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Investing in Grenada's Yellowfin Tuna Exports

A BUSINESS CASE TO INCENTIVIZE AND FACILITATE REQUIRED REDUCTIONS IN BILLFISH MORTALITY

PREPARED BY:

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PREPARED FOR:

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SEPTEMBER 22, 2018

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Business Case for Improvement of Grenada Tuna and Billfish Fisheries

Area	Grenada Exclusive Economic Zone (EEZ) - 26,000km ²
Proposed Investment Amount	US \$362,500
Investment Term	5 years
Fishery/Species Focus	Primary: Yellowfin tuna longline fleet; Secondary: Blue marlin and white marlin conservation improved
Core Business Case Investments	<p>Implement & Monitor a Fishery Improvement Project (FIP):</p> <ul style="list-style-type: none"> • Implement transition from traditional J-hooks to circle hooks to increase post-release survival of blue and white marlin (to not exceed sustainable ICCAT quotas) as part of a conservation agreement with fishers. (Conservation Agreement — See Appendix C) • Capacity building to improve tuna fishing, handling & storage. • Testing to increase the drop (set depth) of longline hooks to reduce the proportion of hooked blue and white marlin, while also improving average tuna size and quality. • Cold-chain upgrades (truck, storage on boats, landing site upgrades and processing facility improvements) to improve tuna quality & prices. • Organizational capacity building for associations and trading companies, including investment in the operational, business and market capacity necessary to improve commercialization of sustainable tuna operations, i.e., compliant with gear and other fishing restrictions, enabling FIP implementation and access to higher value markets. • Implement a Vessel Monitoring Systems (VMS) for a total of 150 vessels to support effective monitoring and enforcement. • Create a traceability platform to support market access and improved data reporting to inform management. • Create an investment vehicle to execute strategy that may be scaled regionally if successful.
Potential Government Investment to Support Case <i>(not required for FIP implementation)</i>	<ul style="list-style-type: none"> • Institute and enforce additional billfish harvest control rules • Reformulate fishing licensing system to avoid effort creep (key step toward secure tenure) • Implement co-management • Invest in airport cold-storage facilities • Collect and analyze key fisheries data, leveraging parallel FIP data collection efforts, i.e., VMS and traceability platform) • Assign a government representative to ICCAT
Fishery Stakeholders Benefitted	Estimated: 150 longline boats (approximately 500 fishermen)
Targeted Environmental Returns: Protecting and Restoring Fish Stocks	Supporting sustainable and more profitable tuna fishing in Grenada will be leveraged to incentivize reduced fishing mortality of blue marlin and white marlin, helping to protect these threatened billfish species from further overfishing.
Targeted Social and Economic Returns: Supporting Fishing Livelihoods	<ul style="list-style-type: none"> • Pay a price premium of US \$0.20 per pound (7% increase to market prices) for higher quality and sustainably-sourced tuna, increasing aggregate fisher income by US \$1.1 million over the investment period. • Improved billfish sustainability and increased incomes in Grenada may serve as a potentially replicable model for other Caribbean nations. • As billfish harvests from tuna fishing are reduced, it may support the nascent recreational fishing industry in Grenada through enhanced billfish abundance, with significant potential to generate additional long-term socio-economic benefits (also, see Appendix E).
Projected Returns	Up to 28% internal rate of return (IRR) for investors

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Executive Summary

Executive Summary

The relatively high incidence of billfish mortality in Grenadian fishing landings and the overall poor health of billfish stocks harvested in the region demonstrates a need for an urgent reduction in incidental billfish landings and mortality. Extensive research and analysis based on 2018 Fishery Performance Indicators (FPIs) indicate that the yellowfin tuna (YFT) export fishery in Grenada may provide the necessary triple-bottom line opportunities to use a parallel approach¹ to address billfish mortality and achieve improved fisheries management. This may be achieved by increasing tuna quality and values for fishers, exporters and the government. At the same time, it is expected that the pressure on the billfish stocks will be reduced through investments to change gear, practices and technology. The increase in tuna quality and reduction in billfish landings is not expected to negatively impact subsistence fishing.

CONTEXTUAL ANALYSIS

- **Target species and stock status:** Yellowfin tuna; overexploited but overfishing not currently occurring²
- **Gear and Vessels:** Longline (LL); 2,028 vessels registered; Active vessels 695 potential LL; Officials estimate 60 active LL boats of varying lengths up to 17 meters landing tuna for export
- **Landings:** Approximately 2 million pounds (1400 metric tons) annually between 2013 and 2015³
- **Exports, 2016:** 1.388 million pounds (value U.S. \$5.9 million)⁴
- **Fishers:** 500 to 1000, estimated
- **Management:** Open access; fishing license and vessel safety inspection are required
- **Monitoring and Enforcement:** Not robust
- **Infrastructure:** Landing facilities and roads are good; airport may require cold storage upgrades
- **Enterprise:** Varied capacity⁵

VALUE PROPOSITION AND BUSINESS MODEL

The proposed interventions are intended to directly reduce billfish mortality by facilitating a switch to circle hooks from traditional J-hooks to increase post-release survival of billfish, and increasing the drop (set depth) of LL hooks via a conservation agreement mechanism linked to the proposed investment in improved data gathering and a fisheries improvement project. Implemented together, these changes in practice have been shown to 1) reduce the number of billfish captured; 2) reduce the mortality of captured billfish (both on the line and after release when required to meet quota needs); and 3) improve the quality of tuna landed.⁶ The

1 Inamdar, N., Band, L., Jorge, M.A., Tullos Anderson, J., and Vakil, R. (2016). *Developing Impact Investment Opportunities for Return-Seeking Capital in Sustainable Marine Capture Fisheries*. Washington, DC: World Bank.

2 http://www.iccat.int/Documents/SCRS/ExecSum/YFT_ENG.pdf

3 FAO. 2017. Fishery and Aquaculture Statistics. Global production by production source 1950-2015 (FishstatJ). In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 2017. www.fao.org/fishery/statistics/software/fishstatj/en

4 Gentner, B., Personal Communication. 2018.

5 Gentner, B., Arocha, F., Anderson, C., Flett, K., Obregon, P., van Anrooy, R. (2018). *Fishery Performance Indicator Studies for the Commercial and Recreational Pelagic Fleets of the Dominican Republic and Grenada*. FAO Fisheries and Aquaculture Circular No. 1162. Rome, Italy. <http://www.fao.org/3/I8833EN/i8833en.pdf>

6 Gentner et al., 2018.

proposed changes in fishing practices are supported by billfish quota limits set by ICCAT, by increasing the value of existing tuna catch through improved product grades, and by the resulting decrease in the relative value of billfish due to the increase in tuna value. These interventions are further linked to the following investments as part of this business case:

- Comprehensive tuna fishery improvement project (FIP)
- Improved cold storage and processing facilities
- Data capture and a digital supply chain

The investment objectives are to improve the operational efficiency of the supply chain and improve the market value of export products, thus generating the necessary additional financial incentives to compensate value chain participants — including fishers — for the additional costs of adopting sustainable fishing practices and reducing billfish mortality.

Note that additional business case interventions were considered but not pursued for the reasons outlined in Appendix E, and in Gentner et al. 2018, including: 1) improving the proportion of Grade 1 (GR1) loined YFT, i.e., processed into fillets, for exports; 2) increasing recreational tourism and revenues to compensate for lost income associated with billfish harvest reductions; 3) improving access to export markets for the smaller-scale FAD fishers in Grenville.

FINANCIAL AND RISK ANALYSIS

The value proposition to achieve the financial outcomes described in this document are centered on the differences in volume and value between GR1 and Grade 2 (GR2) tuna exports.⁷ Based on 2016 data, this business case proposes an increase in the proportion of GR1 exports from Grenada as the justification for the proposed investments.

This model does not require or assume any increase in landings in any of the projected five years. It also does not assume any improvements in price. Should either export volumes increase or prices improve, the financial incentives realized may be further improved.

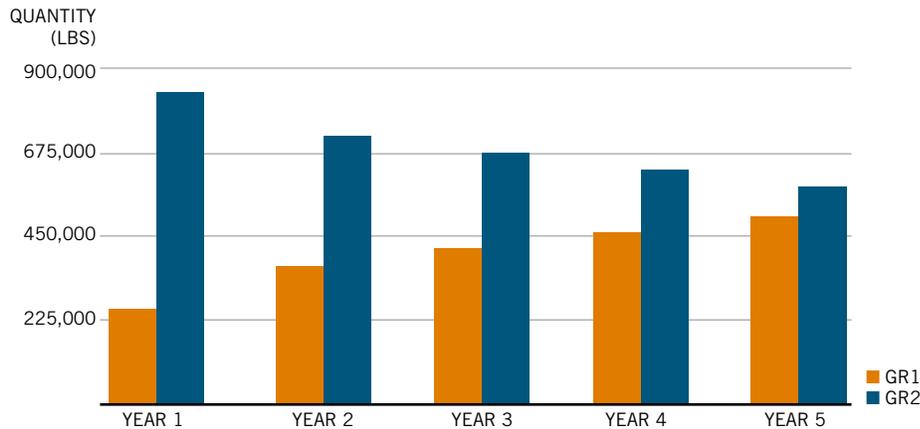
Based on the analysis, provided the assumptions detailed in this business case, an investment of U.S. \$362,500 will be paid back within three years and generate a 28% IRR⁸ to investors over the five years of the investment. This assumes a 7% interest rate and proposed 1% royalty⁹ on the value of exports. It also assumes that fishers are paid an increase of 20¢ per pound for higher quality tuna in compliance with proposed changes in gear and practices to successfully achieve a reduction in billfish landings as well. Key to this is increasing the exports of GR1 tuna from 22% to 31% of all tuna exports in the first year. Over five years, harvester aggregate profits increase by U.S.\$ 1.1 million based on an estimated aggregate of 5.92 million pounds of tuna landings.

7 Tuna meat is graded on appearance, size/shape, color, texture and fat content. Grade 1 tuna is the most valuable. It is bright red, clear, and desirable as sashimi. Grade 1 tuna has been handled with care and kept properly chilled. More detail can be found here: <https://www.luxegourmets.com/chefs-column/tuna-grading-system>

8 IRR, internal rate of return, is U.S.ed to measure investment profitability by calculating the rate of return over the period of the investment.

9 Royalty is an ongoing payment to investors based on a percentage of revenues from product sold

FIGURE 1: TARGETED CHANGE IN GRADES FOR INVESTMENT RETURNS



As with any wild capture fishery, there are a number of variables relevant to an evaluation, which constitute risk. To the extent possible, we have summarized these here, and sought to quantify the risks where possible in the financial model. Key risks are further described in the ‘Risk Section’, and include:

- **Environmental:** Tuna stock declines; natural disasters, including climate change
- **Governance:** Inadequate fishery management
- **Social:** Unknown effects on social norms due to increased income; fishers refuse to change because premiums are late or below expectations
- **Enterprise:** Country ease of doing business (ranked 142 of 190); macroeconomic conditions
- **Operational:** Given the impact of harvest and handling on tuna quality, achieving the projected outcomes without effective operational capacity and quality control is unlikely
- **Market:** It is unknown if existing markets will reward improved product quality or support the proposed interventions.

As neither YFT nor billfishes are preferred species in subsistence fisheries, the risk of negatively impacting fish available for local consumption is anticipated to be low. With regard to reductions in blue or white marlin specifically, food security will not be heavily impacted by the proposed interventions because blue and white marlin represent only 1.6% of the total supply of seafood in Grenada, and billfish meat is either equivalent (U.S. \$2.63 per pound) or more expensive than other protein sources, such as imported chicken legs (U.S. \$1.19 per pound), local fresh whole chicken (U.S. \$2.41 per pound), and other seafood.¹⁰ Furthermore, this business case does not require an increase in the volume of YFT for export. **It is dependent on an improvement in quality of existing levels of exports.**

There are knowledgeable supply chain partners in the fishery with existing market access that would reduce the risk of enterprise failure. However, there are significant structuring concerns as noted in this case that need to be addressed in order to effectively implement the proposed model, and ensure compliance at each level of the supply chain.

¹⁰ Gentner et al., 2018.

This business case is intended to provide the necessary inputs to facilitate one or more of the participants in the Grenada tuna value chain to collaborate across the supply chain to secure investment based on improving market access and addressing value chain inefficiencies.

This business case provides an analysis of the potential range of outcomes for investments directed at improving the quality of exports of headed and gutted (H&G) tuna from Grenada. If at least 31% of YFT exports attain GR1 in year 1 (up from 22% GR1 in 2016), and an efficient investment structure is adopted, it will be possible to provide investors, fishers and the value chain with the financial incentive to undertake the proposed measures. This will result in profits for investors and better prices for fishers.

RECOMMENDATION

Key elements for the long term success of the proposed strategy include ensuring market demand parameters are understood and achieved, and developing an appropriate investment vehicle to absorb both the equity and liabilities for the strategy described. The proposed business case includes some recommended government investments in activities necessary to address relevant enabling environment considerations. Specific to this business case, adopting the following measures are recommended to augment the proposed strategy:

Fishery governance — in the absence of any enforceable property rights:

- Require the adoption of circle hooks to increase post-release survival of blue and white marlin
- Increase the drop (set depth) of LL hooks to reduce the proportion of hooked blue and white marlin
- Instituting and enforcing harvest control rules for billfish
- Collecting and analyzing fishery data for improved management
- Implementing co-management in the target fisheries

Infrastructure

- Invest in improved airport cold storage facilities

Business Case

Abbreviations and Acronyms

ABNJ	Areas Beyond National Jurisdiction
BET	Bigeye tuna
BUM	Blue marlin
CLME	Caribbean Large Marine Ecosystem (Project)
CRFM	Caribbean Regional Fisheries Mechanism
FAO	Food and Agriculture Organization of the United Nations
FIP	Fishery Improvement Project
FPI	Fishery Performance Indicators
FMU	Fisheries Management Unit of the Government of Grenada
GR1	Grade 1
GR2	Grade 2
H&G	Headed and gutted
ICCAT	International Commission for the Conservation of Atlantic Tuna
IRR	Internal rate of return
IUU	Illegal, unreported and unregulated
JICA	Japan International Cooperation Agency
LL	Longline
NGO	Non-governmental organisation
RFMO	Regional fisheries management organization
SAI	Sailfish
SDG	United Nations Sustainable Development Goal
SIDS	Small Island Developing States
SIFH	Spice Isle Fish House
SIMP	United States Seafood Import Monitoring Program
SFA	Southern Fisherman Association
TBL	Triple-bottom line (referring to a business or project with not just a financial “bottom line,” but also accounting for social and environmental outcomes)
UN	United Nations
WECAFC	Western Central Atlantic Fishery Commission
WHM	White marlin
YFT	Yellowfin tuna

Introduction

Three potential value creation opportunities are relevant in determining possible financial opportunities for value chain participants in fisheries reform:¹¹

- Improving **stock health** — leads to a more abundant resource that supports higher long-term yields and makes fish less costly to find and to catch
- Increasing **operational efficiency** — reduces the cost of fishing and delivering fish through the supply chain, improving profit margins and thus improving the returns from fishing as a whole
- Increasing **market value** — through improved market access, certification, branding and long-term partnerships returns more value to fishers

Among the fisheries of Grenada, based on the recently completed Fishery Performance Indicators¹² (FPIs), the commercial longline (LL) tuna fishery holds the greatest promise for the development of triple-bottom line impacts. This is most likely to be achieved by linking changes in gear and practices to improvements in operational efficiency and market value by exporting a greater proportion of Grade 1 (GR1) instead of Grade 2 (GR2) yellowfin tuna (YFT), and linking these efforts to a reduction in blue and white marlin landings.¹³

The proposed interventions reduce billfish mortality by addressing gear change considerations, namely switching to circle hooks from traditional J-hooks and increasing the drop (set depth) of LL hooks.¹⁴ Research demonstrates that these measures result in increased catch rates and better grades for tuna and reduced billfish mortality.^{15, 16} These interventions are further linked to the following investments as part of this business case:

- Development of a comprehensive tuna fisheries improvement project (FIP) to increase market access and improve stock health
- Investment to improve cold storage and processing facilities to increase operational efficiency
- Investment in data capture and a digital supply chain to improve operational efficiency and market access

The objective of these investments is to improve supply chain transparency and operational efficiency and improve the market value of export products, thus generating the necessary additional financial incentives to compensate value chain participants — including fishers — for the additional costs of adopting sustainable fishing practices and reducing blue and white marlin mortality.

11 Holmes, L., Strauss, C. K., de Vos, K., Bonzon, K. (2014). *Towards investment in sustainable fisheries: A framework for financing the transition*. Environmental Defense Fund and The Prince of Wales's International Sustainability Unit.

