

NATIONAL REPORT - JAMAICA

*Fishing for American eel, *Anguilla rostrata**

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1. INTRODUCTION

1.1 Geographic Range of *Anguilla rostrata*

The American eel, *Anguilla rostrata* is a panmictic, catadromous species which spawns in the southern Sargasso Sea of the Western Atlantic. It ranges from Greenland, southward down the Atlantic coast of Canada (including Newfoundland) and the USA, and as far south as Panama and Brazil. It is common throughout the Caribbean and West Indies (NOAA n.d.). Kwak et. al., (2019) describe its range in the Americas and the influence of the currents of the Western Atlantic region on its distribution (Figure 1).

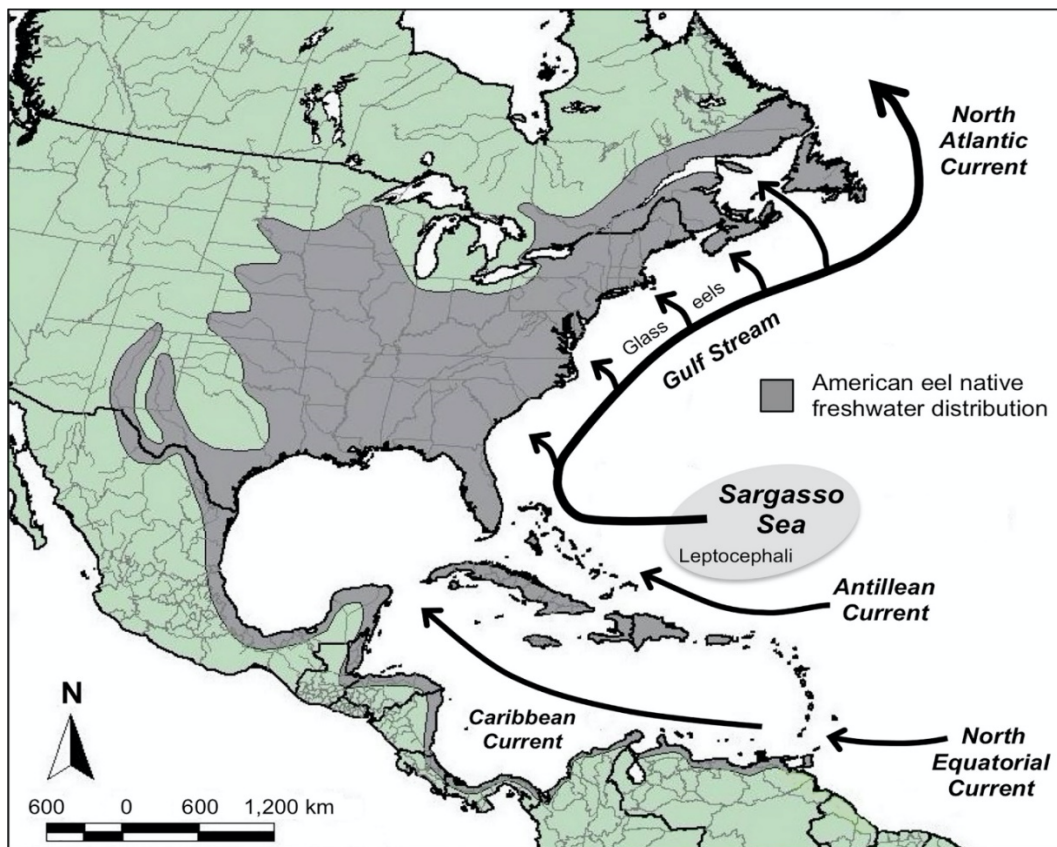
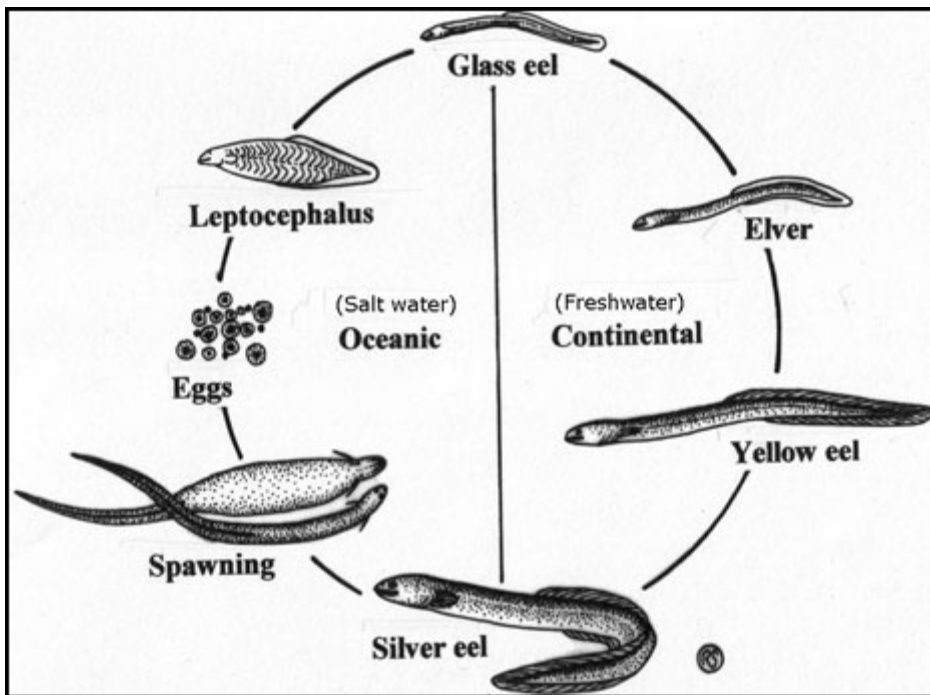


