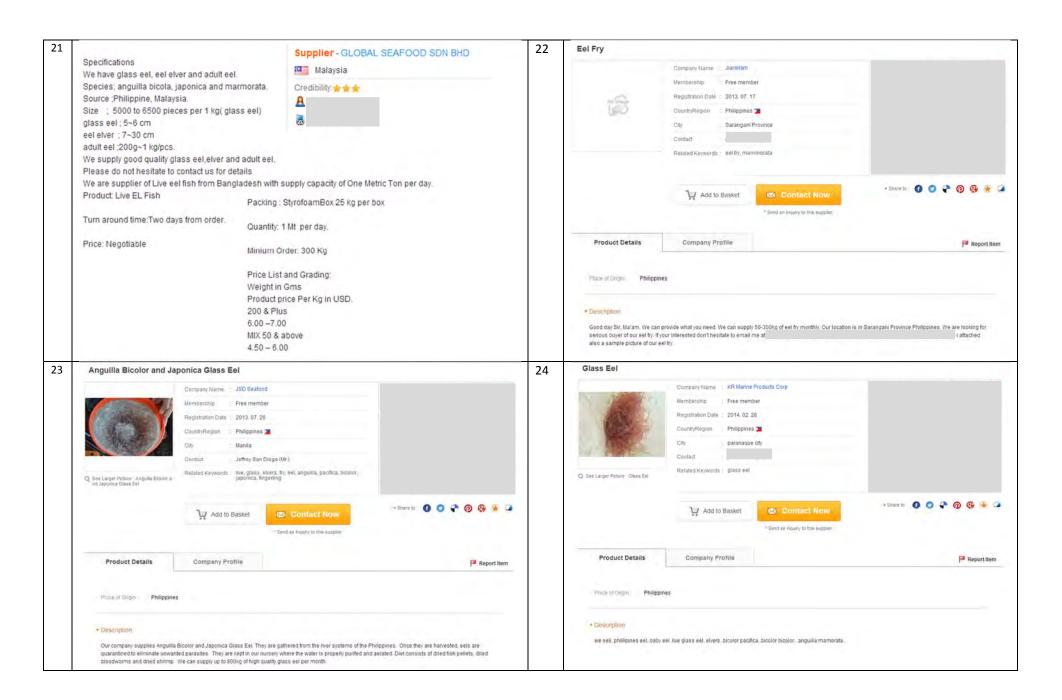


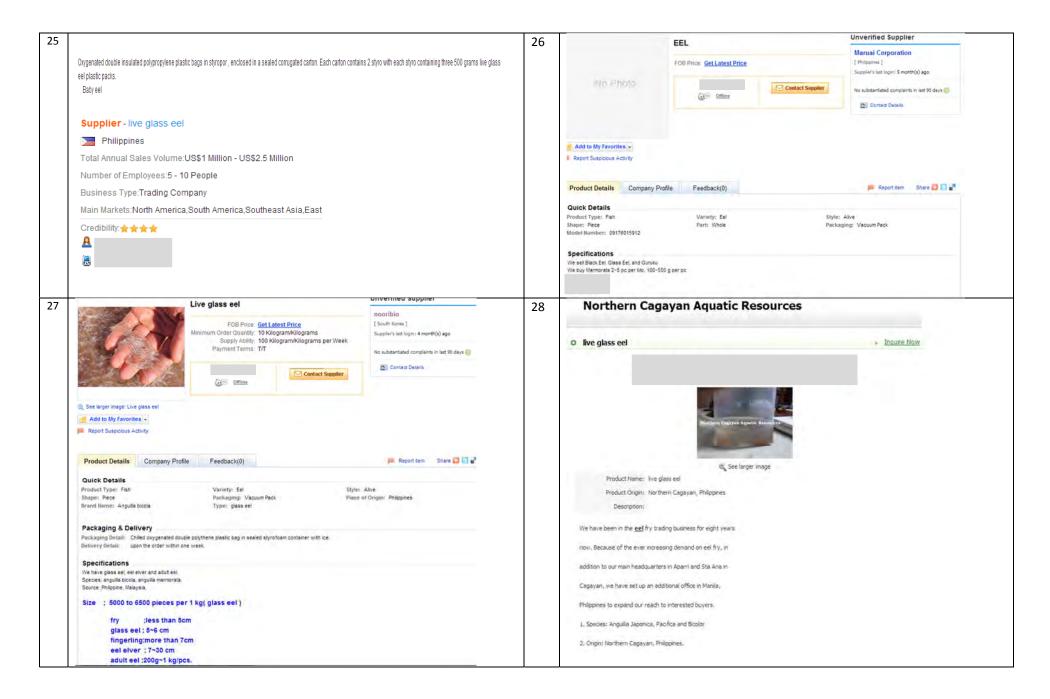


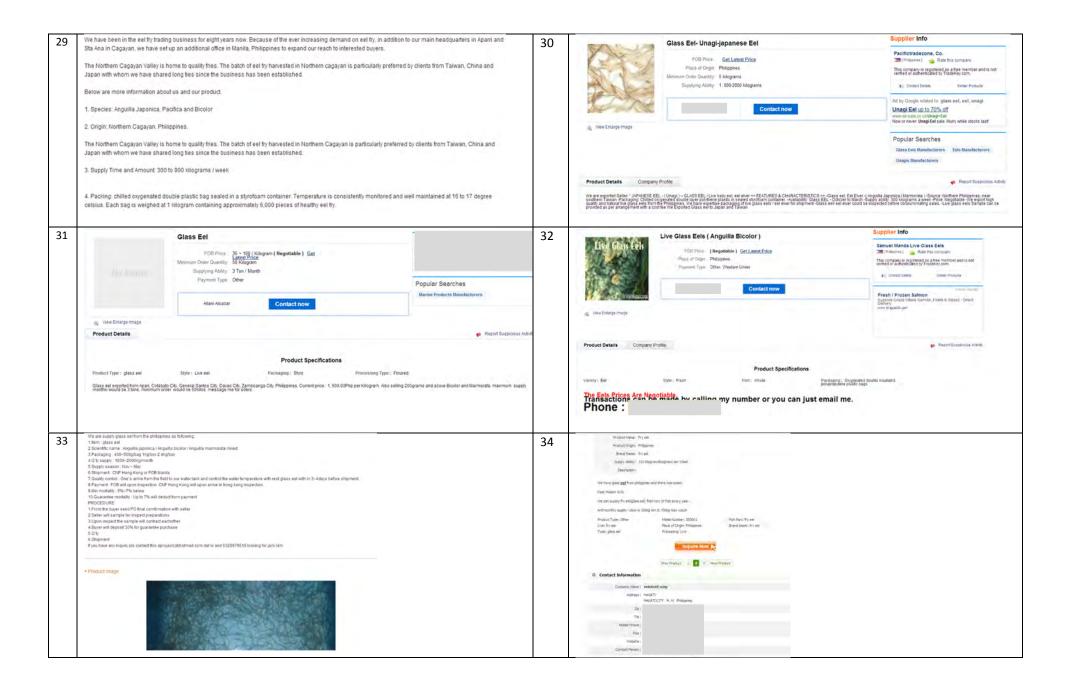












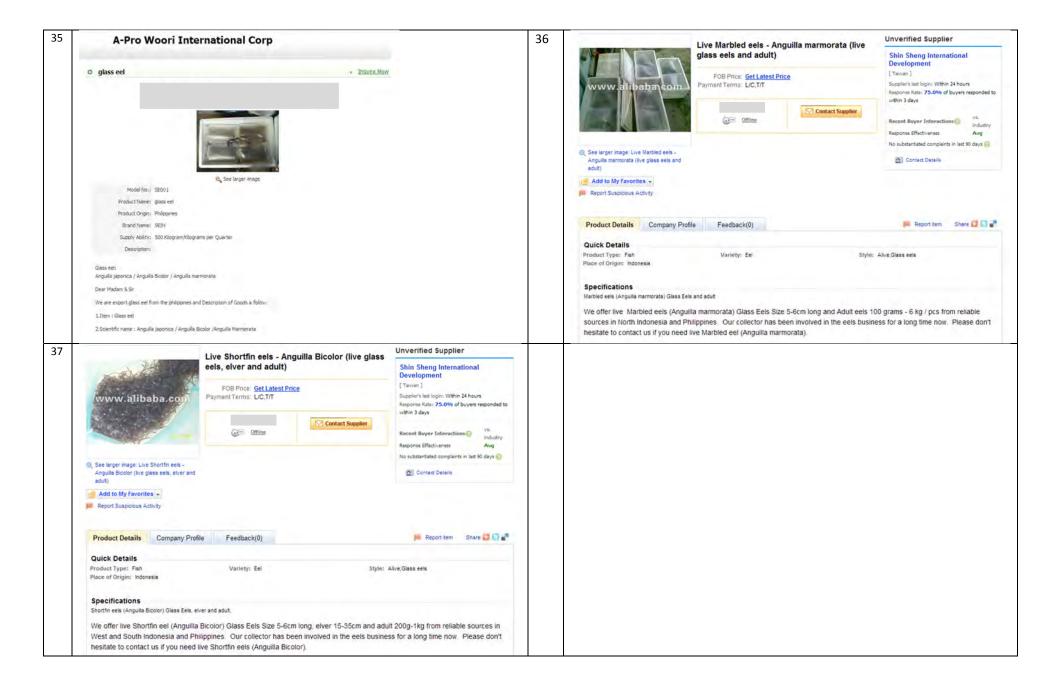


Table 7 Imports of "other live eel" into East Asia (mainland China, Hong Kong, Japan, Korea, Taiwan) by source, 2004-2013, tonnes. <u>Source:</u> East Asian Customs data, as for Table 3. RoW – Rest of the World