12 Gentner, B., Arocha, F., Anderson, C., Flett, K., Obregon, P., van Anrooy, R. (2018). *Fishery Performance Indicator Studies for the Commercial and Recreational Pelagic Fleets of the Dominican Republic and Grenada*. FAO Fisheries and Aquaculture Circular No. 1162. Rome, Italy. <http://www.fao.org/3/I8833EN/i8833en.pdf>

13 <http://cfooduw.org/tuna-billfish/>

14 Gentner et al., 2018.

15 Burns, A.; Kerstetter, D. (2018). *Desk-review of hook performance evaluation in pelagic longline fisheries*. FAO Fisheries and Aquaculture Circular No. 1168. Rome, Italy.

16 Reinhardt JF, Weaver J, Latham PJ, et al. "Catch rate and at-vessel mortality of circle hooks versus J-hooks in pelagic longline fisheries: A global meta-analysis." *Fish Fish*. 2017;00:1–18. <https://doi.org/10.1111/faf.12260>

Analysis of the FPIs and related value chain data, along with landings and export data, identified four specific strategies to improve value of YFT landings and exports:

- Improve the proportion of GR1 headed and gutted (H&G) YFT exports
- Improve the proportion of GR1 loined YFT exports
- Improve data collection to address price transparency consideration
- Improve market access for improved grade product

This business case evaluates the first two above strategies from a financial perspective, while providing links to environmental outcomes related to reducing billfish mortality. It also summarizes the anticipated social implications of increased YFT values and reduced billfish landings based on interviews carried out in country. These changes are linked to improvements in operational efficiency and increased market value to compensate fishers and other value-chain actors for the additional costs of implementing and/or complying with the conservation measures and enforcement mechanisms. Finally, the business case includes a summary of the relevant anticipated risks associated with the proposed investments.

All monetary figures are in U.S. dollars, unless otherwise noted.

Contextual Analysis

Data and analysis provided herein delineate the basic environmental, social and management dynamics of the target fishery, as well as information about the market and potential investment opportunities. Valuable insight about the fisheries of interest in Grenada is provided in the 2018 Fishery Performance Indicators (FPis).¹⁷

Contextual analysis revealed that there is limited market access for locally-caught tuna and limited pricing transparency. In addition, there is product quality loss and waste, known as shrinkage, due to poor handling practices and cold chain inefficiencies. As noted above, switching to circle hooks will increase survival rates of non-target species, like billfish, while also improving the likelihood of tunas attaining a higher grade. Findings, in brief:

- **Target species and stock status:** YFT; overexploited but overfishing not currently occurring¹⁸
- **Gear and Vessels:** Longline (LL); 2,028 vessels registered; Active vessels 695 potential LL; Officials estimate 60 active LL boats of varying lengths up to 17 meters landing tuna for export
- **Landings:** Approximately 2 million pounds (1400 metric tons) annually between 2013 and 2015¹⁹
- **Exports, 2016:** 1.388 million pounds (value \$5.9 million)²⁰
- **Fishers:** 500 to 1000, estimated
- **Management:** Open access; fishing license and vessel safety inspection are required
- **Monitoring and Enforcement:** Not robust
- **Infrastructure:** Landing facilities and roads are good; airport may require cold storage upgrades
- **Enterprise:** Varied capacity²¹

FISHERY STATUS

Fishery stock data for tunas and billfish, including YFT, bigeye tuna (BET), blue marlin (BUM), white marlin (WHM) and sailfish (SAI), are available from the International Commission for the Conservation of Atlantic Tunas²² (ICCAT), the regional fisheries management organization (RFMO) for tuna and tuna-like species. As summarized below, each of these stocks are considered overfished; however, for YFT, overfishing is not currently occurring.

TABLE 1: STATUS OF KEY GRENADIAN PELAGIC STOCKS

SPECIES	OVERFISHED?	OVERFISHING OCCURRING?	REBUILDING?
Yellowfin Tuna	Y	N	May be recovered
Bigeye tuna	Y	Y	See ICCAT summary
Blue marlin	Y	Y	See ICCAT summary
White marlin	Y	Not likely	None listed
Sailfish	Uncertain	Uncertain	None listed

Note that the stock status indicators are for the entire stock, and, as these are cosmopolitan pelagics who roam the entire Atlantic Ocean and associated seas, this reflects Atlantic-wide conditions for the stock. The

17 Gentner et al., 2018.

18 http://www.iccat.int/Documents/SCRS/ExecSum/YFT_ENG.pdf

19 FAO. 2017. Fishery and Aquaculture Statistics. Global production by production source 1950-2015 (FishstatJ). In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 2017. www.fao.org/fishery/statistics/software/fishstatj/en

20 Gentner, B., Personal Communication. 2018.

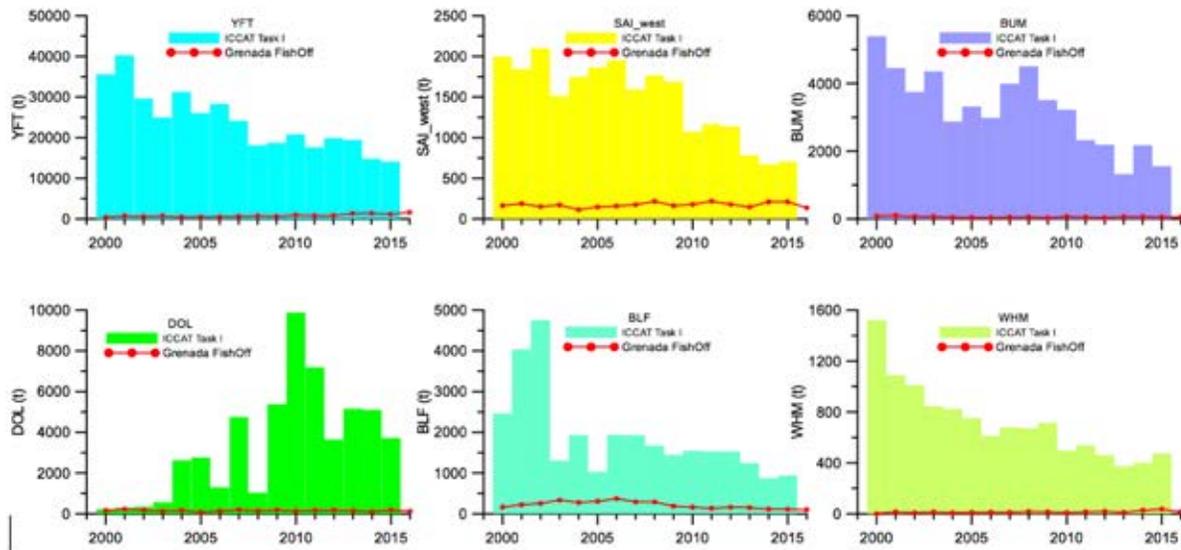
21 Unless otherwise notes, all information is from Gentner et al., 2018.

22 <http://www.iccat.int/en/assess.htm>

landings in Grenada are minimal in comparison to other countries in the ICCAT area, even with the sustained increase of YFT catches by Grenada in recent years, as shown in the figure below, taken from the 2018 Grenada FPIs.²³

FIGURE 2: ANNUAL LANDINGS OF SELECTED SPECIES IN THE ICCAT AREA COMPARED TO GRENADA LANDINGS FOR THE SAME. YFT IS UPPER LEFT; GRENADA LANDINGS ARE THE RED LINE AT THE BOTTOM OF THE GRAPHS.

*DOL=Dolphinfish



Based on the FPI report, fishers are not paid extra for BET, as compared to YFT. While BET may seem as attractive as YFT, if not more attractive in some regards, the most recent ICCAT stock assessment “estimated [a] 70% chance that the stock was being overfished and overfishing was occurring in 2014.”²⁴ It also may be necessary for ICCAT to reduce the quota for this stock in the future. Furthermore, this stock is not currently specifically targeted in the fishery, and fishers are not rewarded for landing this stock. As such, we do not propose to increase any pressure on this stock.

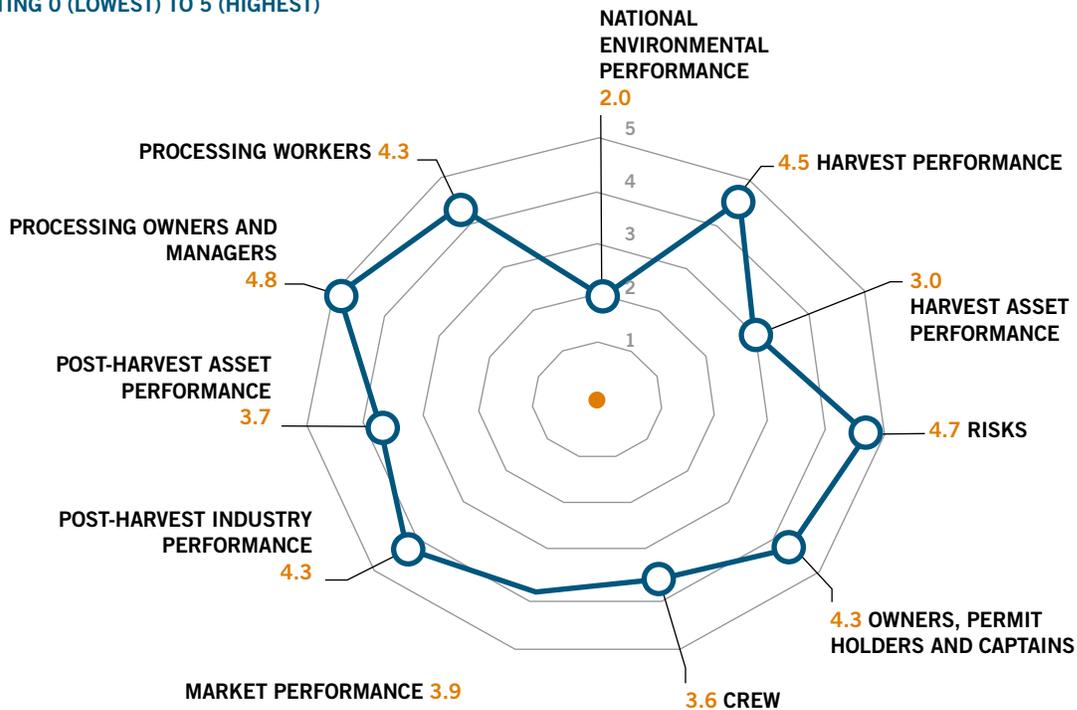
23 Gentner et al., 2018.

24 https://www.iccat.int/Documents/SCRS/ExecSum/BET_ENG.pdf

FPI scores for the pelagic LL fleet indicate robust scores for most output indicators (see figure 3), a measure of the wealth generation of the fishery. The fishery scored well in most areas, including ex-vessel pricing, workers, export performance, etc. The exception was “Harvest Asset Performance,” a measure of the accumulation of economic gains in the harvest sector through vessel profits and the value of permits. Since this is an open access fishery, fishery value will not accrue to the vessel or the permit since there are neither limits to the number of vessels or fishers that can enter the fishery nor limits on the amount or number of fish that can be landed.

FIGURE 3: FPI OUTPUT SCORES FOR THE PELAGIC LL FISHERY OF GRENADA

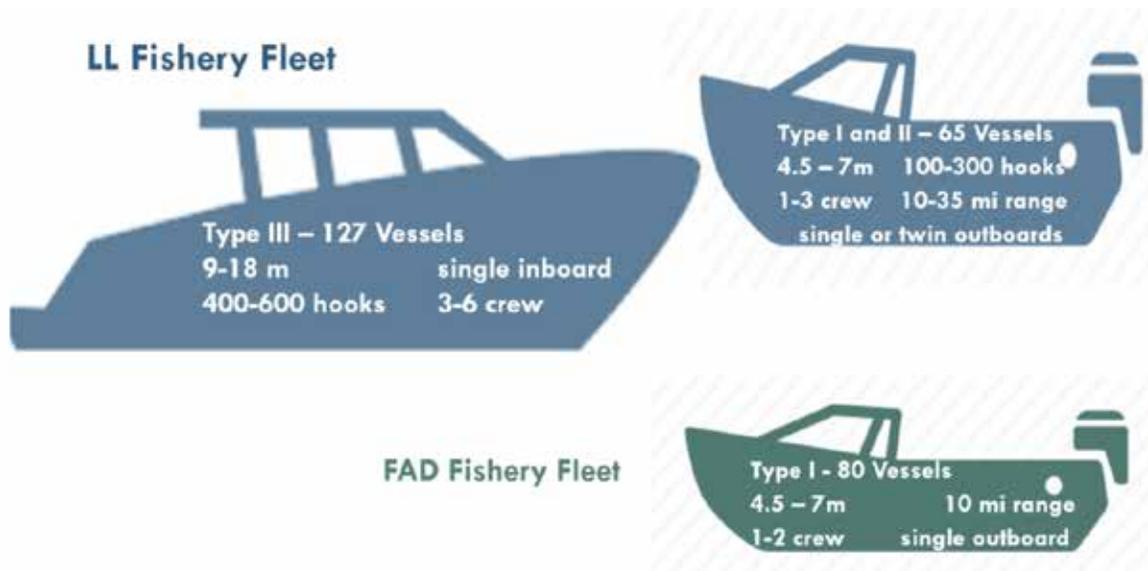
**OUTPUT DIMENSION SCORES
RATING 0 (LOWEST) TO 5 (HIGHEST)**



FLEET

Although there are nearly 200 vessels that are considered to be part of the tuna fleet by Grenadian Fishery Officers, most export tunas are reportedly landed by 60 LL Type III vessels (see below).²⁵ Type III vessels are worth \$30,000 to \$50,000 and may be owner operated or owned by a third party. Many are crewed by family and friends, with 50 percent of net revenue going to the vessel owner and the remainder split equally between the captain and crew.

FIGURE 4: GRENADIAN LL FLEET COMPOSITION



25 As noted in the FPIs and elsewhere, the actual number of active vessels is likely much lower than the number of officially registered vessels.

LANDINGS

As depicted in figure 5, YFT landings for 2013 through 2015 averaged approximately 3 million pounds (about 1360 metric tons). Export volumes appear to have varied between 1.1 million pounds and 1.4 million pounds based on available data. U.S. census data indicates the majority of these exports go to the U.S.²⁶ Allowing for some waste and discards, the balance of tuna is assumed to have been consumed domestically and presumably dominated by YFT that have not met export quality. Value of exports has not been consistent with amounts exported, i.e., the unit value of exports has fluctuated.

GRENADA YFT CAPTURE PRODUCTION AND EXPORTS

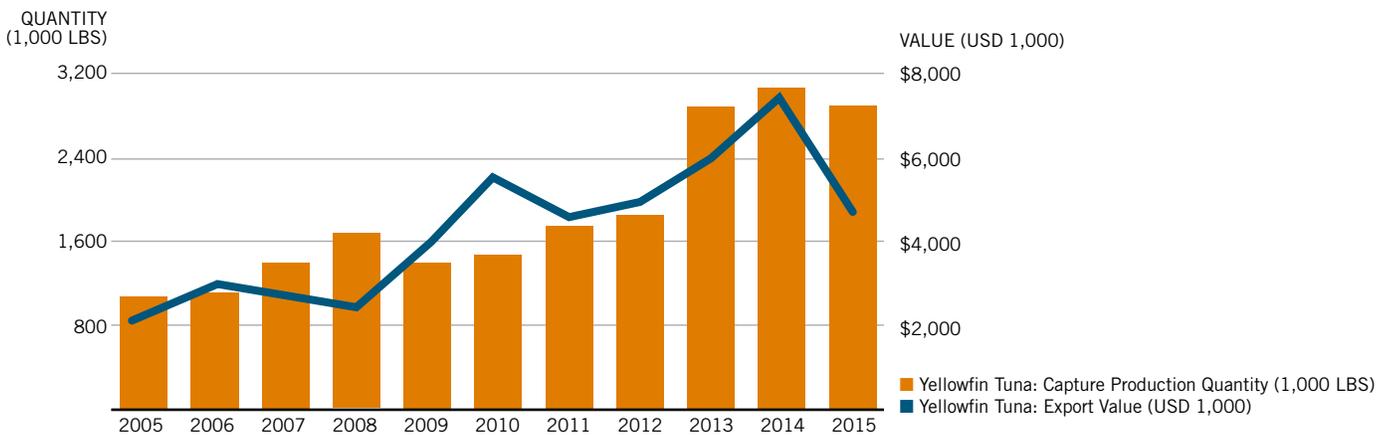


FIGURE 5: GRENADA YELLOWFIN TUNA CAPTURE AND EXPORTS BY QUANTITY AND VALUE²⁷

INFRASTRUCTURE

In general, the eight main landing sites in Grenada are fair to well-equipped. All sites plus three fish houses were built by the Japan International Cooperation Agency (JICA) in the last 30 years or less.²⁸ All have ice plants, cold storage and retail markets, and most have fuel docks. The roads are high quality, although travel times would be hindered by their narrow and winding nature.