Figure 1. American eel native distribution in the Americas as influenced by the currents of the western Atlantic region (Kwak et al., 2019)

1.2 Incidence of *Anguilla rostrata* in Jamaica

The American eel (*A. rostrata*) occurs in Jamaican waters, however, its specific distribution across the river systems is unknown (John & Bailey, 2006). Annually, the sexually mature adults migrate from the rivers and estuaries to the Sargasso Sea where they spawn (John, K. and Bailey, A. (2006). This event is believed to occur between February and April (John & Bailey, 2006). The eggs hatch into leptocephali (long, flat leaf-like larvae) which float in the sea for approximately one year where they feed on detritus and marine snow. As they approach coastal areas, they metamorphose into glass eels. Some elvers may remain in brackish waters while others ascend rivers far inland. Eels may stay in growing areas (riverine systems where they develop and feed) for 8-25 years before migrating back to sea to spawn

(Dept. of Marine Resources, State of Maine, n.d.). The life cycle of *A. rostrata* is illustrated in Figure 2.



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Figure 2: Life Cycle of the American Eel (Extracted from: Fish Migration American Eel, Retrieved June 13, 2021, from https://www.fws.gov/fisheries/fishmigration/american_eel.html)

2. Initiation of the *Anguilla rostrata* Glass Eel Fishery in Jamaica

There is no commercial fishery for *A. rostrata* in Jamaica. However, small-scale exploratory fishing has been allowed since 2013. In 2007, *Anguilla anguilla* was listed in Appendix II of CITES, this became effective in March 2009 (Shiraishi, 2020). It is widely believed that the interest in *A. rostrata* by Jamaican investors was largely due to the trade in the European eel, *A. anguilla* being restricted, as a result of this listing. Interested parties approached the then Ministry of Agriculture and Fisheries, Fisheries Division¹ with unsolicited proposals to fish for *A. rostrata* glass eels. Given the very sparse data and information regarding the abundance and distribution of glass eels in the Jamaican riverine/estuarine systems, the erstwhile Fisheries Division decided to issue Exploratory Fishing Licences for a period of three to five years. Among other things, the Conditions of Licence mandated that research would be conducted jointly between the licensed companies and the Fisheries Division to determine if a viable fishery for the glass eel could be established in Jamaica.

2.1 Exploratory Fishing for Glass Eels

¹ The Fisheries Division has been replaced by the NFA as a result of the promulgation of the Fisheries Act, 2018.

Between the period October 2013 and March 2015 an initial study to investigate the feasibility of developing a sustainable and economically viable fishery for *A. rostrata* in Jamaica was conducted. This study was facilitated by a partnership between the then Fisheries Division and a single company that was authorized to fish glass eels through an exploratory fishing licence.

Jamaica has an extensive river system (Figure 3) and of these, approximately 85 rivers were sampled. During this period a total of 121.5 kg of glass eels were harvested and 23.5 kg were exported. These were shipped to the United States of America where they were held at aquaculture facilities for grow-out prior to shipping to markets in Asia. This initial study provided an indication of the rivers that could potentially support a fishery for the glass eels/elvers as well as the fishing season which was determined to be October to March.



Figure 3: Map Showing Major Rivers in Jamaica (source: <https://gisgeography.com/jamaica-map/>)

From 2014 to present, a total of four companies² were granted exploratory fishing licences. Only a single company was granted a license in the first year, but as interest grew, during the 2015/2016 glass eel fishing season exploratory fishing season licences were granted to two additional companies, only one of which activated their license. In the 2018/2019 fishing season another company was granted a licence. These licences were of twelve months duration. The interest generated in the glass eel fishery resulted in the Fisheries Division developing special Terms and Conditions and Methodology for Exploratory Glass Eel Fishing, that were to "...be read and construed as one with the Conditions of any licence issued to a person and/or company to engage in Exploratory Glass Eel Fishing in Jamaican Rivers" (See Appendix 1). Based on the results of the initial survey, several rivers were designated and assigned to the licensed companies for the fishing of the glass eels/elvers.

² National Fisheries Authority records show that at least one company did not activate their licence and did not engage in any fishing of glass eel.

2.2 Fishing and Processing of the Glass Eels/Elvers

Glass eels (clear and transparent juveniles) and elvers (pigmented juveniles) are harvested using fyke and dip nets employing a technique introduced by Chinese associates of the licensed companies.

The fyke nets were set in the river mouth overnight. The bunt of the net is removed and the glass eels/elvers are separated from debris and other species using a strainer. They are then placed into buckets with clean river water which is chilled by a plastic bottle filled with ice. A portable air blower is also placed in each bucket. The air blower and chilled water serve to reduce stress and improve survival during transportation to the holding facility.