| Source | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | Total |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|--------|
| China | 14189 | 13312 | 13494 | 10157 | 14445 | 8688 | 10130 | 5802 | 3847 | 5221 | 99286 |
| Taiwan | 17547 | 11890 | 8986 | 13193 | 6525 | 5392 | 8976 | 4843 | 1374 | 868 | 79596 |
| Indonesia | 795 | 1171 | 634 | 923 | 936 | 962 | 1068 | 99 | 1325 | 655 | 8570 |
| Bangladesh | 152 | 213 | 621 | 573 | 410 | 140 | 34 | 11 | 11 | 166 | 2330 |
| Australia | 126 | 79 | 115 | 126 | 146 | 70 | 89 | 206 | 276 | 194 | 1428 |
| Philippines | 17 | 37 | 34 | 36 | 25 | 55 | 167 | 168 | 411 | 437 | 1386 |
| Thailand | 65 | 112 | 122 | 173 | 167 | 160 | 165 | 221 | 18 | 5 | 1208 |
| New Zealand | 54 | 36 | 32 | 33 | 31 | 26 | 29 | 88 | 141 | 138 | 608 |
| India | 0 | 0 | 0 | 15 | 53 | 7 | 354 | 0 | 0 | 0 | 430 |
| Canada | 39 | 24 | 40 | 35 | 57 | 26 | 21 | 29 | 19 | 46 | 336 |
| Myanmar | 3 | 23 | 30 | 29 | 27 | 24 | 20 | 18 | 27 | 31 | 231 |
| Korea | 8 | 0 | 2 | 4 | 2 | 4 | 11 | 29 | 75 | 1 | 136 |
| France | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 99 | 126 |
| USA | 0 | 2 | 1 | 1 | 2 | 0 | 9 | 42 | 27 | 29 | 111 |
| Japan | 3 | 14 | 31 | 8 | 3 | 1 | 3 | 27 | 14 | 8 | 111 |
| Tunisia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 50 | 57 |
| Madagascar | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 9 | 6 | 26 | 42 |
| RoW | 13 | 21 | 7 | 3 | 4 | 1 | 9 | 10 | 20 | 7 | 95 |
| TOTAL | 33011 | 26935 | 24150 | 25309 | 22832 | 15555 | 21086 | 11601 | 7625 | 7981 | 196085 |

Table 8 Live eel trade from the Philippines to East Asia according to two different data sources, 2004-2013, tonnes. <u>Sources:</u> Exports from the Philippines to mainland China, Hong Kong, Japan, Korea and Taiwan according to export data reported in UN Comtrade and imports from the Philippines according to East Asian Customs data.

| Exports from | Exports from the Philippines (UN Comtrade) | | | | | | | | | | | |
|--------------|--|----------|--------|---------|------|------|------|------|------|-------|-------|--|
| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | Total | |
| China | 50 | 58 | 143 | 272 | 218 | 232 | 368 | 967 | 3191 | 8185 | 13683 | |
| Hong Kong | 10 | 37 | 16 | 44 | 68 | 19 | 70 | 310 | 799 | 1394 | 2766 | |
| Japan | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 7 | |
| Korea | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 7 | 0 | 12 | |
| Taiwan | 4 | 13 | 7 | 7 | 16 | 1 | 4 | 151 | 1121 | 1812 | 3136 | |
| Total | 65 | 108 | 166 | 324 | 302 | 252 | 442 | 1431 | 5118 | 11397 | 19604 | |
| | | | | | | | | | | | | |
| Imports fron | n the Phi | lippines | (Asian | Customs | 5) | | | | | | | |
| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | Total | |
| China | 16 | 35 | 30 | 30 | 22 | 30 | 48 | 32 | 29 | 20 | 293 | |
| Hong Kong | 1 | 8 | 4 | 13 | 14 | 27 | 122 | 149 | 409 | 435 | 1181 | |
| Japan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | |
| Korea | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 6 | 11 | 21 | |
| Taiwan | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 6 | |
| Total | 17 | 43 | 35 | 44 | 39 | 57 | 170 | 184 | 446 | 470 | 1505 | |

October 2014

TRAFFIC, the wildlife trade monitoring network, is the leading non-governmental organization working globally on trade in wild animals and plants in the context of both biodiversity conservation and sustainable development.

For further information contact:

TRAFFIC Headquarters Office 219a Huntingdon Road Cambridge CB3 ODL

UK

Telephone: (44) 1223 277427

Fax: (44) 1223 277237 Email: tint@traffic.org Website: www.traffic.org