FIGURE 6: PHOTOS OF EXAMPLE INFRASTRUCTURE, LEFT TO RIGHT, SPICE ISLE FISH HOUSE STORAGE AREA; PUBLIC DOCK



IN GOUYAVE SPONSORED BY JICA;. PHOTO CREDIT: FREDDY AROCHA.

26 <https://www.st.nmfs.noaa.gov/commercial-fisheries/foreign-trade/applications/trade-by-country>

27 FAO. 2017. Fishery and Aquaculture Statistics. Global production by production source 1950-2015 (FishstatJ). In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 2017. www.fao.org/fishery/statistics/software/fishstatj/en

28 Gentner et al., 2018.

Exporters use international air to access U.S. and Canadian markets; airport infrastructure was identified as the weakest part of the supply chain. It lacks appropriate cold storage for sending fresh or frozen gutted and gilled product. Additionally, there is a noted lack of regular international cargo-only flights. While the supply chain is comparatively short, the lack of appropriate cold storage on some vessels and at the airport are noted weak points in the cold chain.

MANAGEMENT AND GOVERNANCE

The pelagic fisheries are managed by ICCAT with local governance by the Fisheries Division, the Fisheries Management Unit (FMU) of the Government of Grenada's Ministry of Climate Resilience, the Environment, Forestry, Fisheries, Disaster Management and Information. Grenada became an ICCAT contracting party in October of 2017.

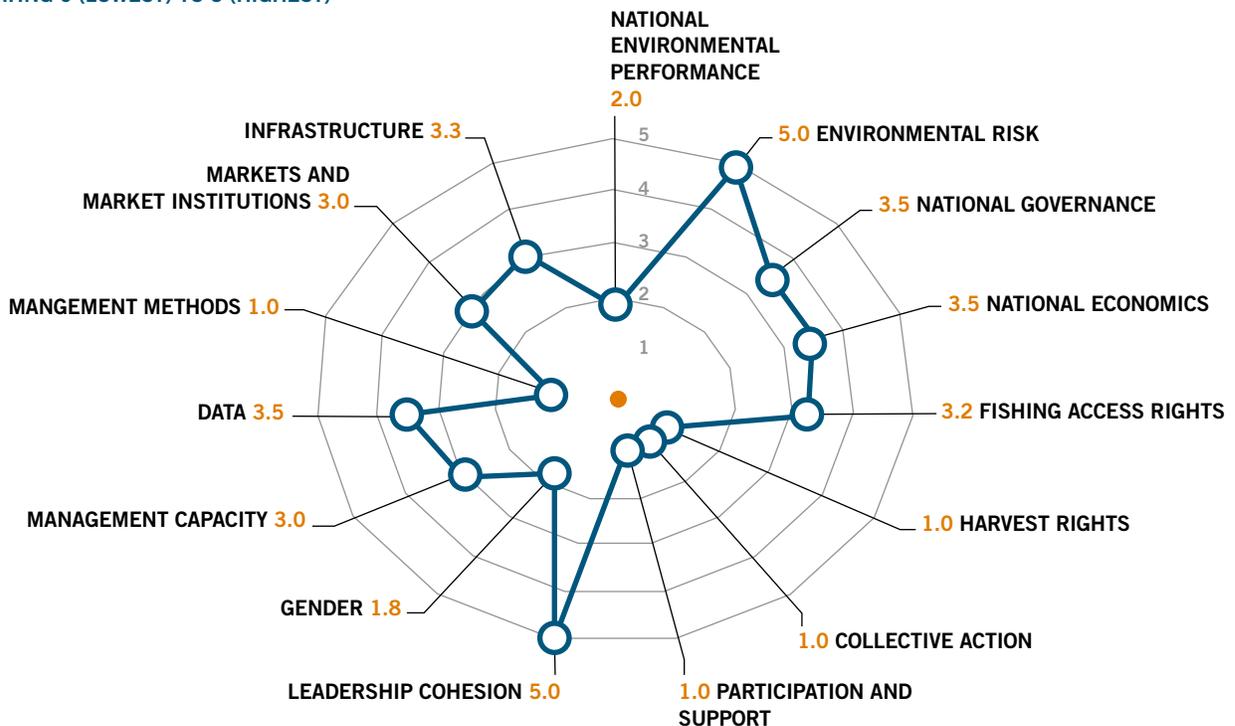
All fisheries governed by Grenada are open access. Fishermen must acquire a fishing license, which is tied to the vessel, and fishing vessels undergo an annual safety inspection.

Wealth creation in the fishery (FPI Inputs; see below) scored low because of the open access management of the fishery, lack of effective marine protected areas, sanctuaries, spatial management and no fishing mortality limits. Lack of harvester organization and participation and poor to no participation by women in the sector also scored low. Bright spots include the social cohesion amongst fishers and the leadership of the main exporter within the YFT fishery.

FIGURE 7: FPI INPUT SCORES FOR THE PELAGIC LL FISHERY OF GRENADA

INPUT DIMENSION SCORES

RATING 0 (LOWEST) TO 5 (HIGHEST)



ORGANIZATIONAL CAPACITY

There are knowledgeable supply chain partners in the fishery that would reduce the risk of enterprise failure because of lack of market access. One exporter in Grenada is estimated to provide 80% of all exports. These facilities have HACCP certification for whole fish and a sophisticated ammonia ice plant. This is a horizontally integrated exporter that also imports food and supplies the food service sector with most of their basic requirements.

Fisher organizations operate at varying degrees of organizational capacity. One fisher group evolved to become a supply chain company that exports YFT and is capable of loining. Other fishing groups do not have the capacity to export but could if they were able to improve their handling, storage and transport, and better coordinate between themselves.

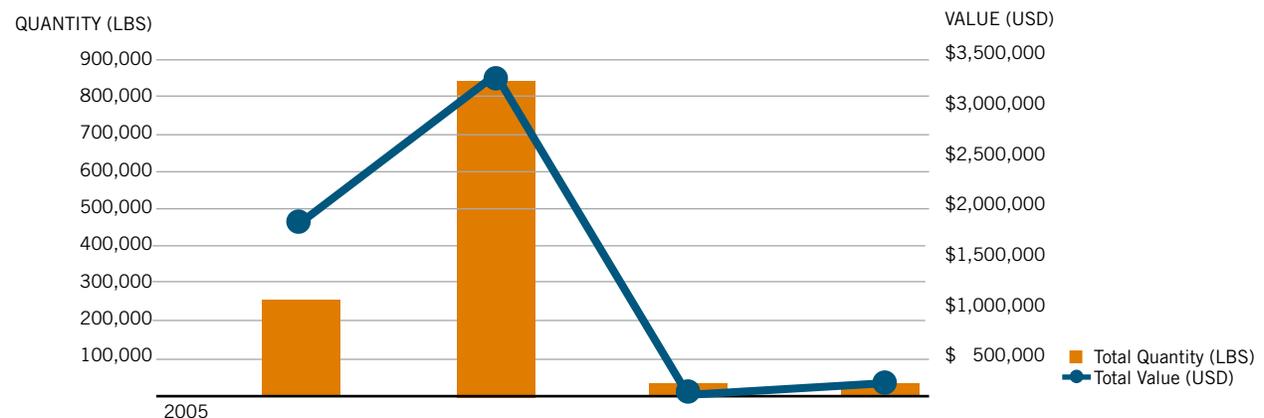
Please refer to the “Investable Entities” section for further discussion.

MARKET POTENTIAL

The highest paying market for high quality YFT from Grenada is the U.S.; some exporters in Grenada have said they have EU certifications, but no YFT was exported there in the 2013 or 2016 data reviewed. Grenada's exports declined in 2016 and it dropped in ranking from 7th to 10th among fresh YFT exporters to the U.S. The U.S. reported \$5 million of fresh YFT imports from Grenada in 2017.²⁹ Local markets for YFT include retail fish houses in St. George and Grenville as well as hotels.

FIGURE 8: GRENADA YELLOWFIN TUNA EXPORTS BY TOTAL QUANTITY AND VALUE ³⁰

GRENADA YFT EXPORTS BY GRADE CATEGORY, 2016



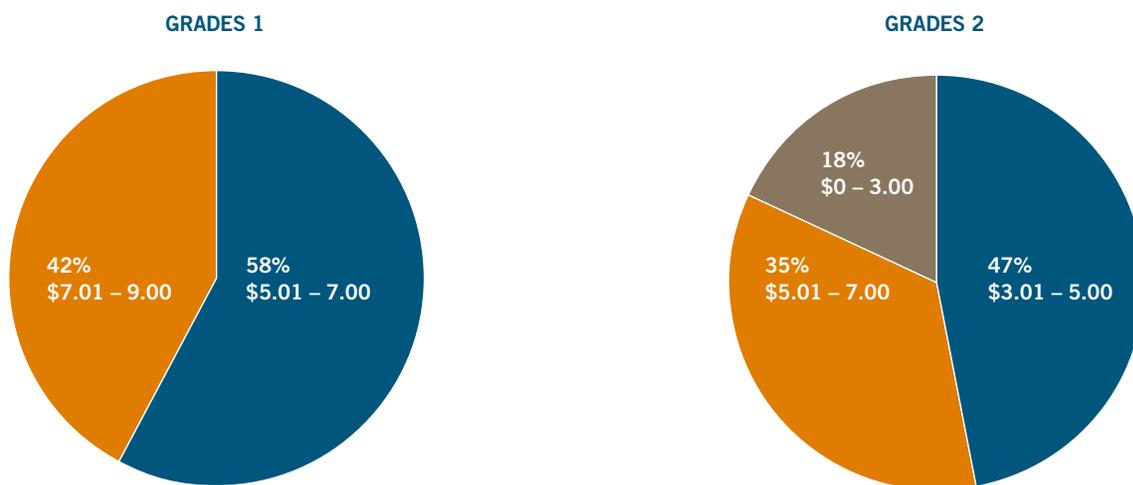
Infopesca reports that the average unit value of fresh YFT imported into the U.S. was around \$4.17 per pound in 2017, while U.S. import data indicated a price of approximately \$3.21 per pound in 2017. Sri Lanka, the top exporter, commanded the highest unit value price (\$5.58 per pound in 2017) whereas Grenada's unit value per pound exported to the U.S. is \$1 below the world average. They note that, “among the top exporters only Suriname and Fiji report lower unit value, while Mexican price is in line with the one paid for Grenada.”

29 https://www.st.nmfs.noaa.gov/pls/webpls/trade_prdct_cntry_ind.results?qttype=IMP&qyearfrom=2017&qyearto=2017&qprod_name=%25&qcountry=2489&qsort=COUNTRY&qoutput=TABLE

30 Gentner, B., Personal Communication. 2018.

For 2016, data provided by the FMU indicates more than 70% of YFT exports from Grenada were classified as Grade 2. Figure 8 indicates that although the absolute value was higher for these exports at \$3.3 million, GR1 exports received a proportionately higher unit value (average \$6.93 per pound versus \$3.92). Figure 9 graphically shows the breakdown of average price per pound by grade for YFT exports in 2016. In 2016, GR1 attained more than \$5 per pound for more than 99% of exported tuna whereas only 35% of GR2 exports attained a price in excess of \$5 per pound.

FIGURE 9: GRENADA YELLOWFIN TUNA EXPORTS PRICE RANGE BY GRADE, 2016³¹



STAKEHOLDER ENGAGEMENT

The FPI document notes that while numerous stakeholders are meaningfully engaged in the fishery, participation in some dimensions is lacking. In particular, the engagement in the post-harvest industry and owners/captains scored well, but there is very little formalized engagement of stakeholders with regards to fishery management. The FPIs note that the latter will be a “critical point in moving forward with any intervention that requires new regulations or management frameworks.” Fishers and vessel owners can play a key role in transitioning to more profitable and environmentally sustainable fisheries in Grenada, if their roles are meaningfully incorporated into fishery management.

A 2012 study of stakeholder engagement noted that the Grenada Development Bank and the Energy Division of the government believe that the perception of fishing as an employer of last resort is one of the greatest management challenges. Engaging the fishers in management of the resource may change their perception of fishing to a more business-oriented mindset. The same study found that many of the stakeholders were willing to participate in fishery management, because they saw it as important to the sustainability of the resource and it was a way to ensure they benefited from such.³²

31 Gentner, B., Personal Communication. 2018.

32 Draft report of the stakeholder identification and analysis of the large pelagic fishery in the Caribbean Sea Large Marine Ecosystem. Prepared for the Caribbean Regional Fisheries Mechanism. Caribbean Natural Resources Institute. 2012.

INVESTABLE ENTITIES

Fortunately for Grenada, a limited number of investable entities familiar with domestic and export markets exist and have experience with the market. These include private companies and firms such as Spice Isle Fish House, and associations such as the Southern Fishermen Association, Gouyave Fishermen Association and the Grenville Fishermen's Association.

Investible entities are a requirement to receive funding and execute a particular business case. A number of basic requirements have been identified for investable entities to be viable.³³ These are included below, and the identified potential investment entities assessed against these requirements.

TABLE 2: BASIC REQUIREMENTS OF INVESTIBLE ENTITIES REFERENCED TO EXISTING GRENADIAN ENTITIES³⁴

REQUIREMENT	SPICE ISLE FISH HOUSE	SOUTHERN FISHERMEN ASSOCIATION	GRENVILLE FISHERMAN'S ASSOCIATION
Legally recognized by the country of Grenada	Yes	Yes	Yes
Experienced management (at least two years of operations)	Yes	Potentially	Unsure
At least two years of profitable operations	Yes	Yes	Unsure
Current and viable financial plan, including: annualized investment returns, financing history, financial projections (profit and loss/ balance sheet), and collateral	Unsure	Unsure	Unsure
Current and viable operational plan, including: strong customer base, clear value proposition, geographic and business risk mitigation strategies, scalability, a well-developed and tested business case, firm-level and market-level upgrading strategies and premiums (including certification options), and market analysis	Unsure	Unsure	Unsure
Activities will have measurable and meaningful environmental and socioeconomic outcomes for the local community	Yes	Yes	Yes
Clear opportunities to create value by improving the supply chain	Yes	Yes	Yes
Meaningful engagement of local fishers in influencing management and fishery access	Yes	Yes	Yes
Strong recognized leader or leaders in the fishing community who influence management and stakeholders	Yes	Yes	Yes
Financial model based on the biology and fishing efforts for the fishery that shows returns	Unsure	Unsure	Unsure

NOTE: While this business case has identified these as potential implementers of the described strategy and business case, no formal due diligence, credit or risk assessment of these entities has been formally undertaken. This business case is intended to provide the necessary inputs to permit one or all of these entities to collaborate across the supply chain to improve market access and address value chain inefficiencies. Should an investor determine they will proceed with an investment of this nature, appropriate due diligence and credit reviews should be undertaken.

33 Inamdar, N., Tullos Anderson, J. (2016). Guide for Return Seeking Capital Investors in Sustainable Marine Capture Fisheries. Written for the World Bank.

34 Inamdar, N., Band, L., Jorge, M.A., Tullos Anderson, J., Vakil, R. (2016). *Developing Impact Investment Opportunities for Return-Seeking Capital in Sustainable Marine Capture Fisheries*. Washington, DC: World Bank.

A number of barriers to attaining full value for the fishery at the enterprise level were identified during the evaluation phase for this business case. These are summarized here.