Prior to shipping, the glass eels/elvers are acclimated in tanks (63" in diameter and 37" deep) which are fitted with a chilling system, air supply and a mixture of 50% sea water and 50% river water. The eels are kept in the holding tank for approximately ten days.

The glass eels are prepared for shipping using triple ply plastic bags which are oxygenated and filled with water (two quarts to one kilogram of glass eel) and packaged with an ice pack in specially designed Styrofoam boxes.

The product is then shipped to the importing country which is usually the United States of America or Canada where they are held in an aquaculture facility for grow-out before being re-exported to Asia.

3. ECONOMIC IMPORTANCE OF THE FISHERY

3.1 Number of Persons Employed in the Fishery

Unfortunately, there are no data and information regarding the total number of persons employed in this fishery. The data which are available is restricted to the number of fishers that participated in the exploratory fishing activities. Based on the licensing and registration data of the National Fisheries Authority (NFA), during the period under review, thirty-two persons were issued exploratory fishing licences to harvest glass eels (Mr. S. Smikle, personal communication, June 10, 2021).

3.2 Harvest and Associated Export Data

An examination of the harvest reports and export data (Table 1) associated with the *A. rostrata* glass eel fishery indicates that over the period October 2013 to February 2020 approximately 425 kgs of *A. rostrata* glass eels/elvers were harvested (NFA, 2021) and 91 kgs were exported (NFA and Veterinary Services Division (VSD), 2021).

Year	Month	Harvest (kg) (Source: NFA)	Export (kg) (Source: VSD)
2013/2014	October – March	45.5	23.5
2014	April – December	37	0.0
2015	January – March	39	0.0
2015/2016	October – March	114	0.0
2016/2017	October – March	127	30
2018	January – March	3	3
2019	January – March	45.5	26.5
2019/2020	December – February	14	8
TOTAL		425	91

Table 1: Harvest and Export Data (NFA and VSD, 2021)

3.3 Trade Data for *Anguilla* spp. and Eels for the period 2006 to 2019

A review of the trade data compiled by the Statistical Institute of Jamaica (STATIN Ja.) (Compilation of external trade data 2006 to 2020) indicates that there is a discrepancy between the trade data recorded and the export permits issued by the VSD³. During the period under review the data collated by STATIN indicated that a total of 2,875 kgs of glass eel were exported which were valued at US\$CIF 81,796.00.

3.3.1 Export of Live Eels (*Anguilla* spp.)

The STATIN Ja. uses both the HS and the SITC codes in describing the form under which a product is shipped. Two HS and SITC codes are used to describe the product form for export, these are indicated in Table 2 below.

Year	HS Code	SITC Code	SITC Description	Quantity (Kg)	Value (US\$CIF)	Partner Country
2014				No data	No data	No data
2015				No data	No data	No data
2016	0302740000	0341800017	Eels (<i>Anguilla</i> spp.), fresh or chilled	9	5418	Canada
2017					No data	No data
2018	0301920000	0341140000	Eels (<i>Anguilla</i> spp.) live.	170	17,084	Canada
2019	0301920000	0341140000	Eels (<i>Anguilla</i> spp.) live.	2,650	52,579	Canada
2020				No data	No data	No data

³ Under Jamaican law, no fish and fish product can be exported without authorization by the VSD.

Table 2: Export Trade Data (Compilation of Trade Data 2014 to 2020, Source: STATIN Jamaica)

3.3.2 Importation of Eels (*Anguilla* spp.) and Others

The trade data indicates that during the period 2006 to 2012 eels of the genus *Anguilla* were imported into Jamaica. The record indicates that over this timeframe approximately 12,654 kgs of *Anguilla* spp. (SITC codes 0342850000, 0342860000, 03, 0341840000) were imported which were valued at US\$102,976.00. It appears that the importation of *Anguilla* spp. into Jamaica stopped in 2013 as these SITC codes were not identified in the import data. However, a further review of the trade data indicated that during the period 2017 to 2020, eels, (SITC code: 0371520000, 0371500001) were imported in the amount of 52,004 kgs, valued at US\$CIF203,421.00. The Countries from which these were imported were Canada and one instance of importation was recorded from St. Lucia.

4. LEVEL OF SUSTAINABILITY OF THE FISHERY

The level of sustainability of the fishery is uncertain. During the period October 2013 to March 2015 an Exploratory Fishing Licence was issued to a single company, the intent of this venture was to determine the viability of establishing a commercial fishery for glass eels in Jamaica. All the major rivers in Jamaica were actively fished during this period. The results indicated that glass eels/elvers occurred primarily during the period October to March with peak landing seeming to occur during the period December to March. Approximately eighty-five rivers were visited and of these only two gave yields of glass eels/elvers that were consistently higher than that of the other rivers. The total amount of glass eels/elvers caught over this timeframe was 121.73 kg. The licence holder indicated that ideally, they were hoping to harvest between 200 – 300 kgs of glass eel per fishing season in order to satisfy overseas buyers. Subsequently over the period October 2013 to March 2019, production from the fishery averaged approximately 40.54 kg per fishing season. There were two years in which peaks were recorded these were October 2015 – March 2016 (114 kgs) and October 2016 to March 2017 (127 kgs.).

The foregoing indicates that more research is required to determine if a sustainable fishery can be established for glass eels. In addition to the low yields of the glass eels/elvers the population of the adult eels of this species is unknown. Several factors are potentially detrimental to the survival of *A. rostrata* including climate change, which leads to longer dry periods. If rivers are dry during the time of migrations this will impact the ability of the glass eels and elvers to migrate upstream, and the ability of adults to leave the river system. This can be observed already, with Branmar reporting low or no catch due to the drought season (personal communication). The alteration of riverine systems by the use of dams or dredging can also hinder the migration of the American eel. John and Phillips (2006) provided recommendations to conserve migratory freshwater fish species and they recommended that it is important to:

- Collate information on the distribution, ecology, and status of migratory freshwater species.

- Identify how constructions on rivers such as dams, affect migratory fish species.
- Ensure that new dams and fordings are constructed with passages and fish ladders.
- Utilise local knowledge of seasonal or daily patterns of migration when planning and permitting sand mining and river dredging operations.

6. GOVERNANCE AND MANAGEMENT FRAMEWORK FOR THE FISHERY

The NFA administers the Fisheries Act, 2018 and is the Agency mandated to develop and manage the fishing industry in Jamaica. The fisheries and aquaculture sector is governed by this Act, which provides a comprehensive definition of fish which includes all its juvenile stages. The Act makes provisions for the issuing of licences for fisheries and aquaculture activities. All persons who engage in fishing are required to obtain a licence, permit or authorization⁴.

The management of the fishery for *A. rostrata* falls under the mandate of the NFA. All persons engaged in this fishery are required to be in possession of a valid licence to fish issued by the NFA. Each licensee is subject to the Approved Terms and Conditions and Methodology for Exploratory Glass Eel Fishing (TCM) which formed part of the Condition of Licence for operations in the fishery. Among the Conditions of Licence set out in the TCM is a requirement that all licensed fishing entities must submit data/reports to the NFA to facilitate the monitoring of the fishing activities. Additionally, prior to the export of the product, exporters must be in possession of a valid Catch Certificate issued by the NFA. Catch Certificates verify that the fish has been harvested in compliance with the relevant laws and conditions of the licence.

Part IV of the Fisheries Act provides for the management of fisheries and aquaculture through, among other things, the development of management plans and the establishment of fishery/aquaculture management areas, zones, and buffer zone. Section 18 of the Act empowers the NFA to ensure that there is free passage of fish (migratory fish) up and down rivers by prohibiting any obstacles in the waterways. Provisions are also made for the notification of the NFA in instances where the fish habitat is altered (Section 20) and ensuring that the habitat can be protected in the case of a harmful event (Section 21). These provisions ensure the conservation and protection of the Jamaica *A. rostrata* population.

The system of management and governance of the glass eel/elver fishery also includes other independent State Agencies that operate under separate legislations. The key Government agencies are the VSD, Ministry of Agriculture and Fisheries and the Jamaica Customs Agency (JCA).

The VSD administers the Aquaculture, Inland and Marine Products and By-Products Act, 2013. Under this Act, the VSD is empowered to regulate the export of fish and fish products from Jamaica. All products that are to be exported from Jamaica are issued Export Health Certificates from the VSD. This, along with the Catch Certificate issued by the NFA, form part

⁴ Citizens who fish with a line from the shore or riverbank are exempt from the requirement of a licence to fish.

of the export documentation that must be presented to the JCA for authorization for export. The JCA ensures that the export of these organisms is properly permitted before leaving the country.

The National Environment and Planning Agency (NEPA) is another key agency relevant to the health of the *A. rostrata* population. It has overall responsibility for the environment and natural resources of Jamaica. Therefore, aspects of the management of the environment of this species will fall under its mandate. An example is seen in proper watershed management to ensure suitable environmental conditions to support the sustainability of this species.

7. CONCLUSION

The available data is sparse and inconclusive and indicates that more research needs to be conducted to determine the viability of a glass eel/elver fishery for *A. rostrata* in Jamaica.

One of the main concerns is that the population dynamics, abundance, and distribution of the stock in Jamaican waters is unknown. The harvest data for the glass eels/elvers does suggest that the glass eel and elver densities were not very high for the periods and areas sampled. In addition, for various reasons, the sampling effort was inconsistent. Other concerns for the population include the impacts of watershed management, including impacts of pollution, sand mining, and deforestation, on the health of the eels. Further, climate change and its attendant impacts on the ocean ecology in general and specifically that of the Sargasso Sea may have negative consequences on the larger *A. rostrata* population.

Therefore, if a fishery is to be developed it will have to be managed very carefully with strict harvest controls and restricted access to the fishery. The conservation and management of the local stocks will require a holistic approach that involves all key stakeholders.