TABLE 3: VALUE DEVELOPMENT CONSTRAINTS FOR GRENADIAN TUNA FISHING

ENTITY	BARRIER	INVESTMENT NEEDED
LL vessels	Lack of suitable onboard cold storage	Provision of adequate cold storage onboard
	J-hooks have higher bycatch mortality (lower post-release survival) & lower quality tunas	Circle hooks for lower bycatch mortality (higher post-release survival) & increased tuna quality
	Shallow set lines increase bycatch proportion and decrease tuna quality	Deep set lines reduce bycatch proportion and increase tuna quality
Spice Isle Fish House (SIFH)	Inefficient cold chain reduces ability to add value	Improved cold storage
	Distrust between importer/exporter prevents accurate dockside pricing	Digital order routing & supply chain alignment, including buyer discussions & full chain traceability
	Lack of digital information flow to governments & supply chain partners further erodes trust	
Southern Fishermen Association (SFA)	No HACCP plan in place for tuna loining plant	Food safety standard upgrading
	Inefficient cold chain reduces exportable product options to H&G	Cold chain improvement
	Lack of digital information flow to governments & supply chain partners further erodes trust.	Digital order routing & supply chain alignment, including buyer discussions & full chain traceability
Gouyave Fishermen Association	No export operations due to lack of cold chain access (currently sells majority of product to SFA & SIFH)	Cold chain improvements, including cold storage
	Lack of local infrastructure & transparency degrade trust between current buyers & boats	New cold storage truck
	Distrust of exporters (fishers are eager to develop their own go-to-market plan as a result)	Training on better handling practices.
		Dock crane
		Digital order routing, landing traceability & supply chain alignment
Grenville Fishermen's Association	Inefficient cold chain reduces market access to consumers in immediate surrounding areas	Cold chain improvements, including cold storage & training on better handling practices
	Distrust of exporters (fishers are eager to develop their own go-to-market plan as a result)	Cold storage truck
		Digital order routing, landing traceability & supply chain alignment

Value Proposition and Business Model

The proposed interventions reduce billfish mortality by facilitating a switch to circle hooks from traditional J-hooks and increasing the drop (set depth) of LL hooks via a conservation agreement mechanism linked to the proposed investment in improved data gathering. These changes have been shown to 1) reduce the number of billfish captured; 2) reduce billfish mortality (on the line and after release to remain within quota limits); and 3) improve the quality of tuna landed.³⁵ The changes in fishing practices will be incentivized by increasing the value of existing tuna catch through improved product grades and the resulting decrease in the relative value of billfish due to the increase in tuna value. These interventions are further linked to the following investments as part of this business case:

- Development of a comprehensive tuna fisheries improvement project (FIP) to increase market access and improve stock health
- Investment to improve cold storage and processing facilities to increase operational efficiency
- Investment in data capture and a digital supply chain to improve operational efficiency and market access

The investment objectives are to improve the operational efficiency of the supply chain and improve the market value of export products, thus generating the necessary additional financial incentives to compensate value chain participants – including fishers – for the additional costs of adopting sustainable fishing practices and reducing billfish mortality. It will also help Grenada comply with billfish quota limits set by ICCAT. Utilizing a digital, data driven supply chain, the investment model scenarios seek to evaluate costs and returns related to the following objectives:

- **Stock Health**
 - Replace billfish landings with higher valued YFT
 - Change gear to circle hooks and change fishing depth for LL fleet, which is expected to result in increased catch rates of tuna and reduced billfish mortality
- **Operational Efficiencies**
 - Improve cold storage and processing facilities along the value chain
 - Use digital technology in the supply chain to capture better fisheries data, reduce supply chain risk, and increase market access for the tuna fisheries of Grenada
 - Improve the proportion of GR1 YFT for exports through better handling
- **Access to Markets**
 - Meet U.S. Seafood Import Monitoring Program (SIMP)³⁶ requirements
 - Promote improved market access through the development of improved fisheries management framework (through the FIP)
 - Leverage data improvements to help identify and address IUU concerns
 - Improve value to fishers by increasing the proportion of GR1 YFT for domestic and export markets

35 Gentner et al., 2018.

36 <https://www.iuufishing.noaa.gov/RecommendationsandActions/RECOMMENDATION1415/FinalRuleTraceability.aspx>

The adoption and implementation of a digital supply chain is intended to improve government and business fisheries data collection, strengthen decision making and support compliance with increasingly stringent ICCAT reporting requirements. Appendix D has a detailed FIP methodology proposal tied to data collection and reporting.

We note that the local high-value market for tuna (particularly the hospitality industry), while not a specific target at this time, will benefit from the proposed investments by having access to locally caught and higher quality wild capture tuna in H&G form.

SCENARIO COMPARISON

Two fishery value-creation investment scenarios were evaluated, and a recommendation presented for a proposed investment. The investment scenarios are:

1. A tuna loining facility and associated cold chain improvements; plus increasing the percentage of GR1 tuna exports; or,
2. Increase the percentage of GR1 tuna exports; with continued export in H&G form.

In each case, the intention is to support the stated value proposition, i.e., improve the value of tuna exports from Grenada in exchange for changes in fishing practices (replace J-hooks with circle hooks, increase drop (set depth), and improve monitoring) that support reduced billfish capture and mortality in the LL fleet to match billfish quota allocations from ICCAT.

These business models are based on existing volumes of exports and are premised upon fishery and industry improvements that reduce the proportion of GR2 YFT in exchange for higher proportions of the harvest being sold as higher value GR1 YFT. Our analysis is that this is sufficient to repay the identified investments for scenario 2, and provide an incentive to fishers for compliance. It is not necessary to improve prices of the product (exported), nor is it necessary to increase the volume of landings or volume of exports. If prices can be improved, or if volumes can be increased, these represent additional upside opportunities. It is essential to note that no market due diligence was undertaken to validate this assumption. We highly recommend an end market demand assessment is completed prior to further supply chain investments.

Based on 2016 data, Grenada exported 22% GR1 tuna and 73% GR2. Securing higher proportions of GR1 tuna, without increasing the volume of overall landings, is a central part of the operational efforts by innovative firms in the tuna industry, most notably Anova Seafood and Bali Seafood International in Indonesia, and Artesmar in the Philippines. Achieving a higher proportion requires improved slaughter, bleeding and cold storage on board vessels, a timely return to shore, and prompt dispatch into the supply chain. These measures are achievable, as has been demonstrated in other tuna fisheries.

Analysis of Strengths, Weaknesses, Opportunities, and Threats of the Business Case

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> - Improve harvester incomes while reducing impacts on billfish through formal agreement with fishermen participating in FIP - Establish and install data collection system for fisheries - Improve fisheries data timeliness and availability - Streamline supply chain - Strengthen harvester organizations - Establish tuna FIP - Improve value chain transparency and address traceability demands on the buyer side - Support alignment of value chain - Improve harvester access to markets - Strengthen Grenada's position in ICCAT 	<ul style="list-style-type: none"> - Compliance not legally mandated - Data only as good as the inputs - Fishery remains "open access" - Requires fishers to build capacity - Billfish mortality may still be too high
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> - Provides economic incentive for changes in gear and practices - Provides economic incentive to register fishers and begin to restrict access - Supports improved fisheries governance - Increases harvester participation in the value chain - Tests viability of model for scale - Contributes to reducing IUU 	<ul style="list-style-type: none"> - Fishers may increase effort in response to improved prices - Tuna prices may decline, jeopardizing investment and participation - Competition from other sources may impact market access or pricing - Markets may not reward fishers for changes in practices - Fishers may decide not to comply for social or economic reasons - Exporters may choose not to share upside with fishers - Uncertain market risks

Financial and Risk Analysis

INVESTMENT ASSUMPTIONS

The investment assumes the following activities are implemented and budgeted for either scenario, unless noted. Under the loining option (scenario 1), the total year 1 investment required is assumed to be \$412,500. Under the H&G option (scenario 2), total year 1 investment required is assumed to be \$362,500. In all cases, the on-going annual costs (for upgrades, maintenance, etc.) associated with these investments are integrated into the cash flow and are not anticipated to require additional loans.

Financial and risk analysis of scenario 1 for a loining investment were not favorable; as such, we have moved analysis and discussion of this option to Appendix E.

FISHERY MANAGEMENT

Fishery Improvement Project (FIP) for Tuna – an industry led, comprehensive FIP is proposed within the investment package. The investment budgets \$50,000 in the first year, and \$25,000 per year for the following 4 years for a total of \$150,000 to develop, implement and monitor the FIP.

DATA

Traceability Platform and Software –\$100,000 is included in the first year for the deployment of appropriate traceability software and equipment at the respective landing sites. It also assumes a further \$25,000 per year in annual management, monitoring and upgrade costs, for a total of \$200,000.

Vessel Monitoring System –\$37,500 is estimated for the first year to install VMS systems on 150 participating vessels. It also includes an ongoing budget of \$15,000 per year to address the annual costs of monitoring, repairs and upgrades.

INFRASTRUCTURE

Cold Storage – the investment package includes \$150,000 in additional investment to improve cold storage in identified facilities on the island. This includes upgrades to storage on boats, at landing sites and in processing facilities.

Cold Storage Truck –\$25,000 in the first year is allocated to ensure that cooperatives are capable of providing appropriately graded product to exporters.

To achieve fishery improvements, the following investments are considered and budgeted (note, these are budget figures, and may be adjusted based on due diligence):

TABLE 4: PROPOSED INVESTMENTS AND ASSOCIATED INITIAL AND ONGOING COST

INVESTMENTS	PURCHASE	RECURRING ANNUAL COSTS
FIP	\$ 50,000	\$ 25,000
Traceability platform and software	\$ 100,000	25,000
Cold storage	\$ 150,000	
Cold storage truck	\$ 25,000	
Vessel monitoring system*	\$ 37,500	\$ 15,000
TOTAL	\$ 412,500	\$ 75,000

Without the loining facility, initial investments amount to \$362,500 and a total of \$687,500 over five years. Expenses were determined using the rates as observed in 2016 data.

All cases presented are based on 7% interest rate and a 1% royalty to investors.

CAPACITY BUILDING INVESTMENTS

The investment model includes an additional \$150,000 per year investment in additional capacity building activities in Grenada to supplement the above fishery, data, and infrastructure investments. It is anticipated this will be utilized to provide the technical support that the fishers and supply chain will require to increase the proportion of GR1 YFT. This proposed amount may be utilized to recruit a local coordinator, provide training workshops and support export efforts. This amount is included in the cash flow of the business case and is NOT included in the loan.

GOVERNMENT INVESTMENTS

The proposed business case includes some recommended government investments in activities to address relevant enabling environment considerations. These include the following:

- Appoint a representative from Grenada to ICCAT, and facilitate their participation in relevant ICCAT scientific meetings and sessions
- Address fishery governance – in the absence of any enforceable property rights, we recommend:
 - Adopting circle hooks (Strongly recommended by ICCAT)
 - Instituting and enforcing harvest control rules for billfish
 - Collecting and analyzing fishery data for improved management
 - Implementing co-management in the target fisheries
- Infrastructure
 - Investing in improved airport cold storage facilities

While these investments would be beneficial in addressing the weaknesses and constraints identified in this document and in the Grenada FPIs, they are not a requirement of the business case. Nor have these costs been integrated into the business case. To a large degree these are external activities and costs outside the value proposition. Furthermore, the costs associated with implementing these activities will depend on the level of government involvement and the extent to which policy review, new legislation and community participation is required.

CURRENT STATE OF FISHERY

Based on data provided by the FPIs, the following has been estimated as the current state of the Grenadian YFT fishery.³⁷ Please note that all prices are in U.S. dollars.

37 Gentner et al., 2018.

In 2013, the fish grade composition and prices achieved were as follows:

TABLE 5: PRICES BY GRADE AND COMPOSITION

H&G YFT	PRICE PAID TO HARVESTER	EXPORT PRICE	PROPORTION OF YFT EXPORTS	EXPORTER MARGIN*
Grade 1	\$2.80	\$6.93	22%	\$4.13
Grade 2	\$2.80	\$3.92	73%	\$1.13
Grade 3*	\$2.80	\$2.29	5%	\$-0.51

*Also includes ungraded YFT

- The exporter will have to pay for labor, processing, packaging and transport, as well as make a profit
- Approximately 1.1 to 1.4 million pounds of YFT were exported between 2013 and 2016. This model uses 1.1 million in all cases for modeling purposes.
- H&G yield is 80% from whole fish

In each case, we present an estimated payback period, project IRR and an estimate of the additional value generated by the investment.

TABLE 6: INVESTMENT ASSUMPTIONS

INVESTMENT	ASSUMPTIONS	NUMBERS
<i>Vessel monitoring system, details (per vessel)</i>	Boats participating	150
	Purchase cost	\$250
	Ongoing data and maintenance annual costs	\$100
Estimated, program operating cost increases	Program staff	\$100,000
	Rent and utilities	\$50,000
Unit costs (per pound)	Price paid to harvester	\$2.80
	Cold storage	\$0.25
	Packaging and transport	\$1.30
	Overhead	15%
Unit costs, other	Inventory storage	1% of Revenue
Financing	Interest rate	7%
	Years	5
	Royalties	1% of Revenue

*The loan amount is assumed to be the same as the total initial fixed costs

FINANCIAL ANALYSIS

Scenario 2 – Improvements in H&G exports

The analysis shows that addressing the proportion of GR1 tuna exported has a significant impact on the profitability of the value chain. Assuming that fishers are paid \$2.80, and assuming the proposed investments are made, net profit breakeven is approximately 31% GR1 and 69% GR2 which is only 9% additional GR1 from the current state.

With a five-year outlook, operations breakeven if the intervention provides an annual GR1 growth rate of 4.8% after year 1; the IRR of the program is zero at about 3.5% growth; the net present value (NPV) is zero at about 4% growth. This would represent a conservative outcome to the proposed interventions.

Projected Growth Rates rates over time:

TABLE 7: GR1 ANNUAL PROJECTED GROWTH RATES OVER FIVE YEAR PERIOD AND RESULTING PROPORTION OF GR1

GR1 GROWTH RATE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
3.5%	22%	26%	29%	33%	36%
4%	22%	26%	30%	34%	38%
4.8%	22%	27%	32%	37%	41%

At the other extreme, securing 50% GR1 tuna has a significant impact on the profitability of the value chain. Should this be possible, the five-year IRR exceeds 180%, with a five-year program NPV of \$2.5 million, assuming no increase in payments to fishers. This is a significant improvement over 50% GR1 loined product. Under this circumstance, increasing harvester prices to \$3.20 (approximately 14%) per pound to compensate for the additional costs of FIP compliance and gear change becomes economically feasible. Doing so reduces the IRR to 77%, and the NPV of the program is over \$889,000. This would represent an optimistic outcome to the proposed interventions.

For the purposes of this business case, we model and provide an option between these two outcomes, in which fishers are paid \$3.00 per pound, representing an extra \$0.20 per pound, for complying with the proposed intervention.

Based on the analysis completed, and the proposed approach, while the breakeven point for scenario 2 occurs at 31% of GR1, this should be achieved by year 2, with an 8% increase in GR1 for each of the following years, to a maximum of 55% in year 5. Under this scenario, the fishery would be exporting about 360,000 pounds of GR1 in year 2, as opposed to the current situation where 22% (242,000 pounds) are exported. **Each additional 1% increase in GR1 exports (after breakeven) results in approximately \$140,000 in profit over five years to the program, providing a significant incentive to all parties.**

SCENARIO 2, EXPANDED

Improvements to fish quality have a significant impact on H&G export value. Once breakeven is met, each 1% increase in GR1 export leads to a \$140,000 gain in net profit over the five-year period.

At breakeven, every dollar invested leads to a 40¢ increase in net profits over the current state. At the upper bounds, if GR1 exports could gradually reach 60% by year 5 through the investments, the same improvements would have a two to four times effect on net profits. At a 10% growth rate year-over-year, after the first year, the investments of \$687,500 over five years would lead to a program profit of slightly over \$1.445 million; for every dollar invested there is a 2.1 times effect on the program profit. This scenario is highly unlikely, as grade depends not only on handling, but also on the condition of the raw product itself. Regardless, this provides incentive and ample room to pay fishers a higher rate.

TABLE 8: SCENARIO 2 NET PROFIT AT YEAR FIVE, GR1 PRICE PER POUND AND PERCENT OF EXPORTS DATA

PRICE	20%	30%	40%	50%	60%
8.50	(103,222)	2,001,302	4,085,182	6,169,063	8,252,943
8.00	(672,321)	1,318,384	3,174,626	5,030,867	6,887,109
7.50	(1,241,418)	635,469	2,264,069	3,892,672	5,521,275
7.00	(1,810,514)	(59,312)	1,353,515	2,754,476	4,155,441
6.93	(1,890,188)	(178,823)	1,226,036	2,595,131	3,964,224
6.00	(2,948,711)	(1,766,604)	(584,495)	478,088	1,423,774
5.00	(4,086,902)	(3,473,896)	(2,860,887)	(2,247,878)	(1,634,869)

Given the current and forecast world market for YFT, \$5 per pound is unlikely and is provided for comparative purposes only.

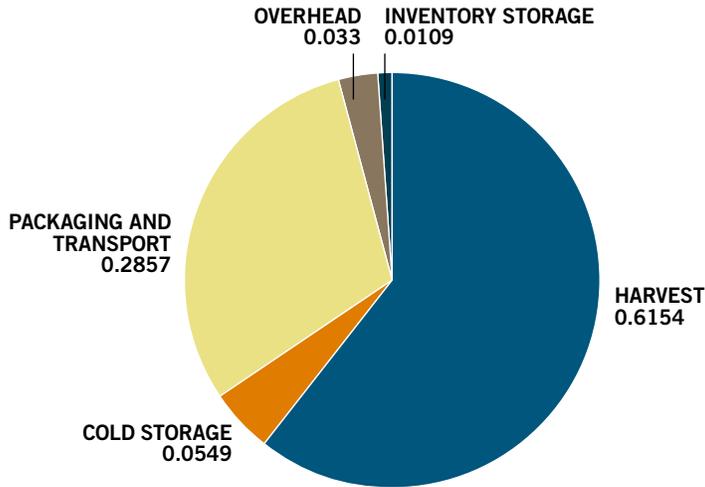
TABLE 9: SCENARIO 2, PAYMENTS TO FISHERS (BOLD NUMBERS INDICATE SELECTED SCENARIO)

PAYMENT TO HARVESTER PER POUND	GR1 PERCENT GROWTH RATE BREAKEVEN	UNIT COSTS PER POUND	HARVESTER INCREASE	FISHERS, PROGRAM PROFIT (5 YEARS)	FISHERS, REVENUE (5 YEARS)
\$2.80	4.8% (GR1 = 41% in Year 5)	\$4.55			\$16,259,923
\$3.00	8.3% (GR1 = 55% in Year 5)	\$4.75	\$0.20	\$1,161,423	\$17,421,346
\$3.20	11.9% (GR1 = 70% in Year 5)	\$4.95	\$0.40	\$2,322,846	\$18,582,770

TABLE 10: GR1 ANNUAL GROWTH OVER FIVE YEAR PERIOD AND RESULTING PROPORTION OF GR1 (BOLD NUMBERS INDICATE SELECTED SCENARIO)

GR1 GROWTH RATE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
4.8%	22%	27%	32%	37%	41%
8.3%	22%	30%	39%	47%	55%
11.9%	22%	34%	46%	58%	70%

FIGURE 10: PROPOSED UNIT COST DISTRIBUTION



Attaining a higher GR1 composition of exports lowers the relative harvesting cost burden, making the fishery more efficient. That is, because harvest costs generally do not vary based on final grade, receiving a higher price for the same fish reduces the percent of revenue needed to cover harvest costs. For example, if harvest costs are \$3 per pound and revenue is only \$4, harvest costs are 75% of revenue. At the same cost and receiving \$6 of revenue per pound, harvest costs are only 50% of revenue.

TABLE 11: HARVEST COSTS

GRADE 1, %	HARVEST COSTS AS % OF REVENUE
30%	58%
50%	51%

Stock Growth

No increase in landings are assumed in the financial model. Changes in net profit based on the percent of exports that attain GR1 are modeled below, e.g., if 60% of 1.161 million pounds are GR1, net profits will be approximately \$3.9 million.

TABLE 12: VOLUME CHANGES TO GR1 PERCENT OF EXPORTS, EFFECT ON NET PROFIT

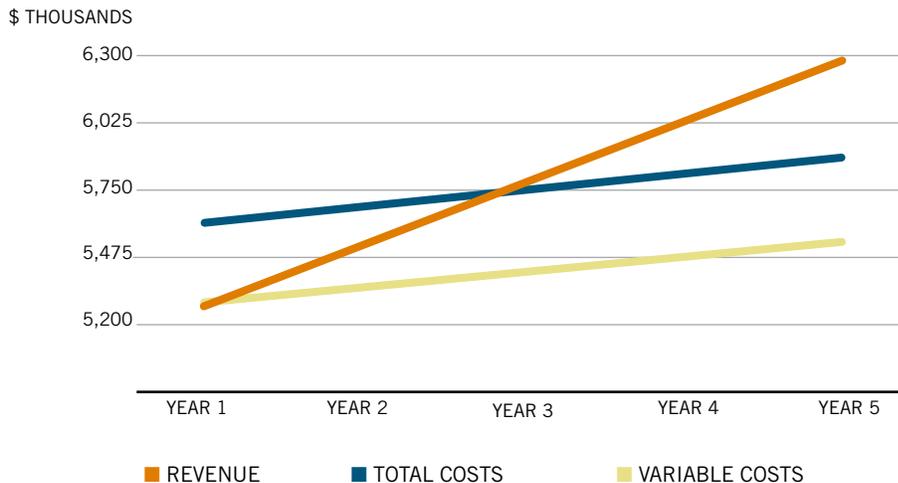
POUNDS	20%	30%	40%	50%	60%
1,700,000	(2,062,485)	356,386	2,362,763	4,369,137	6,375,514
1,500,000	(1,996,980)	172,747	1,943,078	3,713,412	5,483,743
1,300,000	(1,931,470)	(13,615)	1,523,396	3,057,684	4,591,972
1,161,423	(1,886,082)	(172,664)	1,232,606	2,603,340	3,974,078
1,000,000	(1,833,210)	(357,933)	893,871	2,074,093	3,254,315
900,000	(2,062,485)	356,386	2,362,763	4,369,137	6,375,514

Cost, Grade, Profit Graph

As the proportion of GR1 tuna sold increases from year to year, the program's net profit grows. In figure 11, total revenue crosses total costs in year 3 representing the breakeven point. Revenue growth outpaces the growth in variable costs, leading to a widening profit margin over time (in green).

FIGURE 11: SCENARIO 2 BASE-CASE, COST AND PROFIT GRAPH

GRENADA YFT CAPTURE PRODUCTION AND EXPORTS



FINANCIAL RETURNS

The returns identified in this document will only be possible if value chain participants collaborate and if a suitable investment structure is established to capture the changes in value of the product quality.

The Scenario GR1 percentages are as follows:

TABLE 13: SUMMARY GR 1 PERCENTAGES USED

YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
22%	30%	39%	47%	55%

This assumes an annual increase in GR1 of 8.3%

Export volumes, in pounds, are summarized below

TABLE 14: SUMMARY GR1 EXPORT WEIGHT FOR SCENARIO³⁸

		YEAR 1 (CURRENT)	YEAR 2	YEAR 3	YEAR 4	YEAR 5
GR1%	5	22%	30%	39%	47%	55%
Pounds	1,161,423.00	255,513.06	348,426.90	452,954.97	545,868.81	638,782.65

Payments to fishers are set to \$3.00 per pound, an increase of 0.20.

This analysis was developed based on a 7% rate of interest, a 1% royalty on export values, and a 5% discount rate. Based on this, the investment returns for the providers of capital are summarized below.

TABLE 15: SCENARIO 2, H&G AND FISHERS AT \$3.00 — INVESTOR SUMMARY

INVESTOR SUMMARY	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
Outflow							
Loan	\$362,500	—	—	—	—	—	\$362,500
Inflow							
Loan		\$86,135	\$86,135	\$86,135	\$86,135	\$86,135	\$430,676
Base		72,500	72,500	72,500	72,500	72,500	362,500
Profit		13,635	13,635	13,635	13,635	13,635	68,176
Interest Rate	7%						
Royalties		\$53,254	\$56,156	\$59,058	\$61,961	\$64,863	\$295,292
Royalty Rate	1%						
Net		[\$362,500]	\$139,389	\$142,291	\$145,194	\$148,096	\$363,468
NPV, 5 Year Investment							\$264,887
IRR, 5 Year Investment							28%
Payback							Year 3

The majority of the inflows come from loan payments and royalties, which are set at 1% of revenue. Note that this H&G scenario does not involve purchasing a loining facility. The ongoing costs are currently considered as operating expenses in the program model, not the investor model. Thus they are not factored into the initial investment amount.

Please refer to Appendix A for the overall program profit and loss results, a summary of which is provided here.

TABLE 16: SUMMARY SCENARIO RESULTS — FISHERS AT \$3.00

Harvesters, Revenue (5 Years)	\$ 17,421,346	Unit Cost/Lbs	\$4.75
Harvesters, Program Profit (5 Years)	\$1,161,423	Harvester Increase	\$0.20
Per Vessel, Revenue (5 Years)	\$116,142	Terminal Value, Total	\$9,547,933
Per Vessel, Program Profit (5 Years)	\$7,742.82	Year 0 Investment	\$363,500

POTENTIAL RISKS AND ASSUMPTIONS

As with any wild capture fishery, the inherent risks to resources wholly within a natural system are potentially the largest challenge to not only financial but environmental and social returns. Governance, social and financial risks also exist. Identifiable, realistic risks, plus key assumptions and mitigation are outlined below.

Environmental

- Stock health:** This business case is based on the assumption that tuna stocks remain stable and do not suffer increased or sudden mortality. Should the stock decline for any reason, such as overharvesting in other areas, negative effects of climate change, etc., the ability of participating fishers and organizations to align and secure economic incentives and participate in the opportunity will be negatively impacted. The case as proposed will integrate and use a robust data collection and evaluation system to continuously assess this risk. Mitigation measures can then be appropriately defined.
- Natural disasters:** Hurricanes, tsunamis, volcanoes, earthquakes, tropical storms and cyclones are a normal part of this fishery's ecosystem. Most of these challenges are increasingly impacted by climate change which is exacerbating ocean temperature and acidification. Natural disasters may negatively affect tuna stocks and infrastructure.

Governance

- **Fishery management:** Because this is effectively an open access fishery, free riders, i.e., additional fishers and exporters, may increase as fishery value increases. These potential additional actors, while likely limited to the existing (and small) population of Grenada and unlikely to meaningfully contribute to the overfishing of tuna, may negatively affect billfish stocks, and as a consequence of this, Grenada's reputation with ICCAT and U.S. buyers, if these new fishers are not observing best practices. ¶ Fisher management decisions taken within the ICCAT, CRFM and WECAFC regional management and conservation frameworks are likely to have a positive effect on the stocks of tuna in Grenada's EEZ. As such, well-informed participation of Grenada in these regional commissions needs to be secured.
- **Policy and legal framework:** A policy and legal framework that should enable the sector to grow and develop in a responsible manner is largely absent. Slowly some improvements are being made, but no complete and reliable framework can be expected shortly that could reduce uncertainty for businesses in the sector. It is noted that Grenada intends to become a center for excellence for Blue Growth and has established a Blue Innovation Institute. This is in the context of a 2018 World Bank agreement on a "First Fiscal Resilience and Blue Growth Development Policy Credit Facility."³⁹
- **Monitoring and enforcement:** The current monitoring efforts are relatively good, but would greatly benefit from basic training and digitization of records in terms of a fishing vessel registry, gear use, landings, prices, trade, safety, employment, and keeping track of training and capacity building of employees in the fisheries sector. Doing so may have the unintended consequence of illustrating that billfish catch is actually more than being reported and that any increase in fishing efforts will have undesired negative impacts that are greater than predicted using current data. If data management is not improved, and any sort of taxes, fees, or the like are required of stakeholders to help fund upgrades, some beneficiaries may not be asked to pay their fair share.

Social

- **Subsistence fisheries:** Local demand for seafood is high and the consumption of fish and fisheries products was above 30 kg per capita per year in recent years.⁴⁰ Traditionally, small, pan-sized demersal fish species are preferred for consumption. As local demersal fish stock abundance has fallen, consumption has shifted to coastal pelagics like dolphinfish and what is locally called "kingfish," which includes king mackerel and wahoo. In general, Grenadians do not prefer large portions nor dark colored flesh. As a result, sailfish is preferred to tuna. However, the preferences in consumer demand are generally not resulting in any price differentiation in the local markets. Because YFT is not a preferred species for subsistence, risk of negative impacts on fish available for local consumption is low.⁴¹
- **Social norms:** The impacts on social norms if fishers' incomes increase is unknown, and should be monitored to ensure there are not unintended negative consequences such as changes in power dynamics of domestic relationships.⁴²
- **Incentives:** If premiums are not promptly passed to fishers in a transparent manner for compliance with gear change requirements, they may refuse to comply with future requests for changes in behavior.

39 <https://www.worldbank.org/en/news/loans-credits/2018/06/22/grenada-first-fiscal-resilience-blue-growth-development-policy-credit>

40 <http://www.fao.org/faostat/en/#data/FBS>

41 Gentner et al., 2018.

42 Naila Kabeer and Luisa Natali. "Gender Equality and Economic Growth: Is there a Win-Win?." IDS Working Paper 417 Institute of Development Studies. February 2013. ISSN: 2040-0209 ISBN: 978-1-78118-108-9. Retrieved from <http://www.lse.ac.uk/gender/assets/documents/research/choice-constraints-and-the-gender-dynamics-of-lab/Gender-Equality-and-Economic-Growth.pdf>

Enterprise

- **Country:** Grenada ranks 142 among 190 economies in the ease of doing business, according to the latest World Bank annual ratings. This represents a slight deterioration from 2016, when Grenada was ranked 138.
- **Delivery:** The ability of the implementing firms to meet obligations are driven in large part by the capacity of the firms and their ability to both secure value chain efficiencies and access higher value markets. The model as proposed is highly dependent upon strong leadership and accountability both in achieving the desired ratio of GR1 to GR2, and in reliably, consistently and effectively meeting the demands of the global supply chain. Should this not be possible, the business case will be unlikely to succeed.
- **Management:** A business case of this nature has few experienced managers available to implement the strategy described. Key managers will have to have extensive experience in digital supply chains, this industry and in impact investment, and should be well positioned to adaptively manage the facility.
- **Operational:** Fishers are not able to continue adoption and use, or intentionally stop use of circle hooks, reverting to traditional capture methods. Additionally, the increase in proportion of GR1 tuna for exports is dependent on the adoption of harvesting, slaughter and storage practices that are imperative to achieve. Failure to do so will certainly result in lower quality tuna for export, and will threaten the success of this model.
- **Economic:** Demand is driven by economic conditions in the principal buying nations, primarily the U.S. Should the U.S. be impacted by an economic or financial downturn, demand for the product and the willingness of industry to participate in this facility, will be negatively impacted. Management should have extensive experience managing during economic downturns.
- **Price:** As a globally traded product, tuna prices will be impacted by product availability in other producing countries. There is also a risk that prices will decline as stocks recover, resulting in a market oversupply. This will negatively impact the model.
- **Markets:** Uncertainty regarding the optimum market opportunities influence this model. An end market demand assessment would assist in addressing this risk.

There are knowledgeable supply chain partners in the fishery that would reduce the risk of enterprise failure related to market access limitations. One exporter in Grenada is estimated to support 80% of all exports. His facilities are HACCP certified for whole fish and a sophisticated ammonia ice plant. He is a horizontally integrated exporter that also imports food, and supplies the food service sector with most of their basics.

The significant legal and structural risks associated with the proposed model would need to be addressed. Additionally, given the disparate nature of the supply chain, establishing a cost-effective mechanism to aggregate and meet investor requirements; deliver the proposed strategy; capture the financial returns and ensure that the environmental outcomes are achieved may be a challenge. While the risks may be high, the reward will be commensurate--effectively developing this structure will yield a potentially scalable model that may be applied to multiple fisheries (see page 32 for additional information on structure).

ECONOMIC, SOCIAL, AND ENVIRONMENTAL COSTS AND BENEFITS

Assessing the potential costs and benefits of the proposed interventions may be defined through the lens of the United Nations Sustainable Development Goals (SDGs) and improvements to the FPI scores. See Appendix F for SDG alignment.

FPI ALIGNMENT

While the proposed investments will likely not affect macro conditions, like overall environmental performance, if implemented, they will improve 2018 FPI scoring in ecology, economics and community categories. Potential score improvements are not limited to the following, but these are considered to be the most likely to see boosts in scoring once the investments are made.

TABLE 17: RELATIONSHIP OF INVESTMENTS TO OUTPUT MEASUREMENTS - MEASURING WEALTH

COMPONENT	DIMENSION	SUSTAINABILITY CATEGORY	MEASURE	RELATED INVESTMENT
Ecologically Sustainable Fisheries	Fish Stock Health & Environmental Performance	Ecology	Proportion of Harvest with a 3 rd Party Certification	MSC/FIP; Traceability
Post Harvest Performance	Market Performance	Economics	International Trade	Improve cold chain & enterprise operational capacity
Post Harvest Performance	Market Performance	Economics	Wholesale Price Relative to Similar Products	Improve cold chain & enterprise operational capacity

TABLE 18: IMPACT OF INVESTMENTS ON INPUT MEASUREMENTS – ENABLING WEALTH CREATION

COMPONENT	DIMENSION	MEASURE	RELATED INVESTMENT
Co-management	Collective Action	Harvester Organization Influence on Business & Marketing	Improve enterprise operational capacity
Management	Data	Data Analysis	Traceability; FIP
Post-harvest	Markets & Market Institutions	Degree of Vertical Integration	Improve cold chain & enterprise operational capacity
Post-harvest	Infrastructure	Access to Ice & Refrigeration	Improve cold chain

INTEGRATED IMPLEMENTATION APPROACH

The proposed investment and business case should be viewed as part of a holistic system. While it may be implemented alone and as a discrete component of a broader project, the context of the broader fishery is important to ensure long term success.

The overall strategy would consist of the following elements:

- 1. Implement landings and receiving level traceability** in all four supply chains. This will:
 - Build deeper trust with stakeholders
 - Increase efficiency of data flow to the government and alleviate the five year back-log
 - Leverage data efficiency for a better standing in ICCAT and tracking the fishery success in meeting sustainability targets including national quotas
- 2. Begin the MSC assessment of the fishery to further develop a FIP work plan (see text box)**
 - Use FIP work plan as a communication tool to get all stakeholders on the same page
 - Gain trust and better sustainability goals based on the components of the work plan
 - Use the implementation of the FIP to gain a better standing in ICCAT
- 3. Implement the “Business Case” development, and begin to structure the investments.**
 - Structure the business case and use as a market leverage tool to start to align supply chain
 - Gain support from investors and development agencies to increase likelihood of investment
- 4. Appoint a representative from Grenada to ICCAT**
- 5. Address fishery governance** – in the absence of any enforceable property rights, we recommend:
 - Adopting circle hooks
 - Instituting and enforcing harvest control rules for billfish to match ICCAT quotas
 - Collecting and analyzing fishery data for improved management
 - Implementing co-management in the target fisheries
- 6. Improve infrastructure** to improve value and reduce loss.
 - Investing in improved airport cold storage facilities

MSC ASSESSMENT

An MSC pre-assessment provides a cost-effective framework for identifying strength and weaknesses of fishery management and formalizing stakeholder engagement for improving the fishery. The MSC pre-assessment can be used to create a FIP work plan.