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Annex 1: Approved Terms and Conditions and Methodology for Exploratory Glass Eel Fishing

Approved Terms and Conditions and Methodology for Exploratory Glass Eel Fishing



Ministry of Industry, Commerce, Agriculture and Fisheries
Fisheries Division
November 11, 2018

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Background

Literature suggests that eels hatch in the Sargasso Sea south of Bermuda, and then the larvae float and drift in ocean current until they are metamorphosis into glass eels and then migrate to freshwater rivers and streams. It is at this juvenile stage that eels are caught and sold on the Asian markets to be further cultured in fish ponds on aquaculture farms. Glass eels that are not caught develop into an elver stage and the migration continues upstream to rivers and streams where they spend most of their lives. After a number of years, (5 – 20 years) these elvers become sexually mature and return to the Sargasso Sea for spawning.

The Glass eel market is export oriented; the potential exist for increased income to both small and large-scale investors, job creation, and poverty alleviation and for earning foreign exchange. Since 2010 when the European Union banned the export of the European eel and the subsequent destruction of the Japanese eel farms in 2011 by earthquakes & tsunami, there has been an increased demand for glass eel (the juvenile stage) of *Anguilla rostrata* (American eels). “The annual harvest of American eels, although declining, has a value on the order of US\$5 million” (ASMFC, 2000); that is, US\$300 - \$400 per pound for live Glass eel. In 2012, glass eel prices skyrocketed up to a high of US\$2600 per pound. Eel consumption is more prevalent in Asian countries, with Japan consuming up to 100,000 metric tons per year. This has led to significant investment in the aquaculture of the species, a challenging venture due to the scarce biological and population data.

1. Rationale

The status of the American eel in Jamaican waters is largely unknown as information on stock abundance; migration patterns, habitat quality, and ecological carrying capacity are lacking and thus hamper the development of a fishery for the species. There is, therefore, the need to conduct thorough scientific research to fill the knowledge gaps where the species is concerned and facilitate the sustainable development and management of this resource, especially with the eel being a keystone species.

2. Objectives

The overall objective of engaging in Exploratory Glass Eel Fishery is to investigate the potential for the development of a commercially viable and sustainable glass eel fishery thereby providing alternative livelihood to fishers, particularly, in rural riverine communities. It is therefore necessary to investigate the following:

1. The seasonal volume and distribution of glass eels across Jamaican rivers

2. Identify if there is a relationship between glass eel abundance, distribution and environmental factors.
3. Develop appropriate management plan based on the potential for glass eel recruitment and distribution.
4. Determine the socio-economic feasibility and viability of a sustainable glass eel fishery.

3. Expected Outcomes

The key anticipated outcomes of this research include inter alia:

1. An indication of the annual glass eel recruitment in Jamaican waters;
2. Identification of the indices of Glass eel recruitment;
3. Factors affecting glass eel distribution in rivers across Jamaica
4. An understanding of the economic feasibility of a sustainable Glass eel fishery.
5. Data and qualitative information about the glass eel fishing activities.

4. Applicability

The Approved Terms and Conditions and Methodology for Exploratory Glass Eel Fishing shall be read and construed as one with the Conditions of any licence issued to a person and/or company to engage in Exploratory Glass Eel Fishing in Jamaican Rivers.

5. Authorized species

Exploratory Glass Eel fishing in specified Jamaican rivers shall include targeting glass eel (the juvenile stage) of the species *Anguilla rostrata*.

6. Total Allowable Catch

There is presently no Total Allowable Catch for this Fishery; however, the Licensing Authority reserves the right to amend this condition at any time.

7. Collection and Handling of samples

In order to provide data and information, all Licensees are expected to comply with the following:

- a) Submit a monthly report to the Fisheries Division, which should include details of each fishing activity as stipulated in Glass Eel Data Collection Form (see Appendix I)

- b) Permit designated officers to periodically and randomly accompany the fishing team during fishing activity for the purposes of monitoring and data collection.
- c) Provide information to facilitate the completion of a Catch Certificate for each batch of Glass Eel to be exported (see **Appendix II**).

8. Harvest Method and Gear Limitation

1. Authorized species of glass eel shall be harvested using fyke, box and dip nets only or other equipment approved by the Licensing Authority.
2. Licensees shall harvest glass eel in a manner that causes little to no disturbance to other users of the river, water resources, other riverine species or damage the surrounding environment.

9. Total Number of Exploratory Glass Eel Licensees and Maximum Period of Validity of Licence

1. The total number of Licensees allowed to engage in Exploratory Glass Eel Fishing in Jamaican Rivers shall be restricted to three (3) companies and their respective fishing staff. All persons participating in the fishing activity must be duly licensed and subject to the conditions as set out in the conditions stated here in and on the fishing licence.
2. The period of validity of a licence to engage in Exploratory Glass Eel Fishing shall be subject to the results of the analysis and interpretation of relevant data and information.
3. Each Licensee shall, in the first instance, be allowed to engage in Exploratory Glass Eel Fishing for a maximum period of three (3) years from the commencement of this licence and shall be subject to the following, :—
 - a) compliance with all relevant laws and regulations and the terms and condition of the Exploratory Glass Eel Fishing Licence;
 - b) that the results of the analysis and interpretation of relevant data and information conducted by the Fisheries Division confirms that exploratory fishing activities can continue without harm or negative impact to eel or other riverine species;
 - c) any other reason as determined from time to time by the Licensing Authority
4. Notwithstanding, the maximum period allowed to conduct Exploratory Glass Eel Fishing in specified Jamaican Rivers, in accordance with Article 10 (5), each licence shall be issued for a period of twelve (12) months in the first instance and subject to