At this time we neither endorse nor counsel against attaining full MSC certification for Grenada YFT – we recognize the potential gains in market access but also the costs to certification. While MSC certification may help gain access to markets and premium pricing in some cases, it has not yet been linked to improved fisher outcomes.

CERTIFICATION PROCESS

1. Pre-assessment (optional) – Identifies any potential challenges for certification. If pre-assessment is positive a fishery may proceed directly to full assessment. Alternatively, a fishery may first address issues that need improvement.
 2. Full assessment - Includes opportunities for stakeholder input and peer review. Takes between 8 and 18 months with the average time being 12 months.
 3. Certification – Lasts up to five years. During this time the fishery makes any improvements required as a condition of certification.
 4. Annual audits – Examine any significant changes that might have occurred either in the physical environment or in the management of the fishery.
 5. Reassessment – Occurs within five years of the last certificate being granted.
-

INVESTMENT ENTITY AND STRUCTURE

As with many wild capture fisheries investments, a range of activities need to be implemented in order to effectively ensure the long term sustainability of the resource. Unfortunately, the structure of the supply chain in most fisheries, including this one in Grenada, does not often lend itself to a simple investment process. In addition to the constraints inherent to the supply chain, two overarching issues will need to be addressed: investor preference and accountability for outcomes.

Broadly, three approaches are potentially possible in Grenada. Summarized below, the relatively modest governance conditions in Grenada make it unlikely that a “serial” approach will be possible in Grenada. Politically, there is limited appetite for restrictions on fishing practices in the absence of any economic incentive. This leaves us with either the “parallel” or “consolidated” approaches.⁴³

A parallel approach would allow for greater nuance and negotiation between various stakeholders to implement sustainable fisheries practices. This would require engaging with the fishing collectives to implement identified changes while the government addresses policy issues and the exporters implement the proposed upgrades. From an investment perspective, this route has significant risks if it is not overseen by an effective project manager.

43 Inamdar, Neel, Larry Band, Miguel Angel Jorge, Jada Tullos Anderson, and Roya Vakili. (2016). *Developing Impact Investment Opportunities for Return-Seeking Capital in Sustainable Marine Capture Fisheries*. Washington, DC: World Bank.

APPROACHES TO SUSTAINABLE FISHERIES INVESTMENTS

SERIAL APPROACH: Public and philanthropic funders first support the establishment of strong governance arrangements, improved data collection, and fishery management. Once these initiatives mitigate some of the risk associated with a fishery investment, then return-seeking investors are incentivized to finance sustainable infrastructure projects (often through public-private partnerships) and/or enterprises along the value chain, focused on outcomes that achieve a triple bottom line: social responsibility, economic value, and environmental impact.

CONSOLIDATED APPROACH: Governments negotiate agreements with a single private sector entity or cooperative to delegate fishery management responsibilities. The private firm or cooperative then simultaneously invests in fishery data, management, infrastructure, and triple bottom line enterprises.

PARALLEL APPROACH: A range of investors and other stakeholders (for example, governments, nonprofit organizations, fishing collectives) develop coordinated investments to improve fisheries data, management, infrastructure, and triple bottom line enterprises. Efforts can be separately funded, but they work in tandem and share the ultimate goal of achieving sustainable catch with an appropriately capitalized and profitable fishing sector.

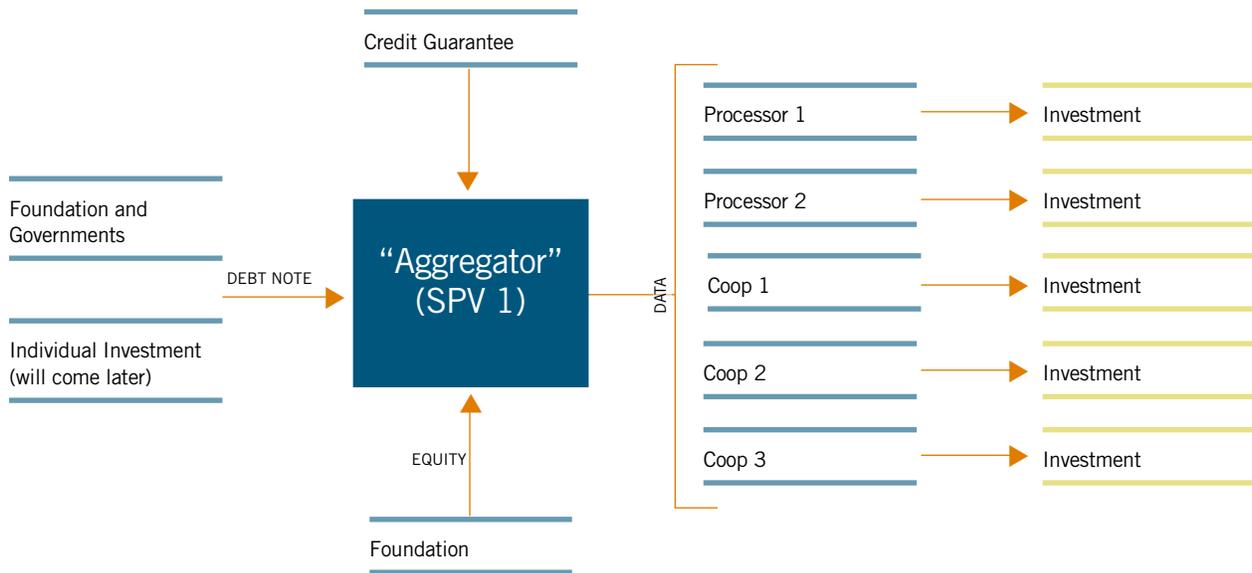
A consolidated approach, if politically and socially acceptable, will be the most investor friendly. It would allow one entity to undertake the proposed measures identified in this case. This one entity would secure the necessary equity and debt capital required to implement changes, and engage directly with each level of the supply chain in order to advance the business case objectives. It would be accountable to the investors and responsive to the participants in the supply chain.

The consolidated approach is more cost efficient and streamlined, but may be more challenging to ensure social and environmental objectives are attained. While the parallel approach may ensure engagement of fishers and stakeholders in a holistic manner, it has been demonstrated to be slower and more time consuming to implement. Given the nature of the supply chain and potential social and political considerations that may make a purely consolidated approach difficult to implement, we would recommend a hybrid approach that seeks to provide the necessary investor assurances, while also supporting and engaging the different participants in the value chain.

Based on an integrated digital supply chain, assuming uniform acceptance of all parties, a hybrid pilot consisting of the advantages of the parallel and consolidated approaches should be tested. This would require a central investment vehicle, staffed by a competent project manager, empowered to deploy the capital necessary to achieve the business case objectives defined.

This entity would receive payment based on an interest rate charged on funds invested along with a royalty on exports. Thus improving the investment upside for investors as GR1 exports increase. This entity would be liable for both the debt and the equity required. Based on the models developed as part of this project, repayment should take place within three to five years with a reasonable ROI given the risks. A schematic is presented below.

FIGURE 12: PROPOSED INVESTMENT STRUCTURE



Unfortunately, given the relatively modest investments required in Grenada, it is unlikely that this investment vehicle will be profitable based solely on the investments in Grenada. However, should this model prove viable, it could be rapidly scaled across the region.

In the absence of any existing precedence, it is difficult to assess the likely success of this investment model. Quality YFT is a high value product, the harvester community in Grenada is relatively homogenous and the supply chain is relatively short, three characteristics of successful community managed fisheries. The species in question has, unfortunately, a wide geographic range, which is not amenable with a highly localized management regime.⁴⁴

A priority next step would consist of developing the appropriate investment structure to successfully implement the proposed investment strategy. A summary of a systematic approach to identifying and structuring investment opportunities is recommended. One such framework is included here.

44 McCay, B. J., Micheli, F., Ponce-Díaz, G., Murray, G., Shester, G., Ramirez-Sanchez, S., & Weisman, W. (2014). Cooperatives, concessions, and co-management on the Pacific coast of Mexico. *Marine Policy*, 44, 49–59. doi:10.1016/j.marpol.2013.08.001. Retrieved from: <http://micheli.stanford.edu/pdf/cooperatives%20concessions%20and%20comanagement.pdf>

FRAMEWORK TO STRUCTURE INVESTMENT OPPORTUNITIES BASED ON CONSERVATION PROJECTS⁴⁵

Conservation Project Selection

- Translate conservation objectives to metrics
- Identify operational delivery mechanisms, partners and costs
- **Goal** – Financing need determined
- **Output** – Fishery Performance Indicator; Feasibility report; Impact baseline and M&E framework

Investment Opportunity Structuring

- Estimate Financial Returns and consider risk mitigation tools
- Determine role of conservation organizations
- **Goal** – Attractive risk return profile
- **Output** – Business Case; Financial Model; Draft Agreements for Delivery Partners

Investor Engagement

- Identify and negotiate with investors and private sector partners
- Choose appropriate structures & service providers
- **Goal** – Funding secured
- **Output** – Investment structure; legal agreements

Delivery

- Implement conservation investment
- Monitor Performance (including non-financial)
- **Goal** – Returns and conservation objectives achieved
- **Output** – Financial and non-financial reports

CURRENT INVESTMENT PARTNERS

It is entirely probable that an existing firm currently operating in Grenada will be able to implement this model. Comparable interest rates from lending institutions in Grenada are in the 8 to 9% range⁴⁶ for prime customers, providing relatively competitive capital. This approach would be comparable to the “consolidated” approach described above, with the associated challenges in securing environmental and social objectives.

It may be possible to mitigate the risks identified by adopting a robust monitoring and evaluation regime. However, the costs of implementing such a regime would need to be addressed.

45 Baumann, K., Havemann, T., Werneck, F., Negra, C. and Nair, S. *CAPITALISING CONSERVATION: How conservation organisations can engage with investors to mobilise capital*. Clarmondial. Switzerland, 2017.

46 <https://tradingeconomics.com/grenada/lending-interest-rate-percent-wb-data.html>

RECOMMENDED TIMESCALE

Given the presence of potential investment entities in Grenada, some of whom have an existing track record and market relationships, it should be possible to implement this business case in a relatively short period of time, and most likely within twelve months.

Key to its implementation will be an appropriate legal structure and the identification of appropriate sources of capital, both debt and equity, to support the implementation of this model, which is likely to be considered risky by traditional lenders and investors.

It is recommended to socialize the findings of this report to gain stakeholder acceptance and to identify relevant and appropriate investors. Based on this socialization process, work could begin in Q1 of 2019 once the funds are secured.

REPLICABILITY AND SCALABILITY

This model may be effectively implemented in the entire Grenadian tuna fisheries, which implies a measure of scale. The model of improving quality for exports species while investing some of those returns in conservation of overfished stocks and increased data collection could be used in the four stocks assessed as part of the RFMO review, other small island nation tuna fisheries throughout the Caribbean Sea and potentially expanded to the Southern Pacific Ocean. A core component of this model is the ability to increase the timeliness and accuracy of fishery data for enhanced stock assessments as well as providing the necessary inputs for accurate and effective enforcement of fisheries management regulations. This core function aligns a country's efforts to RFMO requirements and may act as an incentive model for countries to engage and comply with RFMO policies. This attribute of the model may in turn be scaled in multiple countrywide fisheries that rely on an effective RFMO to manage these species.

The overall process utilized in Grenada, in which FPIs were used to aide business case identification and development, provides a robust process for assessing potential fisheries investments.

RECOMMENDED SOLUTION

Based on the above, we would recommend pursuing scenario 2, increasing the percentage of GR1 H&G YFT. This would allow paying fishers a higher rate, helping ensure sustainable fishing practices, and incentivizing a higher catch quality. This should be developed through an innovative investment structure or vehicle designed to be scalable.

A program target of 31% of GR1 exports within twelve months should be realistically achievable, based on the provided investments. This would permit a premium to the fishers of approximately 20¢ per pound while providing profits to participants. These resources will be utilized to address the listed investments in the FIP, cold storage, traceability and vessel monitoring, as well as addressing the organizational and human capital necessary to achieve this.

Key interventions include organizational capacity building for associations and trading companies, including investment in the operational, business and market capacity necessary to meet the demands of international markets. The other key intervention is technical capacity building for fishers and associations to address the way tunas are landed, slaughtered, and stored on the vessel and on the shore. These practices have a significant impact on the nature and quality of tuna landings, and will require significant investment best suited for public and private collaboration.

Appendix A

PLEASE REFER TO SUPPLEMENTAL MATERIALS

Appendix B – Gear Change Conversion Costs

The per vessel cost, and the cost of converting all LL vessels in Grenada were calculated based on the average hooks per boat detailed in the contextual analysis of the fleet (figure 4) within the body of the report. The fleet mostly uses Japanese style tuna hooks in various sizes from 2.8 to 3.4. The average local price per hundred across those hook sizes is \$61.11, or \$0.61 per hook. The current price for 16/0 circle hooks from Memphis Net and Twine is \$0.54/hook.⁴⁷

Importing those hooks to Grenada and paying the import duty (17.45%), the VAT (15%) and the customs service charge (5%) brings the per circle hook cost to \$0.74 per circle hook, or \$0.13 more per hook than the current tuna hooks in use in the fleet. The marginal cost of converting the entire vessel to circle hooks, relative to replacing their current rigs completely, including locally sourced monofilament line, crimps and other tackle plus two man days of conversion labor per vessel was \$44 for Type I boats, \$89 for Type II boats and \$177 for Type III boats. The average hook loss per trip is not known for current tuna hooks in use in the Grenadian fleets and the LL circle hook trial is still underway. As a result, the team contacted the Pelagic Observer Program to find out about hook loss for boats with similar fishing styles.

Over the last 14 years of data, the average hook loss per 1000 hooks deployed annually is 28 hooks.⁴⁸ At a marginal cost of \$0.13/circle hook over the current tuna hooks, the annual increment to costs would be less than \$2/year for all vessel types. As a result of the low conversion costs and the low annual cost of lost hooks, conversion costs are not explicitly included in the financial analysis.

FIGURE 13: SUMMARY OF CONVERSION COST ESTIMATES

			Vessel	Type 1	Type 2	Type 3	Type 1	Type 2	Type 3
	USD	EC	Hooks	125	250	500	125	250	500
Circle Hook Conversion				USD, Per Vessel			EC, Per Vessel		
Circle Hooks	\$ 0.54	1.46		\$ 68	\$ 135	\$ 270	182	365	729
Crimp & Mono	\$ 1.08	2.92		\$ 135	\$ 270	\$ 540	365	729	1,458
Subtotal	1.62	4.37		\$ 203	\$ 405	\$ 810	547	1,094	2,187
Customs	37.45%	37.45%		\$ 76	\$ 152	\$ 303	205	410	809
Total Supplies				\$ 278	\$ 557	\$ 1,113	752	1,503	3,006
Labor, 2 people 1 day	\$ 200	540		\$ 200	\$ 200	\$ 200	540	540	540
Total Conversion Cost				\$ 478	\$ 757	\$ 1,313	1,292	2,043	3,546
For Fleet				\$ 38,267	\$ 49,184	\$ 166,795	103,321	132,796	450,346
number of vessels				80	65	127	80	65	127
Total to Convert Fleet						\$ 254,245			686,463
Current Hooks	\$ 0.61	1.65		\$ 76	\$ 153	\$ 306	206	413	825
<small>*Crimps and Monos same price</small>									
Marginal Cost For Conversion				\$ 16	\$ 33	\$ 66	44	89	177
For Fleet				\$ 1,311	\$ 2,131	\$ 8,326	3,540	5,753	22,480
Marginal Cost to Convert Fleet						\$ 11,768			31,773

⁴⁷ <https://www.memphisnet.net/>

⁴⁸ Morrell, Thomas. 2018. Personal Communication. Observer Coordinator. Pelagic Observer Program.

Appendix C – Conservation Agreements

Two excellent resources are available for practitioners developing conservation agreements:

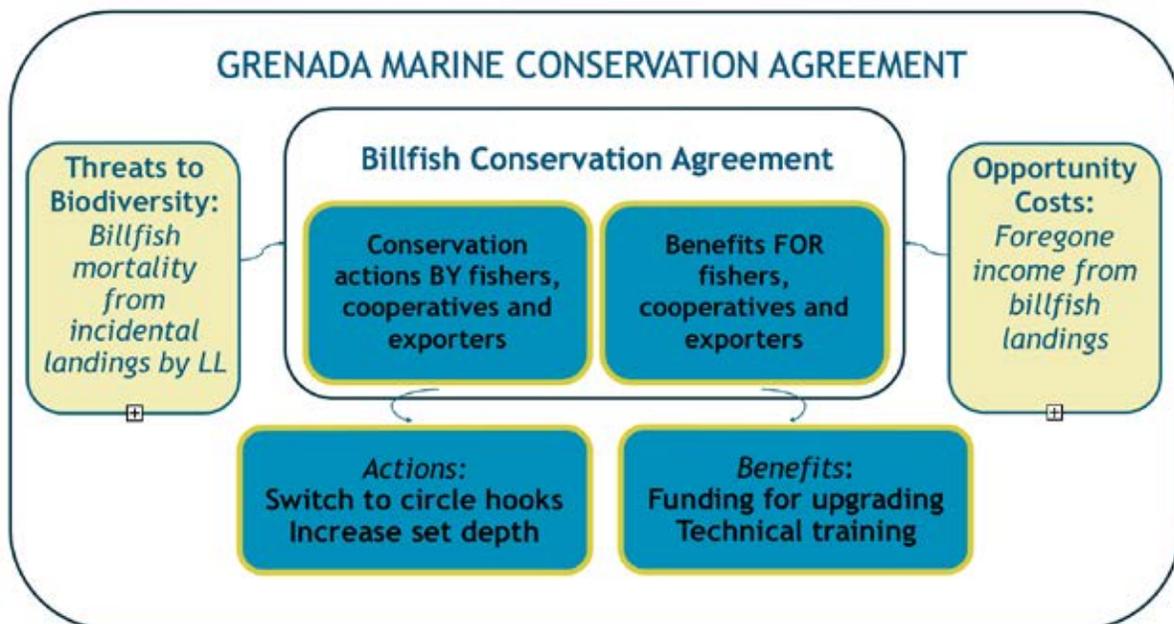
- *Practitioner's Field Guide for Marine Conservation Agreements: Best Practices for Integrating Rights-based Incentive Agreements into Ocean and Coastal Conservation Efforts*. The Nature Conservancy and Conservation International. November 2012, v2.
- *Conservation Agreements: Field Guide for Design and Implementation*. Conservation International. 2016.

The latter provides this definition: “Conservation Agreement specifies conservation actions to be undertaken by the resource users and benefits that will be provided in return for those actions...”

As defined in the guide for Marine Conservation Agreements (MCAs), they are: “Any formal or informal contractual arrangement that aims to achieve ocean or coastal conservation goals in which one or more parties (usually right-holders) voluntarily commit to taking certain actions, refraining from certain actions, or transferring certain rights and responsibilities in exchange for one or more other parties (usually conservation-oriented entities) voluntarily committing to deliver explicit (direct or indirect) economic incentives.”

Adapted from the 2016 guide from Conservation International, the agreement proposed in this document could be graphically represented as the following:

FIGURE 14



We expect that as a result of the direct benefits to the stakeholders, they will be able to increase their proportion of Grade 1 tuna, thereby providing a financial incentive as well.

Appendix D – Data Tracking and Proposed FIP Methodology

INTRODUCTION

A common issue with meeting quotas among developing nation fleets is that the government authorities, industry and fishers only know whether or not the quota has been exceeded when the Fisheries Ministry completes its end of year data assessment to support RFMO reporting. It's then already too late if the quota has been exceeded, but suitable harvest planning can ensure sustainability. Exceeding ICCAT quotas can ultimately place fish export market access at risk. Real time data capture can resolve these concerns by informing harvest planning while also supporting the identification of “bad actors” within the fishery. Once identified, various options are then available to incentivize non-compliant or poorly performing fishers/vessels alignment with regulations or conservation agreement requirements.

The installation of digital data transparency systems provides an opportunity to track a fleets' relative trajectory towards meeting or exceeding a quota in real time. This is possible on a national scale if synchronized coverage is achieved among all relevant landing sites, or down to a vessel by vessel scale through tracking relative vessel quota allocations which may or may not be enforced at that scale. The “national fleet” may include multiple fishery sectors that harvest the stock in question, for Grenada potentially including the various longline vessel types in figure 4 and the FAD fishers that land their harvests at sites with transparency systems installed.

ICCAT is currently setting national billfish quotas which will encompass harvests from all of Grenada's fisheries. Grenada's tuna export industry is suitably incentivized to align with ICCAT quotas and this industry was the main driver of Grenada's signatory to ICCAT, to secure their long term legal access to valuable tuna export markets. Grenada mostly exports its longline caught tuna to the U.S., where the market has a great appreciation for the conservation of billfish species. This is evidenced by accession to Billfish Conservation Act⁴⁹ and the large, valuable recreational fishery targeting billfish in the U.S. Longlines will never be “billfish friendly” but responsible fishing may even glean a premium tuna price if Grenada manages to consistently not exceed its sustainable billfish quotas, and advertise the same to U.S buyers.

PROPOSED FIP METHODOLOGY

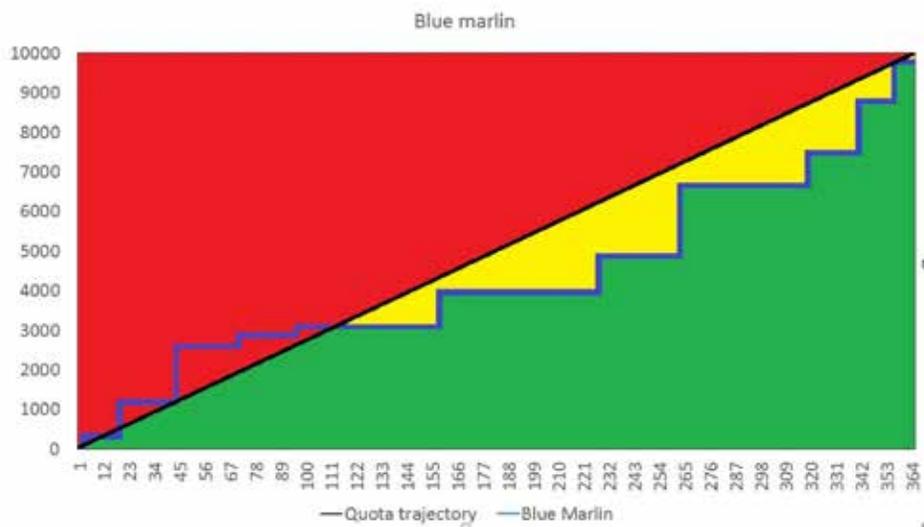
Industry should use project installed data transparency systems to track harvests according to quota trajectories, in real time with each digitized record of a harvest landing and sale event. A simple template can then produce records and graphical outputs of individual vessel and fleet harvest trajectories, as illustrated in Figure 21, to inform both the fishers and industry of the vessel and overall fleets' performance relative to the billfish quotas. This illustrates current status and allows for real time planning towards not exceeding the billfish species quotas allocated by ICCAT, which may require some live billfish releases as advised by ICCAT.

49 <https://www.igfa.org/News/BCA-Advances-in-House.aspx>

This tracking of billfish harvest can occur in parallel to typical tuna harvesting, and therefore has no direct influence upon the fisher incentive to maximize the Grade 1 percentage of harvested tunas. Formal tracking and enforcement of billfish quotas may actually further incentivize tuna efficiencies. This method should also work equally well for tracking and comparing tuna harvest trajectories across time and space, to better understand various environmental or other effects/trends, and for the likelihood of exceeding any quotas for other bycatch species (sharks etc).

Primarily, this system simply provides a mechanism through which the fish buyers efficiently monitor harvests relative to expected quota totals. If the increased tuna profits portrayed through the business case do not organically lead to required billfish harvest reductions, by reducing the relative value and linked targeting of billfish, then mechanisms could be implemented with a billfish sustainability levy that further incentivizes alignment with the quota trajectory. Specifics of this levy, which may apply only to non-tuna sales, must be decided through stakeholder engagements with a minimum participation of fishers, the Fisheries Ministry and the fish buyers (all of which have a long term interest in meeting ICCAT regulations to ensure future export access). A fiscal structure that penalizes bad actors could accumulate funds accrued from a billfish sustainability levy charged of them, to sufficiently incentivize and compensate the costs that good actors amass when reducing their billfish harvest rates to match quotas. Good actors in this respect will remain within the yellow zone of Figure 21, and should thus receive a premium that doesn't affect investor royalties from tuna sales.

FIGURE 15



Graphical output – Black line is a theoretical straight line trajectory through the full year to the overall national blue marlin quota total of 10 000MT. A finer scale vessel level quota equivalent can use an index of the number of hooks deployed by that vessel relative to the number of hooks deployed by the whole fleet. The blue line reflects the actual recorded harvests in association with the quota trajectory. The yellow areas reflect periods when the fleet is below the trajectory threshold, and good actors may therefore receive premiums if the billfish levy systems becomes a requirement to more prescriptively meet the billfish quotas. Equal weighting can be placed upon the premium for any billfish species for which a quota is allocated, currently only blue and white marlins under ICCAT.

Options available for fishers to reduce their billfish impacts

Methods available to fishers for reducing billfish harvest will all benefit from circle hook implementation and are listed below.

- Setting lines deep, to reduce billfish incidence rates while better targeting premium quality tunas
- Active release of live billfish at haulback, with circle hooks and minimal handling supporting minimal post release mortality. This is already requested of CPCs within the ICCAT Marlin Stock Rebuilding Plan (<https://www.iccat.int/Documents/Recs/compendiopdf-e/2015-05-e.pdf>)
- Simply avoiding fishing areas where relatively high billfish catch proportions are typically expected, and temporally focusing fishing effort during the period of peak tuna abundance.
- Using dead, rather than live baits on their hooks. Potentially using squids that are better suited to use with circle hooks and benefit overall sustainability of the fishery through showing exceptionally high food to growth conversion ratios, faster population turnovers and life-history better suited to high mortality rates within their populations than the currently used flying fish.

JUSTIFICATIONS

- The proposed standardized structure, using number of hooks fished by a vessel in the metric to define that vessels proportional quota allocation and linked trajectory, ensures that both CPUE and quota allocation are relative to the vessels capacity to catch (not necessarily harvest) billfish. This places all vessels on a “level playing field” and can be used to identify, compare and monitor good and bad actors in the fishery while also flagging IUU actions. Monitoring the relative frequencies of good and bad actors throughout the fleet can also track compliance trends, while promoting learning from good actors’ methods. Small vessels can improve their cost effectiveness and relative competitive power by not exceeding the billfish trajectory threshold, and thus claiming the relatively more valuable levy premiums for themselves.
- If the billfish sustainability levy draws on overall profits without directly charging from tuna premiums only, the incentive to increase the percent of GR1 tunas sold is actually increased alongside the desire to not overharvest billfishes. As such the potential for royalties to repay an investor is not negatively affected by implementation of the FIP.
- Billfish harvest reductions required to meet expected ICCAT quotas have already been proven to not have inequitable negative influences upon the poorest citizens cheap protein options. Cheaper protein options are already available in Grenada and sustainability is in the interest of all stakeholders linked to the fishing industry.
- Billfish harvest reductions from the most commercialized longline fisheries, which have the highest harvest capacity and target high value tuna exports for premium profits, will allow a shift of billfish harvest rights towards the more critically reliant small scale fisheries (in alignment with SDG 14). These also require better control, but the current mFAD deployments in Grenada are currently only adding an additional layer of increasingly efficient billfish mortality to the overall system without aligned longline harvest reduction. Longline vessels typically returning with excess space in their holds already suggests overcapacity within the fleet. Relatively low CPUE suggests that billfish stock improvements could simply lead to less “empty hooks” at haulback if a formalized mechanism isn’t instituted within the longline fishery; by nature of the current disconnect between capacity and stock abundance. SSF also provide greater employment opportunities relative to harvest quantity, and such “social justice” justifications are politically appealing.
- Real time planning can ensure that dead billfish can continue to be harvested within quota limits throughout the season, while reducing incidence rates and releasing live billfish reduces the overall billfish stock impacts resulting from longline fishing.

- If the system ensures that a tunas value intrinsically becomes associated with the relative billfish mortality required to harvest that tuna (per pound), national legal systems should naturally support the buyers potential mechanism of paying good actors a premium price.
- Longliners in the neighboring island of Barbados use imported squid baits. These are sturdier than flying fish, are thus better suited to circle hook implementation and are suggested within scientific literature to catch less billfish than fish and/or live baits without negative effects upon tuna harvests. Recent influxes of Sargassum weed to the region are making it increasingly difficult for Grenadian longliners to catch sufficient flying fish bait before they can start longlining. This promotes the cost effectiveness of taking frozen squid bait to sea to avoid the searching time costs required to harvest flying fish as bait before longlining. Hidden harvests of flying fish used as bait is a growing concern for fisheries managers in the Caribbean and, as cephalopods, squid are also a more resilient bait source with rapid growth supported by efficient food

Appendix E – Options Reviewed But Not Adopted

INCREASE RECREATIONAL FISHERY TOURISM

One option considered during the business case development was the potential of converting commercial fishermen to charter captains to both increase livelihoods and reduce billfish mortality. While the economic assessment of this option has been documented by Gentner and Associates,⁵⁰ Wilderness Markets considered the business case for this option.

This option was discarded as a potential business case for the following reasons:

- **Significant development cycle**
 - A 3% increase in tourism in Grenada would support one additional full time charter captain at the end of a ten-year period⁵¹.
 - The globally competitive nature of the tourism industry, the extended proposed timeline and the low employment opportunities all present significant risks to the successful implementation of this strategy
- **Unclear market demand**
 - The market demand for additional charter captains is undocumented at the time of this review
- **Training and Liability requirements**
 - Commercial fishermen will require significant training and support to effectively market, promote and safely deliver a professional product and service to discerning tourists in a globally competitive industry
 - Charter captains will need to possess and comply with the necessary professional and liability insurance to serve the charter market
- **Unmet Capital Requirements**
 - Once trained, Charter Captains will either require access to capital to secure an appropriate vessel, or employment on a vessel. The risks identified may make it financially challenging to achieve this profitably.
 - Gentner found that “commercial fisherman could not count on making enough money to pay for a new twin inboard yacht type vessel under these scenario assumptions.”⁵²

While there are comparable experiences with the development and training of tourism guides in terrestrial environments, the additional variables identified in the marine environment present additional risks that are likely to impede the success of this approach, especially considering the seasonal and migratory nature of billfish species.

IMPROVE ACCESS TO EXPORT MARKETS FOR THE FAD FISHERS IN GRENVILLE

FAD fishers were identified as early targets of the billfish initiative in Grenada. However, the relatively low organizational capacity and small size of this group limits its ability to effectively and consistently meet supply chain requirements. However, when their efforts are combined with the other identified supply chain participants, this group is likely to benefit from the proposed strategy.

⁵⁰ Gentner, B. Draft. *Final Report: Economic Impact Analysis of Commercial and Recreational Fisheries in the Western Central Atlantic*. Final grant ending report prepared for Conservation International. Service Agreement #60030333.

⁵¹ Ibid

⁵² Ibid

SCENARIO 1 – LOINING INVESTMENT

In addition to the costs assumed for scenario 2, the loining investment option includes:

- **Loining Facility** – \$50,000 is budgeted for the loining facility in the first year in evaluating this scenario 1. The budget also includes \$10,000 per year for annual maintenance and upgrades. This option is only included in the loining option.
- Current payments to fishers are \$2.80 per pound
- Loined yield is 50% of whole fish. The scenario assumes the following current-state rates:

TABLE 19: BASE PRICES FOR SCENARIO 1

YFT TUNA LOIN	ESTIMATED PRICE	PROPORTION OF YFT EXPORTS	LOINED YIELD	HARVESTER PAYMENT PER POUND
Grade 1	\$10.00	22%	50%	\$2.80
Grade 2	\$5.56	73%	50%	\$2.80
Grade 3*	\$3.30	5%	50%	\$2.80

*Also includes ungraded YFT

Based on the current export prices and the existing proportions of grades for export, the net effect of this scenario is an outright loss. The additional revenue generated by selling loined tuna does not cover the costs of the proposed interventions and there is no opportunity to improve prices to fishers.

TABLE 20: BASE CASE SCENARIO 1

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
GR 1%	22%	32%	36%	40%	44%
Revenue	4,800,323	4,973,682	5,147,043	5,320,404	5,493,765
Expense	5,630,910	5,634,375	5,637,843	5,641,310	5,644,777
Net	(830,587)	(660,693)	(490,800)	(320,906)	(151,012)

The loining investment only becomes profitable (with no increase to fishers) when GR1 loins comprise at least 49% of exports. A loined product requires high processing costs and overhead along with the initial investment into a loining facility. The higher price per pound and reduced transportation costs per unit do not compensate for the increased expenses in the short term. The effective price per pound landed (explained later) for loined fish is also lower than other forms of product under the market assumptions which makes local adoption of the project and loining process less likely.