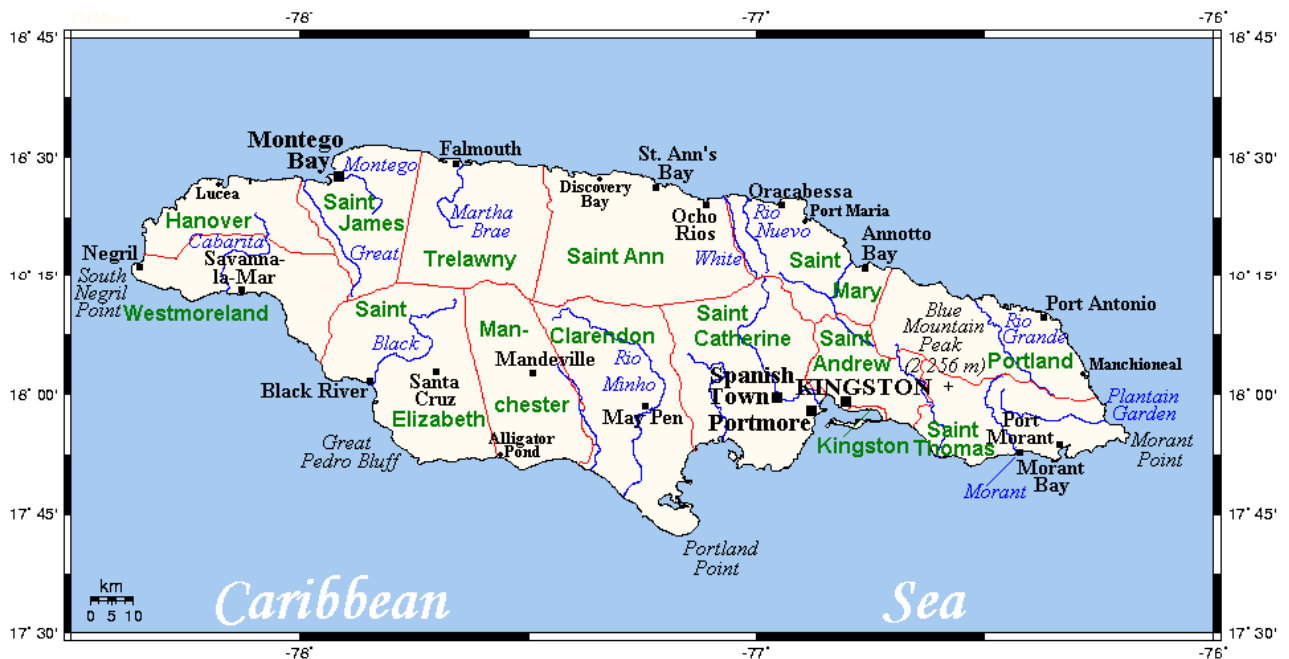
Article 10 (5), 10 (4) and other relevant Articles shall be issued for a further twelve (12) months and then another twelve (12) months subject to the requisite review and analysis of data collected and collated.

10. Exploratory Glass Eel Fishing Period

1. Subject to Article 14, 15 and any other relevant Article, the validity of each licence to conduct Exploratory Glass Eel Fishing in specified rivers shall be for the period as stated on the Exploratory Fishing Licence issued by the Licence Authority.
2. All authorized Glass Eel (*Anguilla rostrata*) must be caught, harvested or landed, on or prior to the last day of this period.
3. At the completion of the licence period, each Licensee's fishing activity and data will be reviewed or at any other time period that is considered to be appropriate by the Licensing Authority.
4. The period of validity of each exploratory glass eel fishing licence may be changed as deemed appropriate by the Licensing Authority.

11. Restricted Areas for Exploratory Glass Eel Fishing

Jamaica has a strong network of water resources to include rivers and groundwater mostly from limestone aquifers (Miller, Harlan, & Waite, 2001). Rivers of varying sizes and volume can be found across the fourteen parishes of Jamaica. They are used for domestic, agricultural and other purposes; as such, due considerations must be given to other users of the resource.



Eighteen (18) rivers spanning eight (8) parishes have been identified and approved for Exploratory Glass Eel fishing. Table 1 below indicates the rivers allocated to respective glass eel fishers. Given the fragility of a river ecosystem which is often times impacted by social, recreational, agricultural, and domestic use, drought, flooding and other environmental factors, the allocation will be reviewed annually.

Table 1 –River allocation per parish and company for the experimental fishing of glass eel (*A. rostrata*)

Company 1 (Co1) *	Company 1 (Co2)	Company3 (C03)	Rivers to be Shared	
			Co1, Co2 and Co3	Co3 & Co2
St. Mary	Portland	Clarendon	Portland	St. Mary
1. Jacks River	3.Prospect	1.Rio Minho	1.Swift River	1. Annatto Bay
2. Pentire River	4.Rio Grande	2. Wag Water	2.Spanish River	
3. Port Maria				
Portland	Manchester	Westmoreland		Clarendon
4. Cassava	Guts River	2.Sweet River		1.Rio Minho
Hanover & St. James		3.Saw Mill		
5. Great River			Co1 & Co2	
			St. Elizabeth	
			Black River	
Westmoreland				
6. Cabarita				

Note that this agreement will take effect on December 1, 2018 and expired on November 30th 2019.