Assuming a Base Case, in which loined exports of GR1 tuna gradually increase from 22% in year 1, to 44% in year 5, the investment generates a negative NPV of \$1.952 million over five years (see Loined Base Case Appendix A). Under this scenario, there is no opportunity for the fishers to be paid more before at least 50% of exports achieve GR1.

Some loining does take place on the island and has been implemented by some of the existing firms. However, operational considerations related to intermittent tuna supplies, staff training and retention, and higher HACCP requirements, combined with the lower marginal value of the product after cutting, has resulted in limited adoption, which is consistent with our analysis.

Comparison of scenarios

Compared to H&G, loined fish has a lower yield from the whole fish. The slightly higher sales price and product losses from cutting result in a higher breakeven point, impacting the financial performance of this option. When normalized for yield, the GR1 revenue per pound of H&G is more than 10% higher than loined.

PROCESSING	YIELD	GR1 PRICE PER POUND	YIELD ADJUSTED PRICE PER POUND
Loining	50%	\$10.00	\$5.00
Head and Gutted	80%	\$ 6.93	\$5.54
Loined % of HG	63%	144%	90%

While loined tuna incurs less handling and transportation fees per unit due to each unit's reduced size, it also incurs higher processing costs and the 10% price gap to H&G tuna is not made up. Therefore, H&G presents a more profitable alternative in all cases (barring any nuance or market requirements not yet considered).

TABLE 21: CURRENT NET PROFITS IN ONE SAMPLE YEAR

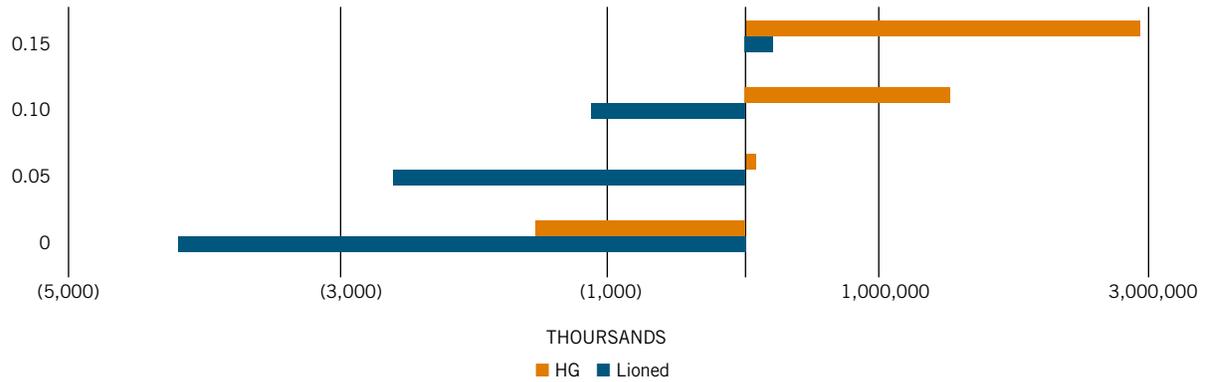
GRADE 1, %	LOIN, SCENARIO 1	H&G, SCENARIO 2
31%	\$ (552,579)	Breakeven
49%	Breakeven	\$ 493,254
50%	\$ 27,461	\$ 520,669
70%	\$521,697	\$1,068,963

If the harvester is paid a \$0.20 increase per pound caught:

TABLE 22: CURRENT NET PROFITS IN ONE SAMPLE YEAR

GRADE 1, %	LOIN, SCENARIO 1	H&G, SCENARIO 2
39%	(\$575,243)	Breakeven
50%	(\$197,958)	\$334,841
56%	Breakeven	\$510,529
70%	\$335,869	\$883,135

FIGURE 16: GR1 OVER GR2 ANNUAL GROWTH RATE AND NET PROFIT COMPARISONS AT YEAR 5



Increases in price and GR1 composition would be necessary to reach a profitable business case for loining:

	20%	30%	40%	50%	60%
11.00	(2,140,564)	(441,627)	1,005,846	2,364,996	3,724,146
10.50	(3,301,198)	(1,679,488)	(57,775)	1,251,151	2,548,522
10.00	(4,461,832)	(2,917,347)	(1,372,857)	137,306	1,372,895
9.50	(5,622,466)	(4,155,204)	(2,687,938)	(1,220,677)	197,271
9.00	(6,783,100)	(5,393,062)	(4,003,020)	(2,612,983)	(1,222,945)

Compared to H&G, loined fish has a lower yield from the whole fish. The slightly higher sales price and product losses from cutting result in a higher breakeven point, impacting the financial performance of this option. Therefore, at this time, H&G presents a more profitable alternative in all cases (barring any nuance or market requirements not yet considered) and is discussed further in the financial analysis section of the paper.

Appendix F — SDG alignment

THE PRIMARY RELEVANT GOALS ARE SDG 12 – SUSTAINABLE CONSUMPTION AND PRODUCTION AND SDG 14 – LIFE BELOW WATER.

SDG 12 – Sustainable Consumption and Production

Sustainable consumption and production is about promoting resource and energy efficiency, sustainable infrastructure, and providing access to basic services, green and decent jobs and a better quality of life for all. Its implementation helps to achieve overall development plans, reduce future economic, environmental and social costs, strengthen economic competitiveness and reduce poverty.⁵³

This SDG aligns closely with the proposed business case. Key targets include the sustainable management and efficient use of natural resources; the reduction of food waste; encouraging companies to adopt sustainable practices and to integrate sustainability information into their reporting cycles as well as support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production.⁵⁴

SDG 14 – Life Below Water

As the FAO states, “fisheries... offer ample opportunities to reduce hunger and improve nutrition, alleviate poverty, generate economic growth and ensure better use of natural resources.”

SDG 14 specifically calls for improving access for small scale artisanal fisheries to marine resources and markets. Under this SDG, the FAO is addressing the following relevant indicators:⁵⁵

- **Proportion of fish stocks within biologically sustainable levels**
 - By implementing the proposed gear change and changes in fishing practices, the measures proposed in this business case are anticipated to reduce mortality of incidentally landed billfish, thus reducing mortality of this depleted stock
 - The measures do not anticipate any increase in YFT landings
- **Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing**
 - By implementing the data collection and traceability system, the measures proposed are anticipated to reduce IUU, improve compliance with ICCAT requirements and U.S. and EU seafood import monitoring requirements



53 <https://www.un.org/sustainabledevelopment/sustainable-consumption-production/>

54 <https://www.un.org/development/desa/disabilities/envision2030-goal12.html>

55 <http://www.fao.org/sustainable-development-goals/goals/goal-14/en/>

- **Sustainable fisheries as a percentage of GDP in small island developing states (SIDS), least developed countries and all countries**
 - By improving the quality of YFT for export, Grenada and participants in the value chain are anticipated to improve economic outcomes associated with the fishery
 - The proposed business case does not imply or require any changes in the proportion of tuna consumed locally, being based on the changes in the ratio of GR1 to GR2 tuna, as opposed to increasing the volume of exports or of landings.
- **Progress by countries in adopting and implementing a legal, regulatory, policy, or institutional framework which recognizes and protects access rights for small-scale fisheries**
 - By improving data aggregation and strengthening the capacity of domestic harvester organizations, the business case builds local capacity to adopt and implement the necessary measures to recognize and protect access rights for fishers and for the nation to comply with ICCAT requirements

Conversely, the impact of not implementing measures such as those described here, within a broader framework of fisheries reform, may be significant. Declining catch levels for both billfish and tunas are likely to negatively impact food security and employment, as well as incomes, livelihoods and export earnings.

Supplementary Information

Additional information around “**De-risking the Grenada Yellowfin Tuna Longline Fishery Business Case and Structuring into an Investment Case**” is available upon request, including:

1. Market demand assessment Report for the Yellow Fin Tuna business case, focused on specific market opportunities and buyer requirements applicable to Grenada, and to the broader Caribbean for purposes of the WECAFC/RFMO business case
2. Buyer engagement memo identifying 2 – 4 potential buyers, product specifications, prices and anticipated volumes relevant to Grenada, including one-on-one meetings discussing and detailing their role in the business case.
3. Field Reports to document stakeholder meetings
4. Workshop report documenting the Stakeholder Engagement and Work-plan Workshop to realign commercial structures
5. Draft work-plan to achieve the goals of the Grenada OPP business case
6. Revised business cash flow model based on re-aligned commercial relationships, showing money-in /money-out scenario(s) for the opportunities identified in the Grenada OPP business case
7. Proposed draft MOU agreement and / or draft delivery agreements for business case delivery partners - note that getting partner endorsements/signatures is desirable, but outside the scope of the current activity.
8. Memorandum identifying the role of the government as a legislator and enforcer of laws/subsidiary regulations as applicable to the business case. If the government adopts roles as a potential investor, investible entity, and/or execution partner this will also be documented
9. Proposed Draft Investment Structuring recommendations memo.

For additional information, please contact:

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Grenada Business case: Investing in Grenada’s Yellowfin Tuna Exports

Risks identified and addressed in the business case development process for improving the average value of harvested tunas and streamlining value chain operations to enable cost effective incremental reductions of billfish harvests to match sustainable national quota allocations. Risks identified and addressed in this business case development process are the following:

Overfishing, bycatch, IUU fishing, data scarcity, weak management. These can be categorized in two impact areas (environmental and governance). Other impact areas were identified for the purpose of this environmental and social impact management framework.

Potential impacts	Mitigation Recommendations	Monitoring of indicators
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Environmental

The catch of fish per definition may have environmental impacts, particularly in case overfishing occurs, but also in terms of impact on aquatic biodiversity, bycatch of endangered, threatened and Protected species, as well as on habitats

Potential environmental impacts identified at the start of the business case development process included:

- Decreased tuna stock health or increased harvest of tunas incentivised by developing higher value for these species
- Effects of Natural Disasters: Natural disasters (hurricanes/storms) may affect the fishing fleet and fisheries infrastructure in Grenada.

The business case aims to replace (by)catch of overexploited billfish species in tuna longline fisheries with a greater proportion of premium quality tuna through gear and fishing operations modifications (e.g. changes in bait, depth of fishing with long lines, introduction of circle hooks). These measures reduce bycatch mortality by allowing catch and release of undesired species (sharks and billfishes), while they also promote the average quality of harvested tunas

A main mitigation is that the business case is developed and forecast according to current catches by the Grenada fleet, which has a very small relative impact upon the Atlantic wide tuna stocks. The case does not call for, nor require, an increase in tuna catch to succeed, because it focusses upon improving average tuna quality, not harvest volume.

The Government has developed a disaster risk mitigation plan. The current infrastructure for tuna fisheries is largely resilient for major storm situations. However, in post disaster situations the catch may still be stopped because of fishers having to rebuild their own houses and repair vessels.

Stock assessment data and information of the billfish and tuna species in the Western Central Atlantic have been collected by the project and are collected and analyzed by ICCAT. The ICCAT Scientific Committee monitors and assesses the stocks health, and sets binding management measures and quotas for stocks that experience overfishing or have been overfished and need recovery. The project supported the ratification process of Grenada to ICCAT, and the country is now bound by the binding recommendations of ICCAT and is reporting to ICCAT on fisheries and catches.

<p>Governance</p> <ul style="list-style-type: none"> - Inadequate Fishery Management: sustainable tuna fisheries depend upon decisions and enforcement of regulations throughout the stocks wide distributions, including in the ABNJ - Insufficient Policy and Legal Framework in Grenada - Inadequate Monitoring and Enforcement of the fishery 	<p>Key interventions included:</p> <ul style="list-style-type: none"> ▪ At regional level Grenada started to participate in ICCAT decision making processes for the fisheries management of tuna and billfish fisheries. ▪ At national level, registration of fishing vessels, fisheries data and statistics, and management planning processes were assisted by the project and continuing to improve. ▪ FAO has been assisting with a fisheries legal framework assessment and an update of the law is ongoing. ▪ A national level prioritization of actions ensuring meaningful stepwise progress has taken place – a Fishery Improvement Project (FIP) has been drafted, considers governance improvements, and is being implemented ▪ The roles of responsible stakeholders in Grenada have been clarified and diverse stakeholders now participate in monitoring of the fisheries through project improved organisational structures. A MOU signed between these groups has formalised this supportive initiative, while also confirming stakeholder buy0in to ongoing improvement processes. 	<p>Stakeholder meeting reports in which fisheries operations and management improvements were discussed, as well as minutes of the Fisheries Advisory Committee (FAC) meetings can be used to monitor progress. Regarding legal aspects, draft reports of the assessment and the draft regulations show the progress made. The regulations were developed in a participatory process with all key stakeholders in Grenada, have entered into force and are being applied.</p>
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<p>Social. The business case foresees an increase in off-vessel fish prices received by fishers, as it is among the main objectives of the business case.</p> <p>Negative social impacts identified, but found very unlikely include:</p> <ul style="list-style-type: none"> - Reduced fisheries employment or incomes - Effects on Social Norms and gender 	<p>Key interventions identified include:</p> <ul style="list-style-type: none"> ▪ Incorporation of a gradual approach to changes in fishing and fish processing practices; training of fishers and processing plant staff in fish handling, quality and safety. ▪ Provision to incrementally improve domestic and market recognition for improved fisheries management. The “storied fish” approach to improving future market opportunities also requires transparent and fair social practices through the value chain. ▪ Propose additional income opportunities directly related to the tuna fishery, such as in ice production and further processing of exports once the average tuna quality has sufficiently increased. Opportunities in fish processing can be mainly carried out by women. 	<p>Average off-vessel fish prices, fish landings by species, ice consumption on board of fishing vessels and employment in fisheries (for men and women) are all expected to increase and are monitored through the data and information collection systems in place in Grenada.</p>
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Enterprise.

Impacts identified at the start of the business case development process included:

- Poor logistics/cold chain
- Low organizational capacity
- Dependence on world market prices

Organizational and operational capacity assessments identified a need to *facilitate improvements in logistics, business planning, and financial analysis to ensure long-term success of the Business case*. Capacity building activities and improvements to organisational structures, supported by the project, have already been implemented for various potential business case implementing enterprises and fisheries cooperatives. The improvement process is ongoing and improving equity among the various stakeholders and entities.

The project carried out market research into the prices paid for various tuna products at the most common import markets. This information was shared with the stakeholders and the stakeholders determined which market to target; contacts were facilitated between exporters and importers and information on prices offered with trends and fluctuations that were shared with the stakeholder before contracts were signed between import and export companies. Opportunities to streamline value chain operations are continuing to be pursued.

The project assessed the status of fisheries infrastructure and the services provided at various sites. The needs for ice and cold storage, as well as costs and benefits, were determined and communicated to the companies, government and other stakeholders, in order to plan for investments.

Organizational and operational capacity assessments identified significant capacity needs to meet logistical, business planning and financial planning needs at the exporter level. The exporters engaged in implementation of the interventions in support of project objectives and the reduction in billfish landings, received project capacity building through stakeholder meetings and training sessions. They are now well positioned to benefit from the market improvements generated by the project interventions in the short and long term.

Price information is available at the Fisheries Division and at enterprises, while market trends are being analyzed during the ongoing FIP process.

The report on “Techno-economic performance of fish landing sites and fishing ports in Grenada: Assessment of the current situation and opportunities for responsible investments” was discussed with all stakeholders and formally submitted to the government and investments are being considered by the Blue Innovation Institute.

<p>Market There is a risk of downward market pricing due to competing in a commodity market, i.e., a “commodity trap”</p>	<p>Key mitigation interventions identified include:</p> <ul style="list-style-type: none"> ▪ Differentiation of products, tied to Pure Grenada, storied fish opportunities and leveraging relative geographic proximity to the main importing market of the USA. The recommended branding efforts focus on product source and “terroir” to improve market recognition and reduce ease of substitution in the Southeastern US. ▪ Value addition through development and production of a more shelf stable, higher-price yielding product. The business case intent here is to diversify tuna usage, provide opportunity for local investment and employment and build on the Caribbean product source branding effort in one to two years. 	<p>The export value of the tuna products is being monitored, as well as the market prices in international markets.</p>
<p>Investment structuring A lack was identified for a cost effective mechanism to aggregate capital; deliver on strategy; capture financial returns; or secure environmental outcomes</p>	<p>Key mitigation interventions identified include:</p> <ul style="list-style-type: none"> ▪ Improve local entities ability to address business strategies through existing credit and cooperative financing mechanisms ▪ Informing corporate structure and logistics streamlining processes. ▪ Strengthening of intermediary lending through local banks ▪ Providing a guarantee and/or first loss mechanism to local banks and credit cooperatives in collaboration with the Blue Innovation Institute 	<p>An assessment of financial institutions in Grenada and opportunities to access credit was carried out and shared with the stakeholders involved. The disbursement of credit in Grenada to agriculture and fisheries sector entities is monitored and reported on by the Ministry of Finance.</p>