* Company Names removed for privacy.

12. Exploratory Glass Eel Fishing Restricted to Designated Rivers

1. Licensees shall not harvest glass eels or cause glass eels to be harvested from any other area within Jamaican maritime space except for the area authorized by the Licensing Authority as stated in the Exploratory Glass Eel Fishing Licence.
2. A breach of this condition shall result in the immediate cancellation of the Exploratory Glass Eel Fishing Licence (s) and may negatively impact any future consideration for a glass eel fishing licence.

13. Conditions to Cease Fishing in Assigned Rivers

All Licensees, upon receipt of a cease & desist order from the Licensing Authority, shall cease, immediately all exploratory fishing activities within any assigned river where such activities has resulted in negative social or environmental impact on the river system or the surrounding community.

14. Period of Validity of Exploratory Fishing Licence

The validity of all Exploratory Glass Eel Licence to fish in designated rivers shall immediately expire on the expiry date stated in the Exploratory Glass Eel Licence; or upon order by the Licensing Authority.

15. Suspension and Cancellation of Licence

Exploratory Glass Eel Licences may be suspended and/or cancelled under the following conditions—

- a) Voluntary surrender by the Licensee;
- b) Breach of any of the: (a) provisions of the Fishing Industry Act and/or related regulations or any law and/or regulation replacing them; (b) approved terms and conditions and methodology for exploratory glass eel fishing; (c) conditions of any Licence related to the exploratory glass eel fishing;
- c) Analysis and interpretation of the relevant data and information confirm that it is not feasible or prudent to continue the exploratory fishing operation; and
- d) Any other reason deemed appropriate by the Licensing Authority.

16. Considerations that mitigate against issuance of Future Licences

Breaching of or failure to adhere to any —

- a) Provisions of the Fishing Industry Act;
- b) Regulations under the Fishing Industry Act;
- c) Law or regulation replacing (a) and (b);
- d) Terms and conditions of licence related to the exploratory glass eel fishing; or
- e) Terms and Conditions and Methodology for Exploratory Glass Eel Fishing may negatively affect the granting of a licence for exploratory and/or commercial fishing for glass eel in the future.

17. Observer Programme

1. The Licensing Authority may designate any person or persons (including but not limited to Fisheries Officers/Inspectors) to act as an observer on any excursion related to glass eel exploratory fishing.

2. The Licensee shall, upon the request of the Licensing Authority make suitable preparation to accommodate one or more authorized person(s) from the Fisheries Division or any other entity/organization to act as an observer on behalf of the Licensing Authority.

18. Mandatory Inspections of Landings

1. An inspection team from the Fisheries Division and the Veterinary Services Division and/or any other entity authorized by the Licensing Authority may be present during the harvesting or landing of all glass eels.
2. All Licensees shall cooperate with and facilitate the Fisheries Division and the Veterinary Services Division teams, and/or teams from any other entity authorized by the Licensing Authority in carrying out inspections during all stages of operations related but not limited to the harvesting, receipt, storage, transportation, landing, processing, sale and exportation of glass eel.

19. Catch Data and Socio-economic Information

Data and information in accordance with the approved data forms and socio-economic report shall be collected during each trip. All approved data forms shall be accurately completed and submitted

to the Fisheries Division as part of the monthly report or upon request. Monthly reports should be submitted within 10 days of the last day of each month.

- a) A final end of fishing season report must be submitted to the Fisheries Division within 15 working days of the end of the specific glass eel fishing season. This report shall *inter alia*: (a) detail all activities of the exploratory fishing activity including summary of main costs (fuel, ice, food, wages and value of per kg of catch); (b) compile all data and information collected; (c) discuss and analyse the results of the exploratory fishing operation; and (d) provide relevant recommendations to enhance the approved methodology and/or the development of a glass eel fishery in Jamaica as well as the socio-economic impact of the fishery.

All relevant information and data shall be analysed and interpreted by the Fisheries Division. Relevant information and data may be analysed and interpreted periodically at any time prior to or subsequent to the mandatory twelve (12) months review.

19.1 Point person

Each Licensee must appoint a dedicated person who is responsible for ensuring the collection and organization of data and information in the format and standard stipulated by the Licensing Authority (Appendix I). The approved data forms should be accurately completed and signed by authorised personnel. The Licensee should submit the names of these authorised personnel to the Fisheries Division.

19.2 Training of data collectors

1. The Licensee and/or Point person (designated contact) is responsible for ensuring that all data and information handlers are properly trained and knowledgeable of the data and information requirements and procedures for the exploratory fishing exercise. At a minimum, persons should have an appreciation of—

- a) The ecosystem in which the glass eel live;
- b) The collection of glass eel without damaging the habitat;
- c) Data and information requirements of the Fisheries Division in accordance with the exploratory glass eel fishing licence.

19.3 Data fields for trip information

1. All glass eel fishing data log forms (See **Appendix I**) must be accurately completed daily while fishing.
2. Fishing data log forms and any other data and information stipulated by the Licensing Authority shall be submitted to the Fisheries Division within seven (7) working days after each fishing activity.
3. The Licensee shall record and provide detailed information regarding their sampling and harvesting activity at each site and for the duration of each trip in accordance with Appendix I.

20. Disposal of Catch

Subject to Article 2, 3 and any other relevant Article, exploratory glass eel fishing Licensees are authorized to sell or otherwise dispose as they see fit, all glass eel harvested in compliance with all applicable national laws, regulations and the conditions of the licence.

21. Catch Certificate Required Prior to Sale, Export or Disposal

Prior to the disposal, sale or export of all glass eels harvested, the Licensee shall obtain and complete a Catch Certificate (see sample Catch Certificate in **Appendix II**) verifying that the said glass eels were harvested in compliance with all applicable laws, regulations and condition of licence.

22. Financial and other risk

The exploratory glass eel fishing Licensee shall bare all the financial and other risks associated with the exploratory fishing activity.

23. Exploratory Fishing Report

The Licensee shall submit to the Fisheries Division in both hard and electronic formats a detailed report of the exploratory fishing activities (all trips combined) within **15 working days** of the expiration of the licence or the Automatic Cessation of Fishing in accordance with Article 14. This report shall include, among other things—

- a) A compilation and summary of the data collected, including:
 - Fishing data – catch and effort, quantities caught, exported, returned, fishing areas;
 - Habitat data at each site – Type of substrate, depth of water, flowrate, temperature, weather conditions, etc.
 - Economic data – summary of main costs (fuel, ice, food, wages and value of per kg of catch); and
- b) Summary of the costs associated with each fishing trip including:
 - Cost of fuel;
 - Cost of food, ice, and miscellaneous (one figure);
 - Average cost of wages directly related to each fishing trip;
- c) Discussion of the economic feasibility of the fishing exercise
- d) Discussion of the abundance, habitat distribution and general behaviour of glass eel
- e) Recommendations regarding the viability and sustainability of the fishery

24. Access to Records, Areas and Samples for Data and Information Collection

The Licensee shall provide to the Licensing Authority or any officer authorized in writing by the Licensing Authority –

- a) Reasonable access to: all records and/or all areas relating to the Exploratory Glass Eel Fishing operation;
- b) The term “operation” in this section refers to all activities related to the Exploratory Glass Eel Fishing in Jamaican rivers and includes, but not limited to all activities such as the harvesting, receipt, storage and transportation of glass eels;

25. Review

- 1) The Licensing Authority may review, amend, suspend or cancel any term and/or conditions and/or methodology forming the terms and conditions of a licence to conduct exploratory fishing of glass eel. The basis of these reviews shall include but not limited to the data and information analysis, interpretation and recommendations contained in the reports generated by the Licensee.
- 2) Each Licensee’s performance in terms of adherence to *the Approved Terms, Conditions and Methodology for Exploratory Glass Eel* will be subject to review at the end of the research period.

26. Amendments

The Approved Terms and Conditions and Methodology for Exploratory Glass Eel Fishing in Jamaican waters may be amended from time to time as deemed necessary by the Licensing Authority.

27. Termination

The validity of an Exploratory Glass Eel Licence may be terminated under the following conditions:

- Voluntary surrender by the Licencee;
- Breach of any of the: (a) approved terms and conditions and methodology for exploratory glass eel fishery; or (b) Conditions of any Licence related to the Exploratory glass eel fishing;
- Analysis and interpretation of the relevant data and information confirm that it is not feasible or prudent to continue the exploratory fishing operation; and
- Any other reason deemed appropriate by the Licensing Authority.

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APPENDIX 1 – Glass Eel Environmental Data Form



FISHERIES DIVISION
 MINISTRY OF INDUSTRY, COMMERCE, AGRICULTURE & FISHERIES
GLASS EEL DATA COLLECTION FORM

		MONTH												
CONDITION OF ELVERS/EEL								WATER QUALITY						
RIVERS VISITED	FREQUENCY	QUANTITY CAUGHT & RELEASED	QUANTITY CAUGHT & HELD	GENERAL QUALITY OF ELVERS	QUALITY OF RIVER SUBSTRATE	QUALITY OF RIVER WATER	Temperature °C	pH	DO (Mg/L)	Turbidity (Secchi disk reading in CM)	SALINITY - ppt	Flow Rate (M/S)	COMMENTS	

APPENDIX II – Rivers in Jamaica

WESTMORELAND	CLARENDON	St. MARY
Sweet River	Gut River	Wag Water
Cabarita River	Salt River	Rio Nuevo
Saw Mill River	Rio Minho	Jacks River
HANOVER	MANCHESTER	ST. ANN
Lances River	Alligator Pond	Dunn's River
Lucea East & West River		White River
ST. JAMES	ST. ELIZABETH	KINGSTON & ST. ANDREW
Great River	Black River	Hope River
TRELAWNEY	ST. THOMAS	ST. CATHERINE
Martha Brae	Yallahs River	Rio Cobre
Rio Bueno	Johnson River	
	Holland River	
PORTLAND		
Rio Grande		
Summerset Falls		
Swift River		
Buff River		
Spanish River		
Reach River		